Agenda
Reliability Assessment and Study Updates

Brenda Corona
Stakeholder Engagement and Policy Specialist

2022-2023 Transmission Planning Process Stakeholder Meeting
September 27-28, 2022

2022-2023 Transmission Planning Process Stakeholder Call – Agenda

Topic	Presenter
Day 1 – September 27	
Overview & Key Issues	Binaya Shrestha
Reliability Assessment - North	RTN - Engineers
Reliability Assessment - South	RTS - Engineers
Day 2 – September 28	
PTO Proposed Reliability Solutions	PG&E, SCE, SDG&E, GLW
High Voltage TAC Update	Binaya Shrestha
Policy Assessment - Update	Nebiyu Yimer
Economic Assessment - Update	Yi Zhang
Next Steps	Brenda Corona

Transmission Program Impact on High Voltage TAC
Estimating Model – 2021-2022 TPP Version

Binaya Shrestha
Manager - Regional Transmission North

2022-23 Transmission Planning Process Stakeholder Meeting
September 27-28, 2022

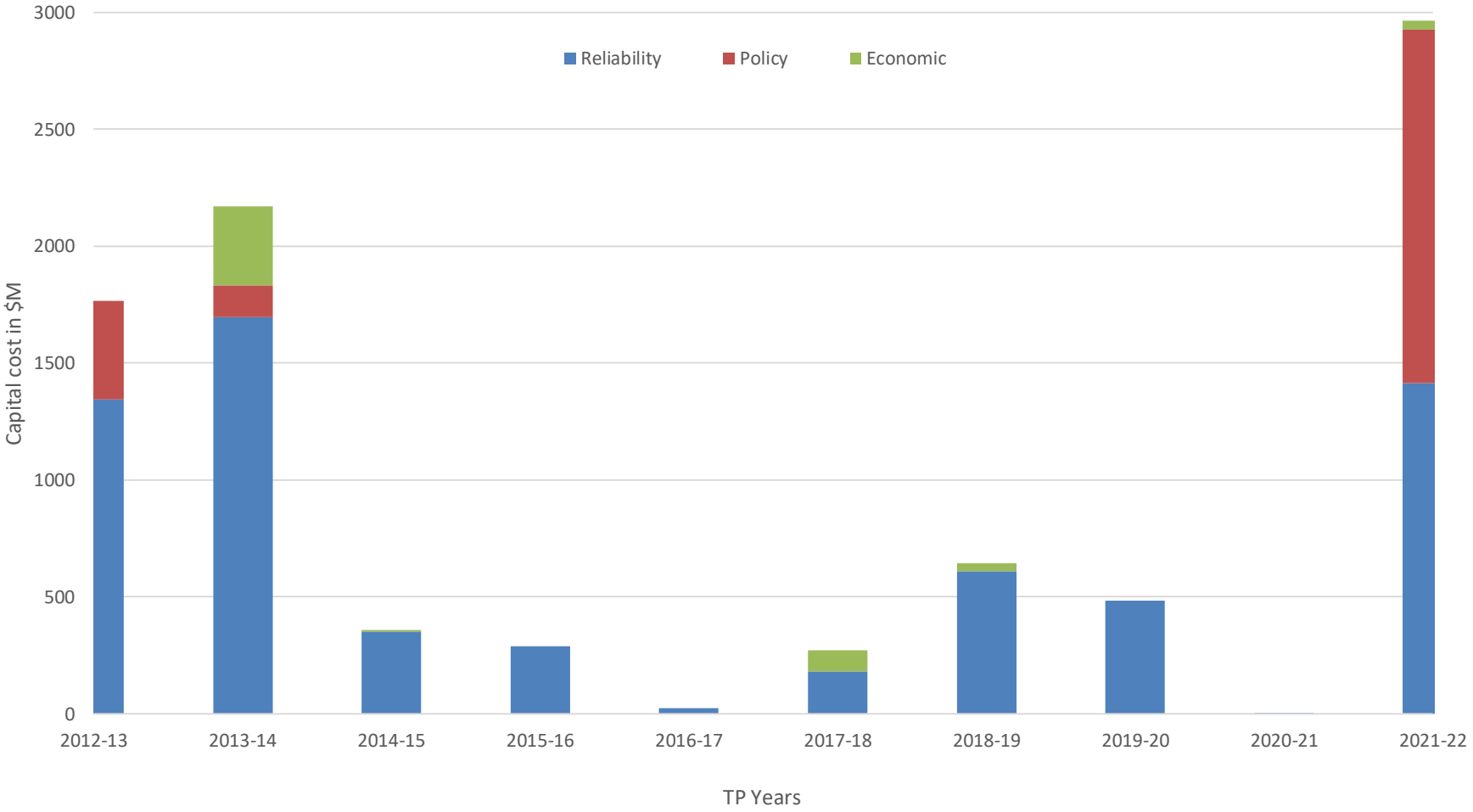
Background

- Forecasting tool developed for the 2012-2013 Transmission Plan in response to concerns over increasing upward pressure on transmission costs.
  - Replacing aging infrastructure
  - Complying with NERC planning standards
  - Meeting California energy policy goals
- Goal is to estimate future high voltage transmission access costs in an objective and transparent manner.
  - Strike a balance of top down estimates with bottom up details
  - Provides transparency to costs related to reliability, policy, and economic driven projects
  - Establish a baseline and allows the flexibility to customize each future project individually
  - Is not a precise forecast of any individual PTO's revenue requirement or any individual project's revenue requirement

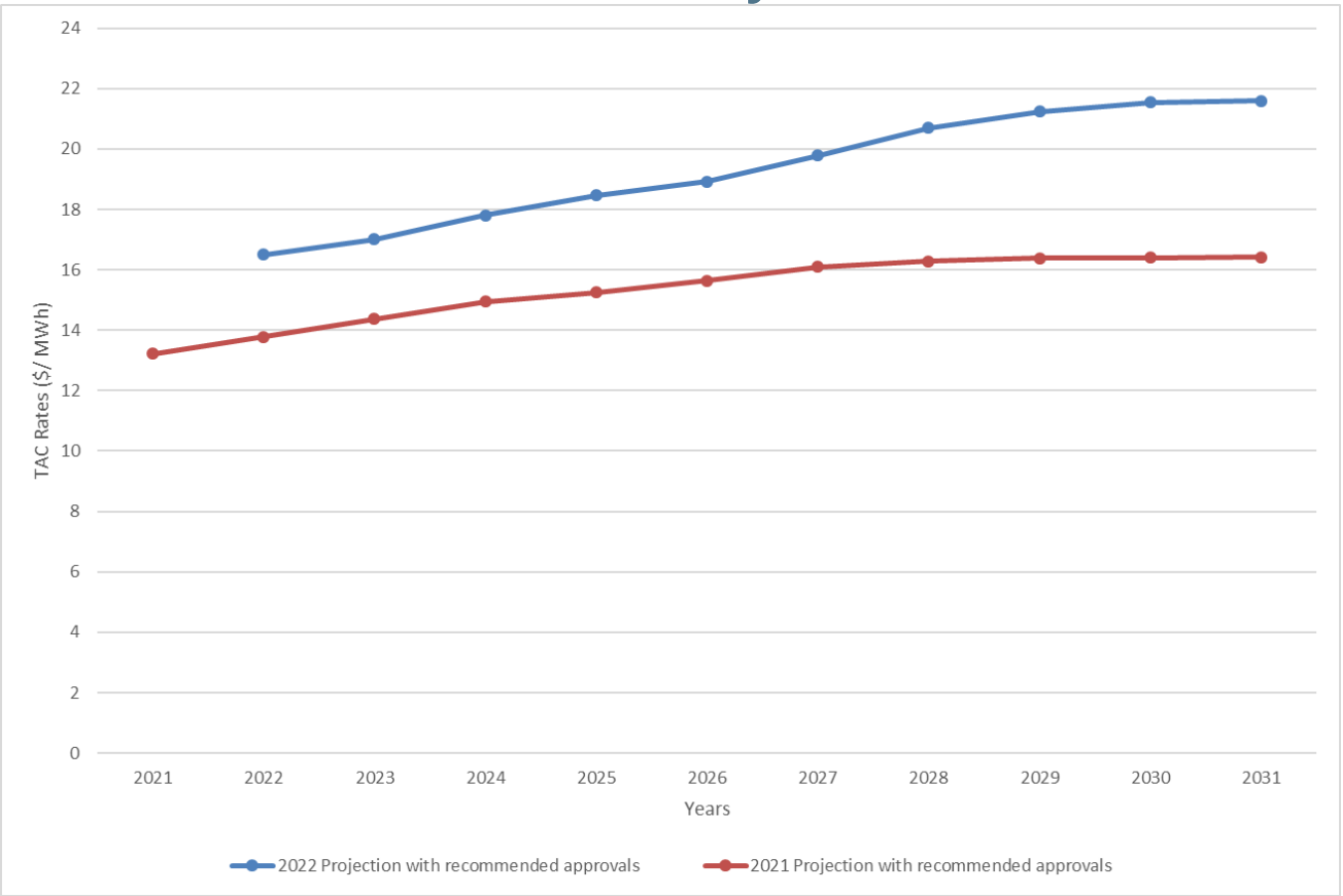
Model and modeling assumptions essentially unchanged from previous years:

- O&M costs escalated at 2% per year.
- Non-ISO capital estimated at 2% of gross plant per year
- “Typical” return and depreciation rates applied.

Comparison of capital projects approved in the 2021-2022 plan and nine previous years:



Regional high voltage transmission access charge projection trended from January 1, 2022 values:



* Existing returns are maintained for existing PTO rate base, and 11% return on equity is assumed for new transmission capital.

Compared to the 2020-2021 model:

- The 2021-2022 projections are higher than 2020-2021 projections which is primarily attributable to:
  - Lower starting Gross load (GWh) for IOUs in the 2021-2022 model as compared to 2020-2021 model
  - Maintained gross load growth at -0.05%
  - Increase of $2.70 from 2020-2021 projection to 2021-2022 actuals due to increase in utility operating costs and capital maintenance costs above the historical average projections for those non-ISO-approved costs
- The trend of the 2022 TAC value for the 2022 projection remains relatively consistent with the 2021 projection.
- The projection also includes capital projects in 2021-2022 plan and all other transmission plan projects not already energized.

Next Steps

- Continue to refine assumptions and costs based on comments received for use in the 2022-2023 transmission plan
- Provide incremental annual updates as part of the annual transmission planning process
- Please submit your comments through the ISO's commenting tool, using the template provided on the process webpage: https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses

Policy-driven Assessment Updates

Nebiyu Yimer
Senior Advisor, Regional Transmission South

2022-2023 Transmission Planning Process Stakeholder Meeting
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Recap of February and July 2022 Presentations

- In February, we presented the study plan for the policy-driven assessment including scope, description of the base portfolio and the deliverability assessment methodology
- In July, we presented updates to the study plan resulting from subsequent recommendations from CPUC and CEC
  - Updated load forecast that included Additional Transportation Electrification (ATE)
  - Sensitivity portfolio extended to 2035 based on the 30 MMT High Electrification scenario
  - To identify MIC expansion opportunities and transmission needs related to out-of-CAISO long-lead time resources, such as OOS wind and geothermal resources while preserving the existing transmission capacity (TPD) that has been allocated to other projects earlier in the queue.
- The ISO's intention to update deliverability study dispatch assumptions for energy storage

Updates Since the July Meeting

1. Adjustments to the base portfolio to account for additional in-development resources that were not included in the CPUC list - https://files.cpuc.ca.gov/energy/modeling/BaseCase_updated_in-dev_andTPD_9-21-22.xlsx
2. Resource additions and adjustments in the base and sensitivity portfolios, respectively, to implement the CPUC/CEC recommendation regarding performing the assessment while preserving the TPD that has already been allocated to projects.

   Resource additions needed to the base portfolio - https://files.cpuc.ca.gov/energy/modeling/BaseCase_updated_in-dev_andTPD_9-21-22.xlsx

   Sensitivity portfolio adjustment - https://files.cpuc.ca.gov/energy/modeling/BusbarMapping_30MMT_HESens_Dashboard_08_22_22_TPD_v2.xlsx
3. Implemented the updated 50% deliverability study dispatch assumption for energy storage for the SSN scenario
4. Included MIC expansion requests that were found to be valid

Portfolio adjustments made to account for additional in-development Resources

- CAISO staff collaborated with CPUC staff in identifying portfolio adjustments (reductions) that were needed to account for additional in-development resources PTOs modeled that were not included in the CPUC's in-development resources list (possibly due to time lag).
- Adjustment primarily affected SCE area due to the amount of the additional in-development resources modeled in the base cases per the TPP study plan
- For the base portfolio, a large portion of these additional resources were accounted for by reduction in the amount of generic portfolio resources. Up coming slides provide a breakdown of the portfolio adjustments by RESOLVE resource area and type
- In the case of the sensitivity portfolio, the additional resources were accounted for before its transmittal to the ISO.

Implementation of the CPUC/CEC's recommendation regarding TPD allocated-resources

- CAISO and CPUC staff collaborated in identifying portfolio adjustments and resource additions that are needed to perform the deliverability assessment of the portfolio while preserving the TPD that is already allocated to projects in the queue.
- Primarily affected areas are SCE EOP, Eastern, NOL and SDG&E areas due to the location of OOBAA resources and MIC expansion requests
- The portfolio adjustment was performed in three steps as follows:
  - Identify and disregard TPD allocated resources in the relevant areas that are already modeled as "in-development" resources
  - Identify and disregard TPD allocated resources that can be deemed to be already included as generic portfolio resources considering their location with respect to transmission constraints
  - In the case of the base portfolio, add the remaining TPD allocated resources that are not accounted for in the above steps or
  - In the case of the sensitivity portfolio, all of the remaining TPD allocated resources accounted for by making adjustments to the portfolio

Base portfolio adjustments and additions – Non-storage resources

PSP Portfolio – 38 MMT base case with 2020 IEPR and High E		Total Resources in Transmitted Portfolio			Updated In-Develop Resources			Updated Incremental Generic Resources			Unaccounted for TPD Allocations
RESOLVE Resource Name	Resource Type	FCDS	EODS	TOTAL	FCDS	EODS	Total	FCDS	EODS	Total	FCDS
InState Biomass	Biomass/Biogas	134	-	**134**	5	-	**5**	129	-	**129**	**-**
Solano_Geothermal	Geothermal	79	-	**79**	-	-	**-**	79	-	**79**	**-**
Northern_California_Geothermal	Geothermal	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Inyokern_North_Kramer_Geothermal	Geothermal	40	-	**40**	48	-	**48**	-	-	**-**	**-**
Southern_Nevada_Geothermal	Geothermal	440	-	**440**	-	-	**-**	440	-	**440**	**-**
Riverside_Palm_Springs_Geothermal	Geothermal	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Greater_Imperial_Geothermal	Geothermal	600	-	**600**	-	-	**-**	600	-	**600**	**-**
Distributed Solar	Solar	125	-	**125**	4	-	**4**	122	-	**122**	**-**
Greater_LA_Solar	Solar	-	1,503	**1,503**	-	-	**-**	-	1,502	**1,502**	-
Northern_California_Solar	Solar	-	-	**-**	-	-	**-**	-	-	**-**	-
Southern_PGAE_Solar	Solar	1,022	1,781	**2,803**	882	103	**985**	140	1,677	**1,817**	-
Tehachapi_Solar	Solar	1,751	3,002	**4,753**	1,300	981	**2,281**	302	2,233	**2,535**	-
Greater_Kramer_Solar	Solar	385	1,071	**1,456**	277	872	**1,149**	57	715	**772**	464
Southern_NV_Eldorado_Solar	Solar	770	1,946	**2,716**	122	387	**509**	736	1,606	**2,342**	-
Riverside_Solar	Solar	862	1,106	**1,968**	1,209	1,104	**2,313**	-	-	**-**	172
Arizona_Solar	Solar	600	1,281	**1,881**	-	-	**-**	600	1,281	**1,881**	183
Imperial_Solar	Solar	100	200	**300**	-	-	**-**	100	200	**300**	-
Northern_California_Wind	Wind	305	351	**656**	-	-	**-**	305	351	**656**	**-**
Solano_Wind	Wind	272	148	**420**	80	-	**80**	192	148	**340**	**-**
Humboldt_Wind	Wind	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Kern_Greater_Carrizo_Wind	Wind	60	-	**60**	-	-	**-**	60	-	**60**	**-**
Carrizo_Wind	Wind	287	-	**287**	99	-	**99**	188	-	**188**	**-**
Central_Valley_North_Los_Banos_Wind	Wind	186	-	**186**	-	-	**-**	186	-	**186**	**-**
Tehachapi_Wind	Wind	275	-	**275**	188	-	**188**	93	-	**93**	**-**
Southern_Nevada_Wind	Wind	442	-	**442**	-	-	**-**	442	-	**442**	**-**
Riverside_Palm_Springs_Wind	Wind	106	-	**106**	114	-	**114**	-	-	**-**	**-**
Baja_California_Wind	Wind	600	-	**600**	-	-	**-**	600	-	**600**	**-**
Wyoming_Wind/Idaho_Wind	OOS Wind, New Tx	1,062	-	**1,062**	-	-	**-**	1,062	-	**1,062**	**-**
New_Mexico_Wind	OOS Wind, New Tx	438	-	**438**	-	-	**-**	438	-	**438**	**-**
SW_Ext_Tx_Wind	OOS Wind, Ext Tx	610	-	**610**	605	-	**605**	5	-	**5**	**-**
NW_Ext_Tx_Wind	OOS Wind, Ext Tx	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Humboldt_Bay_Offshore_Wind	Offshore Wind	-	120	**120**	-	-	**-**	-	120	**120**	**-**
Morro_Bay_Offshore_Wind	Offshore Wind	1,588	-	**1,588**	-	-	**-**	1,588	-	**1,588**	**-**
Diablo_Canyon_Offshore_Wind	Offshore Wind	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Total Non-Storage		**13,139**	**12,509**	**25,647**	**4,933**	**3,446**	**8,380**	**8,464**	**9,833**	**18,297**	**819**

Base portfolio adjustments additions – Storage resources

PSP Portfolio – 38 MMT base case with 2020 IEPR and High E		Total Resources in Transmitted Portfolio			Updated In-Develop Resources			Updated Incremental Generic Resources			Unaccounted for TPD Allocations
RESOLVE Resource Name	Resource Type	FCDS	EODS	TOTAL	FCDS	EODS	Total	FCDS	EODS	Total	FCDS
Greater_LA_Li_Battery	Li_Battery	2,861	-	**2,861**	544	-	**544**	2,390	-	**2,390**	-
Northern_California_Li_Battery	Li_Battery	607	-	**607**	407	-	**407**	200	-	**200**	-
Southern_PGAE_Li_Battery	Li_Battery	1,624	-	**1,624**	518	-	**518**	1,107	-	**1,107**	-
Tehachapi_Li_Battery	Li_Battery	3,051	-	**3,051**	2,286	-	**2,286**	822	-	**822**	-
Greater_Kramer_Li_Battery	Li_Battery	869	-	**869**	772	-	**772**	400	-	**400**	289
Southern_NV_Eldorado_Li_Battery	Li_Battery	1,236	-	**1,236**	440	-	**440**	863	-	**863**	711
Riverside_Li_Battery	Li_Battery	1,608	-	**1,608**	2,572	-	**2,572**	0	-	**0**	1,427
Arizona_Li_Battery	Li_Battery	759	-	**759**	-	-	**-**	759	-	**759**	998
Imperial_Li_Battery	Li_Battery	50	-	**50**	40	-	**40**	10	-	**10**	295
San_Diego_Li_Battery	Li_Battery	899	-	**899**	150	-	**150**	749	-	**749**	100
Total Battery		**13,564**	**-**	**13,564**	**7,729**		**7,729**	**7,299**		**7,299**	**3,820**
Riverside_West_Pumped_Storage	LDES	-	-	**-**	-	-	**-**	-	-	**-**	**-**
Tehachapi_LDES	LDES	500	-	**500**	-	-	**-**	500	-	**500**	**-**
Riverside_East_Pumped_Storage	LDES	-	-	**-**	-	-	**-**	-	-	**-**	**-**
San_Diego_Pumped_Storage	LDES	500	-	**500**	-	-	**-**	500	-	**500**	**-**
Total LDES		**1,000**	**-**	**1,000**	**-**		**-**	**1,000**		**1,000**	**-**
Storage Total		**14,564**		**14,564**	**7,729**		**7,729**	**8,299**		**8,299**	**3,820**
Total Storage+Resources		**27,702**	**12,509**	**40,211**	**12,662**	**3,446**	**16,109**	**16,764**	**9,833**	**26,597**	**4,639**

Sensitivity portfolio adjustments

RESOLVE Resource Name	Resource Type	Adjusted Mapping Summary			Initial Sensitivty Mapping (7/01/22)			Difference		
		FCDS	EODS	TOTAL	FCDS	EODS	Total	FCDS	EODS	Total
InState Biomass	Biomass/Biogas	134	-	**134**	134	-	**134**	-	-	-
Solano_Geothermal	Geothermal	79		**79**	79		**79**	-	-	-
Northern_California_Geothermal	Geothermal	-		**-**	-		**-**	-	-	-
Inyokern_North_Kramer_Geothermal	Geothermal	48		**48**	48		**48**	-	-	-
Southern_Nevada_Geothermal	Geothermal	440		**440**	440		**440**	-	-	-
Northern_Nevada_Geothermal	Geothermal	327		**327**	327		**327**	-	-	-
Riverside_Palm_Springs_Geothermal	Geothermal	-		**-**	-		**-**	-	-	-
Greater_Imperial_Geothermal	Geothermal	900		**900**	900		**900**	-	-	-
Distributed Solar	Solar	125	-	**125**	125	-	**125**	-	-	-
Greater_LA_Solar	Solar	125	1,928	**2,053**	75	2,128	**2,203**	50	(200)	**(150)**
Northern_California_Solar	Solar	344	1,512	**1,856**	344	1,512	**1,856**	-	-	-
Southern_PGAE_Solar	Solar	3,535	7,439	**10,974**	3,535	7,439	**10,974**	-	-	-
Tehachapi_Solar	Solar	3,031	4,952	**7,983**	3,031	4,952	**7,983**	-	-	-
Greater_Kramer_Solar	Solar	900	2,281	**3,181**	770	2,411	**3,181**	130	(130)	-
Southern_NV_Eldorado_Solar	Solar	1,320	4,196	**5,516**	1,320	4,196	**5,516**	-	-	-
Riverside_Solar	Solar	1,817	3,495	**5,312**	2,067	3,690	**5,757**	(250)	(195)	**(445)**
Arizona_Solar	Solar	634	2,592	**3,226**	800	1,831	**2,631**	(166)	761	**595**
Imperial_Solar	Solar	100	553	**653**	125	528	**653**	(25)	25	-
Northern_California_Wind	Wind	305	351	**656**	305	351	**656**	-	-	-
Solano_Wind	Wind	321	196	**517**	321	196	**517**	-	-	-
Humboldt_Wind	Wind	-	-	**-**	-	-	**-**	-	-	-
Kern_Greater_Carrizo_Wind	Wind	60	-	**60**	60	-	**60**	-	-	-
Carrizo_Wind	Wind	287	-	**287**	287	-	**287**	-	-	-
Central_Valley_North_Los_Banos_Wind	Wind	186	-	**186**	186	-	**186**	-	-	-
North_Victor_Wind	Wind	100	-	**100**	100	-	**100**	-	-	-
Tehachapi_Wind	Wind	281	-	**281**	281	-	**281**	-	-	-
Southern_Nevada_Wind	Wind	442	-	**442**	442	-	**442**	-	-	-
Riverside_Palm_Springs_Wind	Wind	116	-	**116**	116	-	**116**	-	-	-
Baja_California_Wind	Wind	600	-	**600**	600	-	**600**	-	-	-
Wyoming_Wind	OOS Wind	1,500	-	**1,500**	1,500	-	**1,500**	-	-	-
Idaho_Wind	OOS Wind	1,000	-	**1,000**	1,000	-	**1,000**	-	-	-
New_Mexico_Wind	OOS Wind	2,328	-	**2,328**	2,328	-	**2,328**	-	-	-
SW_Ext_Tx_Wind	OOS Wind	610	-	**610**	610	-	**610**	-	-	-
NW_Ext_Tx_Wind	OOS Wind	-	-	**-**	-	-	**-**	-	-	-
Humboldt_Bay_Offshore_Wind	Offshore Wind	1,487	120	**1,607**	1,487	120	**1,607**	-	-	-
Morro_Bay_Offshore_Wind	Offshore Wind	3,100	-	**3,100**	3,100	-	**3,100**	-	-	-
Diablo_Canyon_Offshore_Wind	Offshore Wind	-	-	**-**	-	-	**-**	-	-	-
Greater_LA_Li_Battery	Li_Battery	4,055	-	**4,055**	5,139	-	**5,139**	(1,084)	-	**(1,084)**
Northern_California_Li_Battery	Li_Battery	2,198	-	**2,198**	2,198	-	**2,198**	-	-	-
Southern_PGAE_Li_Battery	Li_Battery	6,074	-	**6,074**	6,074	-	**6,074**	-	-	-
Tehachapi_Li_Battery	Li_Battery	3,884	-	**3,884**	3,884	-	**3,884**	-	-	-
Greater_Kramer_Li_Battery	Li_Battery	1,904	-	**1,904**	2,224	-	**2,224**	(320)	-	**(320)**
Southern_NV_Eldorado_Li_Battery	Li_Battery	2,711	-	**2,711**	2,711	-	**2,711**	-	-	-
Riverside_Li_Battery	Li_Battery	4,110	-	**4,110**	3,305	-	**3,305**	805	-	**805**
Arizona_Li_Battery	Li_Battery	1,798	-	**1,798**	1,229	-	**1,229**	569	-	**569**
Imperial_Li_Battery	Li_Battery	415	-	**415**	250	-	**250**	165	-	**165**
San_Diego_Li_Battery	Li_Battery	1,254	-	**1,254**	1,389	-	**1,389**	(135)	-	**(135)**
SPGE_LDES	LDES	300	-	**300**	300	-	**300**	-	-	-
Tehachapi_LDES	LDES	500	-	**500**	500	-	**500**	-	-	-
Riverside_East_Pumped_Storage	LDES	700	-	**700**	700	-	**700**	-	-	-
San_Diego_Pumped_Storage	LDES	500	-	**500**	500	-	**500**	-	-	-
Total		**56,983**	**29,614**	**86,598**	**57,244**	**29,353**	**86,598**	**(261)**	**261**	**-**

MIC expansion requests being assessed

No.	Requestor Name	Intertie Name (Scheduling Point)	MW quantity	Resource type
1-4	San Diego Community Power	IID-SCE_ITC (MIR2)	150	Hybrid (Solar/ Battery)
		ELDORADO_ITC (WILLOWBEACH)	333	Wind
5-7	Valley Electric Association	MEAD_ITC (MEAD 230)	33	Hydro
8			90	Solar
9-10	Sonoma Clean Power	GONDIPPDC_ITC (GONIPP)	68	Geothermal
		MERCHANT_BG (ELDORADO230)	40	
		IID-SDGE_BG (IVLY2)	50	
		SILVERPK_BG (SILVERPEAK55)	13	
11	East Bay Community Energy	SUMMIT_ITC (SUMMIT120)	40	Geothermal
		SILVERPK_BG (SILVERPEAK55)		
12	Peninsula Clean Energy	IID-SCE_ITC (MIR2)	26	Geothermal
13	Southwestern Power Group II, LLC	PALOVRDE_ITC (PVWEST)	1257	Wind

Future improvements being considered to minimize similar post-transmittal portfolio adjustments

- The ISO has provided to the CPUC TPD allocation data (as confidential data for now) for use in the CPUC portfolio development and mapping process
- As part of the CPUC's portfolio development and mapping process, CPUC/ISO staff are considering requesting the transmission planning side of PTOs:
  - To review the in-development resource data the CPUC is utilizing; and
  - Share any additional in-development resources that they plan to include in the next TPP base cases in accordance with the inclusion criteria TPP study plan

Next steps

- Preliminary results of the policy-driven assessment will be presented at the November 17 stakeholder meeting

Economic Assessment Assumption Update for 2022-2023 Planning Cycle

Yi Zhang

2022-2023 Transmission Planning Process Stakeholder Meeting
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Key assumptions and inputs for the ISO PCM development in 2022-2023 cycle

- Use the ADS PCM 2032 for the models of systems outside CAISO, with following changes for the CAISO system models
- ISO TPP 2032 summer peak bulk power flow case for policy study
  - Transmission network model of the CAISO system
  - Load and load modifiers allocation
- CEC load forecasts for California ISO load
- CPUC portfolios for California ISO renewable and battery

Two PCM cases in this TPP cycle

- Base PCM
  - CEC 2032 mid-AAEE high electrification load forecast
    - AAEE, AATE, AAFS, and BTM PV are modeled as resource
  - CPUC base portfolio
- Sensitivity PCM
  - CEC 2035 mid-AAEE high electrification load forecast
  - CPUC 30 MMT portfolio

Current status and next step

- The CAISO is developing the planning PCM cases
- Will present preliminary results in the November stakeholder meeting

Day 2 - Wrap-up
Reliability Assessment and Study Updates

Brenda Corona
Stakeholder Engagement and Policy Specialist

2022-2023 Transmission Planning Process Stakeholder Meeting
September 27-28, 2022

Request Window Submissions for Reliability Assessment

- Request Window closes October 15
  - Request Window is for alternatives in the reliability assessment
  - Stakeholders requested to submit comments to: requestwindow@caiso.com
  - ISO will post Request Window submission on the market participant portal

Comments

- Comments due by end of day October 12, 2022

- Submit comments through the ISO's commenting tool, using the template provided on the process webpage:
- https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/2022-2023-Transmission-planning-process