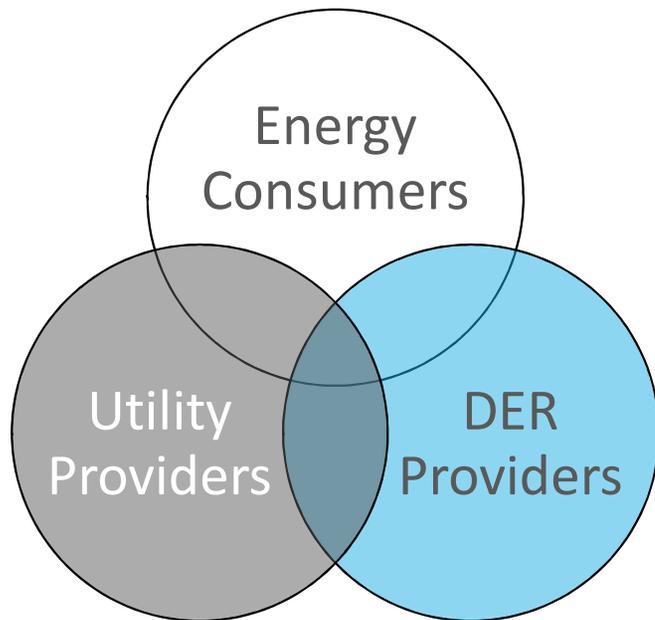


# Data Driven Optimization of Distributed Energy Asset Design and Operation

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Opportunities for a cleaner, more efficient, and resilient grid

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## Why Now?



Maturing technology



Declining cost

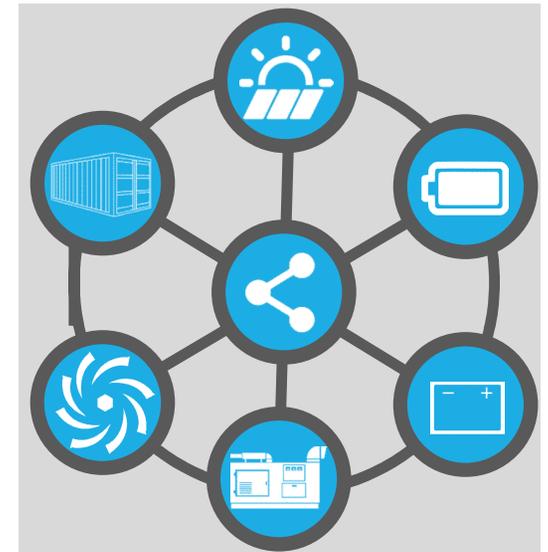


Field proven deployments



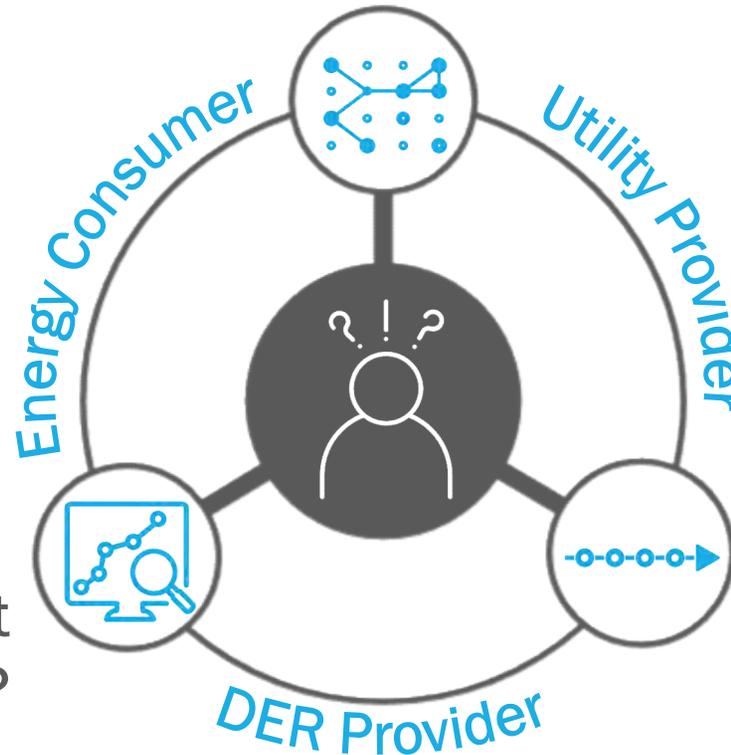
Increasingly accessible energy markets

## Synergistic Operation



## What's the Challenge?

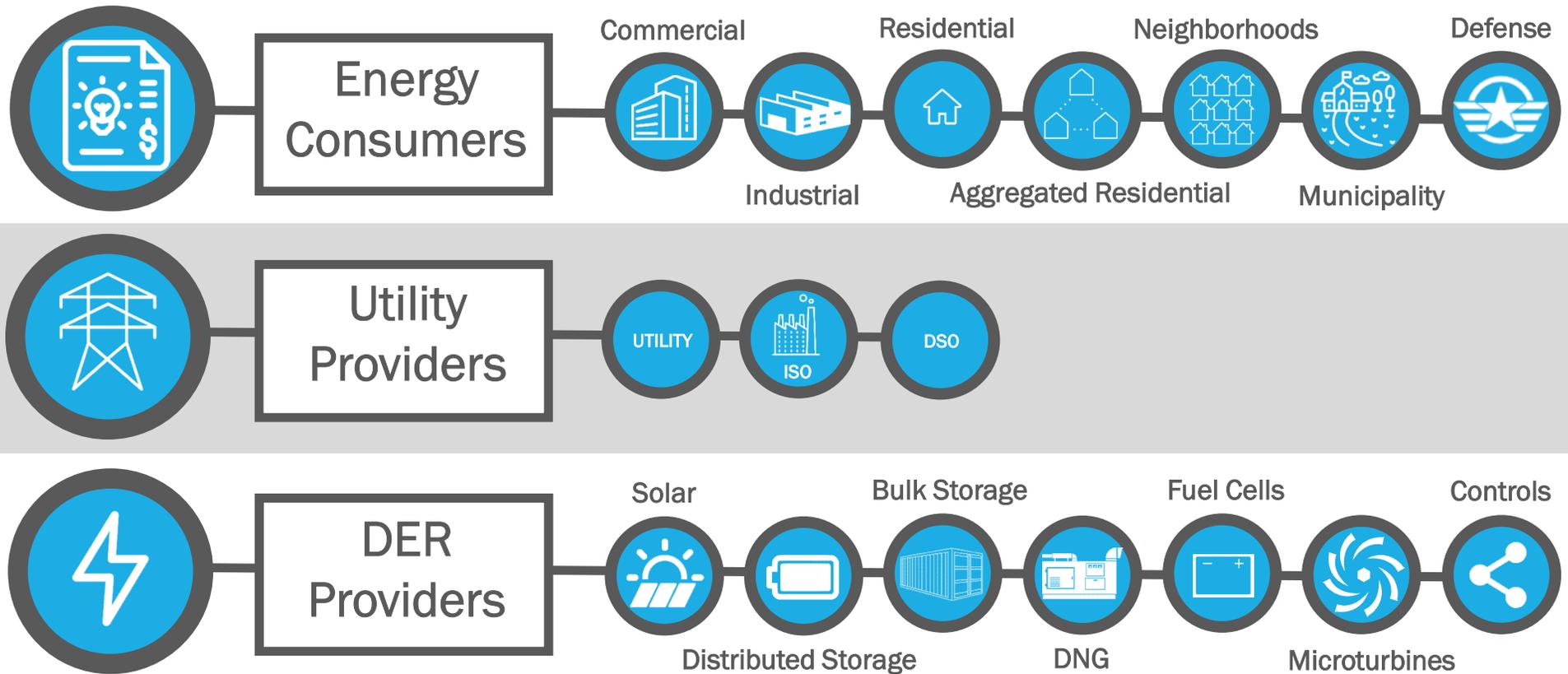
What should I install to meet my objectives?



How do I operate what I've installed?

How will operation need to change over time?

## Who are the Stakeholders?



## Do the Stakeholders Care About the Same Things?

SORT OF...

Cost Savings &  
Revenue Generation

Sustainability &  
GHG Reduction

Energy Security &  
Resiliency



#1 (All)

Commercial Residential



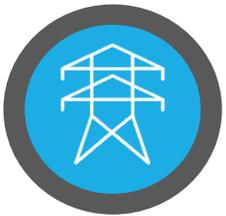
Industrial

Defense

Priority

Mandated

Priority



All

Most

All but PV

# SOFTWARE AND MICROGRID PRODUCTS

What type of DER's should I install?

CleanSpark Offers a Unique Software Suite from Modeling to Active Controls

How do I operate them once installed?

## Microgrid Value Stream Optimizer (mVSO)

### Modeling and Design Software

- › Supports strategic decision making on energy projects based on customer needs and priorities
- › Pinpoints opportunities throughout diverse energy market topographies
- › Tests business models and performance under various regulatory constraints
- › Delivers the answers needed to make confident energy investment decisions

## mPULSE DER Energy Manager

### Enterprise Control and Monitoring Software

- › Intelligently manages and optimizes energy assets to maximize benefits through real-time optimization of multiple generating sources and energy storage
- › Orchestrates the operation of energy assets in coordination with the utility and electric loads to maximize:
  - Energy Savings & Revenue
  - Sustainability / GHG Reduction
  - Energy Security / Critical Power

# SOFTWARE: MICROGRID VALUE STREAM OPTIMIZER (mVSO)

System Summary

Financial Summary

Time Series Data

Demand & Energy Statistics

Generation Statistics

Energy Storage Statistics

What type of DER's should I install?

Delivering the answers needed to make confident energy investment decisions.

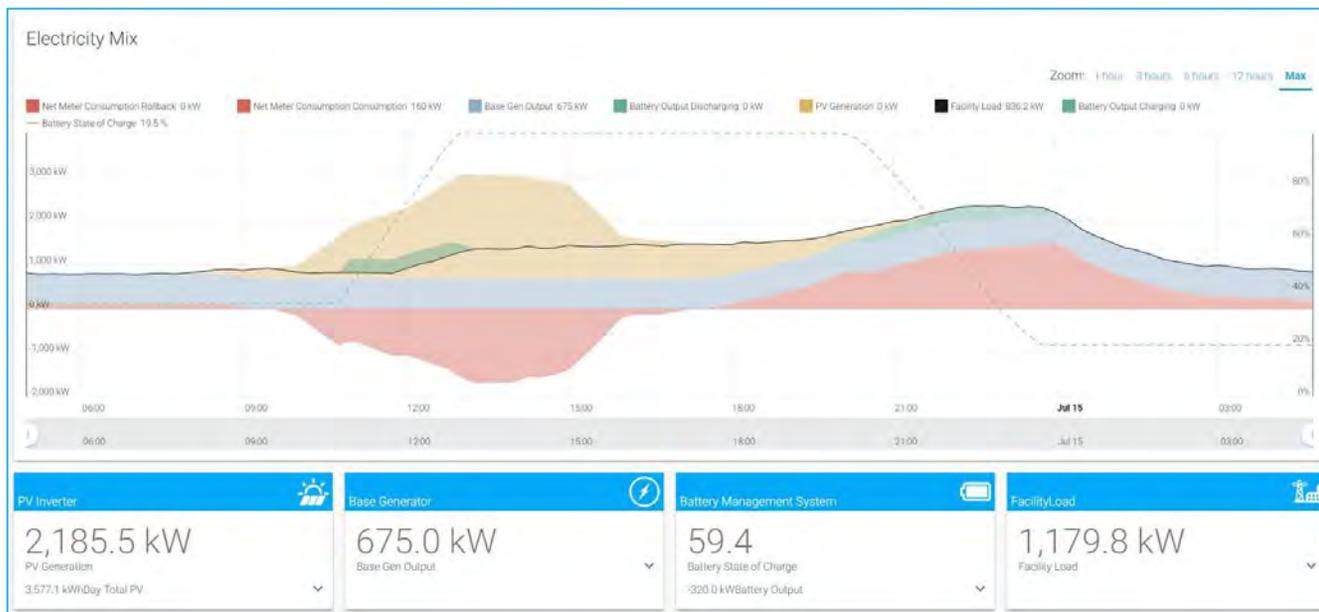


# SOFTWARE: mPULSE DER ENERGY MANAGER

Manages Energy Resources - Creating Benefits Selected By Our Customers

## Enterprise Control and Monitoring Software

How do I operate once installed?



## Forward Looking

- › Built with a forward looking design meant to mirror evolving regional energy markets by running a virtual market at each multi-DER microgrid it controls
- › Multi-DER deployments self-optimize

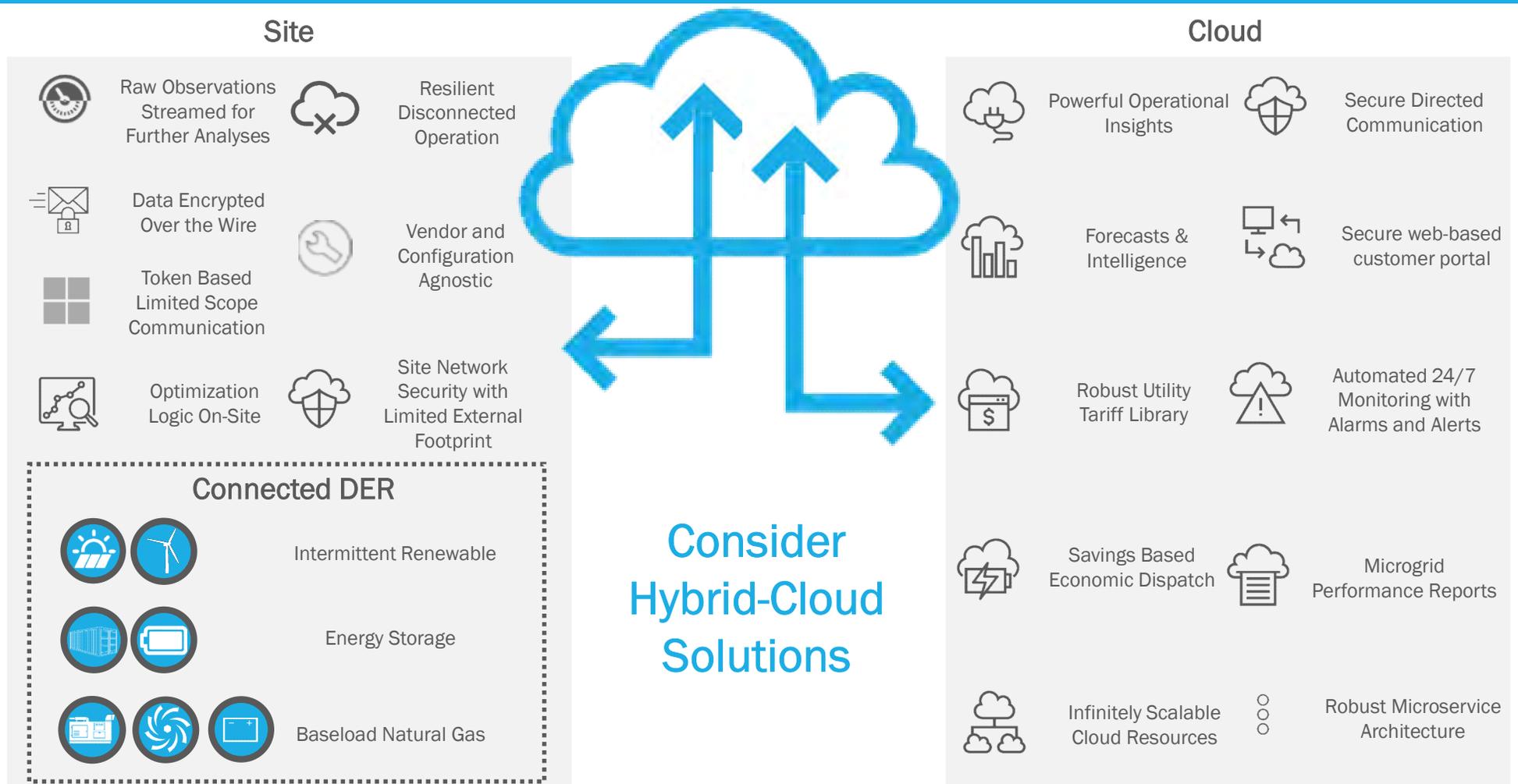
## Patented Forecasting

- › Real-time power source decision making based on forecasted power system needs ensures the system is ready to perform the highest value functions when needed

## Future Flexible

- › System can be easily expanded in a modular fashion as technology evolves and new opportunities arise

# Data Driven Optimization of Distributed Energy Asset Design and Operation



## Equipment Solutions for Facilities



- Automatic Transfer Switches
- LV & MV Paralleling Switchgear
- Master Control Panels
- Redundant Failsafe PLC Operation

Data Centers



Water/Waste Treatment Plants



CHP/Distributed Generation/  
Peak Shaving Projects



Other Commercial Projects



Primary  
Secondary  
&  
Tertiary Control

# EQUIPMENT SALES LV & MV SWITCHGEAR + IPC'S

Santa Fe Springs, CA



## EQUIPMENT SALES FACILITY

- › Modern 40,000 SF facility
- › Diverse metal capability using carbon steel, stainless steel, and aluminum
- › Processes include shearing, laser cutting, punching, tapping, forming and assembly
- › Laser cutter for complex hole patterns and cutouts



# EQUIPMENT SALES PRODUCTS

## Custom Switchgear and Integrated Power Centers

- › LV Switchgear Manufactured to UL 891 & 1558 standards
- › MV Metal-Clad Switchgear
- › LV & MV Paralleling Switchgear
- › NEMA 3R (Walk in & Non-Walk in)
- › Various Breaker Manufacturers
  - › GE
  - › Siemens
  - › Eaton
  - › LSIS
  - › ABB
  - › Powell (MV Only)



# EQUIPMENT SALES PROJECTS

## Paralleling Gear Project Experience

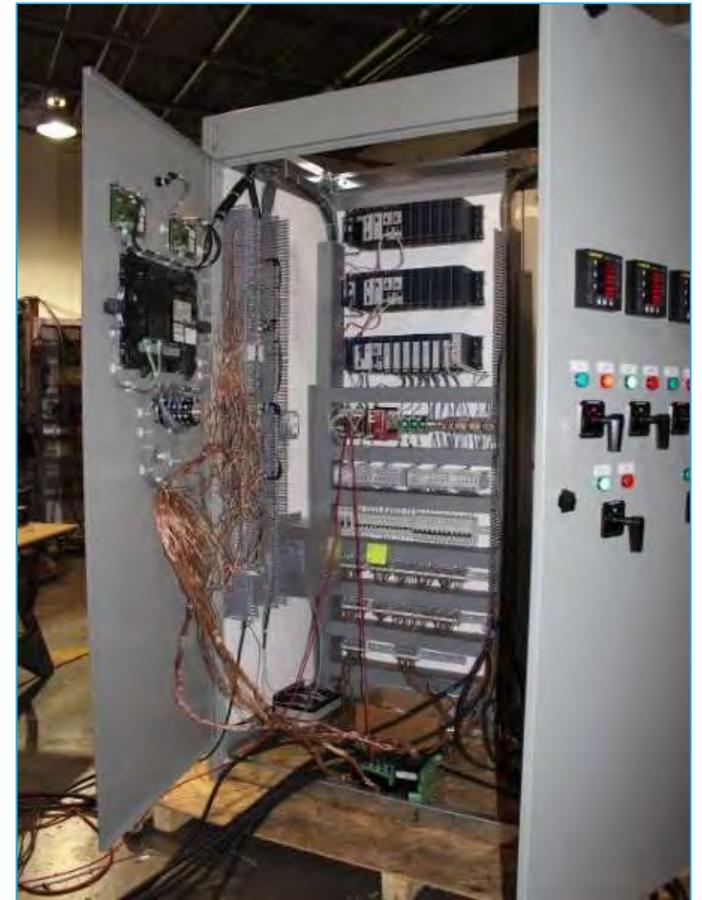
- › Government Projects (Over 44)
  - › US Embassies (3)
  - › USAF LRRS (CHP) - Alaska
  - › Bolling AFB - Washington DC
  - › Naval Research Lab - Washington DC
- › Medical Center Projects (Over 33)
  - › St. Luke's – Kansas City, KS
  - › VA Medical Center – Washington DC
  - › Providence Park – Novi, MI
- › Data Center Projects (Over 37)
  - › Involta – Multiple Locations
  - › Unisys – Multiple Locations
  - › Verizon – Multiple Locations



# EQUIPMENT SALES PROJECTS

## Paralleling Gear Project Experience

- › Commercial and Industrial Projects (Over 35)
  - › Walmart – Multiple Locations
  - › Eli Lilly – Indianapolis, IN
  - › General Motors – Detroit, MI
- › Correctional Facilities Projects (Over 17)
  - › Avoyelles Correctional – Avoyelles, LA
  - › Minn. Correctional – Faribault, MN
  - › Minn. Correctional – St. Cloud, MN
- › Water Treatment Plant Projects (Over 27)
  - › City of Casper – Wyoming
  - › City of Manassas – Virginia
  - › Markham WTP – Sanford, FL
  - › Deltona WTP, Deltona, FL



# EQUIPMENT SALES PROJECTS

## Distributed Generation and CHP (125+ Projects)

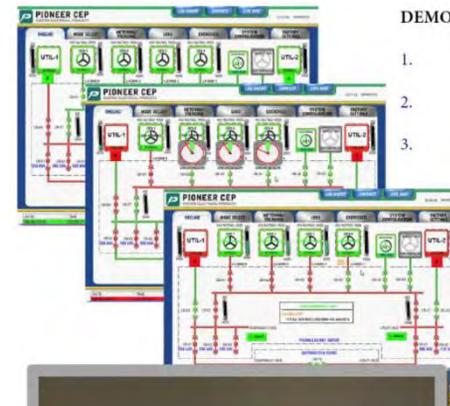
- › Multiple Gen-Sets with On-Board Paralleling
- › ATS Functionality for Stand-By Applications
- › Capable of Utility Paralleling for Peak Shaving and Export Applications
- › Compact Size
- › LV & MV Designs
- › Scalable



# CLEANSPARK MICROGRID/PARALLELING CONTROLS SIMULATOR

- Simulate and verify sequence of operation steps
- Demonstration of various paralleling sequences
- Protocol convertors, read metering data
- Actual components PLC, HMI, meter
- Operator Training
- Lunch and Learns

## CLEANSPARK



### DEMO CASE – SIMULATOR

1. Simulate and verify sequence of operation steps
2. Demonstration of various parameters
3. Protocol convertors, Read metering data
4. Actual components PLC, HMI, meter
5. Operator Training
6. Lunch and Learns

