



## Agenda

*Kim Perez*

*Stakeholder Engagement and Policy Specialist*

*2016-2017 Transmission Plan update and  
2017-2018 Transmission Planning Process Stakeholder Meeting  
February 28, 2017*

# Today's Agenda

Topic	Presenter
Opening	Kim Perez
<b>2016-2017 Transmission Planning – Update</b>	
50% RPS Special Study – Out of state portfolio update	Sushant Barave
Benefits Analysis of Large Energy Storage Special Study	Shucheng Liu
<b>2017-2018 Transmission Planning Process - Study Plan</b>	
Transmission Planning Process Overview	Catalin Micsa
Transmission Cycle Key Issues	Neil Millar
Reliability Assessment	Binaya Shrestha
Local Capacity Requirement (LCR) Studies	
- Near-Term	Catalin Micsa
- Long-Term	
Economic Planning Study	Yi Zhang
Next Steps	Catalin Micsa



# Unified Planning Assumptions & Study Plan *Transmission Planning Process Overview*

*Catalin Micsa*  
*Senior Advisor Regional Transmission Engineer*

*2017-2018 Transmission Planning Process Stakeholder Meeting*  
*February 28, 2017*

# 2017-2018 Transmission Planning Process

January 2017

April 2017

March 2018

## Phase 1 – Develop detailed study plan

State and federal policy  
CEC - Demand forecasts  
CPUC - Resource forecasts and common assumptions with procurement processes  
Other issues or concerns

## Phase 2 - Sequential technical studies

- Reliability analysis
  - Renewable (policy-driven) analysis
  - Economic analysis
- Publish comprehensive transmission plan with recommended projects

## Phase 3 Procurement

ISO Board for approval of transmission plan

# Schedule and Milestones

Phase	No	Due Date	2017-2018 Activity
Phase 1	1	December 21, 2016	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	January 21, 2017	PTO's, neighboring balancing authorities, regional/sub-regional planning groups and stakeholders provide ISO the information requested No.1 above.
	3	February 22, 2017	The ISO develops the draft Study Plan and posts it on its website
	4	February 28, 2017	The ISO hosts public stakeholder meeting #1 to discuss the contents in the Study Plan with stakeholders
	5	February 28 - March 14, 2017	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
	6	March 31, 2017	The ISO specifies a provisional list of high priority economic planning studies, finalizes the Study Plan and posts it on the public website
	7	Q1	ISO Initiates the development of the Conceptual Statewide Plan

# Schedule and Milestones (continued)

Phase	No	Due Date	2017-2018 Activity
Phase 2	8	August 15, 2017	The ISO posts preliminary reliability study results and mitigation solutions
	9	August 15, 2017	Request Window opens
	10	September 15, 2017	PTO's submit reliability projects to the ISO
	11	September/October 2017	ISO posts the Conceptual Statewide Plan on its website and issues a market notice announcing the posting
	12	September 26 – 27, 2017	The ISO hosts public stakeholder meeting #2 to discuss the reliability study results, PTO's reliability projects, and the Conceptual Statewide Plan with stakeholders
	13	September 27 – October 11, 2017	Comment period for stakeholders to submit comments on the public stakeholder meeting #2 material
	14	October 15, 2017	Request Window closes
	15	October/November 2017	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)
	16	October 31, 2017	ISO post final reliability study results
	17	November 14, 2017	The ISO posts the preliminary assessment of the policy driven & economic planning study results and the projects recommended as being needed that are less than \$50 million.
	18	November 16, 2017	The ISO hosts public stakeholder meeting #3 to present the preliminary assessment of the policy driven & economic planning study results and brief stakeholders on the projects recommended as being needed that are less than \$50 million.
	19	November 16 – November 30, 2017	Comment period for stakeholders to submit comments on the public stakeholder meeting #3 material
	20	December 13 – 14, 2017	The ISO to brief the Board of Governors of projects less than \$50 million to be approved by ISO Executive
	21	January 31, 2018	The ISO posts the draft Transmission Plan on the public website
	22	February 2018	The ISO hosts public stakeholder meeting #4 to discuss the transmission project approval recommendations, identified transmission elements, and the content of the Transmission Plan
	23	Approximately three weeks following the public stakeholder meeting #4	Comment period for stakeholders to submit comments on the public stakeholder meeting #4 material
	24	March 2018	The ISO finalizes the comprehensive Transmission Plan and presents it to the ISO Board of Governors for approval
25	End of March, 2018	ISO posts the Final Board-approved comprehensive Transmission Plan on its site	

# Schedule and Milestones (continued)

Phase	No	Due Date	2017-2018 Activity
Phase 3	26	April 1, 2018	If applicable, the ISO will initiate the process to solicit proposals to finance, construct, and own elements identified in the Transmission Plan eligible for competitive solicitation

Note: The schedule for Phase 3 will be updated and available to stakeholders at a later date.

# 2017-2018 Transmission Planning Process Study Plan

- Reliability Assessment to identify reliability-driven needs
- Local Capacity Requirements
  - Near-Term; and
  - Mid-Term
- Policy Driven 33% by 2020 RPS Transmission Plan Analysis
  - Achieving 33% renewable energy on an annual basis
  - Supporting RA deliverability status for needed renewable resources outside the ISO
- Special Studies
- Economic Planning Study to identify needed economically-driven elements
- Long-term Congestion Revenue Rights
- Interregional Transmission Projects



## Study Information

- Final Study Plan will be published March 31<sup>st</sup>
- Base cases will be posted on the Market Participant Portal (MPP)
  - For reliability assessment in Q3
- Market notices will be sent to notify stakeholders of meetings and any relevant information
- Stakeholder comments
  - Stakeholders requested to submit comments to: [regionaltransmission@caiso.com](mailto:regionaltransmission@caiso.com)
  - Stakeholder comments are to be submitted within two weeks after stakeholder meetings
  - ISO will post comments and responses on website

# Coordination of input assumptions with state agencies

## Coordinated with CEC and CPUC:

- CEC 2016 Integrated Energy Policy Report
  - California Energy Demand Updated Final Forecast 2017-2027
  - [http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-05/TN215745\\_20170202T125433\\_FINAL\\_California\\_Energy\\_Demand\\_Updated\\_Forecast\\_20172027.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-05/TN215745_20170202T125433_FINAL_California_Energy_Demand_Updated_Forecast_20172027.pdf)
- Continued coordination between TPP and CPUC LTPP
  - CPUC draft Planning Assumptions & Scenarios Update For The 2017 Long Term Procurement Plan Proceeding And The CAISO 2017–18 Transmission Planning Process
  - <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M172/K519/172519400.PDF>



# Key Issues influencing the 2017-2018 Study Plan *Transmission Planning Process*

*Neil Millar*

*Executive Director, Infrastructure Development*

*2017-2018 Transmission Planning Process Stakeholder Meeting  
February 28, 2017*

# Coordination of input assumptions with California Energy Commission and Public Utilities Commission

- ISO anticipates receiving RPS portfolio direction for 2017-2018 transmission planning process from the CPUC/CEC in February/March
  - The ISO anticipates that the existing 33% RPS scenarios will continue to be used until direction is available on 50% RPS goals – likely 2018-2019
  - Until then, no new policy-driven analysis is anticipated to be required

# Focus in 2017-2018 cycle will be to advance issues identified in the 2016-2017 cycle:

- Not anticipating another round of new special studies – but results for two studies will be updated:
  - Complete validation of updated generation models (extension of 2016-2017 efforts) *and update analysis in 2017-2018 TPP*
  - Continue to assess the risks to reliability of economically driven early retirement of gas fired generation and *update analysis in 2017-2018 TPP*
- Other efforts will be conducted in parallel tracks outside of the TPP:
  - Complete the 50% RPS special study out of state analysis and coordination with the other western planning regions on interregional transmission project studies (extension of 2016-2017 efforts)
  - Support gas-electric coordination issues through anticipated CPUC proceedings (regulatory process)
  - Further consideration of slow response resource characteristics on a separate track outside of the TPP (regulatory process)



# Unified Planning Assumptions & Study Plan *Reliability Assessment*

*Binaya Shrestha*  
*Regional Transmission Engineer Lead*

*2017-2018 Transmission Planning Process Stakeholder Meeting*  
*February 28, 2017*

# Planning Assumptions

- Reliability Standards and Criteria
  - California ISO Planning Standards
  - NERC Reliability Criteria
    - TPL-001-4
    - NUC-001-2.1
  - WECC Regional Criteria
    - TPL-001-WECC-CRT-3

# Planning Assumptions

*(continued)*

- Study Horizon
  - 10 years planning horizon
    - near-term: 2018 to 2022
    - longer-term: 2023 to 2027
- Study Years
  - near-term: 2019 and 2022
  - longer-term: 2027



# 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**
- **SCE local areas:**
  - Tehachapi and Big Creek Corridor
  - North of Lugo area
  - East of Lugo area;
  - Eastern area; and
  - Metro area
- **SDG&E area**
  - Bulk transmission
  - Sub-transmission
- **Valley Electric Association area**
- **ISO combined bulk system**

# Transmission Assumptions

- Transmission Projects
  - Transmission projects that the ISO has approved will be modeled in the study
  - Canceled projects and projects with potential significant scope change will not be modeled
- Reactive Resources
  - The study models the existing and new reactive power resources in the base cases to ensure that realistic reactive support capability will be included in the study
- Protection Systems
  - The major new and existing SPS, safety nets, and UVLS that will be included in the study
  - Continue to include RAS models and work with PTOs to obtain remaining RAS models.
- Control Devices
  - Several control devices were modeled in the studies

# Load Forecast Assumptions

## *Energy and Demand Forecast*

- California Energy Demand Updated Forecast 2017-2027 adopted by California Energy Commission (CEC) on January 25, 2017 will be used:
  - Using the Mid Case LSE and Balancing Authority Forecast spreadsheet of January 12, 2017
- Additional Achievable Energy Efficiency (AAEE)
  - Consistent with CEC 2016 IEPR
  - Mid AAEE will be used for system-wide studies
  - Low AAEE will be used for local studies
- CEC forecast information is available on the CEC website at:  
<https://efiling.energy.ca.gov/getdocument.aspx?tn=215745>

# Load Forecast Assumptions

## *Energy and Demand Forecast (continued)*

- The following are how load forecasts are used for each of the reliability assessment studies.
  - 1-in-10 weather year, mid demand baseline case with low AAEE load forecasts will be used in PG&E, SCE, SDG&E, and VEA local area studies including the studies for the local capacity requirement (LCR) areas
  - 1-in-5 weather year, mid demand baseline case with mid AAEE load forecast will be used for bulk system studies
- Methodologies used by PTOs to create bus-level load forecast were documented in the draft Study Plan

# Load Forecast Assumptions

## *Peak-Shift*

- The California Energy Demand Updated Forecast 2017-2027 includes Peak-Shift Scenario Analysis and states the following with respect to the use results of this analysis in the ISO TPP studies:
- *“The results of the final adjusted managed peak scenario analysis can be used by the California ISO in TPP studies to review previously -approved projects or procurement of existing resource adequacy resources to maintain local reliability but should not be used in identifying new needs triggering new transmission projects, given the preliminary analysis. More complete analyses will be developed for IEPR forecasts once full hourly load forecasting models are developed.”*
- In the 2017-2018 TPP, the ISO will use the CEC energy and demand forecast for the base scenario analysis
- As the ISO conducts sensitivities on a case by case basis and to comply with the NERC TPL-001-4 mandatory reliability standard, these and other forecasting uncertainties will be taken into account in the sensitivity studies

# Load Forecast Assumptions

## *Methodologies to Derive Bus Level Forecast*

- The CEC load forecast is generally provided for the larger areas and does not provide the granularity down to the bus-level which is necessary in the base cases for the reliability assessment
- The local area load forecast are developed at the bus-level by the participating transmission owners (PTOs) .
- Descriptions of the methodologies used by each of the PTOs to derive bus-level load forecasts using CEC data as a starting point are included in the draft Study Plan.

# Load Forecast Assumptions

## *Self-Generation*

- PV component of the self-generation in the CEC demand forecast will be modeled as discrete element in the 2017-2018 TPP base cases.
  - Amount of the self-generation PV to be modeled will be based on 2016 IEPR data.
  - Location to model self-generation PV will be identified based on location of existing behind-the-meter PV, information from PTO on future growth and behind-the-meter PV capacity by forecast climate zone information from CEC.
  - Output of the self-generation PV will be selected based on the time of day of the study using the end-use load and PV shapes for the day selected.
  - Composite load model CMPLDWG will be used to model the self-generation PV.

# 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.
  - OTC repowering projects will be modeled in lieu of existing resources as long as they have power purchase approval from the CPUC or other Local Regulatory Agency (LRA)
  - 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 (2016-2017 TPP 33% Mid AAEE) generation included in the baseline scenario
- Generators identified as retiring within the planning horizon will be modeled as out of service starting in the year they are assumed to be retired.



# Generation Assumptions

## *Renewable Dispatch*

- The ISO has done a qualitative and quantitative assessment of hourly Grid View renewable output for stressed conditions during hours and seasons of interest.
- Available data of pertinent hours was catalogued by renewable technology and location on the grid.
- The results differ somewhat between locations and seasons and was assigned to four areas of the grid: PG&E, SCE, SDG&E and VEA.

# Generation Assumptions

## *Generation Retirements*

- Nuclear Retirements
  - Diablo Canyon will be modeled off-line based on the OTC compliance date
- Once Through Cooled Retirements
  - separate slide below for OTC assumptions
- Renewable and Hydro Retirements
  - Assumes these resource types stay online unless there is an announced retirement date.
- Other Retirements
  - Unless otherwise noted, assumes retirement based resource age of 40 years or more. List included in Appendix A of the draft study plan.

# Generation Assumptions

## *Announced/Requested Generation Retirements (non-OTC)*

PTO Area	Project	Capacity (MW)	First Year to be retired
PG&E	Pittsburg Unit 7	682	2017
SCE	Coolwater Units 1, 2, 3 & 4	335	2015
SDG&E	Kearny Peakers	135	2017
	Miramar GT1 and GT2	36	2017
	El Cajon GT	16	2017

# Generation Assumptions

## *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:

- Generating units that are repowered, replaced or having firm plans to connect to acceptable cooling technology, as illustrated in Table 4.7-5 in the draft study plan; and
- All other OTC generating units will be modeled off-line beyond their compliance dates, as illustrated in Table 4.7-5, or per proposed retirements by the generation owners to proceed on repowering projects that have been approved by the state regulatory agencies.

# Generation Assumptions

*CEC permitted resources or CPUC-approved long-term procurement resources (Thermal and Solar Thermal)*

PTO Area	Project	Capacity (MW)	First Year to be Modeled
PG&E	-	-	-
SCE	Huntington Beach Energy Project Unit 6 (CCGT) *	644	2020
	Alamitos Energy Center Unit 8 (CCGT) *	640	2020
	Stanton Energy Center*	98	2020
	Puente Power Project*	262	2020
SDG&E	Carlsbad Peakers*	500	2019

**Notes:**

\*These projects have received PPTA approvals from the CPUC as part of Long Term Procurement Plan (LTPP) process.

# Preferred Resources

## *Demand Response*

- Demand Response
  - Only program that can be relied upon to mitigate post first contingency are counted
  - DR that can be relied upon participates, and is dispatched from, the ISO market in sufficiently less than 30 minutes (implies that programs may need 20 minutes response time to allow for other transmission operator activities) from when it is called upon
  - DR capacity will be allocated to bus-bar using the method defined in D.12-12-010, or specific bus-bar allocations provided by the IOUs.
  - The DR capacity amounts will be modeled offline in the initial reliability study cases and will be used as potential mitigation in those planning areas where reliability concerns are identified.
  - Two scenarios will be assessed if reliability concerns are identified
    - One using DR capacity with 20 minute response time, and
    - The using DR capacity with 30 minute response time

# Preferred Resources

## *Energy Storage*

- Energy Storage
  - Amounts consistent with D.13-10-040
  - Not included in starting cases (no location data available), unless already procured by the LSEs
  - Locational information provide by CPUC for storage procured to-date
  - Effective busses will be identified using the residual capacity for potential development after reliability concerns have been identified

# Major Path Flows and Interchange

## Northern area (PG&E system) assessment

Path	Transfer Capability/SOL (MW)	Scenario in which Path will be stressed
Path 26 (N-S)	4,000	Summer Peak
PDCI (N-S)	3,100	
Path 66 (N-S)	4,800	
Path 15 (N-S)	-5,400	Summer Off Peak
Path 26 (N-S_	-3,000	
Path 66 (N-S)	-3,675	Winter Peak

## Southern area (SCE & SDG&E system) assessment

Path	Transfer Capability/SOL (MW)	Target Flows (MW)	Scenario in which Path will be stressed
Path 26 (N-S)	4,000	4,000	Summer Peak
PDCI (N-S)	3,100	3,100	
West of River (WOR)	11,200	5,000 to 11,200	N/A
East of River (EOR)	9,600	4,000 to 9,600	N/A
San Diego Import	2,850	2,400 to 3,500	Summer Peak
SCIT	17,870	15,000 to 17,870	Summer Peak



# Study Scenarios

## Base Scenarios

Study Area	Near-term Planning Horizon		Long-term Planning Horizon
	2019	2022	2027
Northern California (PG&E) Bulk System	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak Spring Off-Peak
Humboldt	Summer Peak Winter Peak Spring Light Load	Summer Peak Winter Peak Summer Off-Peak	Summer Peak Winter Peak
North Coast and North Bay	Summer Peak Winter peak Spring Light Load	Summer Peak Winter Peak Summer Off-Peak	Summer Peak Winter peak
North Valley	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Central Valley	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Greater Bay Area	Summer Peak Winter peak - (SF & Peninsula) Spring Light Load	Summer Peak Winter peak - (SF & Peninsula) Summer Off-Peak	Summer Peak Winter peak - (SF Only)
Greater Fresno	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Kern	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Central Coast & Los Padres	Summer Peak Winter Peak Spring Light Load	Summer Peak Winter Peak Summer Off-Peak	Summer Peak Winter Peak
Southern California Bulk Transmission System	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Southern California Edison (SCE) area	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
San Diego Gas & Electric (SDG&E) area	Summer Peak Spring Light Load	Summer Peak Summer Off-Peak	Summer Peak
Valley Electric Association	Summer/Winter Peak Spring Light Load	Summer/Winter Peak Summer Off-Peak	Summer/Winter Peak

# Study Scenarios

## Sensitivity Studies

Sensitivity Study	Near-term Planning Horizon		Long-Term Planning Horizon
	2019	2022	2027
Summer Peak with high CEC forecasted load and peak shift		PG&E Local Areas SCE Metro SCE Northern SDG&E Main SDG&E Sub-transmission	-
CEC peak-shift scenario	PG&E Local Areas SCE Metro SCE Northern SDG&E Main SDG&E Sub-transmission	-	PG&E Bulk PG&E Local Areas SCE Metro SCE Northern SDG&E Main SDG&E Sub-transmission
Off-peak with maximum PV Output		PG&E Bulk Southern California Bulk	
Summer Peak with heavy renewable output and minimum gas generation commitment	-	PG&E Bulk PG&E Local Areas Southern California Bulk SCE Northern SCE North of Lugo SCE East of Lugo SCE Eastern SCE Metro SDG&E Main	-
Summer Off-peak with heavy renewable output and minimum gas generation commitment (renewable generation addition)	-	VEA Area	-
Summer Peak with low hydro output	-	SCE Northern Area	-
Permanent closure of the Aliso Canyon gas storage facility	SCE Metro SDG&E Main		
Retirement of QF Generations	-	-	PG&E Local Areas

# Study Base Cases

- WECC base cases will be used as the starting point to represent the rest of WECC

Study Year	Season	WECC Base Case
2019	Summer Peak	18HS3Sa
	Winter Peak	17HW3b
	Spring Light	17LSP2sa
2022	Summer Peak	22HS1a
	Winter Peak	22HW2a
	Spring Off-Peak	17LSP2sa
2027	Summer Peak	26hs1a
	Winter Peak	26HW1a
	Spring Off-Peak	26LSP1Sa
	Summer Partial Peak	26hs1a

# Contingencies

- **Normal conditions (P0)**
- **Single contingency (Category P1)**
  - The assessment will consider all possible Category P1 contingencies based upon the following:
    - Loss of one generator (P1.1)
    - Loss of one transmission circuit (P1.2)
    - Loss of one transformer (P1.3)
    - Loss of one shunt device (P1.4)
    - Loss of a single pole of DC lines (P1.5)
- **Single contingency (Category P2)**
  - The assessment will consider all possible Category P2 contingencies based upon the following:
    - Loss of one transmission circuit without a fault (P2.1)
    - Loss of one bus section (P2.2)
    - Loss of one breaker (internal fault) (non-bus-tie-breaker) (P2.3)
    - Loss of one breaker (internal fault) (bus-tie-breaker) (P2.4)

# Contingencies

## (continued)

- **Multiple contingency (Category P3)**

- The assessment will consider the Category P3 contingencies with the loss of a *generator unit* followed by system adjustments and the loss of the following:
  - Loss of one generator (P3.1)
  - Loss of one transmission circuit (P3.2)
  - Loss of one transformer (P3.3)
  - Loss of one shunt device (P3.4)
  - Loss of a single pole of DC lines (P3.5)

- **Multiple contingency (Category P4)**

- The assessment will consider the Category P4 contingencies with the loss of multiple elements caused by a stuck breaker (non-bus-tie-breaker for P4.1-P4.5) attempting to clear a fault on one of the following:
  - Loss of one generator (P4.1)
  - Loss of one transmission circuit (P4.2)
  - Loss of one transformer (P4.3)
  - Loss of one shunt device (P4.4)
  - Loss of one bus section (P4.5)
  - Loss of a bus-tie-breaker (P4.6)

# Contingencies

## *(continued)*

- **Multiple contingency (Category P5)**

- The assessment will consider the Category P5 contingencies with delayed fault clearing due to the failure of a non-redundant relay protecting the faulted element to operate as designed, for one of the following:
  - Loss of one generator (P5.1)
  - Loss of one transmission circuit (P5.2)
  - Loss of one transformer (P5.3)
  - Loss of one shunt device (P5.4)
  - Loss of one bus section (P5.5)

- **Multiple contingency (Category P6)**

- The assessment will consider the Category P6 contingencies with the loss of two or more (non-generator unit) elements with system adjustment between them, which produce the more severe system results.

- **Multiple contingency (Category P7)**

- The assessment will consider the Category P7 contingencies for the loss of a common structure as follows:
  - Any two adjacent circuits on common structure<sup>14</sup> (P7.1)
  - Loss of a bipolar DC lines (P7.2)

# Contingency Analysis

*(continued)*

- **Extreme contingencies (TPL-001-4)**
  - As a part of the planning assessment the ISO assesses Extreme Event contingencies per the requirements of TPL-001-4;
    - however the analysis of Extreme Events will not be included within the Transmission Plan unless these requirements drive the need for mitigation plans to be developed.

# Technical Studies

- 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



# 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 *2017-2018 ISO Local Capacity Requirement Studies*

*Catalin Micsa*

*Senior Advisor Regional Transmission Engineer*

*2017-2018 Transmission Planning Process Stakeholder Meeting  
February 28, 2017*

# Existing ISO Local Capacity Requirement (LCR) Areas and OTC Plants



# Near-Term Local Capacity Requirement (update)

# 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.

For latest study assumptions, methodology and criteria see the October 31, 2016 stakeholder meeting. This information along with the 2018 LCR Manual can be found at:

<http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx>.

Note: in order to meet the CPUC deadline for capacity procurement by CPUC-jurisdictional load serving entities, the ISO will complete the LCR studies approximately by May 1, 2017.

# General LCR Transparency

- Base Case Disclosure
  - ISO has published the LCR base cases on the ISO Market Participant Portal  
(<https://mpp.caiso.com/tp/Pages/default.aspx>)
    - Access requires 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/2018LocalCapacityRequirementsFinalStudyManual.pdf>)
- ISO to respond in writing to questions raised (also in writing) during stakeholder process  
(<http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx> )

# Near-Term LCR Study Schedule

## **CPUC and the ISO have determined overall timeline**

- Criteria, methodology and assumptions meeting Oct. 31, 2016
- Submit comments by November 14, 2016
- Posting of comments with ISO response by the November 30, 2016
- Base case development started in December 2016
- Receive base cases from PTOs January 3, 2017
- Publish base cases January 12, 2017 – comments by the 26<sup>th</sup>
- Draft study completed by February 24, 2017
- ISO Stakeholder meeting March 9, 2017 – comments by the 23<sup>rd</sup>
- ISO receives new operating procedures March 23, 2017
- Validate op. proc. – publish draft final report April 6, 2017
- ISO Stakeholder call April 13, 2017 – comments by the 20<sup>th</sup>
- Final 2018 LCR report May 1, 2017



# **Long-Term Local Capacity Requirement Studies**



# Long-Term Local Capacity Requirement

- Based on the alignment of the ISO transmission planning process with the CEC Integrated Energy Policy Report (IEPR) demand forecast and the CPUC Long-Term Procurement Plan (LTPP) proceeding, the Long-Term LCR assessment is to be evaluated ***every two years.***
- The 2016-2017 transmission planning process all LCR areas within the ISO BAA were evaluated for long-term assessment.
- The 2018-2019 transmission planning process is the next planning process in which all LCR areas will be evaluated for long-term needs.



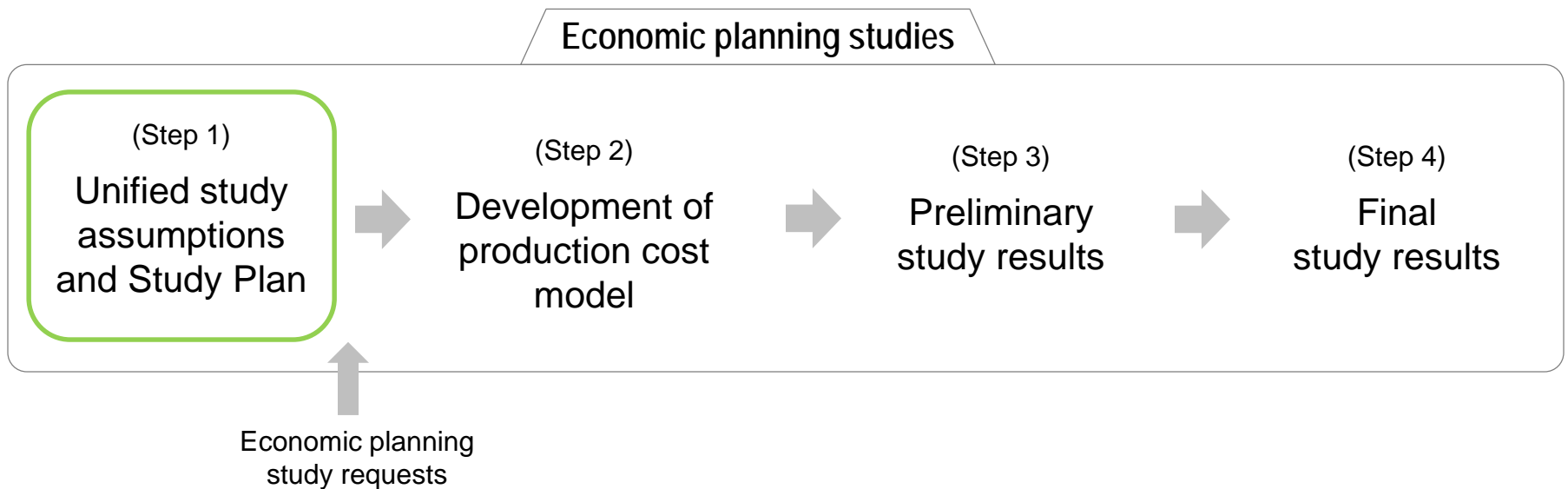
# Unified Planning Assumptions & Study Plan

## *Economic Planning Studies*

*Yi Zhang*  
*Regional Transmission Engineer Lead*

*2017-2018 Transmission Planning Process Stakeholder Meeting*  
*February 28, 2017*

# Steps of economic planning studies



# Economic planning study

- Database development for production cost simulation
- Congestion analysis based on production cost simulations on 2027, and 2022 as optional
- Evaluation of economic study requests
- Selection of high priority studies
  - Rank congestions by severity
  - Consider economic study requests
  - Determine high priority studies
- Assessment for high priority studies

# Assumptions for database development – base case

- Starting point
  - TEPPC 2026 Common Case
  - ISO 2026 production cost model
- Update load, natural gas and GHG prices based on the latest CEC forecasts if different from TEPPC CC
- Generator consistent with reliability assessment
  - Renewable and conventional
- Transmission modeling
  - All approved transmission projects
  - Transmission constraints based on reliability, policy, and LCR study results
- Other updates reflecting market and grid operations

# Economic planning study requests

- Economic Planning Study Requests are to be submitted to the ISO during the comment period of the draft Study Plan
- The ISO will consider the Economic Planning Study Requests as identified in section 24.3.4.1 of the ISO Tariff

Questions/Comments?



## Next Steps

*Catalin Micsa*

*Senior Advisor Regional Transmission Engineer*

*2017-2018 Transmission Planning Process Stakeholder Meeting  
February 28, 2017*



# Next Steps – Major Milestones in 2017-2018 TPP

Date	Milestone
<b>Phase 1</b>	
February 28 – March 14, 2017	Stakeholder comments and economic planning study requests to be submitted to <a href="mailto:regionaltransmission@caiso.com">regionaltransmission@caiso.com</a>
March 31, 2017	Post Final 2017-2018 Study Plan
<b>Phase 2</b>	
August 15, 2017	Post Reliability Results
August 15 - October 15, 2017	Request Window
September 26 – 27, 2017	Stakeholder Meeting – Reliability Results and PTO proposed mitigation
November 16, 2017	Stakeholder Meeting – Policy and Economic Analysis
January 31, 2018	Post Draft 2017-2018 Transmission Plan
February 2018	Stakeholder Meeting – Draft 2017-2018 Transmission Plan
End of March 2018	Post Final 2017-2018 Transmission Plan