Unified Planning Assumptions & Study Plan
Transmission Planning Process

2013-2014 Transmission Planning Stakeholder Meeting

Jeff Billinton
Manager, Regional Transmission - North
February 28, 2013

2013-2014 Transmission Planning Process

March 2013 | **March 2014** | **October 2014**

Coordination of Conceptual Statewide Plan

ISO Board Approval of Transmission Plan

Phase 1

Development of ISO unified planning assumptions and study plan

- Incorporates State and Federal policy requirements and directives
- Demand forecasts, energy efficiency, demand response
- Renewable and conventional generation additions and retirements
- Input from stakeholders
- Ongoing stakeholder meetings

Phase 2

Technical Studies and Board Approval

- Reliability analysis
- Renewable delivery analysis
- Congestion analysis
- Publish comprehensive transmission plan
- ISO Board approval

Phase 3

Receive proposals to build identified policy and economic transmission projects.

Continued regional and sub-regional coordination

Schedule and Milestones

Phase	No	Due Date	2013-2014 Activity
Phase 1	1	December 18, 2012	The ISO sends a letter to neighboring balancing authorities, sub-regional, regional planning groups requesting planning data and related information to be considered in the development of the Study Plan and the ISO issues a market notice announcing a thirty-day comment period requesting demand response assumptions and generation or other non-transmission alternatives to be considered in the Unified Planning Assumptions.
	2	December 19, 2012	The ISO sends market notice requesting information on existing demand response and generation or other non-transmission assumptions to be included in study plan.
	3	January 18, 2013	PTO's, neighboring balancing authorities, regional/sub-regional planning groups and stakeholders provide ISO the information requested in the December 15 letter and market notice (see no.1 above)
	4	January 21, 2013	Comment period for stakeholders to submit information on existing demand response and generation or other non-transmission assumptions.
	5	February 22, 2013	The ISO develops the draft Study Plan and posts it on its website
	6	February 28, 2013	The ISO hosts public stakeholder meeting #1 to discuss the contents in the Study Plan with stakeholders
	7	February 28 - March 14, 2013	Comment period for stakeholders to submit comments on the public stakeholder meeting #1 material and for interested parties to submit Economic Planning Study Requests to the ISO
	8	Last week in March	The ISO specifies a provisional list of high priority economic planning studies, finalizes the Study Plan and posts it on the public website
	9	Q2	ISO Initiates the development of the Conceptual Statewide Plan

Schedule and Milestones (continued)

Phase	No	Due Date	2013-2014 Activity
Phase 2	10	July/August	ISO posts the Conceptual Statewide Plan on its website and issues a market notice announcing the posting
	11	August/September	Stakeholders have a 20 day period to submit comments on the Conceptual Statewide Plan in the next calendar month after posting conceptual statewide plan (i.e. August or September)
	12	August 15, 2013	Request Window opens
	13	August 15, 2013	The ISO posts preliminary reliability study results and mitigation solutions
	14	September 16, 2013	PTO's submit reliability projects to the ISO
	15	September 25 – 26, 2013	The ISO hosts public stakeholder meeting #2 to discuss the reliability study results, PTO's reliability projects, and the Conceptual Statewide Plan with stakeholders
	16	September 26 – October 10, 2013	Comment period for stakeholders to submit comments on the public stakeholder meeting #2 material
	17	October 15, 2013	Request Window closes
	18	End of October 2013	ISO post final reliability study results and mitigation solutions
	19	November 13, 2013	The ISO posts an update on the preliminary policy driven & economic planning study results on its website
	20	November 20 - 21, 2013	The ISO hosts public stakeholder meeting #3 to provide the updates on the preliminary policy driven & economic planning study results
	21	November 21 – December 5, 2013	Comment period for stakeholders to submit comments on the public stakeholder meeting #3 material
	22	December 18 – 19, 2013	The ISO to brief the Board of Governors of projects under $50 million to be approved by ISO Executive
	23	January 2014	The ISO posts the draft Transmission Plan on the public website
	24	February 2014	The ISO hosts public stakeholder meeting #4 to discuss the transmission project approval recommendations, identified transmission elements, and the content of the Transmission Plan
	25	Three weeks following the public stakeholder meeting #4	Comment period for stakeholders to submit comments on the public stakeholder meeting #4 material
	26	March 2014	The ISO finalizes the comprehensive Transmission Plan and presents it to the ISO Board of Governors for approval
	27	End of March	ISO posts the Final Board-approved comprehensive Transmission Plan on its site

Schedule and Milestones (continued)

Phase	No	Due Date	2013-2014 Activity
Phase 3	28	April 1, 2014 – June 2, 2014	If applicable, the ISO solicits proposals to finance, construct, and own economically driven and category 1 policy driven elements identified in the Transmission Plan (No. 24 above)
	29	No later than June 9, 2014	The ISO posts the list of interested project sponsors received
	30	No later than June 23, 2014	The ISO posts the list of qualified project sponsors who met the established criteria
	31	Within 7 calendar days after posting the list of qualified project sponsors	If two or more project sponsors submitted proposals for the same elements(s), they have 7 calendar days from the day the ISO posts the list of qualified project sponsors to submit a request for the opportunity to collaborate.
	32	July 15, 2014	Deadline for joint project sponsor notifications
	33	No later than September 15, 2014	The ISO posts the list of approved project sponsors
	34	No later than October 15, 2014	The ISO releases a detailed report on the approved project sponsors selected

2013-2014 Study Plan Technical Studies

- Reliability Assessment to identify needed reliability projects
- 33% by 2020 renewable resource analysis to identify needed policy-driven elements
- Economic Planning Study to identify needed economically-driven elements
- Long-term Congestion Revenue Rights to identify needed upgrades
- Local Capacity Requirements
- Nuclear and Once Through Cooling update

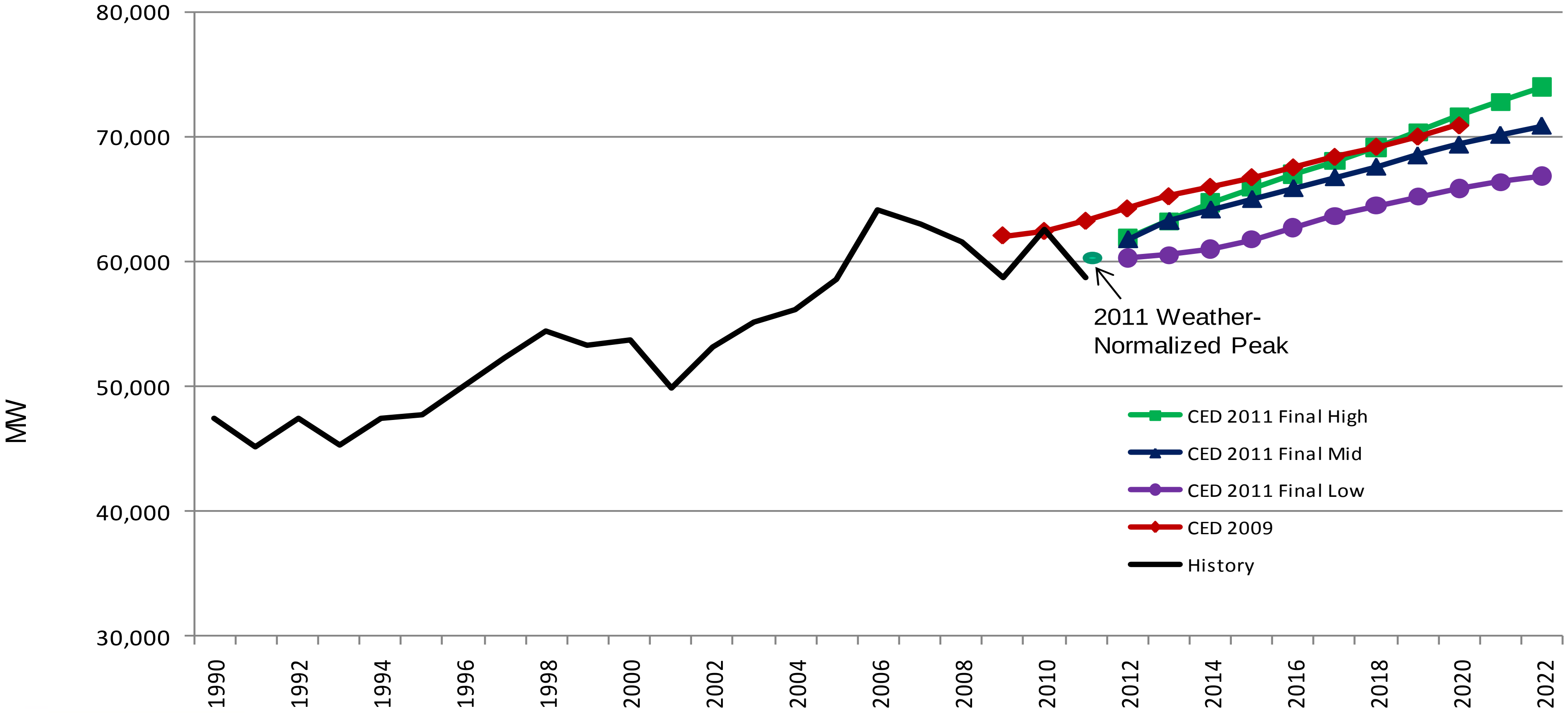
Study Information

- Final Study Plan will be published after the approved California ISO 2012-2013 plan is released
- Base cases will be posted on the Market Participant Portal (MPP)
  - For reliability assessment in Q2-3
  - For 33% renewable energy assessment in Q3
- Market notices will be sent to notify stakeholders of meeting and any relevant information
- Stakeholder comments
  - Stakeholders requested to submit comments to:

    regionaltransmission@caiso.com
  - Stakeholder comments are to be submitted within two weeks after stakeholder meetings
  - ISO will post comments and responses on website

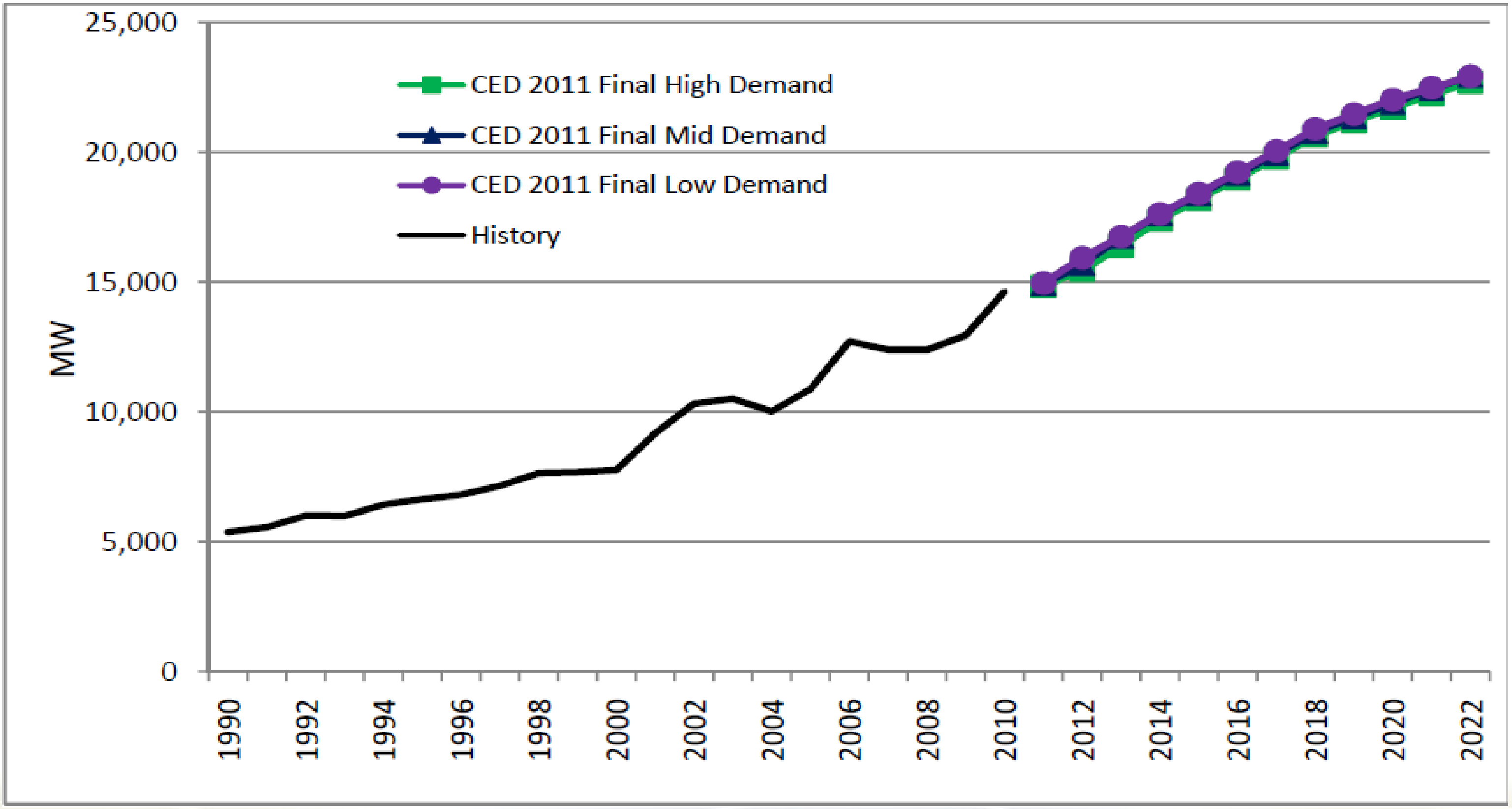
Demand and Energy Forecast

- CEC Statewide Electricity 10-Year Peak Demand Forecast (2012-2022)



Demand and Energy Forecast
Committed Energy Efficiency

- Committed energy efficiency programs are included within the CEC - California Energy Demand Forecast 2012-2022



Demand and Energy Forecast Incremental Uncommitted Energy Efficiency

- In addition to the CEC Energy Demand Forecast the ISO has proposed in the draft study plan to incorporate incremental uncommitted energy savings in forecast utilized in the studies.

  – The draft plan proposes to utilize the CEC's Low-Savings identified in the Energy Efficiency Adjustments for a Managed Forecast: Estimates of Incremental Uncommitted Energy Savings Relative to the *California Energy Demand Forecast 2012-2022*, dated September 14, 2012.

Demand Response

- According to tariff Section 24.3.3(a), the ISO sent a market notice to interested parties seeking suggestions about demand response programs and generation or non-transmission alternatives that should be included as assumptions in the study plan.

- the ISO received demand response information for consideration in planning studies from the following:

  - California Public Utilities Commission (CPUC)
  - Pacific Gas & Electric (PG&E)
  - Clean Coalition
  - California Consumers Alliance
  - Cal Peak Power

Demand Response (continued)

- The CPUC provided the information in Table 4-7 on the existing programs of PG&E, SCE and SDG&E.
  - CPUC indicated that they could provide bus level forecasts of the demand response capacities for SCE and SDG&E; however this data may contain confidential IOU customer information
- PG&E also provided details of all of the existing demand response programs, with the capacity identified for the programs identified by CPUC.

Utility	Program	2012 capacity	2022 capacity
PG&E	Aggregator Managed Portfolio – Day Of (AMP-DO) SMARTAC Base Interruptible Program (BIP)	154 72 188	154 67 231
SCE	Agricultural & Pumping Interruptible (AP-I) Summer Discount Base Interruptible Program (BIP)	42 524 589	48 636 613
SDG&E	Summer Saver Base Interruptible Program (BIP)	16 1	16 6
Total	All 30-minute-or-less programs	1,586	1,771

California ISO
Shaping a Renewed Future

Demand Response (continued)

- The ISO will continue to work with utilities, industry and CPUC:
  - to finalize the complete set of characteristics demand response programs need in order to be viable transmission mitigations.
  - programs that have the appropriate characteristics such that they can be considered when alternatives are developed and compared once the study results testing system reliability have been completed, and options are being explored.
  - work with the CPUC and the utilities to address the issue of data confidentiality.
    - Confidential information cannot be relied upon in the ISO's open and transparent planning process, so a means to address this concern will need to be developed.
- The ISO will be taking into consideration the CPUC's expectations for demand response programs in local capacity areas.

Demand Response (continued)

- Clean Coalition and California Consumers Alliance submission:
  - support and advocate for the use of demand response, incremental energy efficiency and higher levels of distributed generation in the ISO Transmission Planning Program, but did not document any specific existing programs that can be relied upon at present.
  - the ISO will be considering the applicability of the existing demand response within the Reliability Assessment as potential mitigations to transmission constraints.
- Cal Peak Power submission:
  - provides an alternative configuration for transmission interconnection in the area of specific generation. This could be considered in the future if resubmitted in the Request Window to address specific constraints identified in the assessment.

RPS Portfolios

- ISO received the RPS portfolios for 2013-2014 transmission planning process from the CPUC/CEC on February 7, 2013.
  - CPUC/CEC held consultation on December 19th, 2012 taking into account stakeholder comments in development of portfolios.
- ISO will be utilizing the portfolios
  - Commercial interest portfolio in the reliability peak and off-peak basecases for 2023
  - Policy Driven 33% RPS Transmission Plan analysis
  - Production cost models utilized in Economic Analysis

Unified Planning Assumptions & Study Plan
Reliability Assessment Assumptions & Methodology

2013-2014 Transmission Planning Process Stakeholder Meeting

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Lead Regional Transmission Engineer

Frank Chen, Haifeng Liu & Sushant Barave
Senior Regional Transmission Engineers

February 28, 2013

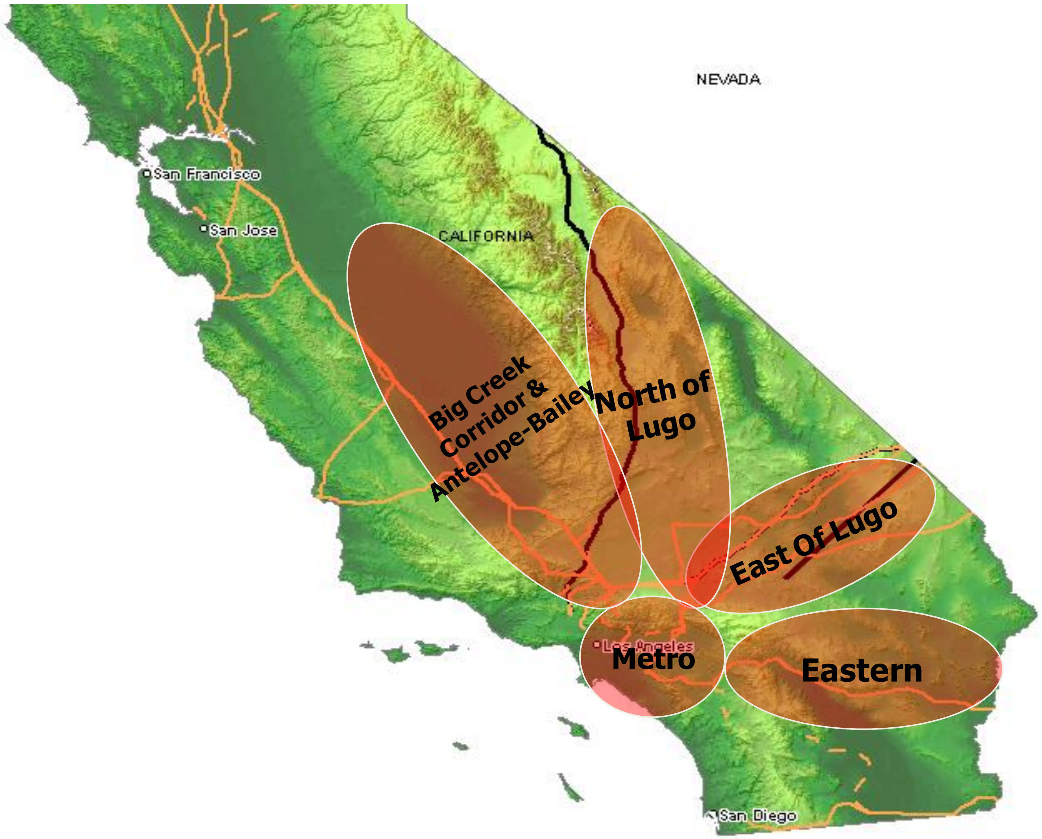
Planning Assumptions

- Reliability Standards and Criteria
  - California ISO Planning Standards
  - NERC Reliability Criteria
    - TPL-001
    - TPL-002
    - TPL-003
    - TPL-004
  - WECC Regional Business Practices
- Study Horizon
  - 10 years planning horizon
    - near-term (2014-2018); and
    - longer-term (2019-2023)

Study Areas

- **Northern Area - Bulk**
- **PG&E Local Areas:**
  - Humboldt area
  - North Coast and North Bay area
  - North Valley area
  - Central Valley area
  - Greater Bay area:
  - Greater Fresno area;
  - Kern area;
  - Central Coast and Los Padres areas.
- **Southern Area - Bulk**
- **SDG&E area**
- **Valley Electric Association area**

Study Areas (Continued)



- **SCE local areas:**
  - Tehachapi and Big Creek Corridor
  - Antelope-Bailey area
  - North of Lugo area
  - East of Lugo area;
  - Eastern area; and
  - Metro area

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Base Case Assumptions

- WECC base cases will be used as the starting point to represent the rest of WECC
- Transmission Assumptions
  - ISO-approved transmission projects
  - Transmission upgrades to interconnect new modeled generation

Study Scenarios for Planning Areas

- Peak loads are studied in individual areas
  - Summer Peak
  - Winter Peak (in specific areas)
- Off-Peak loads are studied in individual areas
- North bulk system and consolidated Southern California area studies include summer peak loads and off-peak studies for 2018 and summer peak study for 2023

Study Scenarios

Study Area	Near-term Planning Horizon		Long-term Planning Horizon
	2015	2018	2023
Northern California (PG&E) Bulk System	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load Summer Partial Peak	Summer Peak Summer Off-Peak
Humboldt	Summer Peak Winter Peak Summer Off-Peak	Summer Peak Winter Peak Summer Light Load	Summer Peak Winter Peak
North Coast and North Bay	Summer Peak Winter peak Summer Off-Peak	Summer Peak Winter Peak Summer Light Load	Summer Peak Winter peak
North Valley	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak
Central Valley (	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak
Greater Bay Area	Summer Peak Winter peak - (SF & Peninsula) Summer Off-Peak	Summer Peak Winter peak - (SF & Peninsula) Summer Light Load	Summer Peak Winter peak - (SF Only)
Greater Fresno	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load Summer Partial Peak	Summer Peak
Kern	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak
Central Coast & Los Padres	Summer Peak Winter Peak Summer Off-Peak	Summer Peak Winter Peak Summer Light Load	Summer Peak Winter Peak
Consolidated Southern California	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak Summer Off-Peak
Southern California Edison (SCE) area	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak
San Diego Gas & Electric (SDG&E) area	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak
Valley Electric Association	Summer Peak Summer Off-Peak	Summer Peak Summer Light Load	Summer Peak

Major Path Flows

Northern area (PG&E system) assessment

Path	Path Flow (MW)			
	Summer Peak	Summer Off-Peak	Winter Peak	Spring Off-Peak
Path 15 (N-S)	N/A	-5400	-1000	TBD
Path 26 (N-S)	4000	-1800 to 1800	2800	800
Path 66 (N-S)	4800	N/A	TBD	1500

Southern area (SCE & SDG&E system) assessment

Paths	Path Rating or SOL (MW)	Flow Range in Local Cases (MW)	Target Flows in Consolidated Southern California Cases (MW)
Path 26 (N-S)	4000/-3000	-3000 to 4,000	TBD
PDCI (N-S)	3100/-3100	0 to 3,100	TBD
West of River	10623	5,000 to 9,700	TBD
East of River	9300	3,200 to 6,000	TBD
Path 42	800	150 to 1000	TBD
Path 61 (N-S)	2400/-900	550 to 1900	TBD
South of San Onofre (N-S)	2200	628 to 801	TBD
ISO - Mexico (S-N)	800/-408	-5 to 5	TBD
IID-SDGE (S-N)	270	-25 to 676	TBD
North of San Onofre (S-N)	2440	-	TBD

California ISO
Shaping a Renewed Future

Load Forecast

- CEC Load forecast will be used as the starting point
  - The mid-case California Energy Demand Forecast 2012-2022 released by California Energy Commission (CEC) dated June 2012 with the Mid-Case LSE and Balancing Authority Forecast spreadsheet updated as of August 16, 2012.
    - In addition, the CEC's Low-Savings identified in the Energy Efficiency Adjustments for a Managed Forecast: Estimates of Incremental Uncommitted Energy Savings Relative to the *California Energy Demand Forecast 2012-2022*, dated September 14, 2012.
  - http://www.energy.ca.gov/2012_energypolicy/documents/index.html#EnergyDemandForecast

Load Forecast (continued)

- Methodologies used by PTOs to create bus-level load forecast were documented in the draft Study Plan
- 1-in-10 year heat wave load projection for individual local area studies
- 1-in-5 year heat wave load projection for bulk system studies

Load Forecast Methodology
PG&E

- PG&E creates bus-level load forecast (using CEC forecast as the starting point)
  - PG&E loads in the base case
    - Determination of Division Loads
    - Allocation of Division Load to Transmission Bus Level
  - Muni Loads in Base Case

Load Forecast Methodology
SCE

CEC coincident forecast for SCE area → Remove MWD, CDWR & Municipal loads → Adjust for transmission system losses → Adjusted CEC coincident forecast for SCE Area

SCE DE non-coincident A-Bank level load forecast

Allocate adjusted CEC coincident forecast to A-Banks based on SCE DE forecast.

Exceptions:

1) Large customers are fixed.
2) MWD, CDWR & Municipal loads are as specified by CEC forecast.

Note:
After allocation the total GE PSLF modeled load for SCE will equal the adjusted CEC forecast.

A-Bank – Load Transformer
CDWR – California Department of Water Resources
CEC – California Energy Commission
DE – Distribution Engineering
GE PSLF – General Electric Positive Sequence Load Flow
MWD – Metropolitan Water District
SCE – Southern California Edison

Load Forecast Methodology SDG&E

- Utilize CEC's latest load forecast as the starting point
- SDGE's methodology to create bus-level load forecast
  - Actual peak loads on low side of each substation bank transformer
  - Normalizing factors applied for achieving weather normalized peak
  - Adversing factor applied to get the adverse peak

Generation Assumptions

- One-year operating cases
- 2-5-year planning cases
  - Generation that is under construction (Level 1) and has a planned in-service date within the time frame of the study;
  - Conventional generation in pre-construction phase with executed LGIA and progressing forward will be modeled off-line but will be available as a non-wire mitigation option.
  - CPUC's discounted core and ISO's interconnection agreement status will be utilized as criteria for modeling specific renewable generation
- 6-10-year planning cases
  - CPUC RPS portfolio generation included in the baseline scenario
- Retired generation is modeled in appropriate study areas

New CEC approved resources

PTO Area	Project	Capacity (MW)	First Year to be Modeled
PG&E	Marsh Landing (Construction)	774*	2013
	Los Esteros Combined Cycle (Construction)	120	2014
	Russel City – East Shore EC (Construction)	600	2013
	Oakley Generation Station (Construction)	624	2016
SCE	Abengoa Mojave Solar Project (Construction)	250	2014
	El Segundo Power Redevelopment (Construction)	560	2014
	Sentinel Peaker (Construction)	850	2014
	Genesis Solar Energy Project (Construction)	250	2014
	Ivanpah Solar (Construction)	370	2013-2014
	Walnut Creek Peaker (Construction)	500	2013
SDG&E	Carlsbad (Pre-Construction)	558	2016
	Pio Pico Energy Center (Pre-Construction)	300	2016

Generation Retirements

PTO Area	Project	Capacity (MW)	First Year to be retired
PG&E	Contra Costa 6	337	2013*
	Contra Costa 7	337	2013*
SCE	El Segundo 3	335	2014**
SDG&E	Kearny Peakers	135	2014
	Miramar GT1 and GT2	36	2014
	El Cajon GT	16	2014

OTC Generation

- **OTC Generation:** Modeling of the once-through cooled (OTC) generating units follows the State Water Resources Control Board (SWRCB)'s Policy on OTC plants with the following exception:
  - Base-load nuclear generation units are modeled on-line, except for the nuclear generation backup plan studies;
  - Generating units that are repowered, replaced or having plans to connect to acceptable cooling technology;
  - Generating units that were identified as needed for local capacity requirements in the ISO 2011/2012 Transmission Plan related to OTC analyses (Section 3.3 of ISO 2011/2012 Transmission Plan).

Demand Response

- Within the 2013-2014 Transmission Planning Process the ISO
  - will be working with the utilities, and intends to consult with industry through the course of the summer, to finalize the complete set of characteristics demand response programs need in order to be viable transmission mitigations.
  - will work with the utilities to identify those programs that have the appropriate characteristics such that they can be considered when alternatives are developed and compared once the study results testing system reliability have been completed, and options are being explored.
  - will also be taking into consideration the CPUC's expectations for demand response programs in local capacity areas.
  - will also work with the CPUC and the utilities to address the issue of data confidentiality. Confidential information cannot be relied upon in the ISO's open and transparent planning process, so a means to address this concern will need to be developed.

Study Methodology

- The planning assessment will consist of:
  - Power Flow Contingency Analysis
  - Post Transient Analysis
  - Post Transient Stability Analysis
  - Post Transient Voltage Deviation Analysis
  - Voltage Stability and Reactive Power Margin Analysis
  - Transient Stability Analysis

Contingency Analysis

- **Normal conditions (TPL-001)**
- **Loss of a single bulk electric system element (BES) (TPL-002 - Category B)**
  - The assessment will consider all possible Category B contingencies based upon the following:
    - Loss of one generator (B1)
    - Loss of one transformer (B2)
    - Loss of one transmission line (B3)
    - Loss of a single pole of DC lines (B4)
    - Loss of the selected one generator and one transmission line (G-1/L-1) , where G-1 represents the most critical generating outage for the evaluated area
    - Loss of a both poles of a Pacific DC Intertie
- **Loss of two or more BES elements (TPL-003 - Category C)**
  - The assessment will consider the Category C contingencies with the loss of two or more BES elements which produce the more severe system results or impacts based on the following:
    - Breaker and bus section outages (C1 and C2)
    - Combination of two element outages with system adjustment after the first outage (C-3)
    - Loss of a both poles of DC lines (C4)
    - All double circuit tower line outages (C5)
    - Stuck breaker with a Category B outage (C6 thru C9)
    - Loss of two adjacent transmission circuits on separate towers

Contingency Analysis (continued)

- **Extreme contingencies (TPL-004 - Category D)**
  - The assessment will consider the Category D contingencies of extreme events which produce the more severe system results or impact as a minimum based on the following:
    - Loss of 2 nuclear units
    - Loss of all generating units at a station.
    - Loss of all transmission lines on a common right-of-way
    - Loss of substation (One voltage level plus transformers)
    - Certain combinations of one element out followed by double circuit tower line outages.
  - More category D conditions may be considered for the study

Corrective Action Plans

- The technical studies mentioned in this section will be used for identifying mitigation plans for addressing reliability concerns.
- As per ISO tariff, identify the need for any transmission additions or upgrades required to ensure System reliability consistent with all Applicable Reliability Criteria and CAISO Planning Standards.
  - In making this determination, the ISO, in coordination with each Participating TO with a PTO Service Territory and other Market Participants, shall consider lower cost alternatives to the construction of transmission additions or upgrades, such as:
    - acceleration or expansion of existing projects,
    - demand-side management,
    - special protection systems,
    - generation curtailment,
    - interruptible loads,
    - storage facilities; or
    - reactive support

Unified Planning Assumptions & Study Plan
2013-2014 ISO LCR Studies

2013-2014 Transmission Planning Process Stakeholder Meeting

Catalin Micsa
Lead Regional Transmission Engineer
February 28, 2013

Scope plus Input Assumptions, Methodology and Criteria

The scope of the LCR studies is to reflect the minimum resource capacity needed in transmission constrained areas in order to meet the established criteria.

Used for one year out RA compliance, as well as long-term look in order to guide LSE procurement.

For latest study assumptions, methodology and criteria see the November 8, 2012 stakeholder meeting. This information along with the 2014 LCR Manual can be found at: http://www.caiso.com/Documents/2014%20local%20capacity%20technical%20study%20meeting%20Nov%208,%202012.

General LCR Transparency

- Base Case Disclosure
  - ISO has published the 2014 and 2018 LCR base cases on the ISO protected web site

  (https://portal.caiso.com/tp/Pages/default.aspx)
  - Remember to execute WECC/ISO non-disclosure agreements

  (http://www.caiso.com/1f42/1f42d6e628ce0.html)
- Publication of Study Manual (Plan)
  - Provides clarity and allows for study verification

  (http://www.caiso.com/Documents/2014LocalCapacityRequirementsFinalStudyManual.pdf)
- ISO to respond in writing to questions raised (also in writing) during stakeholder process

  (http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx)

Summary of LCR Assumptions

- Transmission and generation modeled if on-line before June 1 for applicable year of study (January 1 for Humboldt – winter peaking)
- Use the latest CEC 1-in-10 peak load in defined load pockets
- Maximize import capability into local areas
- Maintain established path flow limits
- Units under long-term contract turned on first
- Maintain deliverability of generation and imports
- Fixed load pocket boundary
- Maintain the system into a safe operating range
- Performance criteria includes normal, single as well as double contingency conditions in order to establish the LCR requirements in a local area
- Any relevant contingency can be used if it results in a local constraint
- System adjustment applied (up to a specified limit) between two single contingencies

LCR Criteria

- The LCR study is a planning function that currently forecasts local operational needs one year in advance

- The LCR study relies on both:
  – ISO/NERC/WECC Planning Standards
  – WECC Operating Reliability Criteria (ORC)

- Applicable Ratings Incorporate:
  – ISO/NERC/WECC Planning Standards – Thermal Rating
  – WECC ORC – Path Rating

2014 and 2018 LCR Study Schedule

CPUC and the ISO have determined overall timeline

- Criteria, methodology and assumptions meeting Nov. 8, 2012
- Submit comments by November 22, 2012
- Posting of comments with ISO response by the January 15, 2013
- Base case development started in December 2012
- Receive base cases from PTOs January 3, 2013
- Publish base cases January 15, 2013 – comments by the 29th
- Draft study completed by March 4, 2013
- ISO Stakeholder meeting March 7, 2013
- ISO receives new operating procedures March 21, 2013
- Validate op. proc. – publish draft final report March 28, 2013
- ISO Stakeholder meeting April 4, 2013 – comments by the 18th
- Final 2014 LCR report May 1, 2013

Unified Planning Assumptions & Study Plan
Economic Planning Studies

2013-2014 Transmission Planning Process Stakeholder Meeting

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February 28, 2013

Forewords with keywords

Economic planning study
Congestion study
Significant and recurring congestion
Economic planning study requests
High-priority studies
Production simulation for 8,760 hours
Security-constrained unit commitment and economic dispatch
Production benefits
Capacity benefits
Any other benefits
Transmission Economic Assessment Methodology (TEAM)
Benefits to the ISO ratepayers
Cost-benefit analysis (CBA)
Benefit-cost ratio (BCR)
Net benefit
Congestion management
Economically-driven network upgrades
Non-wire solutions

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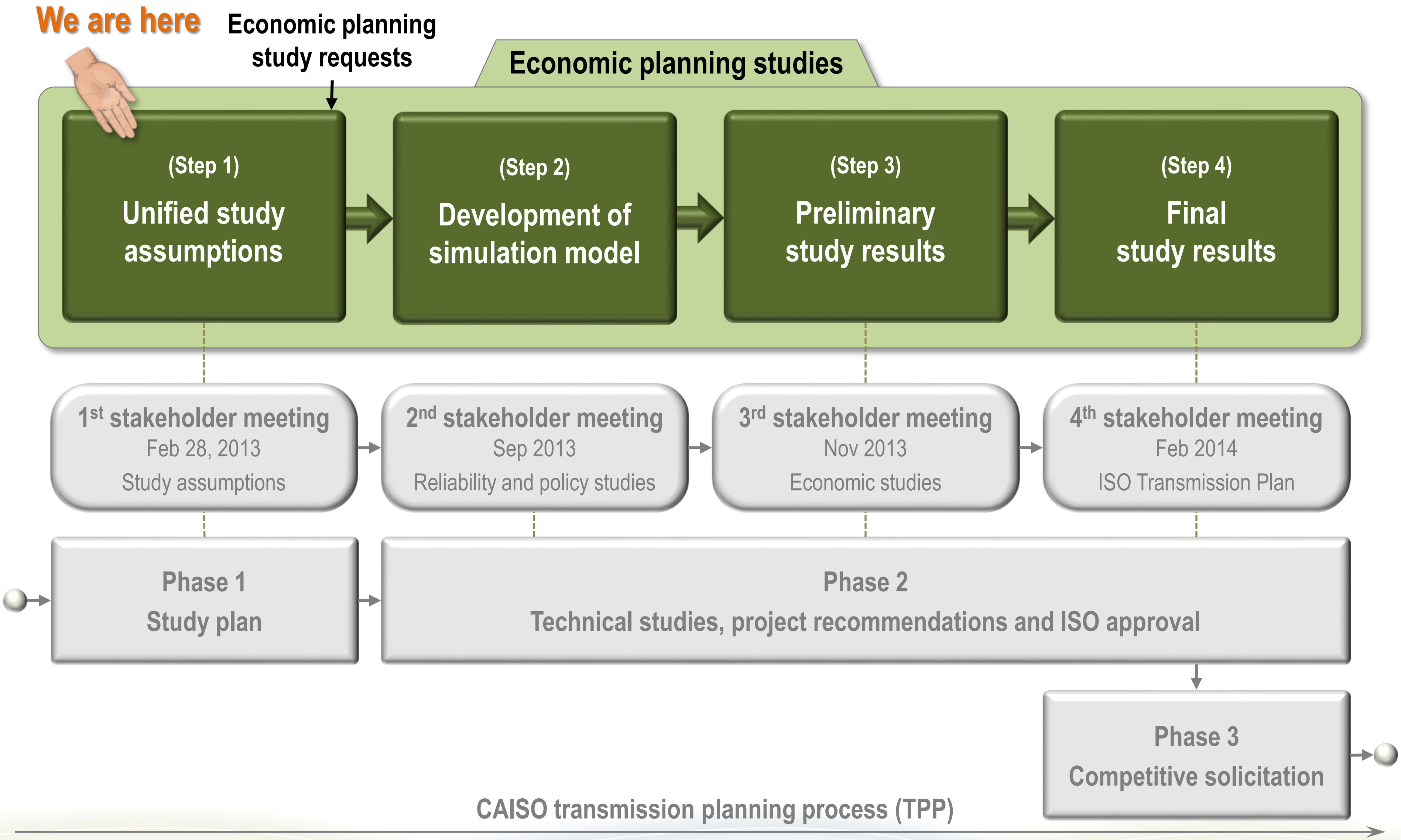
Steps of economic planning studies

ISO Transmission Plan 2013-2014



Economic planning study request

Consideration of stakeholder inputs in scoping high priority studies

An economic planning study request shall:

- Refer to the congestion identified in the economic planning study of the last cycle
- Or point to areas of congestion concerns that the ISO has not paid attention to

The ISO determines the scope of high priority studies in the following procedure:

(1) Conduct simulation to identify congestion

(2) Rank congestion by severity

(3) Associate the economic study requests with the identified congestion

(4) Determines five high priority studies according to most concerned congestion

What is an economic planning study and what is not?

Congestion? What congestion?

1. **Does the congestion cause any violations of regulatory policies?**
   Meet renewable portfolio standards, environmental policies, etc.

   If the answer is yes, this is *not* a economic planning study
   Rather, this is a policy-driven technical study, instead

2. **Does the congestion cause any violations of reliability criteria?**
   Meet NERC/WECC/CAISO planning standards

   If the answer is yes, this is *not* a economic planning study
   Rather, this is a reliability-driven technical study, instead

3. **If (1) and (2) answers are no, do you still see congestion?**
   Binding condition in market operations, i.e. congestion managed by re-dispatch

   If the answer is yes, this is a economic planning study

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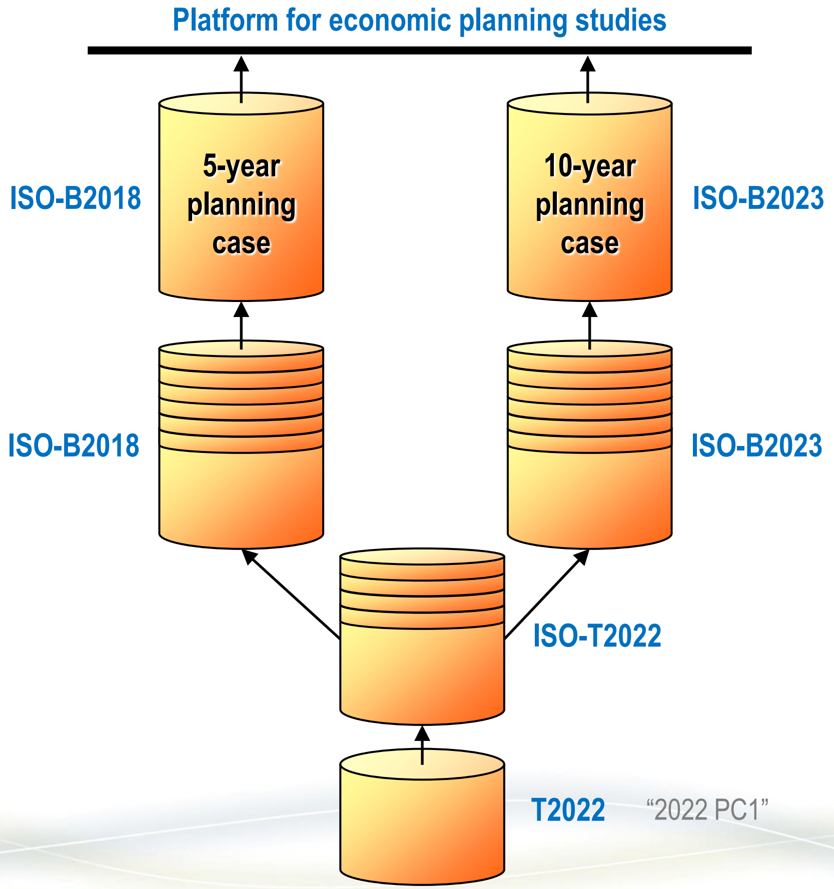
Study assumptions

Category	Type	TP2012-2013	TP2013-2014
Load	In-state load	CEC 2011 IEPR	Same (or CEC 2013 IEPR if available)
	Out-of-state load	LRS 2012 data	Same (or LRS 2013 data if available)
	Load profiles	TEPPC profiles	Same
	Load distribution	Spring, autumn, summer and winter	Same
Generation	Thermal	ISO Unified Study Assumptions	Same (will update if any changes)
	Hydro	TEPPC hydro data of 2005 pattern	Same
	Pumps	TEPPC hydro data of 2005 pattern	Same (or change to 2012 pattern)
	RPS	CPUC/CEC 2012 RPS portfolios	CPUC/CEC 2013 RPS portfolios
	OTC	ISO OTC assumptions	Same (will update if any changes)
	CA nuclear	SONGS available	Same (will update if any changes)
	Natural gas prices	Prices of 2011 ISO renewable int. study	CEC NAMGas prices
	Other fuel prices	TEPPC fuel prices	Same
	GHG prices	CPUC 2011 MPR	Same (will update if any changes)
Transmission	Reliability upgrades	Addition of approved projects	Same plus to-be-approved projects
	Policy upgrades	Addition of approved projects	Same plus to-be-approved projects
	Economic upgrades	N/A	Projects approved in TP2012-2013

Note:
The above-listed are base case study assumptions
Sensitivity study assumptions will vary around the base case assumptions

Database and tools

Category	Type	TP2012-2013	TP2013-2014
Database	Reference database	TEPPC "2022 PC1"	Same
	ISO enhancements	ISO 2012 modeling	ISO 2013 modeling
Tools	Production simulation	ABB GridView™	Same
	AC power flow	GE PSLF™	Same



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Study Scope

Two studies years, five high-priority studies

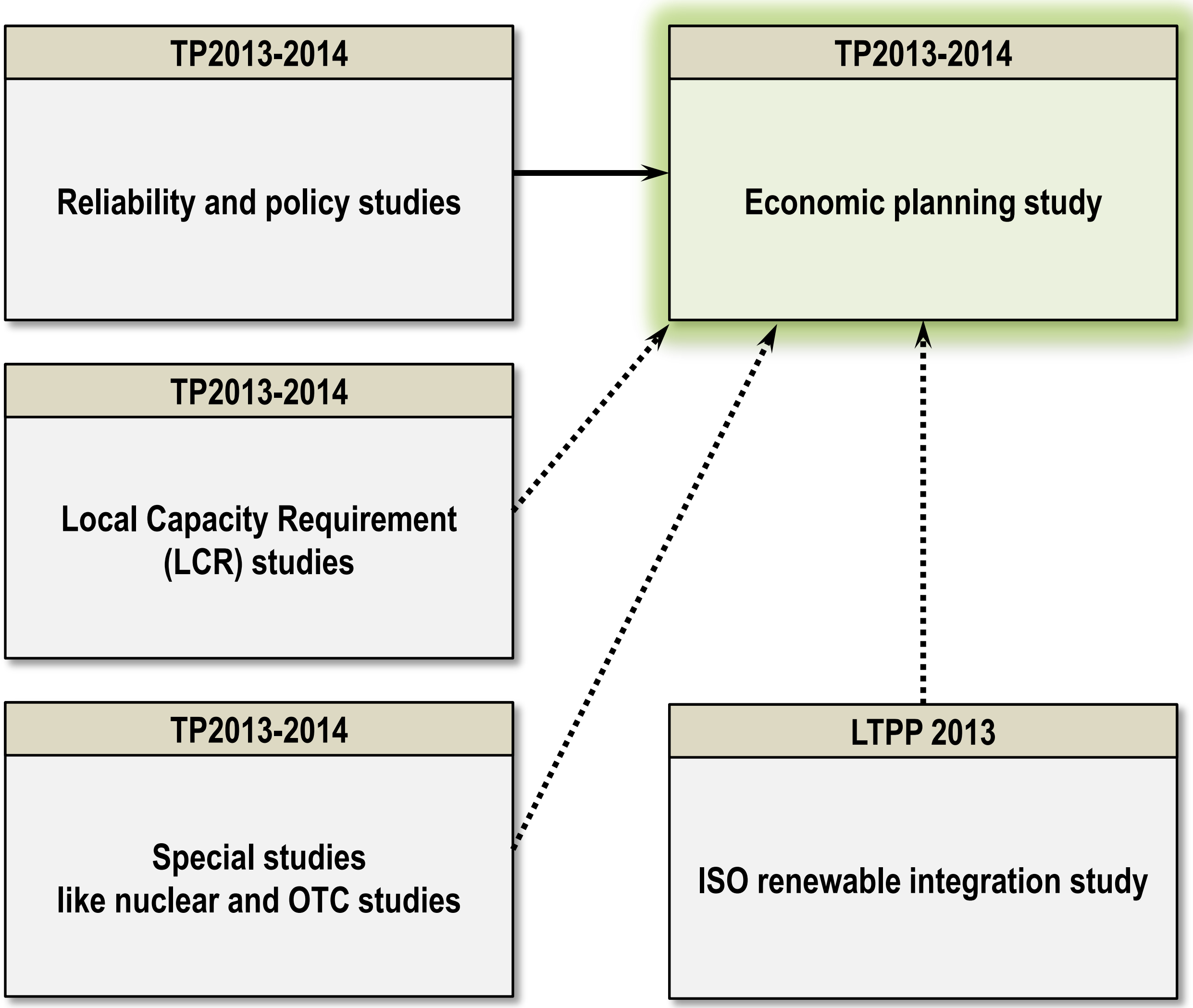
5th planning year	10th planning year
2018	2023

Study 1	Study 2	Study 3
Path 26 (Northern-Southern CA)	TBD	TBD

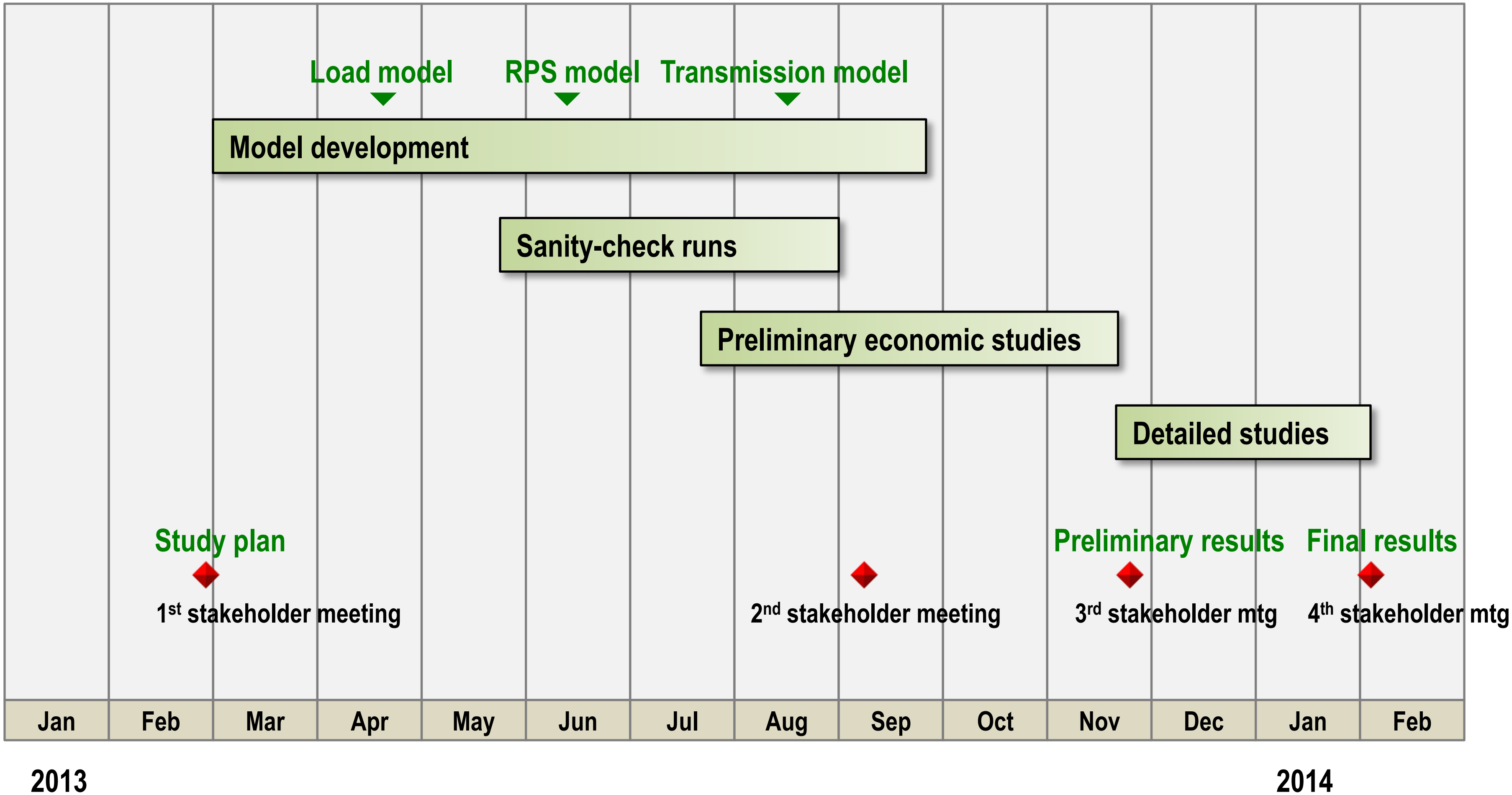
Study 4	Study 5
Pacific Northwest – California	Desert Southwest – California

Note:
The above-listed studies are subject to change when simulation model is constructed and grid congestion is simulated
High-priority studies will be determined based on evaluation of grid congestion and other relevant system conditions

Relationship with other studies



Study Schedule



Thanks!

Your questions and comments are welcome

For clarifying questions, please contact Xiaobo Wang at:
(916)608-1264, XBWang@caiso.com

For written comments, please send to:
RegionalTransmission@caiso.com

Unified Planning Assumptions & Study Plan

Once Through Cooling/Nuclear Generation Absence Studies

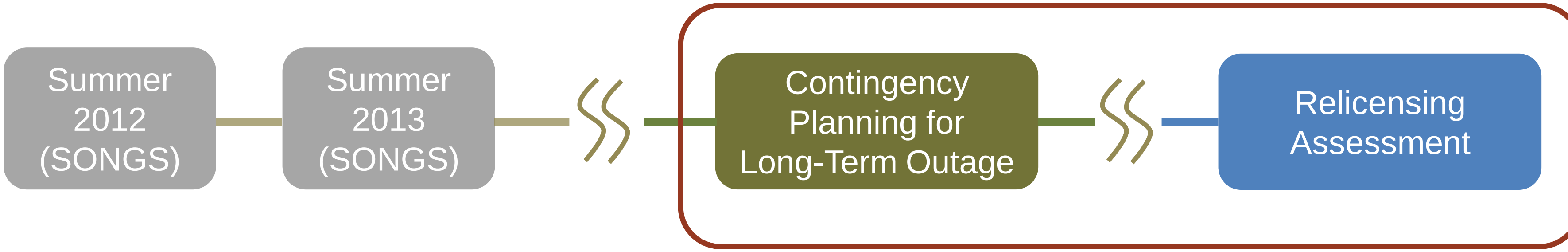
2013-2014 Transmission Planning Process Stakeholder Meeting

David Le
Senior Advisor – Regional Transmission South
February 28, 2013

Overview

- Recap of completed studies in the ISO 2012/2013 transmission planning process
- Studies under consideration for 2013/2014 transmission planning process

Study efforts completed in ISO 2012/2013 TPP



- Summer 2012 and 2013 Preparedness
  - Addendum to 2013 LCR studies (without SONGS) was posted
- Mid Term Study – Contingency Planning (2018)
  - Considers what elements of the long term plan should be initiated immediately to help mitigate future unplanned extended outages
- Long Term Study – Relicensing Assessment (2022)
  - Studies focus on transmission system implications of loss of SONGS and DCPP
- Study results are documented in the Draft ISO 2012/2013 Transmission Plan, posted on 2/1/2013

Studies under consideration for 2013/2014 transmission planning process

- Updates and refinement to the nuclear generation absence studies
  - Once-through cooling policy implications will be incorporated
- The ISO is considering deferring the updates and refinement to the nuclear generation absence and once-through cooling generation to mid November 2013 through May 2014 time frame, in order to:
  - Incorporate the CEC's 2013 IEPR demand forecast, including up-to-date information on uncommitted energy efficiency assumptions
  - If this path is pursued, the updated studies would become separate from the 2013/2014 transmission plan and be released as a separate study

Back-up Documents

List of OTC Generating Units in ISO BAA

Area	Generating Facility (Total Plant MW)	Owner	Unit	SWRCB Compliance Date	Generation Owners' Proposed Compliance Date	Existing NQC Capacity (MW)	Final Capacity, if Already Repowered or Under Construction (MW)
Humboldt LCR Area	Humboldt Bay (163 MW non-OTC)	PG&E	1	12/31/2010	In compliance July 2010	Former 105 MW facility was repowered with 10 CTs	Repowered / Compliant with Policy on OTC Plants (163 MW)
			2	12/31/2010	In compliance July 2010		
Greater Bay Area LCR	Contra Costa (674 MW)	GenOn	6	12/31/2017	4/30/2013	337	To be replaced by Marsh Landing power plant (760 MW) – under construction (current COD 6/2013)
			7	12/31/2017		337	
	Pittsburg (1,311 MW**) **Unit 7 is non-OTC	GenOn	5	12/31/2017	12/31/2017 but may take longer	312	If GenOn receives long-term PPA, it can utilize cooling tower of Unit 7 for Units 5 & 6 to comply with OTC Policy
			6	12/31/2017		317	
	Potrero (Retired)	GenOn	3	10/1/2011	In compliance 2/28/2011	206	Retired
Central Coast (non-LCR area) *Non-LCR area has no local capacity requirements	Moss Landing (2,530 MW)	Dynegy	1	12/31/2017	12/31/2032	510	These two OTC combined cycle plants were placed in service in 2002
			2	12/31/2017		510	
			6	12/31/2017	12/31/2017	754	
			7	12/31/2017		756	
	Morro Bay (650 MW)	Dynegy	3	12/31/2015	12/31/2015	325	May attempt to repower with two 50 MW, one 100MW or one 164 MW
			4	12/31/2015	12/31/2015	325	
	Diablo Canyon (2,240 MW)	PG&E	1	12/31/2024	12/31/2024	1122	Consultants to PG&E and SCE (and Water Board) to evaluate alternatives of cooling system
			2	12/31/2024	12/31/2024	1118	
Big Creek-Ventura LCR Area	Mandalay (430 OTC plus 130 MW non-OTC)	GenOn	1	12/31/2020	12/31/2020	215	Mandalay has 3 units (two are OTC and one is non-OTC)
			2	12/31/2020		215	
	Ormond Beach (1,516 MW)	GenOn	1	12/31/2020	12/31/2020	741	
			2	12/31/2020		775	

List of OTC Generating Units in ISO BAA (cont'd)

Area	Generating Facility (Total Plant MW)	Owner	Unit	SWRCB Compliance Date	Generation Owners' Proposed Compliance Date	Existing NQC Capacity (MW)	Final Capacity, if Already (or To Be) Repowered (MW)
Los Angeles (LA) Basin LCR Area	El Segundo (670 MW)	NRG	3	12/31/2015	8/1/2013	335	Unit 3 to be repowered with 560 MW; under construction (current COD of 8/1/2013)
			4	12/31/2015	12/31/2017	335	
	Alamitos (2,011 MW)	AES	1	12/31/2020	2022	175	AES plans to repower, although firm plans (i.e., which ones will definitely move forward to construction) are not available at this time
			2	12/31/2020		175	
			3	12/31/2020	2024	332	
			4	12/31/2020		336	
			5	12/31/2020	12/31/2020	498	
			6	12/31/2020		495	
	Huntington Beach (452 MW)	AES	1	12/31/2020	2022	226	
			2	12/31/2020		226	
			3	12/31/2020	Sale to EME means retirement in 2012	225 (Retired)	Units 3 & 4 are replaced by Edison Mission Energy's 500 MW Walnut Creek Energy Project (COD 5/1/2013)
			4	12/31/2020		227 (Retired)	
	Redondo Beach (1,343 MW)	AES	5	12/31/2020	2022	179	
			6	12/31/2020		175	
			7	12/31/2020	2018	493	
			8	12/31/2020		496	
	San Onofre (2,246 MW)	SCE/ SDG&E	2	12/31/2022	12/31/2022	1122	Consultants to PG&E, SCE (and Water Board) to evaluate alternatives of cooling system for SONGS; currently off-line
			3	12/31/2022		1124	
San Diego/I.V. LCR Area	Encina (946 MW)	NRG	1	12/31/2017	prior to 12/31/2017	106	NRG proposes repowering with a new 558 MW project (Carlsbad Energy Center), which does not have PPA at this time
			2	12/31/2017		103	
			3	12/31/2017		109	
			4	12/31/2017	12/31/2017	299	
			5	12/31/2017		329	
	South Bay	Dynegy	1-4	12/31/2011	Retired 12/31/2010	692	Retired

Unified Planning Assumptions & Study Plan

2013-2014 ISO 33% RPS

2013-2014 Transmission Planning Process Stakeholder Meeting

Yi Zhang
Senior Regional Transmission Engineer
February 28, 2013

Overview of the 33% RPS Transmission Assessment in 2013/2014 Planning Cycle

- Objective
  - Identify the policy driven transmission upgrades needed to meet the 33% renewable resource goal
- Portfolios
  - CPUC/CEC portfolios
- Methodology
  - Power flow and stability assessments
  - Production cost simulations
  - Deliverability assessments

Portfolios

- The TPP portfolios have been developed by CPUC, CEC, and ISO
- In accordance with tariff Section 24.4.6.6, the renewable portfolios and justification for policy driven upgrades will reflect considerations, including but not limited to, environmental impact, commercial interest, risk of stranded investment, and comparative cost of transmission alternatives

Portfolios

Scenario Name	Commercial	Environmental	High DG
Net Short (GWh)	32,184	32,184	32,184
	Portfolio Totals (MW)	Portfolio Totals (MW)	Portfolio Totals (MW)
Discounted Core	10,383	9,744	13,504
Commercial Non-Core	0	0	0
Generic	1,571	3,112	0
Total	11,954	12,855	13,504
CREZ			MW
Alberta	450	450	450
Arizona	550	550	550
Carrizo South	900	900	300
Distributed Solar - PG&E	984	1,529	3,449
Distributed Solar - SCE	565	1,255	2,345
Distributed Solar - SDGE	143	190	157
Imperial	1,700	860	860
Kramer	762	62	62
Mountain Pass	645	645	645
Nevada C	316	316	316
NonCREZ	443	623	443
Northwest	104	104	104
Riverside East	964	1,064	964
San Bernardino - Lucerne	42	42	42
Solano	200	-	-
Tehachapi	2,176	2,306	2,176
Westlands	148	1,285	148
Central Valley North	25	173	25
El Dorado	407	407	407
Merced	62	62	62
Los Banos	370	-	-
Total	11,954	12,855	13,504

Methodology – Production Simulation

- Conduct production simulation for each of the developed portfolios using the ISO unified economic assessment database
- The production simulation results are used to inform the development of power flow scenarios for the power flow and stability assessments

Methodology –Power Flow and Stability Assessments

- Power flow contingency analysis
- Voltage stability assessment (Voltage deviation, Reactive Power Margin, PV/QV analysis)
- Transient stability (Voltage deviation, Frequency deviation, stability)

Methodology –Deliverability Assessment

- Follow the same methodology as used in GIP
- Deliverability for the base portfolio and sensitivity portfolios as needed

Modeling Portfolios

- Model base commercial interest portfolio in the reliability peak and off-peak basecases for 2023
- Start from the reliability peak and off-peak basecases for 2023 for the environmental and high DG portfolio cases
- Modeling CPUC’s portfolios in transmission planning power flow and production cost models
- Representative GIP study data used if an equivalent resource could be matched; otherwise generic model and data will be used

Q &A

Unified Planning Assumptions & Study Plan
Next Steps

2013-2014 Transmission Planning Stakeholder Meeting

Jeff Billinton
Manager, Regional Transmission - North
February 28, 2013

Next Steps – Major Milestones in 2013-2014 TPP

Date	Milestone
Phase 1	
February 28 – March 14, 2013	Stakeholder comments and economic planning study requests to be submitted to regionaltransmission@caiso.com
March 29, 2013	Post Final 2013-2014 Study Plan
Phase 2	
August 15, 2013	Post Reliability Results
August 15 - October 15, 2013	Request Window
September 25 – 26, 2013	Stakeholder Meeting – Reliability Results and PTO proposed mitigation
November 20 - 21, 2013	Stakeholder Meeting – Policy and Economic Analysis
January 2014	Post Draft 2013-2014 Transmission Plan
February 2014	Stakeholder Meeting – Draft 2013-2014 Transmission Plan
End of March 2014	Post Final 2013-2014 Transmission Plan