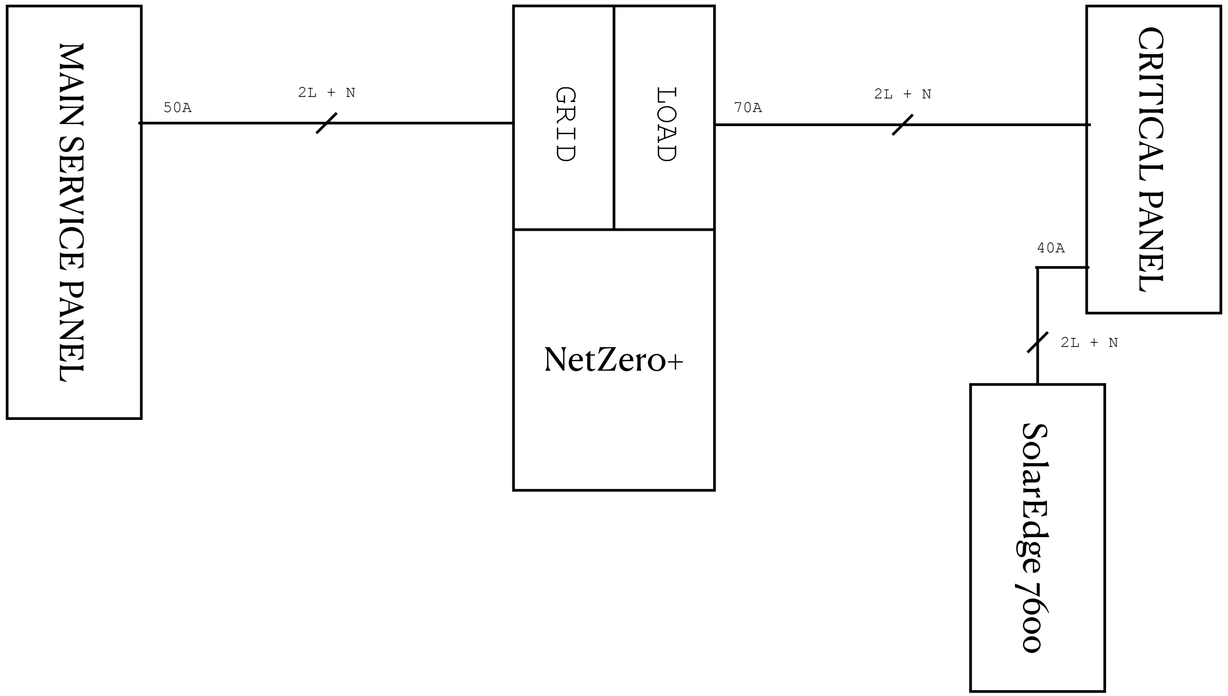
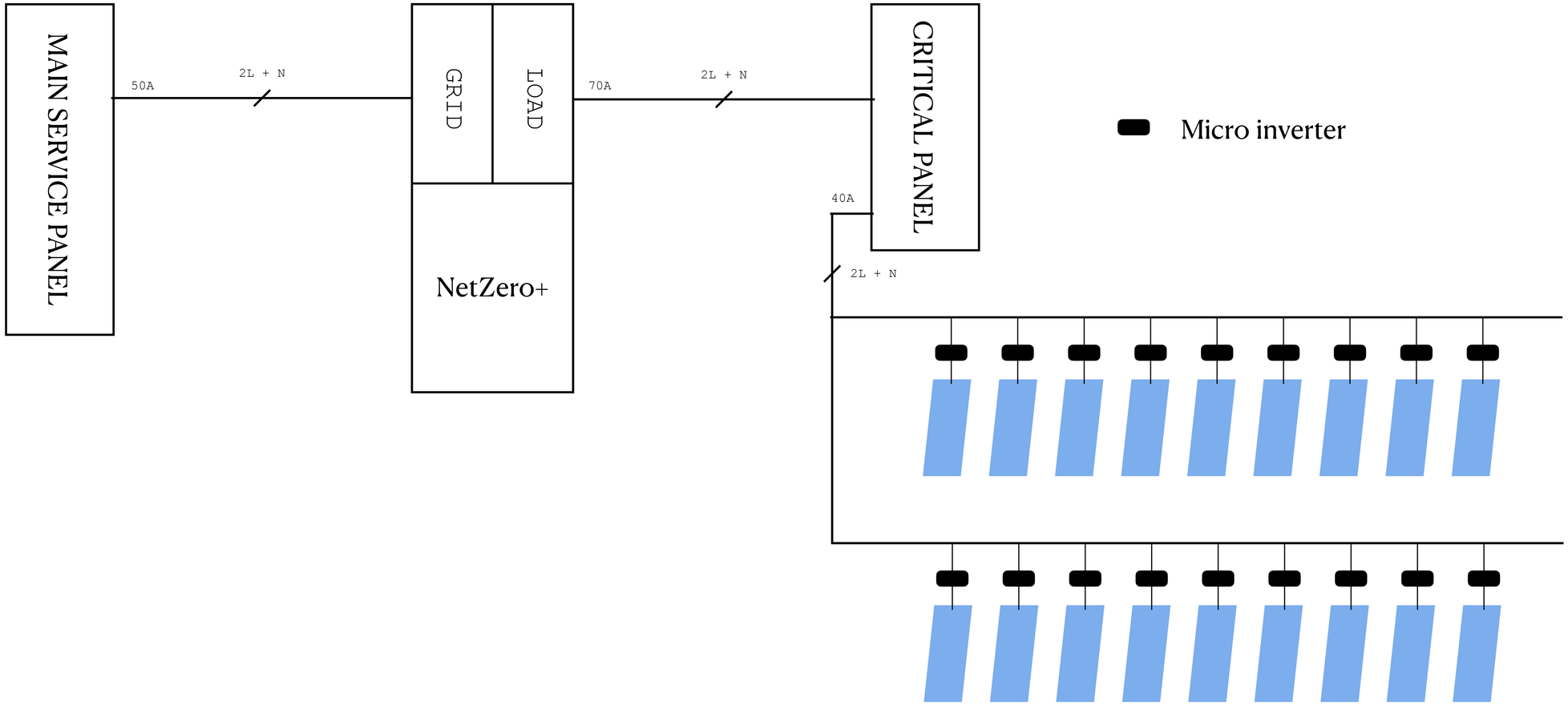
AC Coupled with Grid Tied Inverter(s)

Application Notes

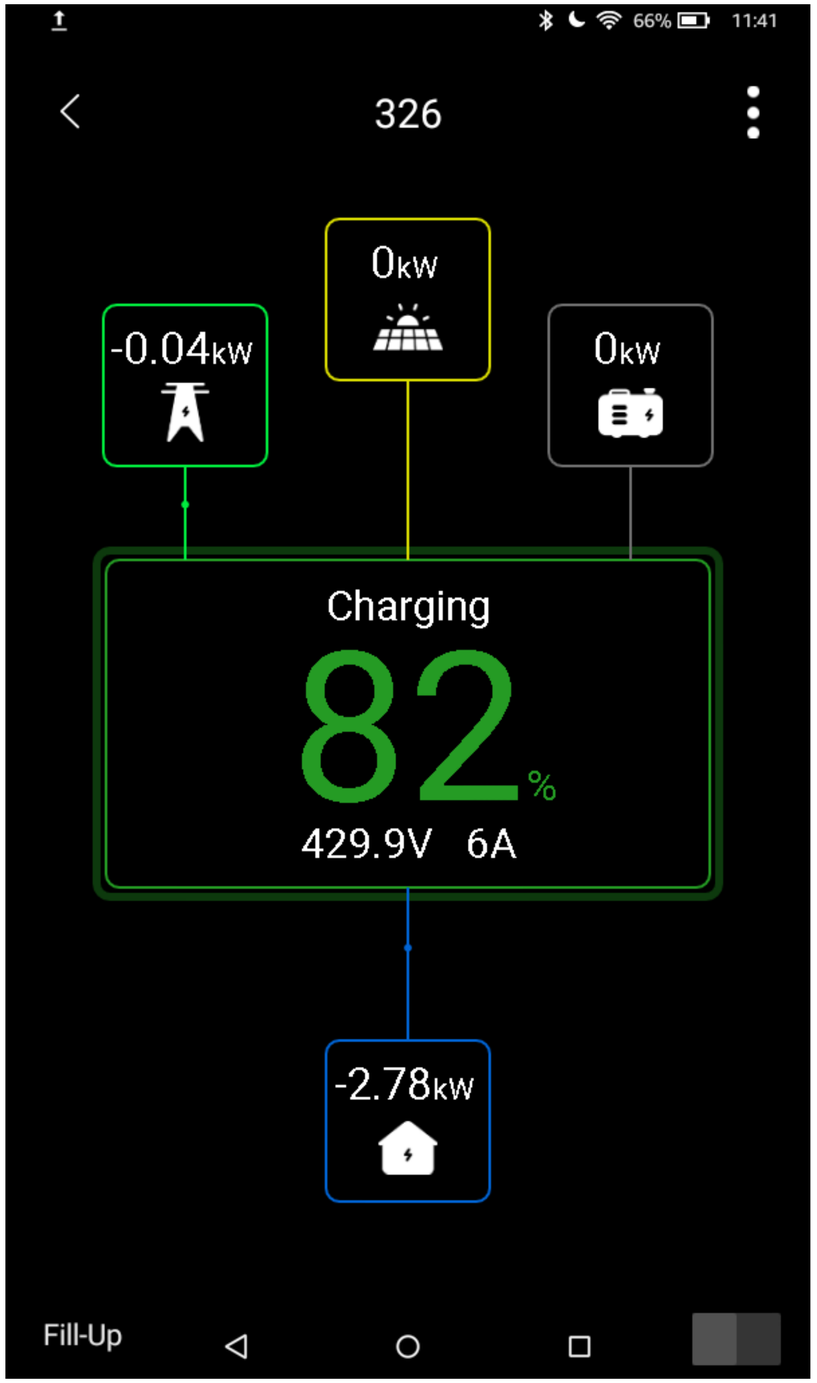
POMCUBE INC. 02-02-2020



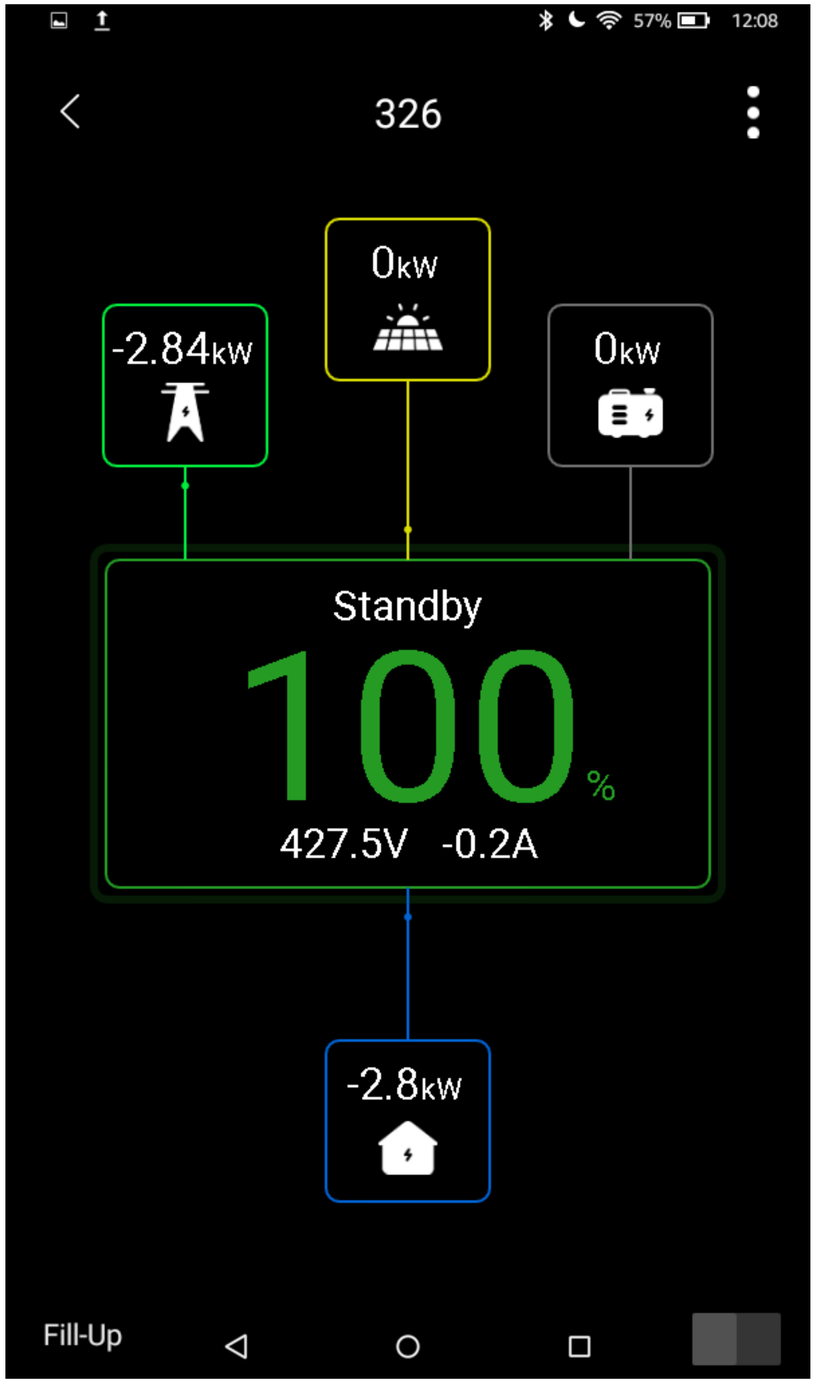
NetZero+ can support grid-tied inverter(s) natively



Grid tied inverter can continue producing energy when grid service is disrupted.



1. WHEN GRID SERVICE IS NORMAL (CONNECTED)
2. GRID TIED INVERTER(S) PRODUCES MORE THAN THE DEMAND ON THE CRITICAL PANEL
3. THE “LOAD” (BLUE BOX, USUALLY CONNECTED TO CRITICAL PANEL) WILL SHOW A NEGATIVE VALUE
4. -2.78KW SHOWN HERE IS THE EXCESSIVE ENERGY PRODUCED AFTER MEETING THE LOCAL DEMAND. IN THE OTHER WORD, THE REAL PRODUCTION, FROM THE GRID TIED INVERTER(S) IS EQUAL OR LARGE THAN 2.78KW AT THE INSTANCE OF THE POLLING BECAUSE OF THE LOCAL DEMAND.
5. IF THE LOCAL DEMAND IS ZERO, THE READING WILL MATCH THE REAL PRODUCTION FROM THE GRID TIED INVERTER.
6. PLEASE REFER TO THE MANAGEMENT TOOL OF THE GRID TIED INVERTER FOR THE REAL POWER OUTPUT OF THE INVERTER.
7. IF THE BATTERY IS NOT FULL, NETZERO+ WILL CHARGE ITS BATTERY AUTOMATICALLY
8. THE CHARGING RATE IS BASED ON THIS NEGATIVE NUMBER MEASURE IN NEAR REAL TIME BY THE PCS.
9. 429.9V X 6A = 2579.4W
10. 2579.4/2780 ~= 92.78% THE LOSS IS DUE TO THE CONVERSION, BY PCS, FROM AC TO DC (AT 429.9V)
11. THE ACTUAL CONVERSION EFFICIENCY WILL BE SLIGHTLY HIGHER AS THERE IS POLLING TIME DIFFERENCE BETWEEN THIS TWO READING (2.78KW AND 429.9V@6A)



1. **WHEN THE BATTERY IS FULL**
2. **AS LONG AS THE GRID IS CONNECTED, ALL EXCESSIVE ENERGY WILL FLOW BACK TO THE GRID THROUGH NETZERO+.**
3. **PLEASE NOTE THE READING FROM GRID (GREEN BOX) IS CALCULATED VALUE. UNLESS NETZERO HAS REVENUE GRADE METER CONNECTED TO THE GRID OUTPUT PORT, THE READING IS THE GREEN BOX IS FOR YOUR REFERENCE ONLY**
4. **THE BACKFLOW RATE SHOULD MATCH THE READING FROM THE MANAGEMENT PLATFORM (OR APP) ON THE GRID TIED INVERTER(S) IN THIS CASE.**

Disrupted Grid Service

Supply Must Meet Demand

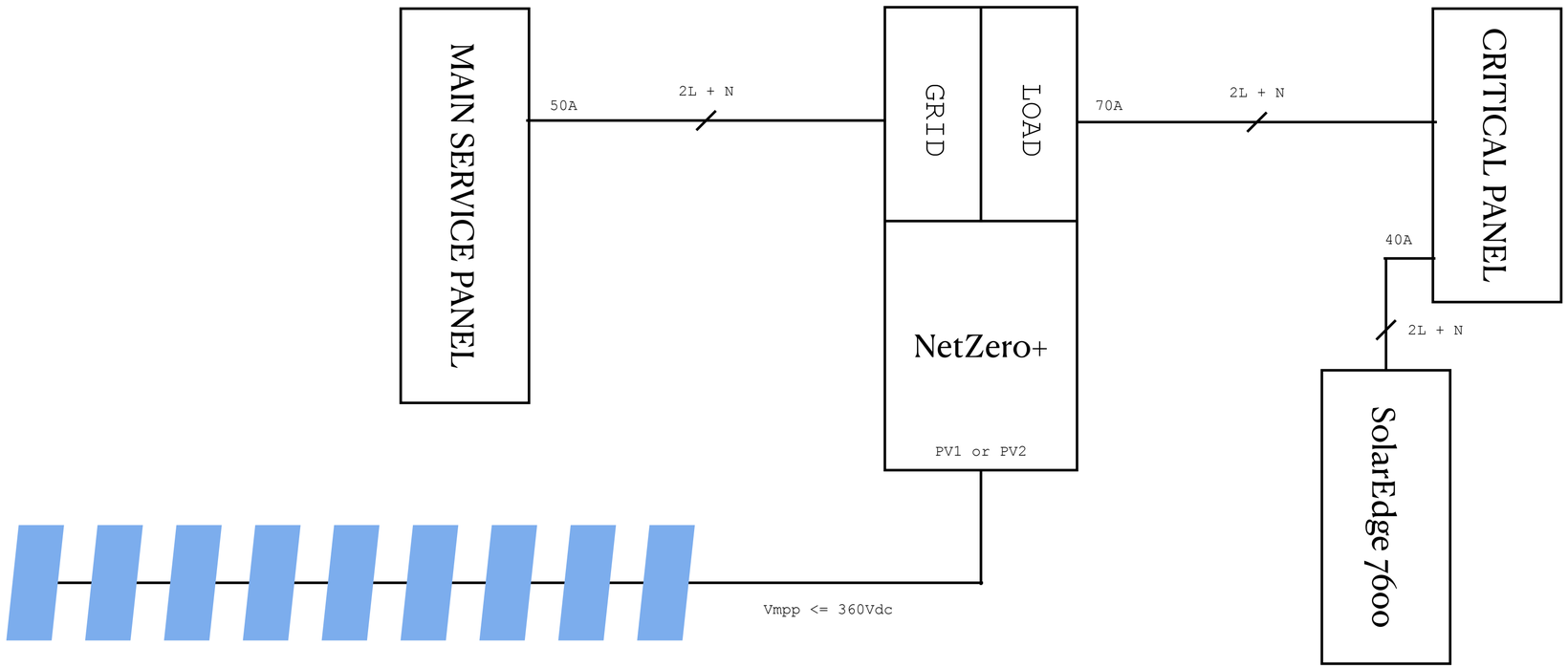
Supply meets Demand

Energy Must flow Somewhere

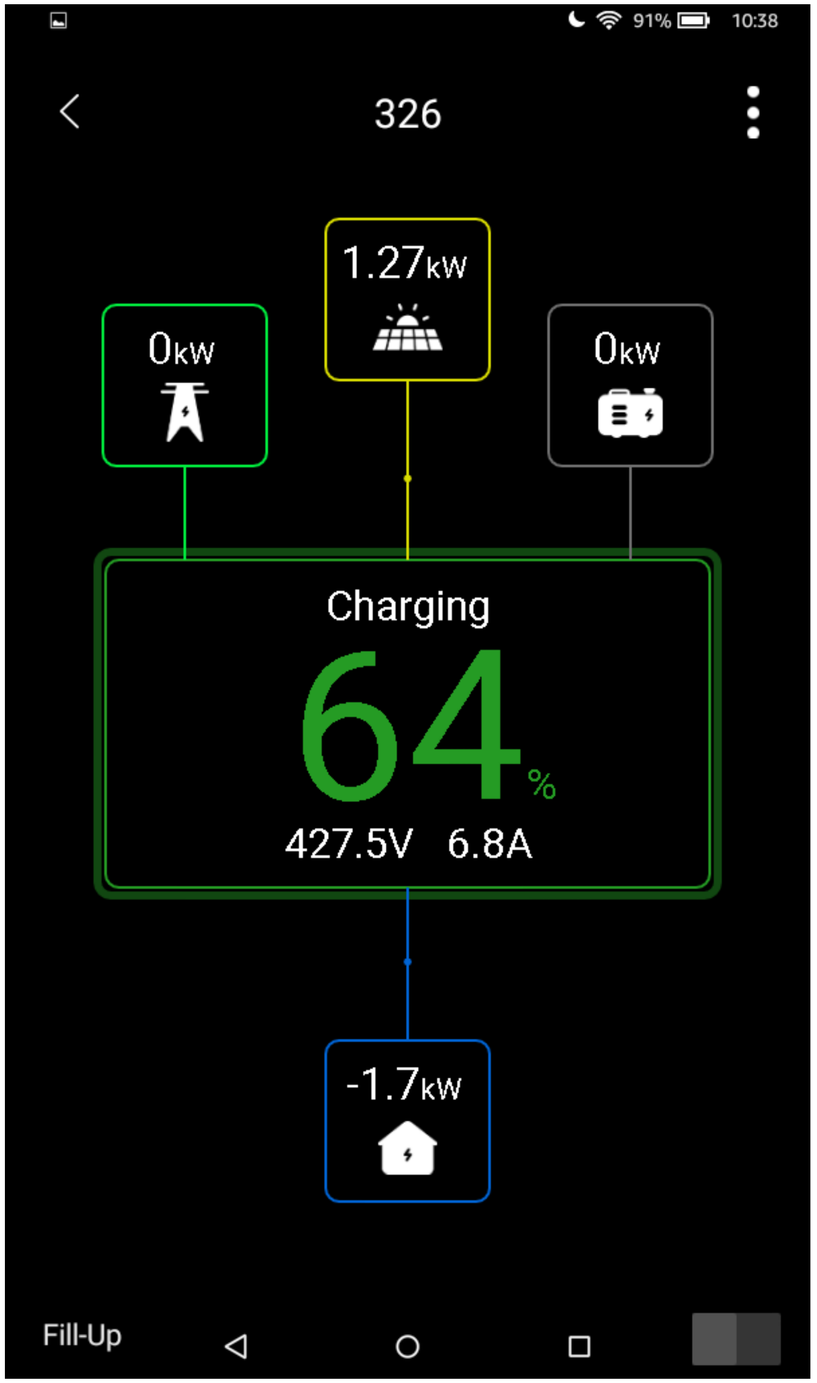
- Supply and demand must be balanced when NetZero+ is the VF source (grid service is disrupted)
- Once battery reaches 100% (or 95% above, APP configurable), NetZero+ will adjust the frequency to reduce the output from grid tied inverter(s).
- NetZero+ will maintain the frequency above 62.5Hz until the battery SOC falls below 90%. NetZero+ will then return the frequency to 60Hz so that grid tied inverter can resume production.
- The idea is to balance the supply (from grid tied inverter(s)) and the demand (on the critical panel).
- NetZero+ may keep the frequency higher to prevent grid tied inverter(s) from producing energy at full capacity. Since the f-w curve is different among all different inverter vendors, the outcome may differs from one case to the other. Ultimately, NetZero+ will try hard to keep the grid tied inverter(s) producing energy while maintaining the stability of the power network.

Mixed Mode

Wake Up Battery Module



Directly connected PV panels can wake up the battery even after it is completely depleted the night before.



1. NETZERO+ WILL CHARGE FROM ITS DIRECTLY CONNECTED PV PANEL FIRST
2. THE TOTAL CHARGING RATE IS CONTROLLED BY BATTERY MANAGEMENT SYSTEM (BCMS)
3. THE MAXIMUM CHARGING RATE CAN NEVER EXCEED 13KWDC
4. IN THE EXAMPLE HERE
5. DIRECTLY CONNECTED PV CONTRIBUTES 1.27KW
6. THE GRID TIED INVERTER, MINUS THE LOCAL DEMAND, CONTRIBUTE 1.7KW
7. 427.5V X 6.8A = 2907W
8. 2907 - 1270 = 1637W
9. 1637/1700 = 96.29%
10. NOTICE THE RATIO IS HIGHER.

Thank You

For Making The World Greener