

# 2014 Energy Storage (ES) Request for Offers (RFO)

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**December 1, 2014**

- PG&E intends to issue the 2014 Energy Storage (ES) RFO on **December 1, 2014**
- Procurement Target for the 2014 ES RFO: **74 MW**
  - Transmission Connected ES: 50 MW
  - Distribution Connected ES: 24 MW (after credit of 6 MW of existing ES projects)

### Future Targets for PG&E

	2014	2016	2018	2020	Total
Transmission Connected (MW)	50	65	85	110	310
Distribution System Connected (MW)	30	40	50	65	185
Customer Connected, Behind the Meter (MW)	10*	15	25	35	85
<b>Total (MW)</b>	<b>90</b>	<b>120</b>	<b>160</b>	<b>210</b>	<b>580</b>

\*The 2014 customer-connected ES target was partially met through 9 MW of existing ES projects, and the rest of this target is expected to generally be met through programs outside of this RFO.

- On October 17, 2013, CPUC issued the Final Decision 13-10-040 on energy storage.
- CPUC approved PG&E's ES Application, with modifications, on October 22, 2014.
- CPUC Objectives:
  - (1) The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
  - (2) The integration of renewable energy; and
  - (3) The reduction of greenhouse ("GHG") emissions

- An Independent Evaluator (IE) will be used for the 2014 ES RFO:
- The primary role of the IE is to:
  - Monitor RFO processes to ensure fair and equal treatment of all Participants
  - Monitor evaluation processes to ensure PG&E has implemented methodology as described and that bids are treated consistently
  - Report on proposed transactions to CPUC when filed for CPUC approval
- The IE performs an independent review of all offers
- The IE may review all proposal data and monitor all negotiations of Agreements

	Contract Type	Configuration	What Products Will Use this Contract?
A	<b>Energy Storage Agreement (ESA)</b>	Stand-alone energy storage	ESAs are for stand-alone energy storage products. They'll be the most common contract used for this RFO.
B	<b>Resource Adequacy (RA) Confirmation</b>	Stand-alone energy storage	RA Confirms are for energy storage projects that will provide RA.
C	<b>Amendment to RPS PPA</b>	Hybrid/co-located energy storage & RPS	RPS PPAs are for ES projects co-located with renewable energy under existing contract with PG&E, that would charge <i>only</i> from the renewable energy.
D	<b>Amendment to Conventional PPA</b>	Hybrid energy storage and conventional	Existing conventional agreements will be modified for those ES projects co-located with existing natural gas facilities, with an existing PG&E contract.
E	<b>Purchase and Sale Agreement (PSA)</b>	Energy storage providing distribution deferral benefits (could be dual use)	PSAs will be used for those projects located at sites specified by PG&E, intended to defer distribution line upgrades for 10 years. These projects must be turnkey projects, that are sold to PG&E once complete.
		Energy storage at PG&E owned PV sites	PSAs will be used for turnkey ES projects to be located at 3 specific PG&E-owned PV sites, sold to PG&E once complete.
		Stand-alone energy storage (under consideration)	Stand-alone energy storage products may be sold to PG&E, in addition to the ESA structure.

DATE	EVENT
December 1, 2014	PG&E issues Energy Storage RFO
December 18, 2014	General Participants' Conference
January 5, 2015	Deadline for Notice of Intent (NOI) to bid
January 15, 2015	Offer Form Webinar
February 17, 2015	Deadline for PG&E to receive Offers by 1:00 pm PPT (via Power Advocate)
April 24, 2015	PG&E notifies selected Participants of their Offer eligibility for Shortlist Negotiations
May 1, 2015	Participants notify PG&E whether they accept Shortlist position by 12:00 pm
May – September 2015	PG&E and Participants negotiate and execute Agreements subject to Regulatory Approval
December 1, 2015	PG&E files Application including executed contracts

- PG&E will have a technology-neutral procurement approach.
- Customer-side ES targets are expected to generally be met through existing CPUC programs. However, PG&E will entertain customer connected projects that wish to compete with T&D connected projects in this RFO.
- Projects must be fully developed, permitted, and if applicable, interconnected. PG&E is not seeking technology-only offers. That is, PG&E is not providing sites for developers or technology providers wishing to offer PG&E their specific technology product.

- **Minimum Size Requirements**

- Distribution System Energy Storage – at least 1 MW
- Transmission System Energy Storage – at least 10 MW
  - Multiple 1 MW or larger ES projects can be aggregated to meet the 10 MW size requirement. However, these aggregated projects must meet PG&E's operational needs to economically dispatch as a single resource (likely a single CAISO Resource ID, and metering configured to allow for single messaging and settlements dispatch).
- Distribution Deferral Projects – at least 1 MW

- **Delivery Terms**

- ESA and RA Confirm – no maximum, but PG&E prefers contracts of 10 years or less, due to less experience with storage technologies at this point.
- Amendment to Conventional Agreement – up to the remaining delivery term under the existing contract
- Amendment to RPS PPA – up to the remaining term under the existing contract

- **Commercial Online Date**

- Stand Alone Projects - must commence or have commenced operation between January 1, 2010 and December 31, 2022.
- Hybrid Projects (Storage + Existing Conventional Generation or Storage + RPS Generation) – the generation portion may have existed prior to January 1, 2010, but the energy storage portion must be new and online prior to December 31, 2022.
- PSA: Distribution Deferral Projects – online by 2017 or 2018 (site-specific).
- PSA: ES at PG&E-Owned PV Sites – online by 12/31/17.

- **Site Control**

- Site control not required, but Participant must have exact site identified and must be on track to obtaining site control.

- **Interconnection Status**

- *No interconnection study required at the time of Offer submission. However, Participants must have submitted their application for an interconnection study by execution of an Agreement, for all contract types except PSAs.*
- For distribution deferral PSAs, no interconnection study required by Participant.

- **Credit**

- **Project Development Security (PDS)** – required for all contracts. Payment is due in 2 installments – some money at contract execution, and some money at CPUC approval. Amount varies depending on the type of contract executed.
- **Delivery Term Security (DTS)** – once the COD is achieved, DTS is required for all contracts except PSAs. Amount varies depending on the type of contract executed.

## Appendix

Location	Size (MW)	Duration (Hours)	Guaranteed Site Specific Required Duty Cycle	Guaranteed Commercial Operation Date (latter of the two)
<b>Shingle Springs Bank 2 – Cameron Park, CA</b>	4.0	4.0	1 per day, up to 365 days per year	May 1, 2017, or 12 months after CPUC approval
<b>Kearney Bank 3 – Fresno, CA</b>	1.0	2.0	1 per day, up to 365 days per year	May 1, 2017, or 12 months after CPUC approval
<b>Mendocino Bank 2 – Redwood Valley, CA</b>	1.0	2.0	1 per day, up to 365 days per year	May 1, 2018, or 12 months after CPUC approval
<b>Molino Bank 1 – Sebastopol, CA</b>	1.0	2.0	1 per day, up to 365 days per year	May 1, 2017, or 12 months after CPUC approval
<b>Point Arena Bank 1 – Point Arena, CA</b>	1.0	2.0	1 per day, up to 365 days per year	May 1, 2018, or 12 months after CPUC approval



# Specifications for Energy Storage at PV Sites

Site	Nominal Voltage At Connection Point (See Note 1 Below)	Minimum Guaranteed Dmax (MW) at Year 1- 10 (See Note 3 Below)	Guaranteed Discharge Duration (hours)	Guaranteed Site Specific Required Duty Cycle
<b>Guernsey</b> 21024 10-1/2 Avenue Hanford, Ca. 93234	700VDC (DC side of inverters)	(100kW)x(40 inverter locations) = 4MW	4	1 full discharge and charge per day, for 365 days per year for 10 years
	420VAC (AC side of inverters)	(400kW)x(10 transformers) = 4MW	4	
	12.47kVAC (at the switchgear )	4MW	4	
<b>Huron</b> 17123 West Avenue Huron, Ca. 93234	700VDC	(100kW)x(40 inverter locations) = 4MW	4	1 full discharge and charge per day, for 365 days per year for 10 years
	420VAC	(400kW)x(10 transformers) = 4MW	4	
	12.47kVAC	4MW	4	
<b>Stroud</b> W. Kama Ave near S. Lassen Ave (Hwy 145) Fresno County, Ca.	700VDC	(100kW)x(40 inverter locations) = 4MW	4	1 full discharge and charge per day, for 365 days per year for 10 years
	420VAC	(200kW)x(20 transformers) = 4MW	4	
	12.47kVAC	4MW	4	

**Notes:**

- The voltages listed are nominal only. System voltage can vary as follows:
  - DC system rating requirement is 1000VDC, typical DC Voltage range is 0VDC to 850VDC, and the inverters turn on at 700VDC.
  - The equipment connected to the 480VAC bus shall be rated for 600VAC, normal output range of inverter is 378VAC to 462VAC.
  - The equipment connected to the 12.47kVAC bus shall be at least 15kV class equipment, typical voltage range is from 0VAC to 13.8kVAC.
- Maximum DC current on the input to the inverter is 850 Amps DC.
- These values are minimum total output power for the Energy Storage Systems (ESS) at each site. Dmax of 4 megawatts is the minimum output for a duration of 4 hours. At the 12.47kVAC bus level, the total minimum power output is 4 megawatts. This system should be made up of smaller units (say 500kW or 1 MW) in parallel to give the total of 4 megawatts.

- **QUANTITATIVE CRITERIA**

- Net Market Value
- Portfolio Adjusted Value

- **QUALITATIVE CRITERIA**

- Project viability
- Credit
- Operating characteristics and flexibility
- Contract modifications
- Counterparty concentration
- Technology diversity
- Supplier diversity

- PAV modifies the NMV to account for elements that impact a particular Offer’s value in the context of PG&E’s electric portfolio
- PAV calculations make explicit and systematic adjustments to NMV to reflect portfolio effects and preferences that benefit PG&E customers
- PG&E will evaluate PAV by adjusting NMV by the following components:
  - Location
  - Cost of Transmission Network Upgrade
  - T&D Investment Deferral Value
  - Increased Efficiency of Fossil Generation
  - Curtailment
- PAV is intended to represent the value of an Offer in the context of PG&E’s portfolio by making explicit and systematic adjustments for PG&E’s preferences on each component