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CEERT Comments 23-EIPR-04

Additional submitted attachment is included below.



May 9, 2023

Commissioner Patty Monahan
Commissioner Siva Gunda

RE: Docket 23-IEPR-04
Accelerating Interconnection of Clean Energy Resources with the Bulk Power System

Esteemed Commissioners:

The Center for Energy Efficiency and Renewable Technologies (CEERT) appreciates the opportunity to comment on the proposed focus for the 2023 Integrated Energy Policy Report (IEPR). We strongly believe that the attention of state energy policy makers is urgently required to identify and effectuate solutions that will accelerate the deployment of clean energy resources to the bulk power system in order to meet California's climate goals. At the recent May 4 Commission workshop it was made absolutely clear that California needs to sustain deployment of renewable power sources and battery energy storage systems at unprecedented levels of at least seven gigawatts annually for the next decade.

In order to meet this level of deployment California's bulk transmission system will need to be transformed in a very fundamental way. A system that was largely built out before 1980 to deliver electricity from fossil, nuclear and hydroelectric generation will need to be expanded to delivery enormous quantities of solar, wind and geothermal energy from locations across California and from neighboring states. At the May 4 workshop we heard that the California Independent System Operator (CAISO) has put forward a zonal approach to transmission planning that is intended to coordinate the development of new transmission assets with the interconnection of new sources of generation and procurement of selected generation by load serving entities.

CEERT strongly supports the CAISO's zonal approach and believes that the soon-to-be-adopted 2022-2023 Transmission Plan will be a significant step forward in putting this approach into action. CEERT expects that the 2023-2024 Transmission Planning Process, which is currently underway, will further advance the transformation of California's electric grid. CEERT recommends that it include a focus on opportunities to develop the abundant solar potential in the lower Central Valley through major upgrades to Path 15 and connections to the Greater Bay Area and the Los Angeles Basin. CEERT has been briefed on a report being developed by The Nature Conservancy on suitable lands for solar development in the Central Valley and encourages the Commission to incorporate information from this report on the opportunity for Central Valley solar development into the IEPR



The focus of CEERT’s policy recommendations in the remainder of these comments will be on barriers and solutions to accelerate the installation of transmission system projects and network upgrades that are necessary for the advancement of renewable energy and battery storage projects that have executed interconnection agreements and are awaiting the construction of planned network upgrades. There are currently 166 projects in the CAISO interconnection queue that have executed agreements for interconnection. The generation capacity from these agreement totals nearly 40 gigawatts. Development of just a portion of these projects would go a long way towards advancing California’s climate goals.

The specific transmission system upgrades needed to connect these 166 projects to the grid have been identified through the CAISO interconnection study process and the costs of the projects have been ascertained. The next step is for the participating transmission owners to finalize designs, procure equipment and construct the projects. There are currently 63 network upgrades that have been identified through the CAISO Generator interconnection and Deliverability Allocation Procedures (GIDAP) process for customers with executed interconnection agreements. Responsibility for building these projects are as follows: Pacific Gas and Electric (PG&E) – 42; Southern California Edison (SCE) – 14; San Diego Gas & Electric (SDG&E) – 3 and Valley Electric Association (VEA) – 4.

To monitor progress of the installation of these projects, the CAISO, in conjunction with the California Public Utilities Commission (CPUC), established the Transmission Development Forum which meets quarterly. At the quarterly meetings Participating Transmission Owners (PTO’s) provide updates on the status of selected projects identified by the GIDAP process and the Transmission Planning Process (TPP). The Forum is open to the public through remote access. However, there are no formal minutes of the meetings. A quarterly spreadsheet of projects that includes expected in-service dates and aggregate impacted megawatts for each project is posted on the CAISO website.

The CPUC Public Advocates Office has recommended that a Comprehensive Forum Meeting be held periodically at which energy policy makers, stakeholders and the public could get a big picture understanding of backlogs, reasons for delay and PTO plans to address problems. The Public Advocates Office also expressed alarm at PG&E’s “massive backlog” of 83 CAISO approved projects emanating from previous Transmission Plans and interconnection



agreements.¹ CEERT agrees that elevation of attention on the delays of transmission projects is needed with a particular focus on PG&E’s problems.²

CEERT has reviewed the most recent Transmission Development Forum spreadsheets for projects approved from previous transmission plans and for network upgrades identified in interconnection agreements and confirms that PG&E’s backlog for both types of projects is many times greater than for the other PTO’s. We are providing as addenda to these comments PDFs of pending PG&E projects. The spreadsheets themselves can be found at <http://www.caiso.com/informed/Pages/MeetingsEvents/UserGroupsRecurringMeetings/Default.aspx>.

To provide a snapshot of the impact on interconnection, CEERT has ranked PG&E’s pending projects by the aggregate megawatts in the queue with executed large-generator interconnection agreements. It can be readily observed that delays in the execution of these projects could have a major impact on California’s efforts to meet its climate goals.

PG&E Network Upgrades Ranked by Impact on Interconnection Customers

Network Upgrades	Type of Upgrade	Expected CPUC Permit Application	Expected In-Service Date	Aggregate MW in Queue with Executed LGIA
Gates 230 kV circuit breakers 352, 362 and 372 overstress mitigation	Reliability	10/24/22	5/23/23	2993
QC8RAS-08 RAS (Deliverability Triggered RNU)	Deliverability		5/3/24	2871
Tesla 500 kV circuit breakers 542 and 642 overstress	Reliability	3/29/24	9/24/24	2680
Gates Substation 230 kV Bus Overstress	Reliability	1/31/24	3/31/25	2300

¹ Comments of the CPUC Public Advocates Office on January 25, 2023 stakeholder call discussion, CAISO Transmission Development Forum Q1 2023 Reports.

² The draft 2022-2023 CAISO Transmission Plan identifies 24 reliability-driven transmission projects. Sixteen of those project would be assigned to PG&E with a total estimated budget of \$1,134.5 million.



Metcalf Substation 230 kV capacitor circuit breakers overstress	Reliability	10/22/24	2/26/26	2195
Gates 230kV Bus E and CB 312, 322, 2102, 2202 overload mitigation	Reliability	8/6/21	5/31/23	1994
Vaca-Dixon Substation 230 kV circuit breakers 442, 452 and 462 overstress	Reliability	3/18/24	8/14/25	1841
Metcalf 115kV breakers Overstress (almost all breakers)	Reliability	5/2/25	2/5/26	1145
Re-conductor Los Banos-Quinto SS 230 kV Line	Deliverability	3/3/22	5/10/23	1111
Tesla 500 kV circuit breaker 612 overstress	Reliability	8/22/24	10/28/24	850
Cottonwood Substation 230 kV Circuit Breaker 522 and 542 Overstress	Reliability	8/29/23	9/4/24	700
Re-conductor Dos Amigos PP-Panoche #3 230 kV Line	Deliverability	9/17/24	4/30/25	632
Re-conductor Borden-Gregg #2 230 kV Line	Deliverability	8/8/25	1/16/26	632
Re-conductor Borden-Gregg #1 230 kV Line	Deliverability	1/30/26	5/7/26	632
New 230 kV switching station to loop Dos Amigos–Panoche # 3 230 kV	Deliverability		12/31/28	632
Re-conductor Padre Flat SS-Panoche #1 230 kV Line	Deliverability	9/21/23	5/10/24	600

In written comments made in the Transmission Development forum, the CPUC Public Advocates Office recommended that the CAISO consider market alternatives to alleviate PG&E’s problems in their timely completion of transmission projects. CEERT agrees that this problem of continued delays by PG&E merits the attention of the CAISO and other energy policy makers. We believe that it would be appropriate for the Commission to schedule a



dedicated workshop to dive deeper into this issue and consider alternative solutions including assignment of responsibility for completing the projects to other capable parties.

CEERT appreciates your consideration of our comments and recommendations as you prepare the 2023 IEPR. We look forward to continued participation in the process.

Sincerely,

V. John White, Executive Director

Ed Smeloff, Technical Consultant

Approved PG&E Transmission Projects

Project	PTO	Transmission Plan Approved	In-service Date at Approval in Transmission Plan	Expected In-Service Date 2020-2021 Transmission Plan	Expected In-Service Apr 2023 TDF	Expected CPUC Permit Application Filing	Expected Construction Start
Metcalf-Piercy & Swift and Newark-Dixon Landing 115 kV Upgrade	PG&E	2003	2008	2029	Dec-27	TBD	Dec-26
Rio Oso 230/115 kV Transformer Upgrades	PG&E	2007	2009	2024	Dec-25	N/A	Jul-22
Pittsburg 230/115 kV Transformer Capacity Increase	PG&E	2007	2011	2025	Jun-26	N/A	Apr-25
South of San Mateo Capacity Increase	PG&E	2007	2009	2027	Jun-27	TBD	Mar-26
Maple Creek Reactive Support	PG&E	2009	2011	2026	Dec-27	TBD	Dec-26
Clear Lake 60 kV System Reinforcement	PG&E	2009	2012	2027	Dec-28	TBD	Dec-27
Moraga-Castro Valley 230 kV Line Capacity Increase Project	PG&E	2010-2011	2013	2025	Oct-24	TBD	Aug-24
Cascade 115/60 kV No.2 Transformer Project	PG&E	2010-2011	2014	2023	Dec-24	N/A	Jul-19
Vierra 115 kV Looping Project	PG&E	2010-2011	2014	2025	May-25	PTC: A.18-06-004	Jan-24
Midway-Kern PP Nos. 1,3 and 4 230 kV Lines Capacity Increase	PG&E	2010-2011	2013	2025	May-25	N/A	Apr-21
Oro Loma 70 kV Area Reinforcement	PG&E	2010-2011	2015	2026	Dec-26	NOC - May 2024	Jan-26
Wilson 115 kV Area Reinforcement	PG&E	2010-2011	2015	2026	Jan-28	N/A	May-25
East Shore-Oakland J 115 kV Reconductoring Project	PG&E	2011-2012	2015	2022	Dec-23	NOC: AL 5872E	Jun-21
Rio Oso Area 230 kV Voltage Support	PG&E	2011-2012	2016	2024	Jun-25	N/A	Aug-24
Kern PP 115 kV Area Reinforcement	PG&E	2011-2012	2016	2027	Aug-27	NOC	Jan-25
North Tower 115 kV Looping Project	PG&E	2011-2012	2015	2030	Jan-30	TBD	Jan-28
Wilson-Le Grand 115 kV line reconductoring	PG&E	2012-2013	2020	2022	Nov-23	NOC: AL 5293-E	Jan-21
Warnerville-Bellota 230 kV line reconductoring	PG&E	2012-2013	2017	2024	Apr-24	NOC: AL 6047-E	Jun-22
Monta Vista 230 kV Bus Upgrade	PG&E	2012-2013	2016	2024	Jul-25	N/A	Jun-18
Lockeford-Lodi Area 230 kV Development	PG&E	2012-2013	2017	2027	Jan-29	CPCN Q2 2023	Feb-27
Midway-Temblor 115 kV Line Reconductor and Voltage Support	PG&E	2012-2013	2018	2027	Feb-29	NOC - April 2026	Jul-26
North of Mesa Upgrade	PG&E	2012-2013	2019		Oct-32	CPCN	Jul-26
Glenn 230/60 kV Transformer No. 1 Replacement	PG&E	2013-2014	2018	2022	Oct-23	N/A	Apr-20
Midway – Kern PP #2 230 kV Line	PG&E	2013-2014	2019	2024	Apr-27	NOC: AL 5026-E	Nov-18
Morgan Hill Area Reinforcement (formerly Spring 230/115 kV substation)	PG&E	2013-2014	2021	2026	Sep-27	NOC: AL 5200-E	Jul-25
Mosher Transmission Project	PG&E	2013-2014	2017	2027	Dec-27	NOC - April 2026	Jan-27
Midway – Kern PP #2 230 kV Line	PG&E	2013-2014	2019	2024	May-28	NOC: AL 5924-E	Nov-24
Estrella Substation Project	PG&E	2013-2014	2019	2026	Jul-29	PTC: A.17-01-023	Oct-24
Wheeler Ridge Junction Substation	PG&E	2013-2014	2020		Mar-34	CPCN - TBD on Date	Mar-30
Martin 230 kV Bus Extension	PG&E	2014-2015	2021	2024	Nov-25	CPCN: A.17-12-021	Feb-24

Project	PTO	Transmission Plan Approved	In-service Date at Approval in Transmission Plan	Expected In-Service Date 2020-2021 Transmission Plan	Expected In-Service Apr 2023 TDF	Expected CPUC Permit Application Filing	Expected Construction Start
Panoche – Ora Loma 115 kV Line Reconductoring	PG&E	2015-2016	2021	2023	Mar-24	NOC: AL 5390-E	Jan-22
Newark-Milpitas #1 115 kV Line Limiting Facility Upgrade	PG&E	2017-2018	2019	2022	Dec-24	TBD	Jan-24
Oakland Clean Energy (MORAGA 115KV BUS UPGRADE & BK 3 SW)	PG&E	2017-2018		2023	Apr-25	N/A	Nov-21
Cottonwood 230/115 kV Transformers 1 and 4 Replacement Project	PG&E	2017-2018	2019	2024	Jul-25	N/A	Mar-25
Reedley 70 kV Reinforcement	PG&E	2017-2018	2017	2025	Oct-25	N/A	Feb-24
Vaca Dixon-Lakeville 230 kV Corridor Series Compensation	PG&E	2017-2018	2019	2027	Oct-25	N/A	Mar-25
Vaca Dixon Area Reinforcement	PG&E	2017-2018	2023	2026	Feb-26	PTC - TBD on Filing	Sep-25
Herndon-Bullard 115 kV Reconductoring Project	PG&E	2017-2018	2021	2026	Dec-26	NOC - TBD on Date	Jul-25
Tie line Phasor Measurement Units	PG&E	2017-2018	2020	2026	Aug-27	N/A	Jun-22
Ignacio Area Upgrade	PG&E	2017-2018	2023	2027	Dec-28	TBD	Dec-26
Lakeville 60 kV Area Reinforcement	PG&E	2017-2018	2021	2027	Dec-28	TBD	Dec-27
Red Bluff-Coleman 60 kV Reinforcement	PG&E	2017-2018	2021	2025	Mar-29	NOC	Jul-25
Coburn-Oil Fields 60 kV system project	PG&E	2017-2018	2022	2029	Jun-29	N/A	Jul-27
Giffen Line Reconductoring Project	PG&E	2018-2019		2023	Jan-24	NOC: AL 6600-E	Nov-23
Tesla 230 kV bus D and circuit breakers 372, 382 and 842 overstress	PG&E	2018-2019	2023	2023	Mar-24	N/A	Jun-23
Gates 500 kV Dynamic Voltage Support	PG&E	2018-2019	2025	2025	Aug-24	N/A	Apr-23
Round Mountain 500 kV Dynamic Voltage Support	PG&E	2018-2019	2024	2024	Oct-24	NOC	Jun-23
Ravenswood 230/115 kV transformer #1 Limiting Facility Upgrade	PG&E	2018-2019	2019	2024	Dec-25	TBD	Oct-25
Cottonwood 115 kV Bus Sectionalizing Breaker	PG&E	2018-2019	2022	2025	Mar-26	N/A	Nov-25
Tyler 60 kV Shunt Capacitor	PG&E	2018-2019	2022	2026	May-26	TBD	Oct-25
Jefferson 230 kV Bus Upgrade	PG&E	2018-2019	2022	2026	Dec-26	TBD	Oct-24
South of Mesa Upgrade	PG&E	2018-2019	2023	2026	Apr-27	NOC - Feb 2024	Oct-25
East Marysville 115/60 kV Project	PG&E	2018-2019	2022	2027	Jan-28	N/A	May-26
Christie-Sobrante 115 kV Line Reconductor	PG&E	2018-2019	2022	2028	May-28	TBD	Jan-25
Gold Hill 230/115 kV Transformer Addition Project	PG&E	2018-2019	2022	2028	Jun-28	TBD	Feb-27
Moraga-Sobrante 115 kV Line Reconductor	PG&E	2018-2019	2023		TBD	TBD	TBD
East Shore 230 kV Bus Terminals Reconfiguration	PG&E	2019-2020	2024	2026	Dec-25	TBD	Dec-24
Tuluca-Napa #2 60 kV Line Capacity Increase	PG&E	2019-2020	2023	2026	Dec-25	TBD	Dec-24
Salinas-Firestone #1 and #2 60 kV Lines	PG&E	2019-2020	2024	2025	Dec-26	TBD	Dec-25
Newark 230/115 kV Transformer Bank #7 Circuit Breaker Addition	PG&E	2019-2020	2024	2026	Dec-26	TBD	Dec-25
Borden 230/70 kV Transformer Bank #1 Capacity Increase	PG&E	2019-2020	2025	2027	Dec-27	TBD	Dec-26
Moraga 230 kV Bus Upgrade	PG&E	2019-2020	2024	2027	Dec-28	TBD	Dec-27
Wilson-Oro Loma 115kV Line Reconductoring	PG&E	2019-2020	2026	2026	Dec-28	TBD	Dec-27
Kasson – Kasson Junction 1 115 kV Line Section Reconductoring Project	PG&E	2020-2021	2023	2027	Nov-23	TBD	Aug-23

Project	PTO	Transmission Plan Approved	In-service Date at Approval in Transmission Plan	Expected In-Service Date 2020-2021 Transmission Plan	Expected In-Service Apr 2023 TDF	Expected CPUC Permit Application Filing	Expected Construction Start
Manteca #1 60 kV Line Section Reconductoring Project	PG&E	2020-2021	2024	2027	Jan-25	TBD	Nov-24
Series Compensation on Los Esteros-Nortech 115 kV Line	PG&E	2021-2022	2023	2023	Dec-24	TBD	Oct-23
Vasona-Metcalf 230 kV Line Limiting Elements Removal Project	PG&E	2021-2022	2025	2025	May-25	TBD	Oct-24
Contra Costa PP 230 kV Line Terminals Reconfiguration Project	PG&E	2021-2022	2025	2025	May-25	TBD	Feb-24
Atlantic 230/60 kV transformer voltage regulator	PG&E	2021-2022	2026	2026	May-26	TBD	Feb-25
Manteca-Ripon-Riverbank-Melones Area 115 kV Line Reconductoring	PG&E	2021-2022	2028	2028	May-26	TBD	May-25
Weber-Mormon Jct 60 kV Line Section Reconductoring Project	PG&E	2021-2022	2027	2027	May-26	TBD	May-25
Cooley Landing 60 kV Substation Circuit Breaker No #62 Upgrade	PG&E	2021-2022	2026	2026	Dec-26	TBD	Jun-26
Moss Landing – Las Aguilas 230 kV Series Reactor Project	PG&E	2021-2022	2026	2026	Dec-26	TBD	Jun-25
Cortina 230/115/60 kV Transformer Bank No. 1 Replacement Project	PG&E	2021-2022	2027	2027	May-27	TBD	Oct-25
Coppermine 70 kV Reinforcement Project	PG&E	2021-2022	2027	2027	Dec-27	TBD	Dec-26
Table Mountain Second 500/230 kV Transformer	PG&E	2021-2022	2027	2027	Dec-27	TBD	Oct-25
New Collinsville 500 kV substation	PG&E	2021-2022	2028	2028	Dec-28	TBD	Jun-26
New Manning 500 kV substation	PG&E	2021-2022	2028	2028	Dec-28	TBD	Feb-27
Reconductor Delevan-Cortina 230kV line	PG&E	2021-2022	2028	2028	Dec-28	TBD	Dec-27
San Jose Area HVDC 230 kV Line (Newark - NRS)	PG&E	2021-2022	2028	2028	Dec-28	TBD	Oct-27
San Jose Area HVDC 500 kV Line (Metcalf – San Jose)	PG&E	2021-2022	2028	2028	Dec-28	TBD	Mar-26
Reconductor Rio Oso–SPI Jct–Lincoln 115kV line	PG&E	2021-2022	2028	2028	Dec-29	TBD	Dec-28

PG&E Network Upgrades Generator Interconnection

Network Upgrades	Description	PTO	Study	Type of Upgrade	Expected CPUC Permit Application	Expected In-Service April TDF 2023	Aggregate MW in Queue with Executed LGIA
Gates 230 kV circuit breakers 352, 362 and 372 overstress mitigation (Cap Banks)	Replace Gates 230 kV circuit breakers 352, 362 and 372 with 63 kA interrupting capability	PG&E	C12	Reliability	Oct-22	May-23	2993
QC8RAS-08 RAS (Deliverability Triggered RNU)	RAS to trip Generation offline for outage AND overload of either Gates 500/230 kV Transformer Bank 11 or 12	PG&E	C8	Deliverability		May-24	2871
Tesla 500 kV circuit breakers 542 and 642 overstress	Replace Tesla 500 kV circuit breakers 542 and 642 with 63 kA interrupting capability	PG&E	RA-20	Reliability	Mar-24	Sep-24	2680
Gates Substation 230 kV Bus Overstress	Install series bus reactors between Gates Substation 230 kV bus sections E and F	PG&E	C12	Reliability	Jan-24	Mar-25	2300
Metcalf Substation 230 kV capacitor circuit breakers 654, 664, 674 and 684 overstress	Replace Metcalf Substation 230 kV capacitor circuit breakers 654, 664, 674 and 684	PG&E	C13	Reliability	Oct-24	Feb-26	2195
Gates 230kV Bus Section E and CB 312, 322, 2102, 2202 overload mitigation (BAAH)	Convert bus section E to BAAH and move Panoche-Gates #1 and #2 230 kV lines into bus section E	PG&E	C9	Reliability	Aug-21	May-23	1994
Vaca Dixon Substation 230 kV circuit breakers 442, 452 and 462 overstress	Replace Vaca Dixon Substation 230 kV circuit breakers 442, 452 and 462 and associated switches/relays	PG&E	C12	Reliability	Mar-24	Aug-25	1841
Metcalf 115kV breakers Overstress (almost all breakers)	Install 4-3 ohm reactors at low side of Metcalf 115 kV 230kV Transformers	PG&E	RA-20	Reliability	May-25	Feb-26	1145
Re-conductor Los Banos-Quinto SS 230 kV Line	Re-conductor 6.11 mi Quinto-Los Banos 230 kV Line with super bundled 795 ACSS	PG&E	C8	Deliverability	Mar-22	May-23	1111
Tesla 500 kV circuit breaker 612 overstress	Replace Tesla Substation 500 kV CB 612 and associated switches/relays	PG&E	RA-20	Reliability	Aug-24	Oct-24	850
Cottonwood Substation 230 kV Circuit Breaker 522 and 542 Overstress	Cottonwood Substation 230 kV CB Overstress: Replace CB 522 & 542 (rated @ 34.5KA, overstress close-in fault is 35,179A or 2%, 679A).	PG&E	C8	Reliability	Aug-23	Sep-24	700
Re-conductor Dos Amigos PP-Panoche #3 230 kV Line	Re-conductor 23.63 mi Dos Amigos PP-Panoche #3 230 kV Line with 795 ACSS	PG&E	C9	Deliverability	Sep-24	Apr-25	632
Re-conductor Borden-Gregg #2 230 kV Line	Re-conductor 6.25 mi Borden-Gregg #2 230 kV Line with 1113 ACSS	PG&E	C9	Deliverability	Aug-25	Jan-26	632
Re-conductor Borden-Gregg #1 230 kV Line	Re-conductor 6.25 mi Borden-Gregg #1 230 kV Line with 1113 ACSS and upgrade equipment to 2000 A minimum	PG&E	C8	Deliverability	Jan-26	May-26	632
New 230 kV switching station to loop Dos Amigos – Panoche # 3 230 kV	Build a new 2 bay 230 kV BAAH switching station to loop in the Dos Amigos – Panoche # 3 230 kV Line	PG&E	RA-22	Deliverability		Dec-28	632
Re-conductor Padre Flat SS-Panoche #1 230 kV Line	Re-conductor 32.59 mi Q779/Padre Flat SS-Panoche #1 230 kV Line with 795 ACSS	PG&E	C8	Deliverability	Sep-23	May-24	600
Cottonwood Substation 230 kV circuit breakers 232, 242 overstress	Replace Cottonwood Substation 230 kV circuit breakers 232, 242 and associated switches/relays	PG&E	C11	Reliability	Aug-24	Mar-25	500
Contra Costa 230kV Bus Sections D, E and F and circuit breaker 820 overload	Contra Costa PP: Re-conductor Bus Sections D, E and F. Replace circuit breaker 820.	PG&E	C11	Reliability	Dec-24	May-25	491
Ames Distribution 115 kV circuit breaker 132 overstress	Replace Ames Distribution 115 kV circuit breaker 132	PG&E	C12	Reliability	Dec-25	Mar-26	450
Palo Alto 115 kV circuit breakers 412 and 442 overstress	Replace Palo Alto 115 kV circuit breakers 412 and 442 with 63 kA interrupting capability	PG&E	RA-21	Reliability	Oct-26	Nov-27	250
Re-conductor Fulton-Hopland 60 kV Line (Fitch Mountain Tap-Geysers Jct)	Re-conductor Fulton-Hopland 60 kV Line (Fitch Mountain Tap 009/005A-Geysers Jct 016/004) ~7 mi total length with 715 AAC	PG&E	C11	Deliverability	Dec-25	May-26	230

Network Upgrades	Description	PTO	Study	Type of Upgrade	Expected CPUC Permit Application	Expected In-Service April TDF 2023	Aggregate MW in Queue with Executed LGIA
Re-conductor Fulton-Hopland 60 kV Line (Geysers Jct-Cloverdale Jct-Hopland)	Re-conductor 24.21 mi Fulton-Hopland 60 kV Line with 715 AAC and upgrade any limiting equipment	PG&E	C9	Deliverability	Dec-25	May-26	230
Moraga 115 kV circuit breakers 582, 612, 622, 642 and 712 overstress	Replace Moraga 115 kV circuit breakers 582, 612, 622, 642 and 712	PG&E	C12	Reliability	Aug-28	Nov-28	220
Kern PP Substation 115 kV CBs 182, 262 and 282 overstress (BAAH Conversion Phase 1)	Kern PP Sub: Existing PG&E 115 kV BAAH conversion project will cover this replacement.	PG&E	RA-21	Reliability	Jul-21	Nov-24	200
Kern PP Substation 115 kV CBs 182, 262 and 282 overstress (BAAH Conversion Phase 2 - incl CB282)	Kern PP Sub: Existing PG&E 115 kV BAAH conversion project will cover this replacement.	PG&E	RA-21	Reliability	May-25	Dec-25	200
Kern PP Substation 115 kV CBs 182, 262 and 282 overstress (BAAH Conversion Phase 3 - incl CB262)	Kern PP Sub: Existing PG&E 115 kV BAAH conversion project will cover this replacement.	PG&E	RA-21	Reliability	Jan-26	Dec-26	200
Kern PP Substation 115 kV CBs 182, 262 and 282 overstress (BAAH Conversion Phase 4 - incl CB182)	Kern PP Sub: Existing PG&E 115 kV BAAH conversion project will cover this replacement.	PG&E	RA-21	Reliability	Feb-27	Dec-27	200
QC8RAS-02 SPS (Deliverability Triggered RNU)	QC8SPS-02 SPS to trip Q1106 200 MW wind and Hatchet Ridge 102 MW wind for thermal overloads.	PG&E	C8	Deliverability	May-28	Dec-28	200
Open Bitterwater-Wheeler Ridge #2 230 kV Line for loss of Midway-Bitterwater line and overload on Midway-Wheeler Ridge #1 line.	RAS to open Bitterwater-Wheeler Ridge #2 230 kV Line.	PG&E	RA-20	Reliability	May-24	Nov-24	100
Ripon-Manteca 115 kV Line Reconductor	Reconductor Ripon-Manteca 115 kV line 1.51 mi section of 2/0 CU and 0.92 mi 4/0 ACSR (2.43 mi total)	PG&E	C12	Deliverability	Jun-28	Sep-28	99
Stanislaus-Melones Sw Sta-Manteca #1 115 kV Line Reconductor	Reconductor Stanislaus-Melones Sw Sta-Manteca #1 115 kV line 25.23 miles section of various conductors from 018/115-043/277	PG&E	C12	Deliverability	Jun-28	Sep-28	99
Bellota-Riverbank-Melones Sw Sta 115 kV Line 115 kV Line Reconductor	Reconductor a total of 17 miles of Bellota-Riverbank-Melones SW STA 115 kV Line with 477 ACSR	PG&E	C12	Deliverability	Jun-28	Sep-28	99
Stanislaus-Melones SW STA-Riverbank Jct Sw Sta 115 kV Line Reconductor	Reconductor Stanislaus-Melones Sw Sta-Riverbank Jct Sw Sta 115 kV Line 7.53 miles section of various conductors from 000/001-007/043	PG&E	C12	Deliverability	Jun-28	Sep-28	99
North Dublin-Cayetano 230 kV Line	Reconductor North Dublin-Cayetano 230 kV Line 2.63 miles OH Line & 2.82 UG cable with new UG cable 797 MVA/2000 A	PG&E	C11	Deliverability	Sep-24	Feb-25	91
Rio Oso Substation 115 kV circuit breakers 412, 422, 482, 522 and 542 overstress	Replace Rio Oso Substation 115 kV circuit breakers 412, 422, 482, 522 and 542 and associated switches/relays	PG&E	C12	Reliability	Jun-21	Sep-24	50
Gold Hill Substation 115 kV circuit breakers 142 and 172 overstress	Replace Gold Hill Substation 115 kV circuit breakers 142 and 172 and associated switches/relays	PG&E	C12	Reliability	Mar-24	Jan-25	50
Convert Midway Substation 230 kV to BAAH	Convert Midway Substation 230 kV to BAAH in order to install bus reactors & RAS	PG&E	C13	Reliability		Apr-25	0
Contra Costa 230kV SW's 601, 603 overload	Contra Costa PP: Replace 230kV SW's 601 & 603 and jumpers.	PG&E	C11	Reliability	Dec-24	May-25	0
El Cerrito G 115kV CB 112, 142, 132 Overstress	Replace Overstressed Circuit Breakers	PG&E	RA-21	Reliability	Feb-24	Dec-25	0
Tesla MPAC	New 230kV MPAC building relocates 230kV equipment from existing Control Building	PG&E	n/a	Reliability	Mar-25	Dec-25	0
Henrietta Substation 70kV CBs 12 and 72 Overstress	Henrietta Sub: Replace 70kV CB 12 & 72 and switches.	PG&E	RA-21	Reliability	Jul-25	Oct-26	0
New 230kV MPAC building relocates 230kV equipment from existing Morro Bay MPAC	Control Building	PG&E	n/a	Reliability	1/5/26	5/6/27	0