

SOLAR INDUSTRY OVERVIEW

Panasonic



A Panasonic Eco Solutions Partner

AMERICAN ASSOCIATION OF BLACKS IN ENERGY

VIRGINIA CHAPTER MEETING



INTRODUCTION

CORONAL DEVELOPMENT SERVICES

- Formerly HelioSage Energy; CDS is now the development arm of Coronal-Panasonic
- Over 450 MW_{AC} of PPAs executed to date
- Operational solar projects in 10 states with additional contracts in 6 more
- Exclusive strategic partnership with Panasonic North America



Connecticut
Light & Power



REPRESENTATIVE PROJECTS



Boseman Solar Center
5 MW | Nash County, NC
PPA: NCEMPA



Somers Solar Center
5 MW | Somers, CT
PPA: CT Light & Power



Sullivan Solar Garden
2 MW | Loch Sheldrake, NY
PPA: SUNY-Sullivan College



Camden Solar Center
1.8 MW | Camden, NJ
PPA: Camden County MUA



Upchurch Solar Center
5 MW | Vance County, NC
PPA: Duke Energy



Boston Scientific
1.3 MW | Quincy, MA
PPA: Boston Scientific

SOLAR 101

INDUSTRY BY THE NUMBERS

- ✓ 22 GW online today – enough energy for 4.6 million US homes
- ✓ This number expected to double by the end of 2016
- ✓ Solar represented 40% of all new electric capacity installed last year
- ✓ A new solar installation is completed every 2 minutes
- ✓ 175,000 people across 8,000 companies in all 50 states



INDUSTRY SEGMENTS

- Solar industry includes three major segments:
 - (1) Residential
 - fastest growing segment (30+% annual growth last 2 years)
 - 25% of capacity installed in 2014
 - (2) Commercial
 - growth in C&I rooftop solar has stagnated over last 3 years but corporate America continues to “go solar”
 - (3) Utility Scale
 - 43% of installed capacity nationally
 - 13-14 GW expected for build out in 2016



➤ MAJOR BRANDS

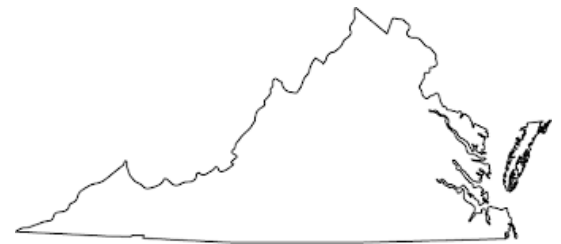
Sample Company	Panels	Residential	Commercial	Utility Scale
SUNPOWER™	✓	✓	✓	✓
 SunEdison®	✓	✓	✓	✓
 First Solar.	✓			✓
 SolarCity	✓	✓	✓	
 sunrun™		✓		

WHERE IS SOLAR HAPPENING?

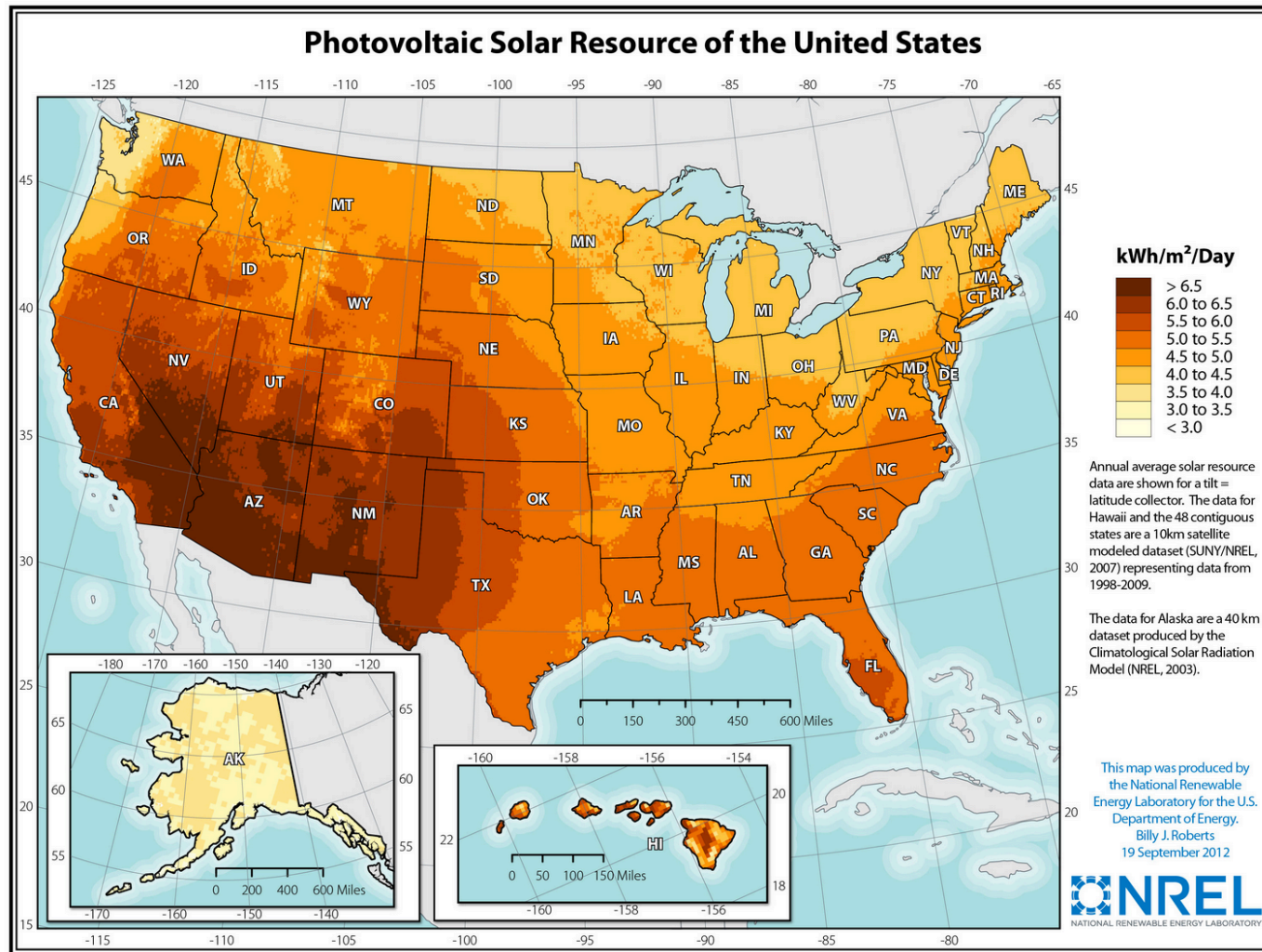
- By the end of 2016, sixteen US states will have over 100 MW installed
- Top 10 solar states:
 - (1) California – 11.5 GW
 - (2) Arizona – 2.1 GW
 - (3) New Jersey – 1.5 GW
 - (4) North Carolina – 1.1 GW
 - (5) Nevada – 974 MW
 - (6) Massachusetts - 876 MW
 - (7) New York – 519 MW
 - (8) Hawaii – 497 MW
 - (9) Colorado – 430 MW
 - (10) Texas – 387 MW

SOLAR IN VIRGINIA

- Virginia has been a solar laggard - limited enabling policy (no mandatory RPS, no tax credit) + affordable traditional power
 - 15 MW installed capacity – 31st out of 50 US states
 - 170 companies employing 1,850 people
- Signs of change?
 - ✓ Dominion Community Solar Program (up to 30 MW total)
 - ✓ Dominion announcement of 400 MW of utility scale solar by 2020
 - ✓ RFPs from Appalachian Power, ODEC, CVEC, others



➤ SOLAR INSOLATION



kWh / m² / day =
number of sun hours
per day

SOLAR 201

ROOF MOUNT VS. GROUND MOUNT

What are the major considerations / challenges?

Roof Mount

- Roof Age
- Roof Warranty
- Roof Load
- Roof Ownership



Ground Mount

- Zoning / Permitting
- Environmental
- Topography
- Soil Conditions
- Proximity to grid



THE SOLAR INVESTMENT

- Solar remains a tax motivated investment decision
- 50-60% of project return is driven through tax benefits (ITC, MACRS)
- Third party ownership (“TPO”) model has thrived as a result – tax efficient system owners can translate their ability to fully utilize tax benefits into aggressive PPA or lease rates for their clients
- Payback generally achieved in 7-9 years

INVESTMENT TAX CREDIT “ITC”

- The federal ITC is a tax credit worth 30% of total system cost for owners
- Introduction in 2006 has driven tremendous industry growth and advancement
 - 73% decline in average installed costs
 - Compound annual growth rate for installed capacity of 48%
 - US now #1 in market size worldwide
- ITC scheduled to step down at the end of 2016.
 - Forecasted decline in construction of 57% for 2017
 - Residential segment will be hit hardest
 - Life will go on

AVERAGE INSTALLED COSTS

Segment	Average turnkey cost 2014
Residential	\$3.48 / watt
Commercial	\$2.25 / watt
Utility	\$1.55 / watt

Sample Project	Installed Cost
10 kW roof mount	\$34,800
150 kW roof mount	\$3,375,000
20 MW ground mount	\$31,000,000

NET METERING

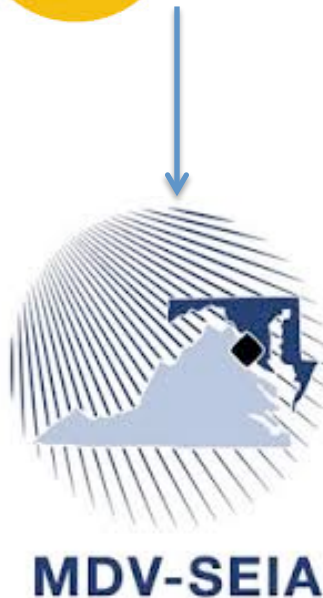
- Net metering is another form of local policy that can help drive the adoption of solar
- In VA the net metering capacity limit is 20kW for residential, 1 MW for commercial systems
- Participation in net metering requires an application with the utility and the installation of a billing meter
- When excess generation is produced, a credit is applied at the same value of the kWh that was offset

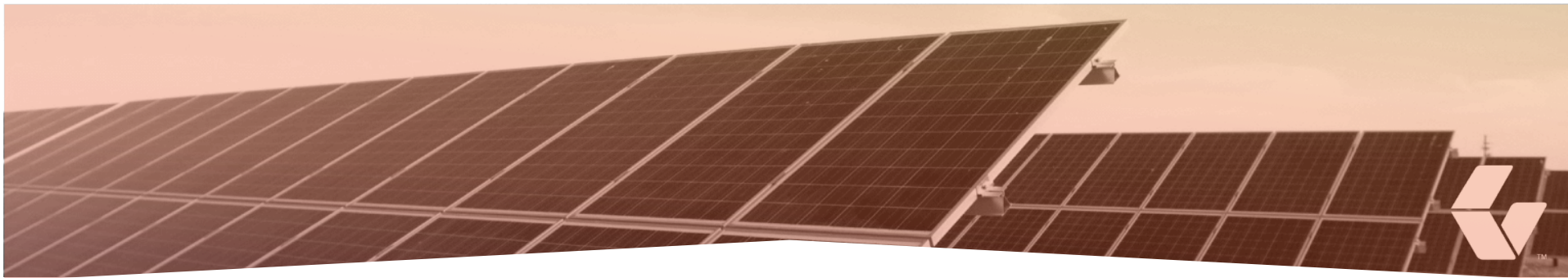


“VALUE OF SOLAR”

- Is there one formula for assessing the per kWh benefit of solar that takes into account the technical, environmental and societal benefits? No
- Related concept: Value of solar tariff, or “VOST” – a rate design policy that gives customers credit for electricity generated by a PV system. Why?
 - Avoiding the purchase of energy from other, polluting sources
 - Avoiding the need to build additional power plant capacity to meet peak energy needs
 - Providing energy for decades at a fixed price
 - Reducing wear and tear on the electric grid, including power lines, substations, and power plants
- Elusive and somewhat contentious - requires regulatory oversight & approval
- VOST only active in Minnesota and Austin, TX today

INDUSTRY ASSOCIATIONS





THANK YOU



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