



## Model Scenario: SCADA (Supervisory Control and Data Acquisition) for an Electric Utility

Modern industrial control systems depend on computer networks that monitor and control the complex processes associated with daily enterprise activities, be they industrial, infrastructure or facility-based.

A large Midwestern electric utility is retrofitting automation and control upgrades to dozens of critical power distribution substations in their service area. The utility needs 100% uptime; their equipment has to work straight through every conceivable kind of power outage while delivering the control and data operations the company needs.

Most of the substations have backup generators and battery storage already, but they are of two different brands – with three different control schemes – and no matter what, it’s not going to be an adequate margin with the new equipment. Most renewable energy systems are complex, and expensive. Plus, staff, money, time, and space on the ground are all tight...the utility can’t afford to redesign a separate solar power system for each station.

### REQUIREMENTS

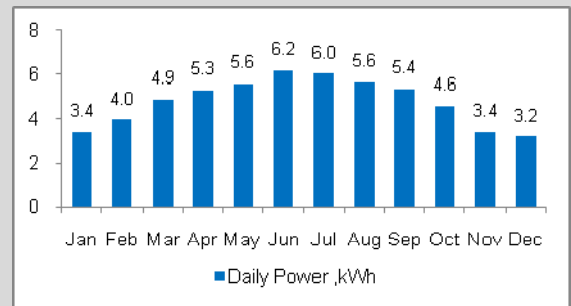
The utility’s SCADA systems require a power source that can ideally:

- Integrate seamlessly with a mixed bag of existing gas-powered backup generators
- Integrate to an existing facility without additional building permits or redesign
- Pay for itself day-to-day; not just when there’s an emergency
- Fit within a small footprint, in diverse station layouts
- Run without worries about emissions permits
- Be ordered “off the shelf” without adding to design and time burdens
- Expand over time as needs increase

### RENEWABLE RESOURCES

The chart below shows the average monthly power production by a single ReGenerator H5000 with 1200 Watts of integrated solar in:

Cincinnati, Ohio USA



Source: HOMER Energy / NREL

### POWER REQUIREMENTS

Supervisory Control and Data Acquisition (SCADA)

Substation monitoring and switchgear	3000 Watts
Hours per day - min	12 h
Hours per day - max	24 h
Days per year - min	3 days
Days per year - max	12 days
Total power needed:	
Min power per year	108 kWh
Days per year - min	864 kWh

## Model Scenario: SCADA for an Electric Utility (continued)

### SOLUTION: THE REGENERATOR H5000

The Midwestern utility orders ReGenerator H5000 units, each with 5 kVA of power and 25.9 kWh of backup energy. As each substation is upgraded, they install one ReGenerator with no more than a pickup truck and a forklift. The units are placed wherever space and shading permit. The entire ordering process requires nothing more than a corporate card for purchasing the units.

Unlike their old UPS system which provided no automatic updating, the ReGenerator units operate 24/7 and report their status remotely, reducing their station power bills without eating into emissions permit time. The utility adds on fossil-fuel generator interface kits that allow the ReGenerator units to intelligently start and stop each of their fossil-fueled backup generators automatically. Brief power interruptions don't even start the gas generators, saving fuel (and fueling trips.) Two of the stations require additional control power for substation automation equipment during what might be a days-long outage. For these, the utility adds an additional 2.8 kW of solar to their ReGenerators using the simple quick-connect plugs on the side of the units. Longer outages see the generators kick on seamlessly... providing 100% coverage 24x7 at lower cost than either system could provide individually.



Recommended Configuration	ReGenerator H5000
Power Rating	5,000 VA of digital-quality AC power 10,000 Watts of peak power
Integrated Solar	1,200 W of rated Solar
External Solar	Option to quick-connect to 1.2 kW of Solar or connect up to 1.8 kW of Solar through AC input
Wind Generation	Option to connect a wind turbine up to 1.2 kW
AC Power Output	120V AC at 60 hz or 230V AC at 50 hz 8 x 110V AC GFCI Outlets
DC Power Output	3 x 12V DC Outlets 1 x 24V DC Outlet
Generator Support	Generator Auto-start, up to 12 kW
Storage	12 x 180 Ahr AGM batteries 25.9 kWh of storage
Control & Monitoring	Window desktop client Wireless web monitoring using GSM / GPRS
Weight	2,490 lbs / 1,129 kg
Transport	Delivered and installed using a light tilted trailer

REGENERATOR POWER PRODUCTION	
ReGenerator H5000 in Cincinnati, Ohio USA	
ReGenerator H5000 rated solar	1.2 kW
Average monthly power production:	145 kWh
Annual power production:	1,747 kWh
Energy storage capacity	25.9 kWh
<ul style="list-style-type: none"> <li>Each ReGenerator H5000 has sufficient energy storage to run substation monitoring and switchgear for 6 hours before charging from the solar panels or a generator</li> </ul>	

For more information:  
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