



OpenADR 2.0b use case study:
Aggregated PV generation curtailment and beyond.

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Aiea, Hawaii



HECO Rule 24: Customer Grid Supply Plus (CGS+)

- Pursuant to HPUC Decision and Order No. 34924, issued October 20, 2017
- CGS+ added “Communication and Controls” to the existing CGS export tariff.
- The new tariff shall enable the Hawaiian Electric Companies (Company) to:
 - 1) Remotely measure, monitor, evaluate distributed energy resources.
 - 2) Verify technical compliance, Generating Facility performance, and power quality.
 - 3) If necessary, control the Generating Facility.

HECO Rule 24: Customer Grid Supply Plus (CGS+)

- A Customer-Generator may effectuate such Communication and Controls by electing to either:
 - 1) have the Company install a separate smart production meter to be owned, installed or operated by the Company; or
 - 2) contract separately with a third-party aggregator where the Company will accept aggregated data from such aggregators that can meet the Company's technical requirements for reliability of data collection and provision to the Company.

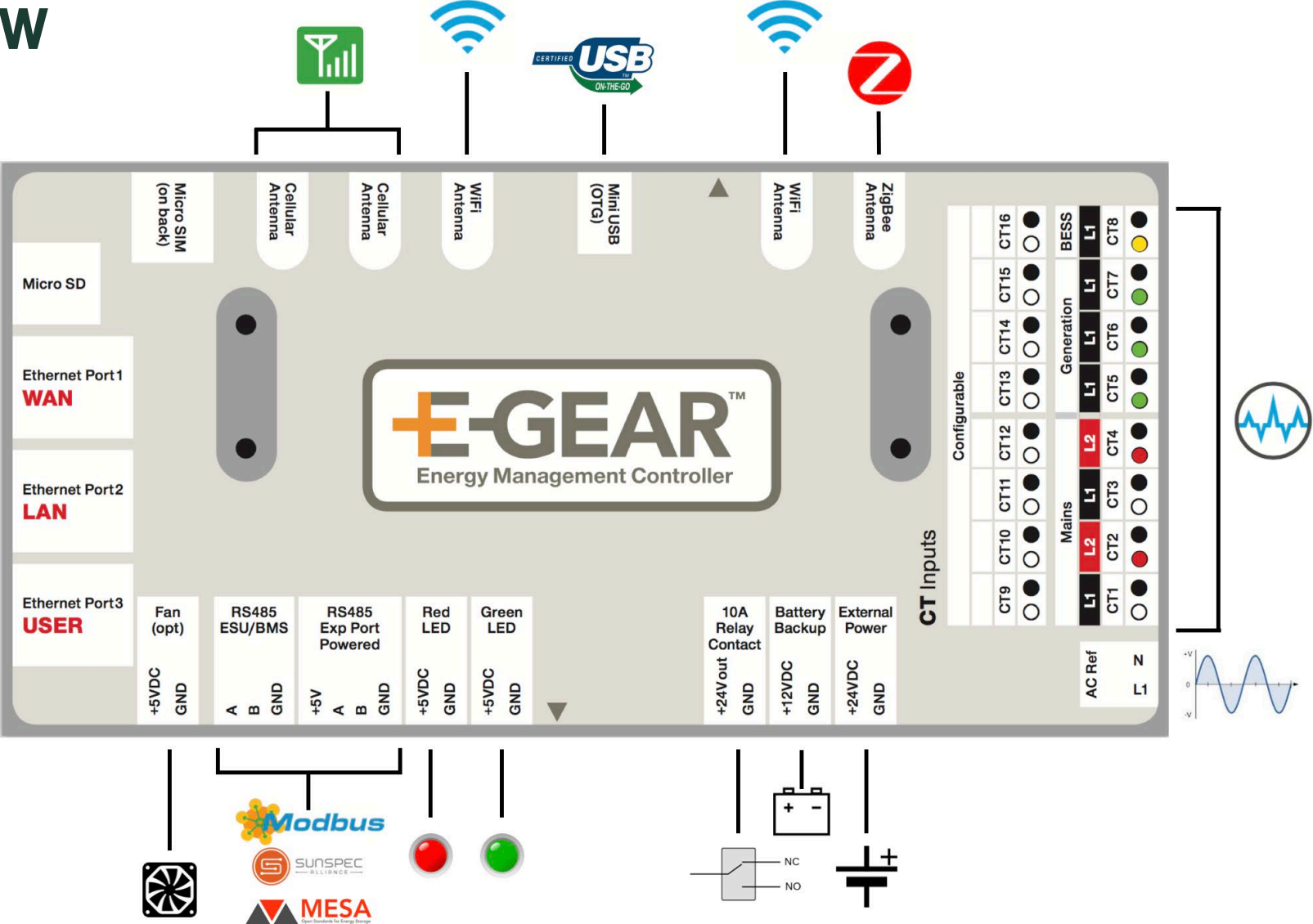
Aggregated PV generation curtailment

- **When the Company determines that curtailment of energy becomes necessary pursuant to the rules of the tariff, all Generating Facilities enrolled under the Customer Grid Supply Plus program may be curtailed as a single block.**
- **Curtailment may also be effected in increments in order to manage the impact to the Company's system (ramp rate).**
- **Grid Supply Plus participants shall only be curtailed after all other curtailable resources on the Company's system have first been curtailed.**

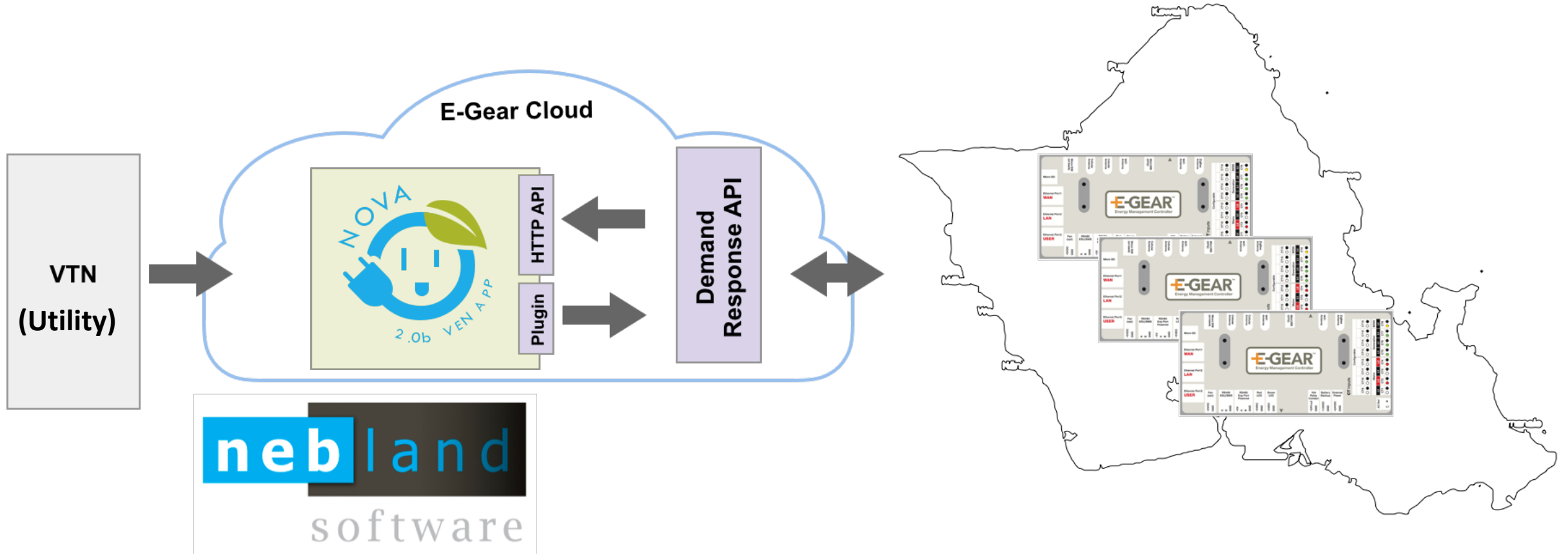
Communication and control under the CGS+ aggregator option using OpenADR 2.0b

- Communication and Control **Hardware**
 - E-Gear Energy Management Controller (EMC)
- OpenADR **Software**
 - Nebland software NOVA stack
- **Security**
 - E-Gear Device Cloud
- **Aggregation Platform**
 - E-Gear Aggregator Tools
- **Certification**

E-Gear EMC Overview



Nebland software NOVA stack to add OpenADR 2.0b support



Security

E-GEAR™



Aggregation

Devices

Filters

UID ▲	Size (kWh/mo)	Current Owner	Address
00080003-00000000-0300044F-08EA7FC9	500	Patric, Robert rpatric@openadr.com	4816 Conder Ave., Fontana CA 92336
00080003-00000000-0300044F-388CCEA9	500	Coronado, Gerald gcoronado@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-4385EDF4	500	Travis, Steve sttravis@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-85E09608	500	Patric, Robert (Group) rpatric@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-9744EBD1	500	Steve, Steve sttravis@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-9D1355DD	500	Patric, Robert rpatric@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-9EA1CC92	500	Patric, Robert (Group) rpatric@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-9F6C2CC6	500	Steve, Steve sttravis@openadr.com	1444 W. 14th St., Fontana CA 92335
00080003-00000000-0300044F-C09C98C0	500	Patric, Robert rpatric@openadr.com	1444 W. 14th St., Fontana CA 92335

Device

General Firmware Settings Daily Production Export Events Notes

UID:	00080003-00000000-0300044F-08EA7FC9
Address:	4816 Conder Ave., Fontana CA 92336
Geographic Region:	CA - San Bernardino
Utility PV system Interconnected to:	Southern California Edison
Size (kWh/mo):	500.0
Inverter manufacturer:	SMA
Battery Inverter Type:	Eguana AC Battery
Battery Type:	LG 3.2 kWh
Battery Size (kWh):	(2) 6.4
Current Installer:	EPRI Fontana ZNE Homes
Current Aggregator:	OpenADR - Fontana ZNE Homes
Groupings:	None
Reported Battery Size (kWh)	6.039
Current Owner:	Patric, Robert (Group) rpatric@openadr.com, since May 24, 2016 12:00am PDT
Current Firmware Version:	1.0.0-rc14
Connection:	5
Status:	●
Cell Status:	●
Last Reported At:	November 10, 2016 9:40am PST
Cloud Password Configured:	In-Progress

Consumer View Back

Last updated at July 30, 2016 8:36am PDT by [more...](#)

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Signed in successfully.

Filters

Connectivity Power Production Device Health



Details



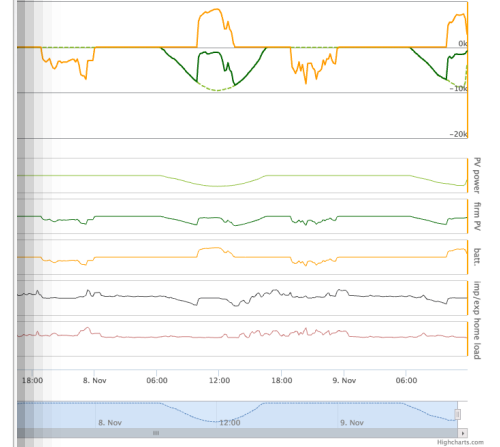
Details

Graph End Date (<= 2016-11-09)

2016-11-09

Graph

From Nov 7, 2016 To Nov 9, 2016



Energy Currently in Batteries	Total Energy Consumed	Grid Energy Consumed
31.58 kWh	168.19 kWh	94.53 kWh

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Certification



Current residential aggregated resource on Oahu

- 158 Systems
- 140 Connected to BESS
- 800 kW of PV generation
- 3.64 MWh of BESS



Moving beyond generation curtailment into BESS control

- OpenADR “SIMPLE” signal, which has been found to be limited, can only be set to one of four values: 0, 1, 2, or 3
 - 0 = Run Normal
 - 1= Start Charging
 - 2 = Discharge Battery
 - 3 = Stop Charging
- Currently integrating and testing the “LOAD_DISPATCH” signal where power is adjusted in the OpenADR signal and a requested change can be expressed as follows:
 - Relative to a baseline (or current power) using either a delta or a multiplier
 - To a defined discrete level using a positive or negative integer between -10 and +10
 - Hold shall be represented by a rate of 0

Mahalo

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