



Solar Technology

150+ Projects
North America and UK

3 Billion kWh
And Counting

1.3 GW
Operating Assets

10 GW
Operating | Construction | Pipeline

Solar - The Basics

EVOLUTION, DEPLOYMENT, DEVELOPMENT

Evolution of Solar Cell Technology

- Density energy production per square foot of solar cells increased over time
- Reduction in error rates for solar cell technology has reduced, reducing the cost of solar cells
- Refined installation procedures
- Improvement in inverter technology, voltage, size

Solar Photovoltaic Projects

- Rooftop distributed energy projects
- Behind the meter projects
- Utility scale projects

Development Timeline

- Solar irradiance resource maps, consistent and known
- Interconnection, low voltage or high voltage
- Permitting
- Site acquisition, roof, land, parking lot?
- 12-24 months

SEE THE IMPACT FOR GENERATING CLEAN ENERGY

3,275,909,615 = **2,302,231**
Kilowatt-Hours of Electricity Metric Tons of Carbon Dioxide

THIS IS EQUIVALENT TO:

Annual greenhouse gas emissions from:



5,517,654,018
Miles /Year Driven
by an Average
Passenger Vehicle



730,627
Tons of waste
recycled instead
of landfilled

CO₂ emissions from:



259,055,998
Gallons of Gasoline
Consumed



5,330,151
Barrels of
Oil Consumed

Solar

MONTANA

Resource In The North

- Scotland, UK
- Seasonal resource variability, summer vs winter
- Not just an equatorial resource

What solar offers

- Energy as available
- Paired with storage to offer capacity, capture ITC

DISTRIBUTED GENERATION (DG) PROJECTS



Athenian School
Danville, CA
Fixed Tilt Ground Mount

0.42MWdc



Atlantic County
Criminal Courts Complex
Mays Landing, NJ
Rooftop and Carport Installations

1.54MWdc



University of Utah
Museum of Natural History
Salt Lake City, UT
Fixed Tilt Roof Mount

0.59MWdc



Oceanic Time Warner
Mililani, HI
Fixed Tilt Roof and Carport Mount
on Five Different Sites

0.86MWdc



Mennen Sports
Arena and School
Morristown, NJ
Fixed Tilt Roof And Carport Mount

3.19MWdc



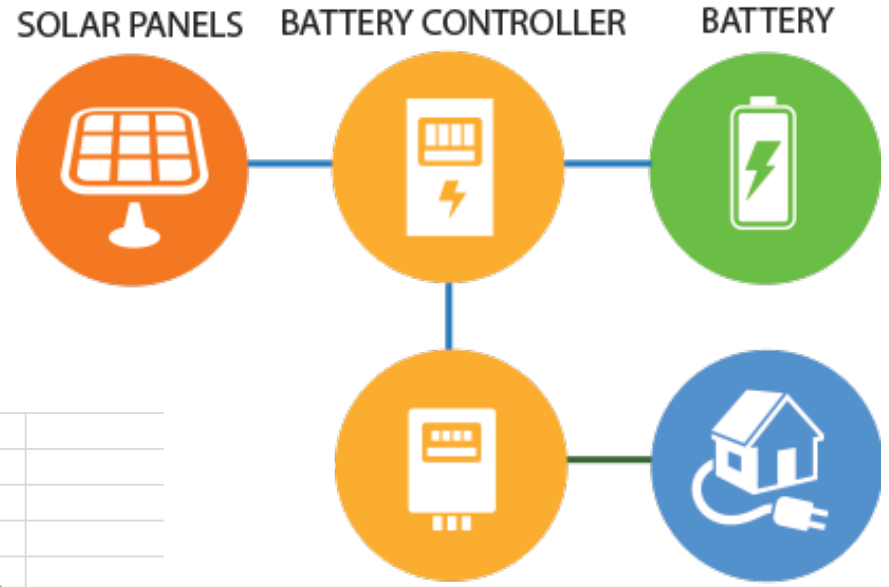
Estee Lauder
Melville, NY
Fixed Tilt Roof Mount

0.60MWdc

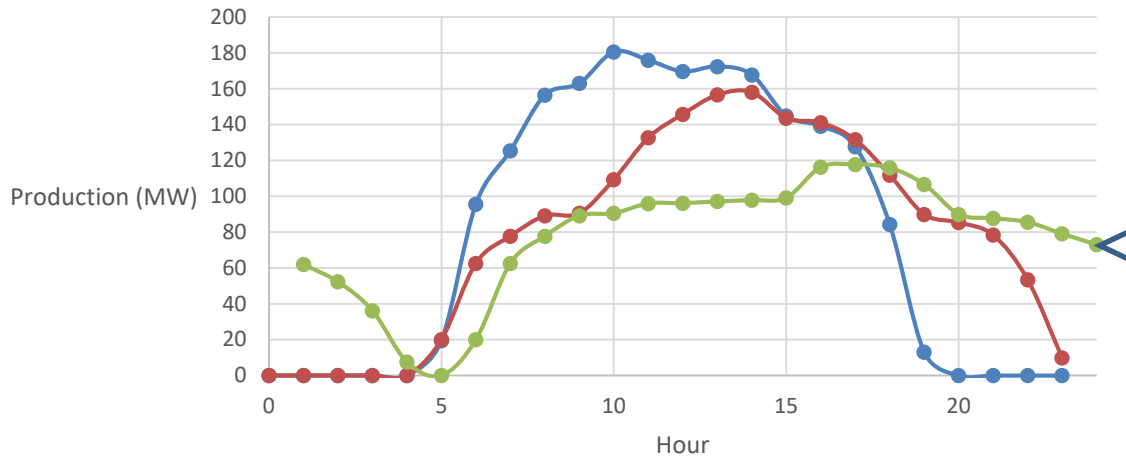
Solar + Storage

AN EXAMPLE

- When using energy storage, excess solar energy is stored within batteries before the energy is inverted from DC to AC.



June - Boseman, MT



—●— 200MW Solar —●— 200MW Solar with 100MW 4hr Battery —●— 200MW Solar with 100MW 8hr Battery

Energy from the battery is utilized when solar panels are no longer producing, resulting in a smoothed production curve.

Solar

COST & RELIABILITY

Cost





















- Varies by site based on installation
- Site preparation work
- Interconnection
- Improvement in inverter technology, voltage, size
- Split between panels and balance of plant

Reliability & Life

- 35 year life
- Degradation ~1% per year
- Capacity factors in the low 20s
- Few moving parts

Keys To Operational Reliability

- Well trained technicians
- Product warranty, panels, inverters and balance of plant
- System monitoring – key performance indicators

			
American Solar Greenworks Lancaster, CA Fixed Tilt Ground Mount 8.9MW	Antelope Big Sky Ranch Lancaster, CA Single Axis Tracker Ground Mount 26.3MW	Central Antelope Dry Ranch C Lancaster, CA Fixed Tilt Ground Mount 22.4MW	Citizen Solar B Mendota, CA Fixed Tilt Ground Mount 7.1MW
			
Fairmont Fairmont, NC Fixed Tilt Ground Mount 5.0MW	Golden Hill United Kingdom Fixed Tilt Ground Mount 6.2MW	Lancaster Dry Farm Ranch Lancaster, CA Single Axis Tracker Ground Mount 5.9MW	Lancaster Little Rock C Lancaster, CA Fixed Tilt Ground Mount 7.0MW
			
Nick East Liberty, NC 6.5MW	Redwood Cluster Bakersfield, CA 72.8MW	Riverhead I Calverton, NY 9.2MW	Sandstone Solar Florence, AZ 57.4MW
			
SEPV Mojave West Mojave, CA Single Axis Tracker Ground Mount 25.0MW	SEPV Palmdale East Palmdale, CA Single Axis Tracker Ground Mount 11.5MW	Sheals Hook United Kingdom Single Axis Tracker Ground Mount 14.7MW	Shoreham Solar Shoreham, NY Fixed Tilt Ground Mount 14.2MW
			
Summer Solar SCPPA Lancaster, CA Single Axis Tracker Ground Mount 25.9MW	Victor Dry Farm Ranch Phelan, CA Fixed Tilt Ground Mount 11.2MW	VML B2-E2 (Seneca Solar) Victorville, CA Fixed Tilt Ground Mount 8.3MW	WABSRA Lancaster, CA Single Axis Tracker Ground Mount 23.9MW

