

# **Sustainable and Resilient Multi-Family Building**

## **572 Van Ranst in Mamaroneck, NY**

Including Energy Building Blocks

- Rooftop Solar PV
- (4) EV Charging Stations
- State-of-the-art Fuel Cell System



Anticipated Results:

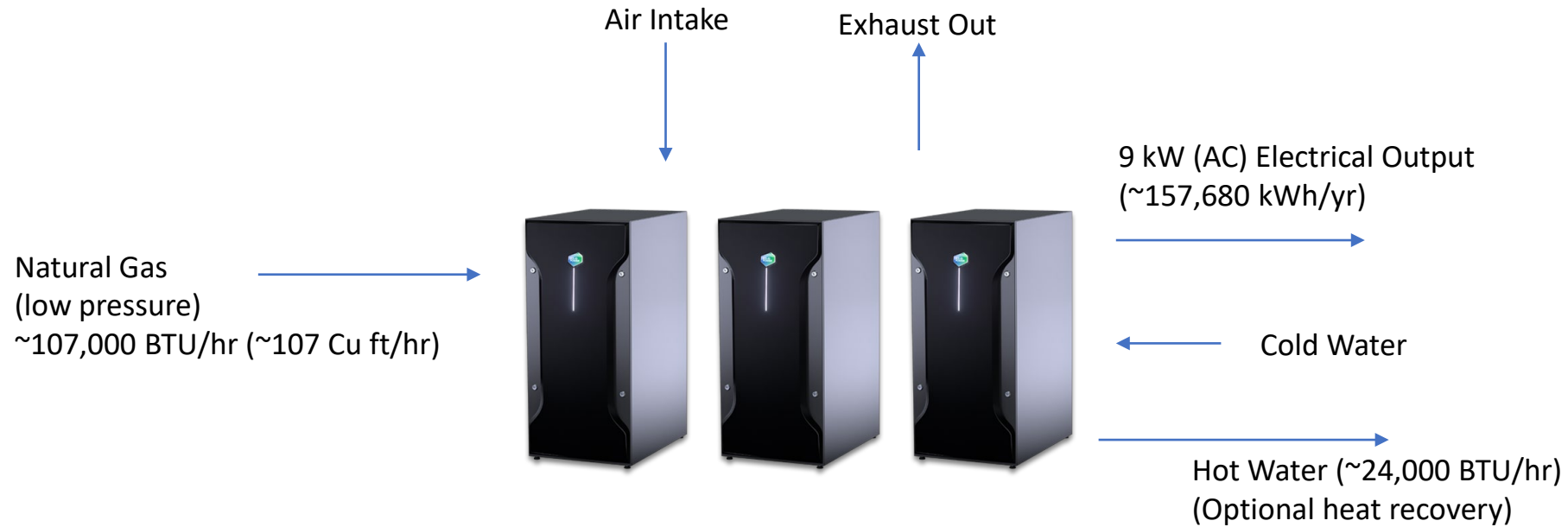
- Resilient “always on” electric service for tenants, common areas and electric vehicle charging stations
- 58%+ reduction in Greenhouse Gas emissions (GHG)
- A model multi-family housing project for others to follow

Aris Energy Solutions, Aug 25, 2001





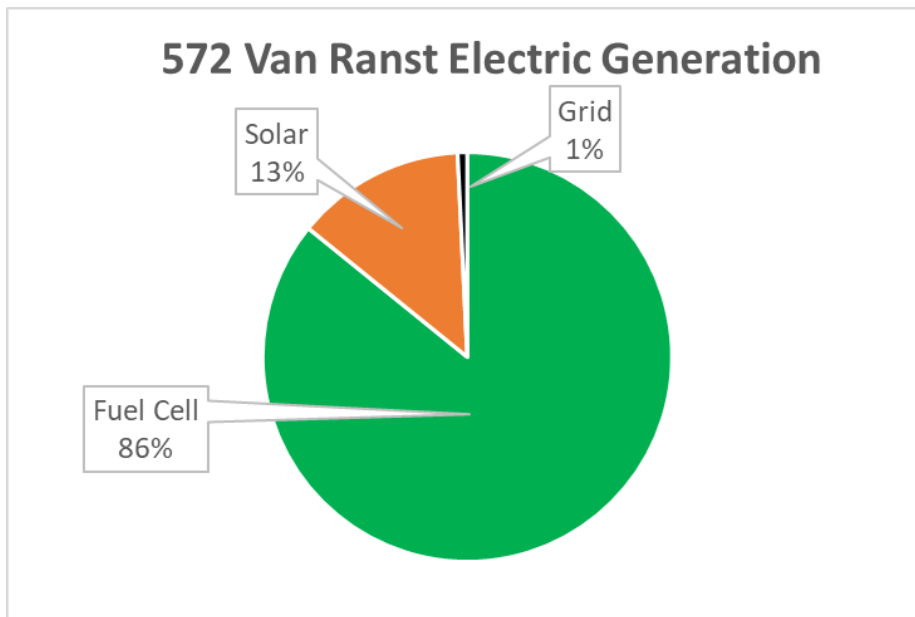
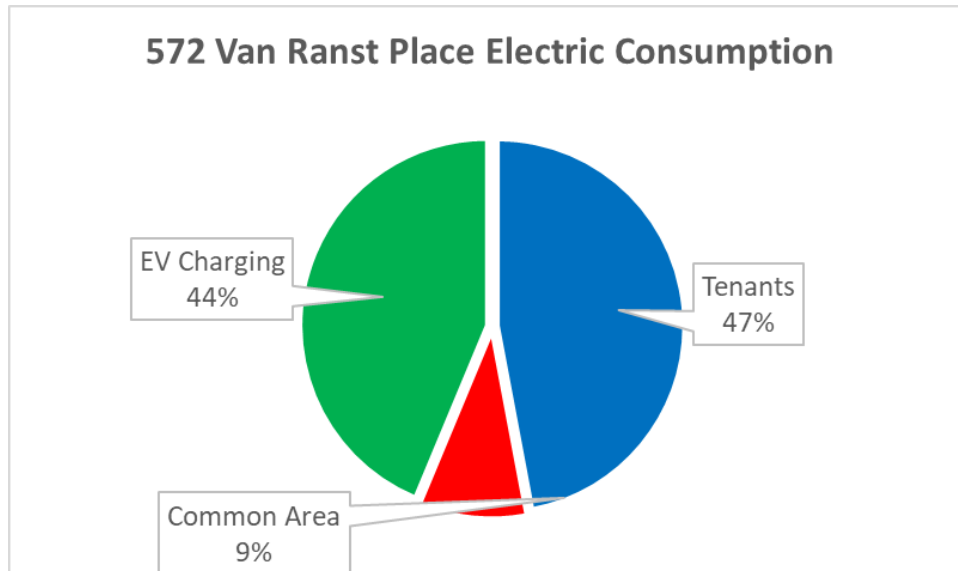
## (3) x BG-60 Fuel Cell System



# Estimated Electrical Consumption and Generation (kw-hr/year)

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572 Van Ranst Place, Mamaroneck NY			
	1 BR	2BR	EV duty
<b><u>Consumption</u></b>			
kw-hr/day	20	30	kw per charge
kw-hr/yr	7,200	10,800	Charges/day
# units	6	4	kw-hr per station
Total kw-hr/yr	43,200	43,200	EV kw-hr/day
Total kw-hr/yr Tenants	86,400		
Est'd Common Area kw-hr	17,000		
EV charging stations	4		
EV charging per year	80,300		
Total kw-hr/yr	183,700		
<b><u>Generation</u></b>			
Solar	24,628		20.875kW x 13.5% capacity factor
BG-60 Fuel Cell kw-hr/year	52,560		6 kw, 24/7
# BG-60's	3		
Fuel Cell Generation	157,680		
Total Generation	182,308		
Grid kw-hr/year	1,392		

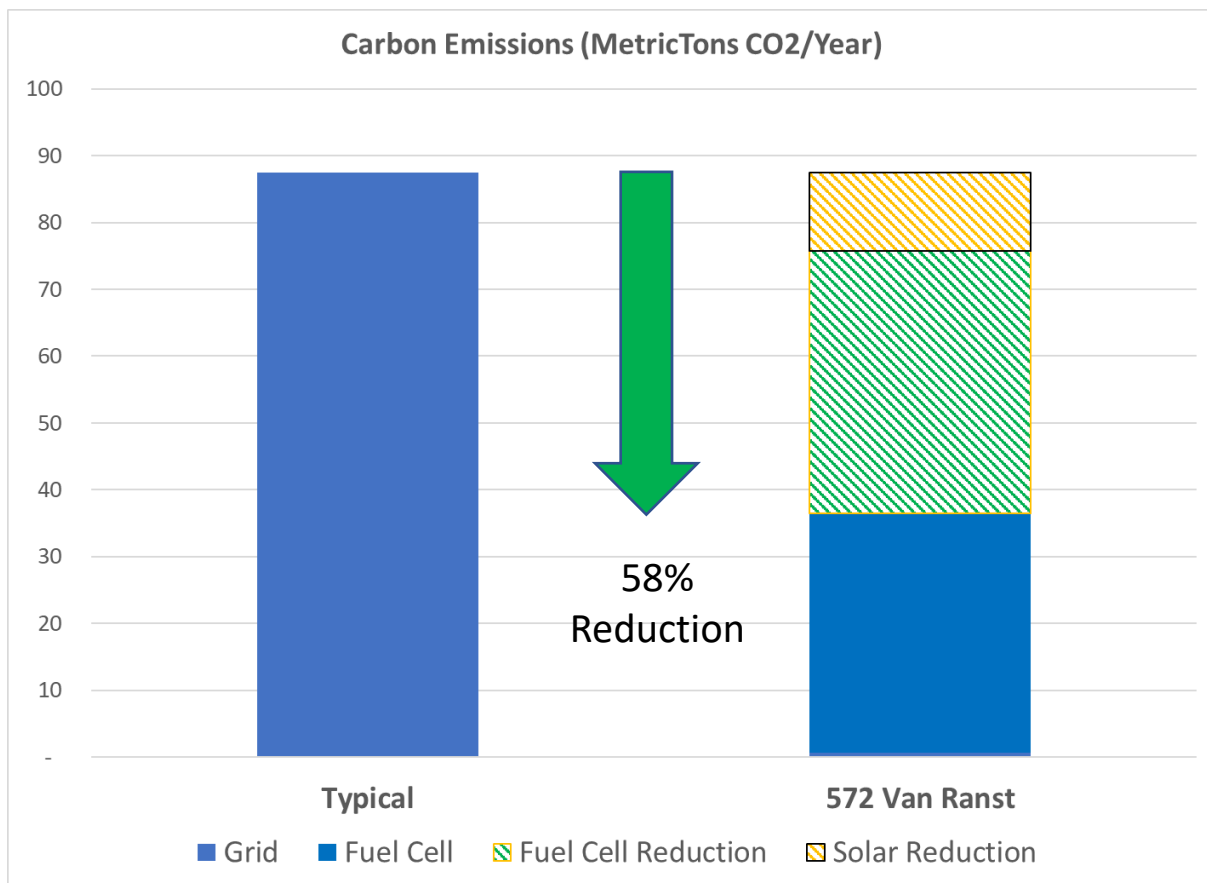
# Estimated Electrical Consumption and Generation (kw-hr/year)



Note: Fuel cell power is “resilient”, always on in event of electrical outage

# Decarbonization

## Estimated Reduction in Green House Gases (mT/year)



### Notes:

1. 58% reduction illustrated above is based only on the electrical output, it does not include value of reduced GHG for fuel cell's CHP capabilities.
2. It does also not include GHG reduction value for the (4) EV charging stations' impact
3. GHG reduction for electrical based on 0.5 # CO<sub>2</sub>/kw-hr with fuel cell vs typical NY State average of 1.05 # CO<sub>2</sub>/kw-hr.
4. Fuel cell output power is also 100% resilient to electrical grid power loss, including opportunity to power EV's during grid blackouts.

# BlueGEN BG-60 FUEL CELL

Micro Combined Heat & Power (mCHP)

SOLID  
POWER



*The BG-60 provides 6.0 kW of dependable, resilient power, plus by-product heat*

## Commercial Status

- Successful BlueGen European operating history:
  - 2500+ installations
  - 40+ million operating hours
  - 7 yr stack life
  - 10 yr service contract
  - Growing installed US operating fleet

## Advantages

- High Efficiency - 57% electric, up to 90% total CHP efficiency
- Reduce carbon emissions *today* (~50%)
- “Hydrogen Ready” to step to zero emissions *tomorrow*
- RESILIENT – if grid goes down, fuel cell stays up
- Hi availability ~99% capacity factor
- Highly distributed, dispatchable behind the meter solution helps utility grid
- Can turn down production and load follow

## Integration/Installation

- Integrates into MicroGrids with other DER's and energy technologies
- Base fuel cell product with optional “Resiliency Package” or “CHP Package”
- Indoor or outdoor installation
- Uses low-pressure gas 0.13-0.30 psi

## Applications

- Single Family Residential
- Multi-Family Residential
- Small/Med Commercial
- Municipal/Institutional
- Data Centers/Critical Power



*Europe's broad deployment program (“PACE”) installing 1000's of units in residential and small commercial sites, enabling volume based cost reduction*

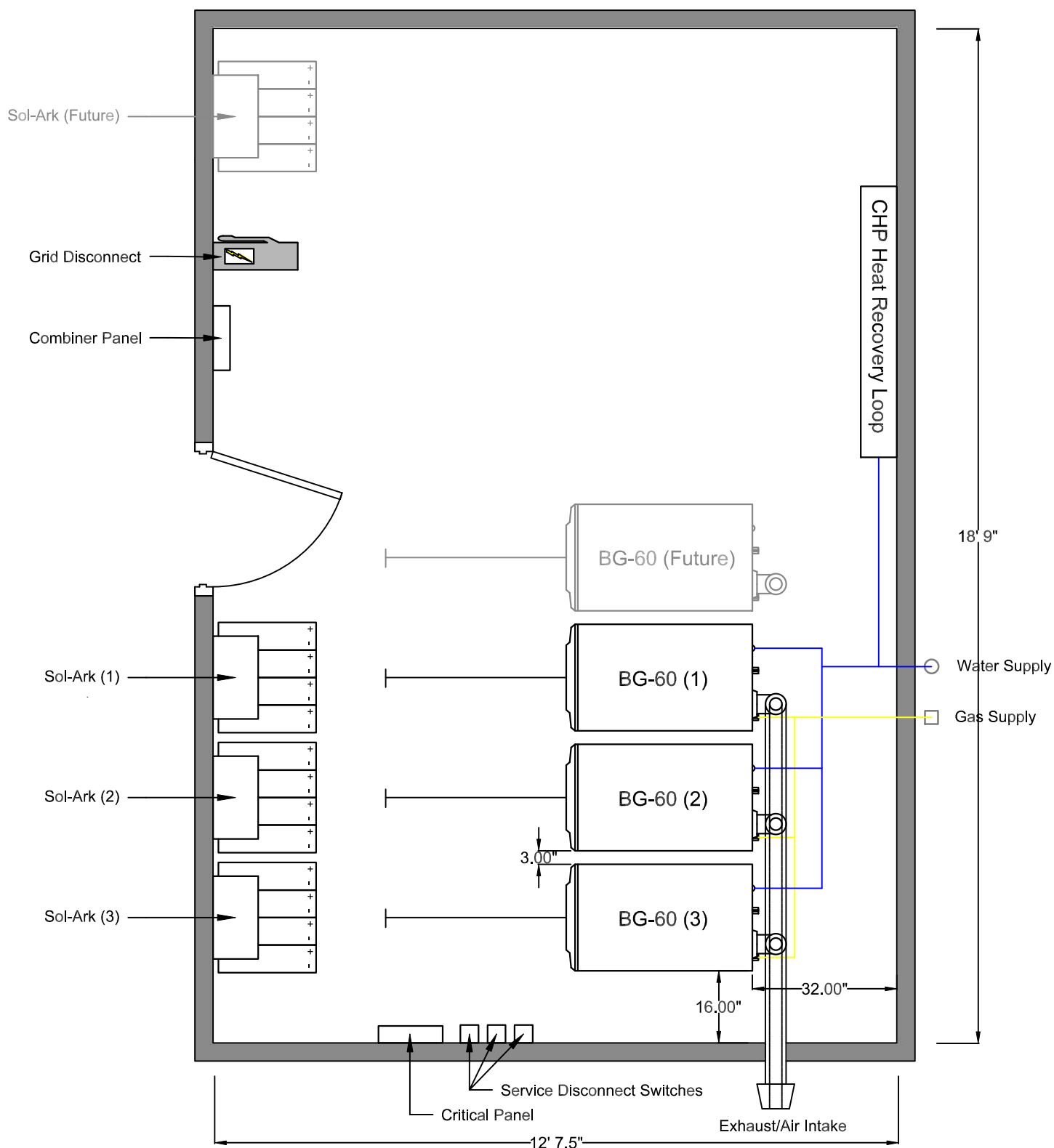
## TECHNICAL DATA

Application	Electrical power generator with heat recovery for commercial businesses, public buildings and private homes
Use	Large residential and commercial buildings
Operation Mode	Year-round (approx. 8,700 hours)
Fuel Type	Natural gas (biogas methane)
Fuel cell technology	Solid oxide fuel cell (SOFC)
Fuel consumption <sup>1)</sup>	Approx. 10.8 kW (36.8 MBH)
Power output	Max. 6kW, min. 0.5 kW
Electrical efficiency <sup>2)</sup>	Up to 57%
Thermal output <sup>2)</sup>	Up to 3.4 kW
Heat recovery	Exhaust gas heat exchanger
Overall efficiency <sup>2)</sup>	Up to 90%
Electrical energy generated/year	Up to 52,000 kWh
Thermal energy generated/year	Up to 29,580 kWh
Operation	Fully automated start/stop
Carbon emissions	2 pounds/kw-hr
Control	24Hr remote monitoring by manufacturer, Internet/smartphone app control
Weight	1432 lb
Height x width x length	63" x 23.6" x 41.3"
Decibels	< 47 db (A)
Service interval <sup>3)</sup>	12 months
Full maintenance service	Yes (120 months)


1) Based on the lower calorific value for natural gas at the start of operation

2) The thermal output/energy varies depending on the electrical efficiency and the return flow temperature

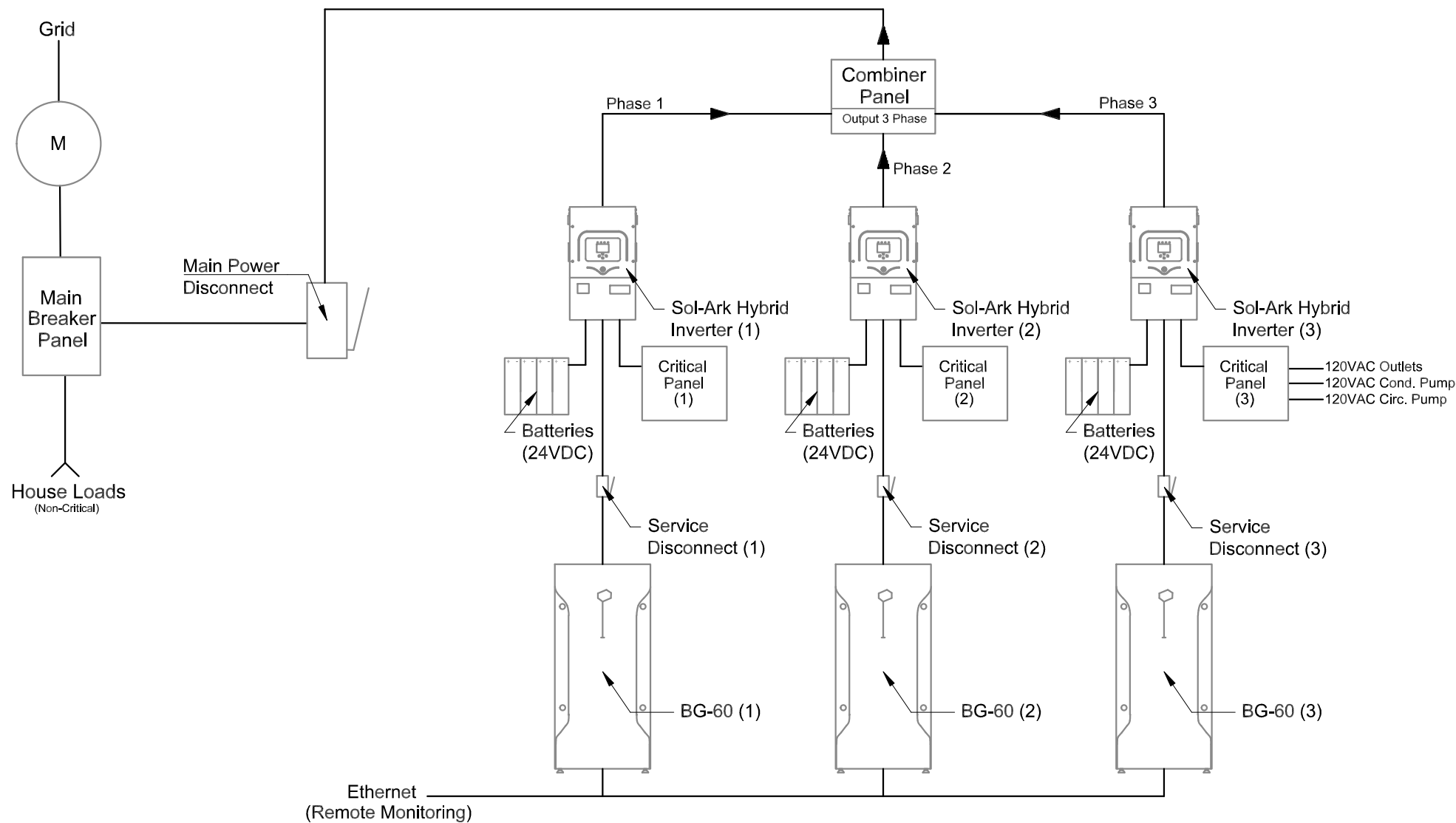
3) Filters are replaced depending on the actual water, air, and gas quality




BG-60 Dimensions:  
 23.6" W x 41.2 D x 63.0" H

							
NO. REVISION				DATE			
				ARIS_ENERGY_SOLUTIONS_572_VAN_RANST			
				PLAN_VIEW			
				FUEL_CELL_LAYOUT (BG-60)			
DRAWN				DATE			
CS				8/23/2021			
CHECK				DRAWING NO.			
INITIALS				AES-21-6-01			
				SHEET 1 OF 1			
				REVISION			
				#2			





						
NO. / REVISION		DATE		ARIS_FUEL_CELL_DEMO		
				PRELIMINARY_1-LINE_WIRING_DIAGRAM		
				(3)_BG-60_1-LINE		
DRAWN	CHECK	NOT FOR CONSTRUCTION	SCALE	DATE	DRAWING NO.	REVISION
CS	-		NONE	08/23/2021	AES-21-6-02 SHEET10F1	#1