



Microgrid Decisions Simplified

Power System Design Issues for Minigrids

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Design Criteria

- What is the alternative?
 - Size, density, & distance from existing grid
- Role of diesel
 - Reliability requirement
 - Fuel supply & maintenance management
- Load diversity
 - Residential versus daytime commercial
 - Waterpumping & battery charging
 - Refrigeration
 - Motor loads

3 Generic Designs

- Small (10 kW peak load)
 - Competes with Solar Home Systems
 - Backup generation is optional
 - Medium (80 kW peak load)
 - Diesel genset for backup and battery management
 - Large (1 MW peak load)
 - Competes with grid extension
 - Multiple gensets
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Sample Results

	Small	Medium	Large
Peak Load (KW)	10	80	1000
Scaled Annual Average KWh/day	58	576	9478
Number of Customers	69.6	691.2	11373.6
Component Sizes	PV: 22.3 KW Gen: 12 KW LA Batt: 154 KWh Converter: 6.78 KW	PV: 210 KW Gen: 110 KW LA Batt: 1508 KWh Converter: 63.7 KW	PV: 1371 KW Gen: 1200 & 500 KW LI Batt: 282 KWh Converter: 649 KW

Additional Analyses

- PV Total Installed Capital Cost:
 - \$3.00 / watt
 - \$1.25 / watt
 - Different load profiles
 - Waterpumping
 - Daytime commercial loads
 - Soft costs
 - Distribution system costs
 - Tariff Implications
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