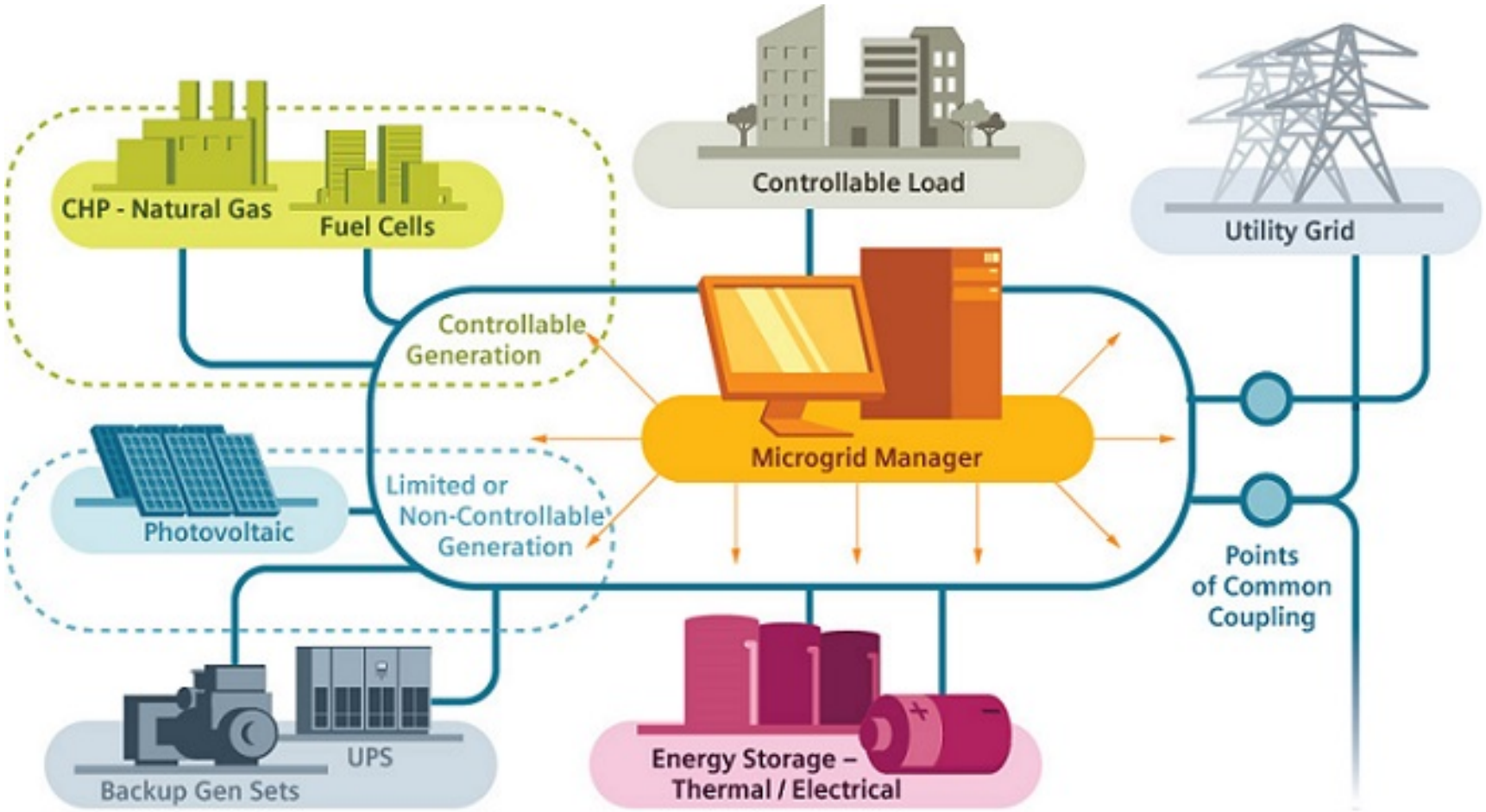
solarone
RENEWABLE ENERGY DEVELOPMENT

ACE NATURAL
Commercial Microgrid
Westchester, NY
Local Utility- Con Ed

What is a Microgrid?

- A microgrid is an electrical system that can:
- Operate independently
- Use its own power generation
- Connect and communicate with the multiple generation components
  - Grid (Utility)
  - Solar
  - Wind
  - Generator
  - Hydro
- ESS stores the power and keeps it available for use

Microgrid Management System



Microgrid Controller

ELM Fieldsight Controller

- Cloud based application, can be managed from plant or remotely.
- Two- way communications
- On-site Gateway
- 24/7 real-time monitoring & control; Centralized Network Operations Center (NOC)
- System Monitoring

Microgrid Control Functions

Advanced two-way communication and control infrastructure is required-

- The controls and programming vary by microgrid operational goals and type of operation
- On-grid heuristics are different than off-grid (resilient) operation for the same Microgrid

Microgrid Controller Functions

Off-Grid Mode Examples

- Monitor and actively Manage Command Distributed Energy Resources (DER)
- Connect to/disconnect from Grid
- Initiate “Black-start” capability for Microgrid
- Manage battery reserves; Change set points (ex. DOD)
- Control PV Output to avoid overload with generator

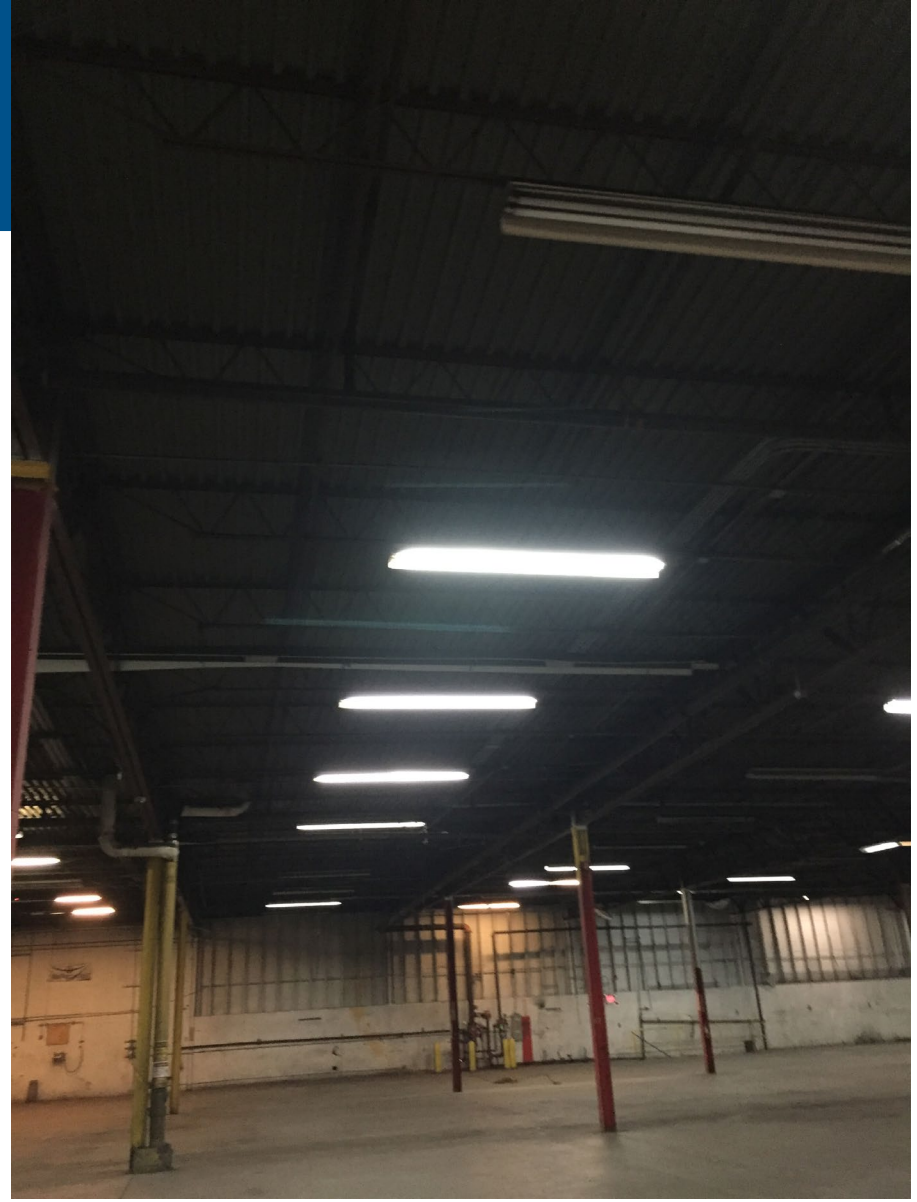
Commercial Microgrid

Ace Natural Foods

- In Business since 1980
- Leading Organic Foods Distributor in Northeast
- Moved to New Facility with 4 times more Refrigerated Capacity
- Committed to Reducing Carbon

Client Business Goals-

- Energy Usage Reduction (kWh)
- Reduction in Demand Charges
- Resiliency



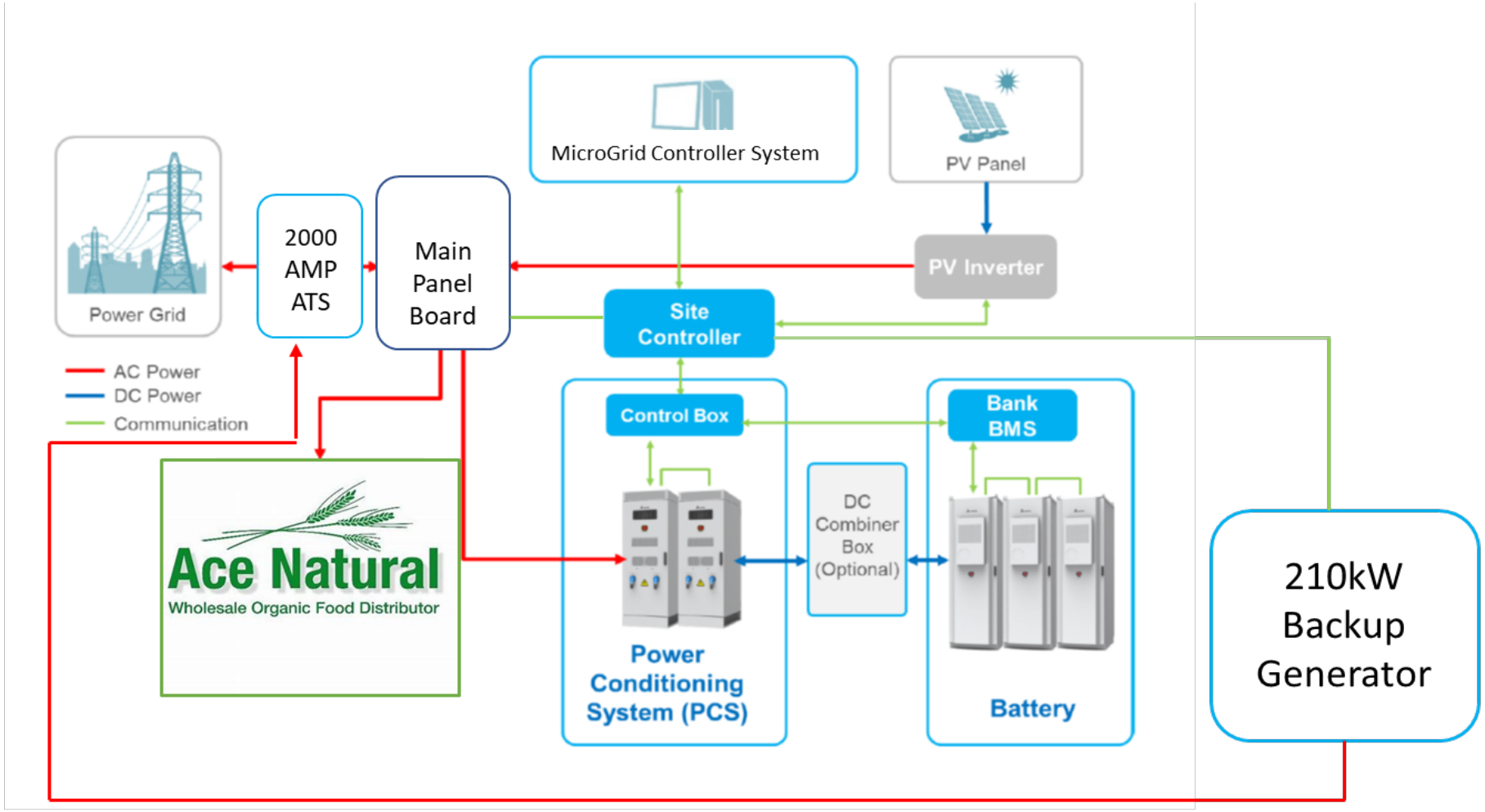
Ace Foods Microgrid

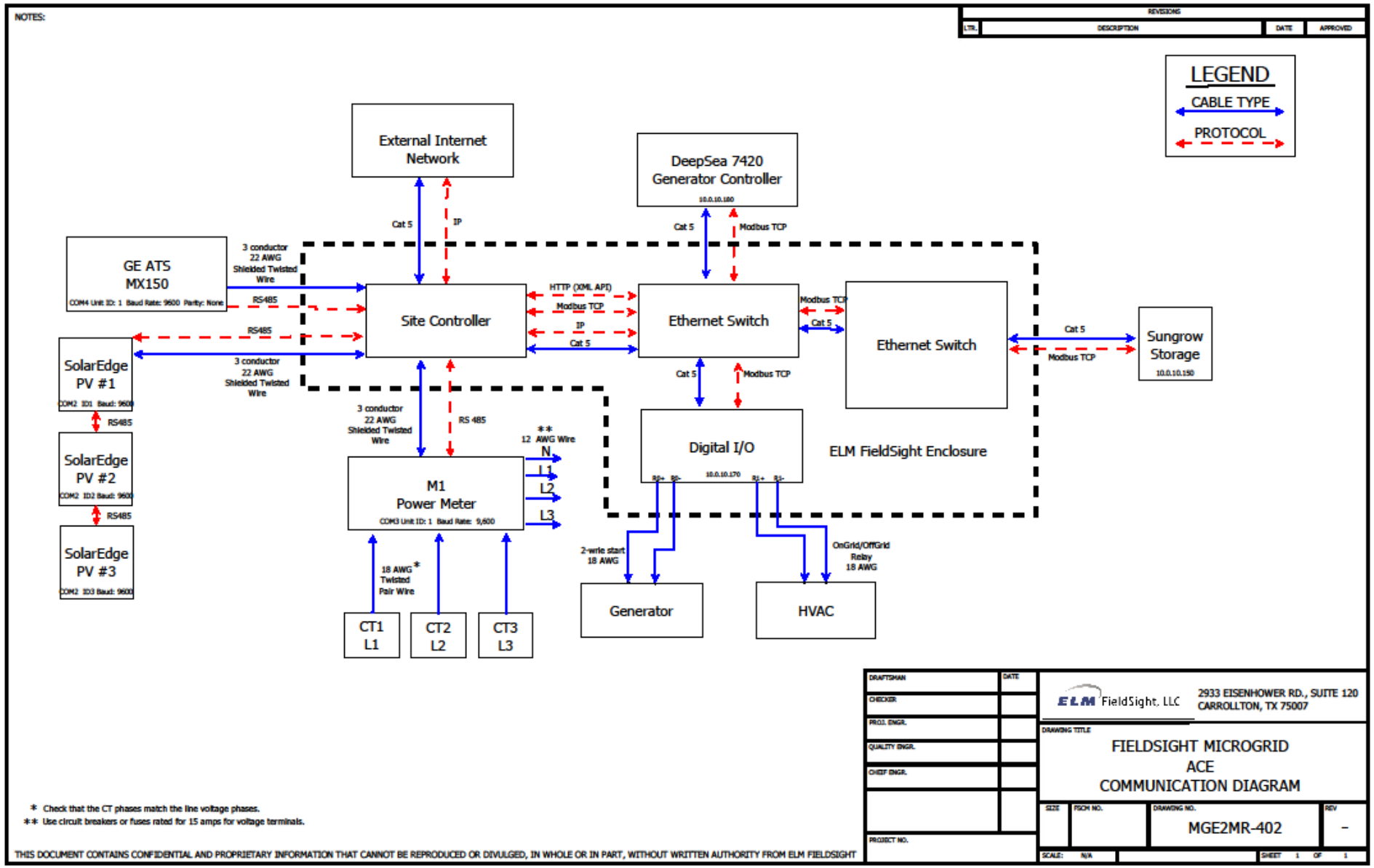
Commercial Microgrid

Ace Natural Foods

- 350kW Rooftop PV
- 230kW Bio-Diesel Generator
- 2000 Amp ATS
- 250kW/548kWH Energy Storage System
- ELM Fieldsight Microgrid Controller

Commercial Microgrid Components




NOTES:
REVISIONS
LTR.
DESCRIPTION
DATE
APPROVED
LEGEND
CABLE TYPE
PROTOCOL
External Internet Network
DeepSea 7420 Generator Controller
10.0.10.180
Cat 5
IP
Modbus TCP
GE ATS MX150
COM4 Unit ID: 1 Baud Rate: 9600 Parity: None
3 conductor 22 AWG Shielded Twisted Wire
RS485
Site Controller
HTTP (XML API)
Modbus TCP
IP
Cat 5
Ethernet Switch
Ethernet Switch
Sungrow Storage
10.0.10.150
SolarEdge PV #1
COM2 ID1 Baud: 9600
SolarEdge PV #2
COM2 ID2 Baud: 9600
SolarEdge PV #3
COM2 ID3 Baud: 9600
3 conductor 22 AWG Shielded Twisted Wire
RS 485
** 12 AWG Wire
N
L1
L2
L3
M1 Power Meter
COM3 Unit ID: 1 Baud Rate: 9,600
Digital I/O
10.0.10.170
ELM FieldSight Enclosure
18 AWG * Twisted Pair Wire
CT1 L1
CT2 L2
CT3 L3
2-wrie start 18 AWG
Generator
OnGrid/OffGrid Relay 18 AWG
HVAC
* Check that the CT phases match the line voltage phases.
** Use circuit breakers or fuses rated for 15 amps for voltage terminals.
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DRAFTSMAN
DATE
CHECKER
PROJ. ENGR.
QUALITY ENGR.
CHIEF ENGR.
PROJECT NO.
ELM FieldSight, LLC
2933 EISENHOWER RD., SUITE 120
CARROLLTON, TX 75007
DRAWING TITLE
FIELDSIGHT MICROGRID
ACE
COMMUNICATION DIAGRAM
SIZE
FSCM NO.
DRAWING NO.
MGE2MR-402
REV
-
SCALE: N/A
SHEET 1 OF 1

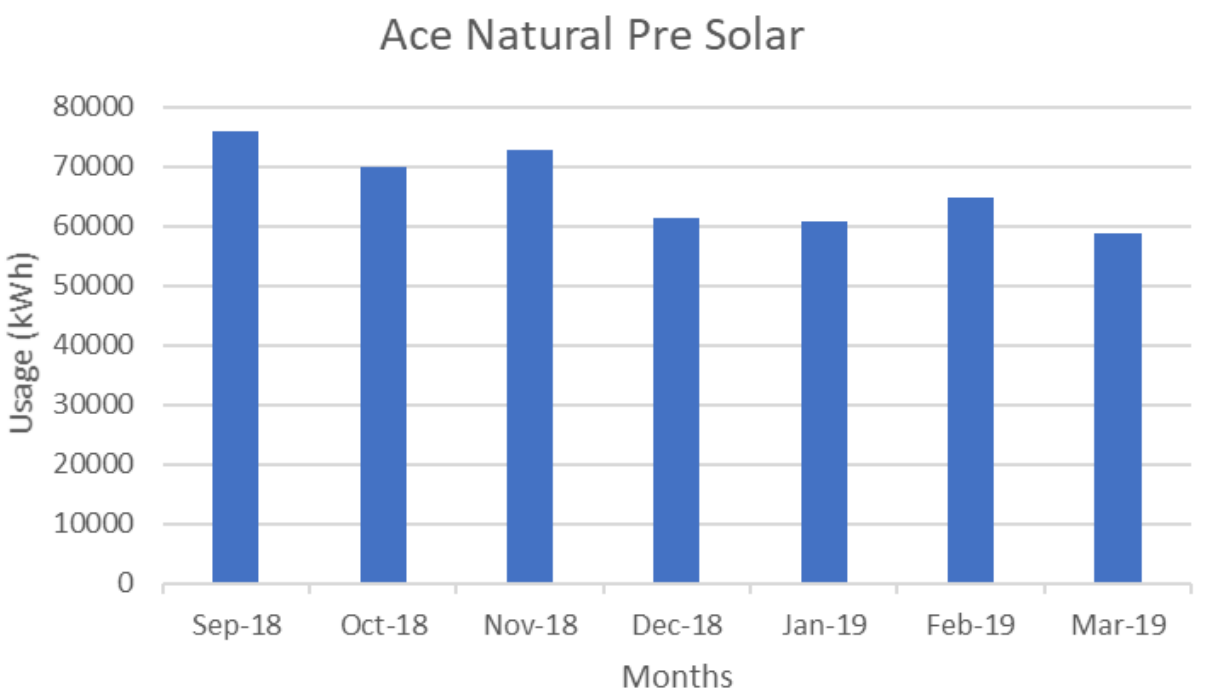
Commercial Microgrid

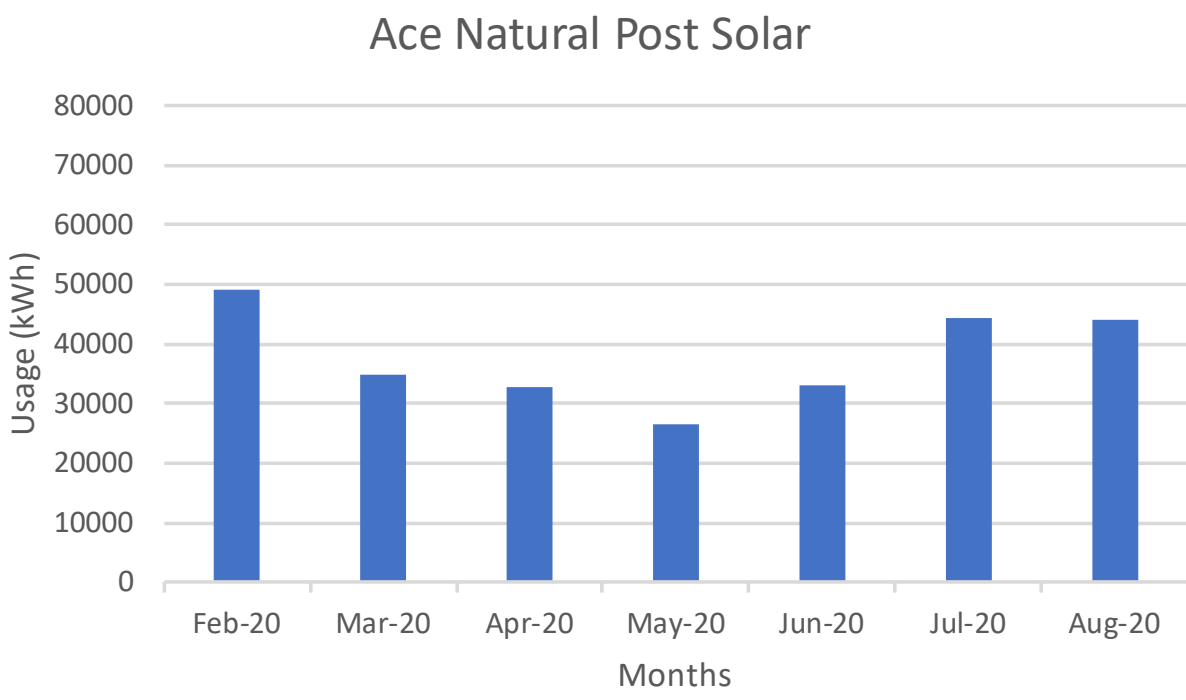
Stages Of Development

Development Priorities-

1. PV (following new roof)
2. Microgrid Controller
3. Generator
4. ESS
5. Optimization

Commercial Microgrid





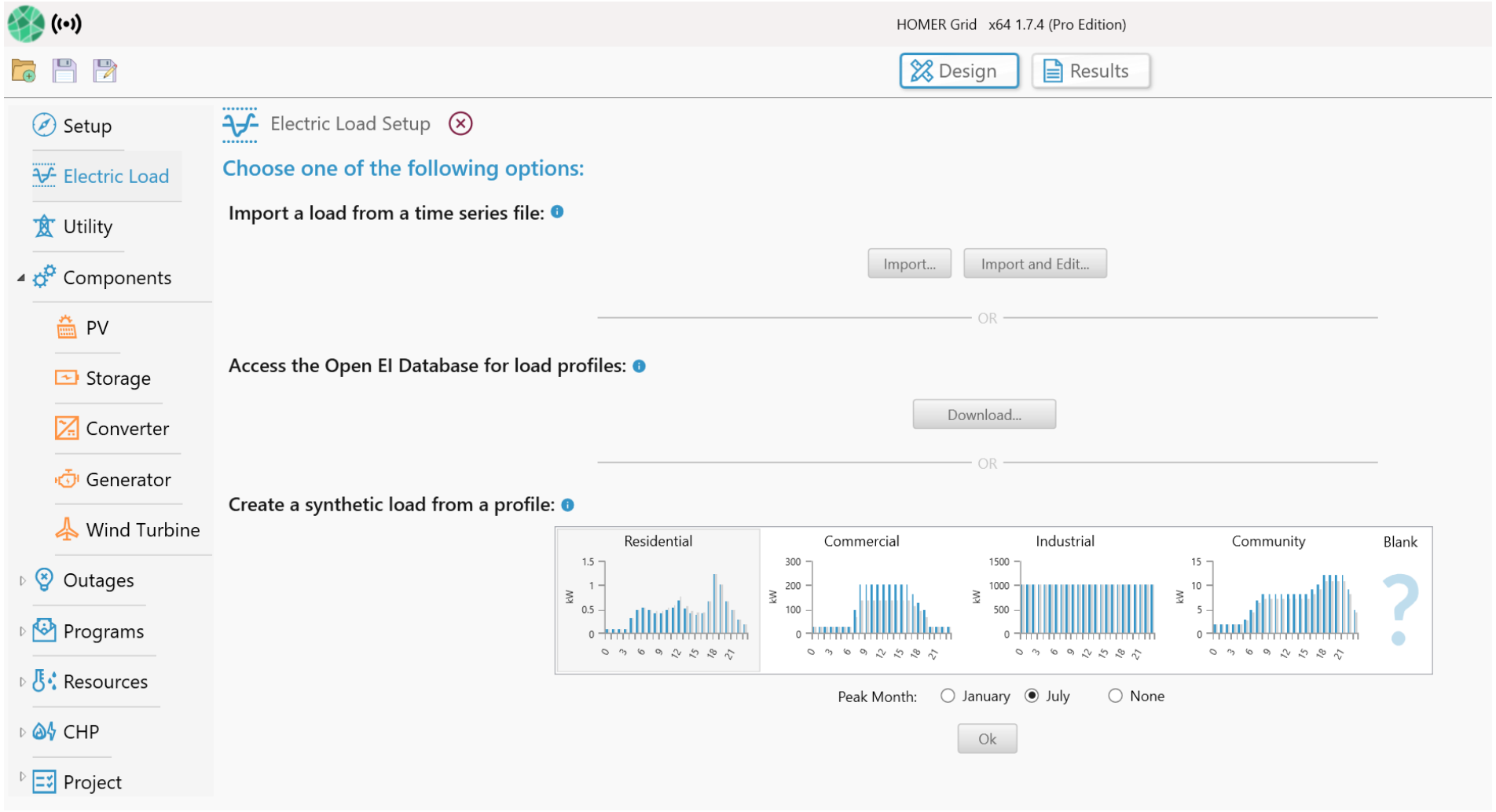
Commercial Microgrid

	Pre-Solar	Post-Solar	Percent Change
kWh	66,343	37,829	-43%
Cost	$10,638	$7,431	-30%

Pre-Period: Sep 2018-Mar 2019
Post – Period: Feb 2020 – Aug 2020

Optimizing With HOMER

The first step is understanding the load profile

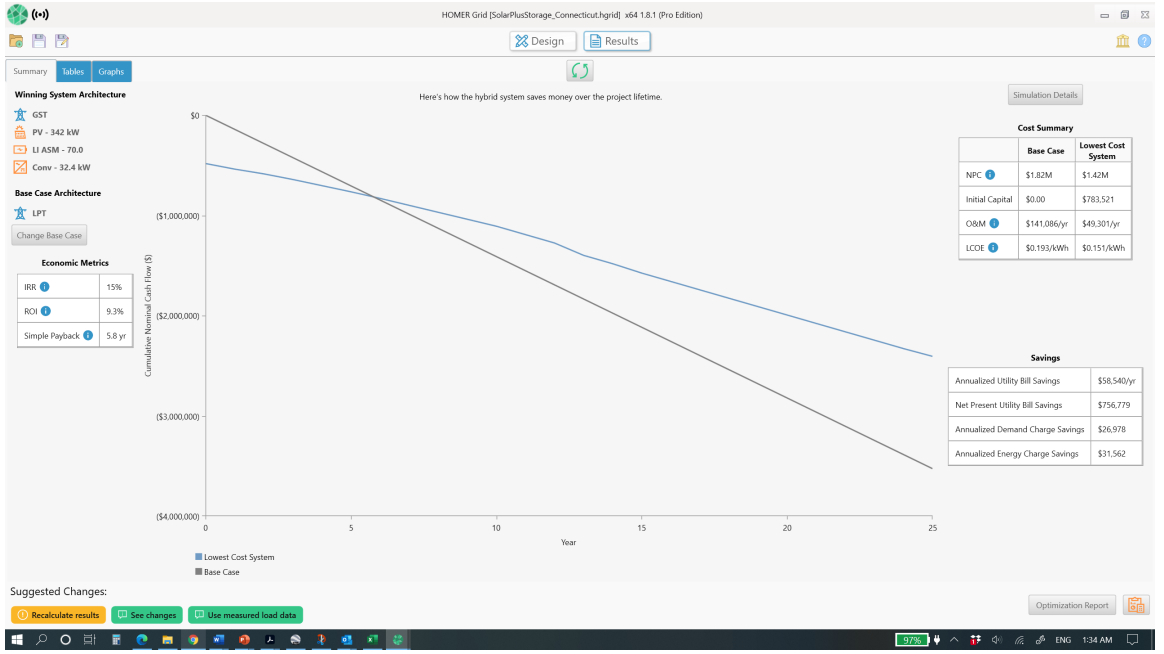


Using Interval Data With HOMER

Optimizing Opportunities-

- Summer –
  - Reduce Peak Period kWh –Optimize ESS use in Peak Tariff Periods
  - Reduce Demand – Optimize ESS use to lower demand cost based on Peak kW Loads
  - Participate In Con Ed Demand Reduction Program

- Winter
  - Reduce Demand - Optimize ESS use to Lower Demand cost based on Peak kW Loads
  - Use ESS to recharge overnight to lower Peak kW loads during winter lower PV power production



500kW/1000kWh ELM Unit – Pre-wired Microgrid Controller & Storage

Thank You

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Assisted By:
Sarah Medina
Renewable Energy Analyst
Solar One Energy

ELM

The ELM Microgrid Package is assembled to the highest standards in a UL 508A shop. It is shipped as a self-contained unit and can be installed outdoors or indoors.

MICROGRID 500 PACKAGE

Turnkey Solution
- Factory Assembled
- Pre-Engineered
- Pre-Wired
- Pre-Installed Safety Labels
- Pre-Tested

Managed Assets
- Solar Generation
- Distributed Battery Storage
- Diesel, Propane & Nat Gas Generators
- CHP Systems
- Grid Power

Communications & Control
- 4G LTE Cellular
- Ethernet and Wifi
- Building Management
- Generator Start and Stop
- Optimal Power Forecasting
- Power Reliability Alerts
- Isochronous Generation Control

The ELM Advantage
- Assembled in UL 508A Shop
- Turnkey Solution
- Indoor and Outdoor Enclosure Options
- Includes Climate Control and Fire Suppression
- Includes Microgrid Installation and O&M Guides