



California ISO
Shaping a Renewed Future

Resource Adequacy Deliverability for Distributed Generation

2014-2015 DG Deliverability Assessment Results

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1 Introduction

In accordance with the ISO tariff section 40.4.6.3, the ISO performed the 2014-2015 Distributed Generation Deliverability (DGD) assessment to determine MW quantities of Potential DGD at specific nodes of the CAISO Controlled Grid for assigning deliverability status to Distributed Generation (DG) Facilities.

Section 2 of this paper provides a high level summary of the study results by participating transmission owner (PTO) service territory. The study model used by the ISO in conducting the annual DG deliverability assessment is described in section 3. Section 4 describes how the Potential DGD at each node is determined. Section 5 provides information intended to help make the detailed results easier to understand.

The detailed results are contained in worksheets attached to this report.

2 DG deliverability assessment results summary

The 2014-2015 DG deliverability assessment results indicate that a total of 2363.33 megawatts of Potential DGD is available at nodes on the ISO grid for assignment of deliverability status to DG resources¹ connected or requesting interconnection below those nodes. The total Potential DGD for each PTO service territory is summarized in the following table. Of these total quantities, some amounts of Potential DGD at specific nodes will be available to municipal utility distribution companies (UDC) for assignment of deliverability status to DG resources on their distribution systems.

¹ For purposes of this study, DG refers to generation resources connected to utility distribution systems. The ISO recognizes that, in some contexts, some parties use the term “distributed generation” to mean resources of certain technology types or below certain size thresholds, and may even include such categories of resources when they are connected to the transmission system. For purposes of this study, however, the term “distributed generation” refers to all generation resources connected to utility distribution systems, without regard to size or resource type.

PTO service territory	Total MW of Potential DGD
SCE	1359.36
SDG&E	133.11
PG&E	870.86
VEA	0.00
Total	2363.33

The detailed nodal amounts of Potential DGD within each PTO service territory are provided in worksheets attached to this report. The following three sections provide a summary of the results for each PTO service territory.

2.1 SCE service territory

There were 42 nodes studied for Potential DGD in the SCE service territory.² The study determined that a total of 1359.36 megawatts of Potential DGD is available at 32 of the 42 nodes including the Potential DGD that was identified but not assigned in the previous DGD cycle. There is none available at the remaining 10 nodes, either because (i) there was no DG designated at these nodes in the base portfolio utilized in the ISO's annual transmission planning process and there were no energy-only interconnection requests in a WDAT/Rule 21 queue or (ii) because of deliverability constraints.

In the SCE service territory, there are four ISO grid nodes with Potential DGD where municipal utility load is served off of their respective distribution systems.³ These four nodes are

- "Laguna Bell" with 5.00 MW of Potential DGD (shared between SCE and Vernon)
- "Lewis" with 15.0 MW of Potential DGD (Anaheim)
- "Mira Loma" with 5.75 MW of Potential DGD (shared between SCE and Corona)
- "Vista" with 10.77 MW of Potential DGD (shared between SCE, Riverside and Colton)

The PDGD is allocated to each load serving entity in proportional to their load share at the node.

² These are the nodes at which DG is designated in any of the resource portfolios used in the ISO's 2014-2015 Transmission Planning Process. This is a subset of the total nodes represented in the power flow model in the SCE service territory. This same situation also applies in the case of PG&E and SDG&E.

³ The load represented is based on the CEC's 2019 coincident peak demand forecast.

Node	PDGD	LSE-1			LSE-2			LSE-3		
		Name	%	PDGD	Name	%	PDGD	Name	%	PDGD
LAGUNA BELL	5.00	SCE	29.04%	1.45	City of Vernon	70.96%	3.55			
MIRA LOMA	5.75	SCE	95.69%	5.50	City of Corona	4.31%	0.25			
VISTA	10.77	SCE	34.06%	3.67	Riverside Public Utility	58.03%	6.25	City of Colton	7.90%	0.85

In the SCE service territory, there are six nodes where the distributed generators contribute to overloads that trigger Special Protection Scheme (SPS) action. Assuming the participation of the generators at the node for the proposed or existing SPS, the deliverable Megawatt for these generators was determined by the next constraint identified in the studies. The Potential DGD should only be assigned to distributed generators that participate in the associated SPS.

- “Goleta” with 9.41 MW of Potential DGD if the DG is participating in the Moorpark SPS that has been identified in the ISO generation interconnection studies.
- “Rector” with 88.96 MW Potential DGD if the DG is participating in the existing Big Creek/San Joaquin SPS.
- “Santa Clara” with 27.15 MW of Potential DGD if the DG is participating in the Ventura SPS that has been identified in the ISO generation interconnection studies.
- “Springville” with 100.95 MW of Potential DGD if the DG is participating in the existing Big Creek/San Joaquin SPS.
- “Vestal” with 118.76 MW of Potential DGD if the DG is participating in the existing Big Creek/San Joaquin SPS.
- “Victor” with 226.67 MW of Potential DGD if the DG is participating in the existing High Desert Power Plant SPS.

2.2 SDG&E service territory

There were 46 nodes studied for Potential DGD in the SDG&E service territory (see footnote 2). A total of 133.11 megawatts of Potential DGD is available for assignment of deliverability status to DG resources at 12 of the 46 nodes. There is none available at the remaining 34 nodes either because (i) there was no DG designated at these nodes in the base portfolio utilized in the ISO’s annual transmission planning process and there were no energy-only interconnection requests in a WDAT/Rule 21 queue and/or (ii) because of deliverability constraints.

2.3 PG&E service territory

There were 452 nodes studied for Potential DGD in the PG&E service territory (see footnote 2). A total of 870.86 megawatts of Potential DGD is available for assignment of deliverability status to DG resources at 157 of the 452 nodes. There is none available at the remaining 295 nodes, either because (i) there was no DG designated at these nodes in the base portfolio utilized in the ISO’s

annual transmission planning process and there was no energy-only interconnection requests in a WDAT/Rule 21 queue, or (ii) because of deliverability constraints.

In the PG&E service territory, there were no nodes with Potential DGD where only municipal utility load is served. There were no ISO grid nodes with Potential DGD at which both PG&E and municipal utility load is served.

In the PGE service territory, there are 25 nodes where the distributed generators contribute to overloads that can be mitigated by tripping generators at those nodes using a Special Protection Scheme (SPS⁴) as identified in latest GIP or earlier studies. Assuming the participation of the generators at the node for the proposed or existing SPS, the deliverable Megawatt for these generators was determined by the next constraint identified in the studies. The Potential DGD should only be assigned to distributed generators that participate in the associated SPS

2.4 VEA service territory

There was one DG node “Vista” in VEA service territory. However, the generator at this node contributes to multiple deliverability constraints identified in the QC7 Phase I study that require network upgrade mitigation. Therefore, no Potential DGD is available in VEA service territory.

3 DG deliverability assessment study model

The study model used by the ISO in the assessment was developed from the most recent ISO generation interconnection deliverability assessment base case. The first step was to model the transmission systems and prior commitment of deliverability that generally included:

- i. Generators that are operational and have obtained Full Capacity Deliverability Status (FCDS) or Partial Capacity Deliverability Status (PCDS)⁵, including the ones obtained FCDS or PCDS in the previous DGD cycles;
- ii. Active generation interconnection requests in the ISO’s and Participating TOs’ generation interconnection queues that requested Full Capacity Deliverability Status or Partial Capacity Deliverability Status in Queue Cluster 7 window or earlier;
- iii. Generation projects that have obtained deliverability using the annual full capacity deliverability option;
- iv. Generation projects that have obtained deliverability in the previous deliverability status assignment;

⁴ The Potential DGD should only be assigned to distributed generators that participate in the associated SPS.

⁵ These generators may not have achieved FCDS or PCDS due to required Network Upgrades not in service yet.

- v. The MW amount of Potential DGD that was identified but not assigned in 2013-2014 DGD cycle, i.e. 2014 unassigned PDGD;
- vi. Transmission upgrades that have been approved in ISO Transmission Planning Process;
- vii. Network Upgrades required for any generation interconnection requests that are under construction or have received regulatory permits.

Next, target DG amounts were determined and added to the study model following the steps described below.

- i. Identify all DG nodes that have non-zero distributed generation MW in one of 2014-2015 Transmission Plan renewable portfolios.
- ii. At each DG node, determine the target additional DG amount. The target additional DG amount at each node was initially set to *{total existing Energy Only DG⁶ + the greatest of the (a) and (b) below}*:
 - a. Maximum DG MW at the node among all renewable portfolios
 - b. Total MW amount of non-NEM WDAT or Rule 21 requests

The target amount was set to 0 at a node if any of the following two conditions was true:

- If the node is within an electrical area for which the Queue Cluster 7 Phase I interconnection studies have showed a need for a Delivery Network Upgrade;
- If the node is within an electrical area for which a Delivery Network Upgrade was identified and then removed in Queue Cluster 3 and 4 Phase II interconnection studies, and the constraint driving the Delivery Network Upgrade is still binding for Queue Cluster 3 and 4 in the Queue Cluster 7 Phase I interconnection studies.

The total MW modeled at a node is equal to $\{FC + \max(\text{target MW, 2014 unassigned PDGD})\}$.

4 DGD determination

This ISO performed deliverability assessment determined the amount of deliverable MW at each node. Part or all of the deliverable MW amount determined was then identified as Potential DGD for assigning Deliverability Status to Distributed Generation Facilities. In general, the Potential DGD is the deliverable MW amount, minus any prior commitments, that does not exceed the sum of existing Energy Only DG and future Energy Only DG. If the initially identified Potential DGD is lower than the 2014 unassigned Potential DGD, the 2014 unassigned Potential DGD is preserved.

⁶ For the purpose of this study, Energy Only DG includes any DG that has requested Energy Only Deliverability Status and not previously obtained Full Capacity Deliverability Status or Partial Capacity Deliverability Status, as well as the portion of a DG that would bring the DG from Partial Capacity Deliverability Status to Full Capacity Deliverability Status.

$$\text{Potential DGD} = \max \{2014 \text{ unassigned PDGD}, \min \{ \text{deliverable MW} - \text{existing FC} - \text{FC interconnection requests}, \text{existing EO} + \max \{ \text{base portfolio}, \text{EO interconnection requests} \} \} \}$$

5 Detailed DG deliverability assessment results

The detailed results are attached to this report. There is one worksheet for each PTO service territory. The following is a listing of the column headings used in the worksheet along with a brief explanation of each.

- A. **DG Node—Substation Name.** Name of the substation representing the DG node.
- B. **DG Node—Transmission Level kV.** The transmission level voltage at the transmission/distribution interface.
- C. **DG in Base Portfolio.** The megawatts of DG at the node in the base portfolio utilized in the ISO's 2014-2015 Transmission Planning Process.
- D. **WDAT/Rule 21 non-NEM DG—EO.** The total megawatts of non-NEM DG at the node in the WDAT queue that have requested Energy Only Deliverability Status and not obtained deliverability previously.
- E. **WDAT/Rule 21 non-NEM DG—FC.** The total megawatts of non-NEM DG at the node in the WDAT or Rule 21 queue that have requested or obtained deliverability.
- F. **Existing non-NEM DG—EO.** The total megawatts of non-NEM DG at the node already in commercial operation that have not obtained deliverability.
- G. **Existing non-NEM DG—FC.** The total megawatts of non-NEM DG at the node already in commercial operation that have obtained deliverability.
- H. **2014 Unassigned PDGD.** The total megawatts of Potential DGD identified but not assigned in the 2013-2014 DG deliverability cycle.
- I. **DG Modeled.** The total megawatts of DG modeled at the node in the DG deliverability assessment.
- J. **DG Deliverable.** The total megawatts of DG determined to be deliverable at the node.
- K. **Potential DGD.** The total megawatt amount of Potential DGD at the node available for assignment of deliverability status to DG resources. Potential DGD is calculated as $\text{Max} (\text{Column H}, \text{Min} (\text{Column J} - \text{Column E} - \text{Column G}, \text{Column F} + \text{Max} (\text{Column C}, \text{Column D})))$.
- L. **Notes.** Comments to help understand the results.