

# Commercial Scale PV Systems

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# Commercial Scale PV Systems

- Connected on customer's side of the utility meter - offsets energy used at the site.
- May provide additional benefits such as shading or roof insulation.
- Size is greater than 20 kW with 3-phase electrical connection. Many new systems are MW size.
- Systems may be building integrated, roof-mounted or ground-mounted.

# Some roofs are better than others



**This is a good roof!**

# This roof is ... *complicated*



Photo credits: Byron Stafford, NREL



**However, even complicated roofs can have a PV system.**



Photo credits: Byron Stafford, NREL

# Another Tight Rooftop PV System



Photo credit: Byron Stafford, NREL

# A Flat Roof System



Photo credits: Byron Stafford, NREL



Neutrogena  
Los Angeles, CA  
546 kW - across  
3 buildings

# Roof-mounted PV System with Ballast

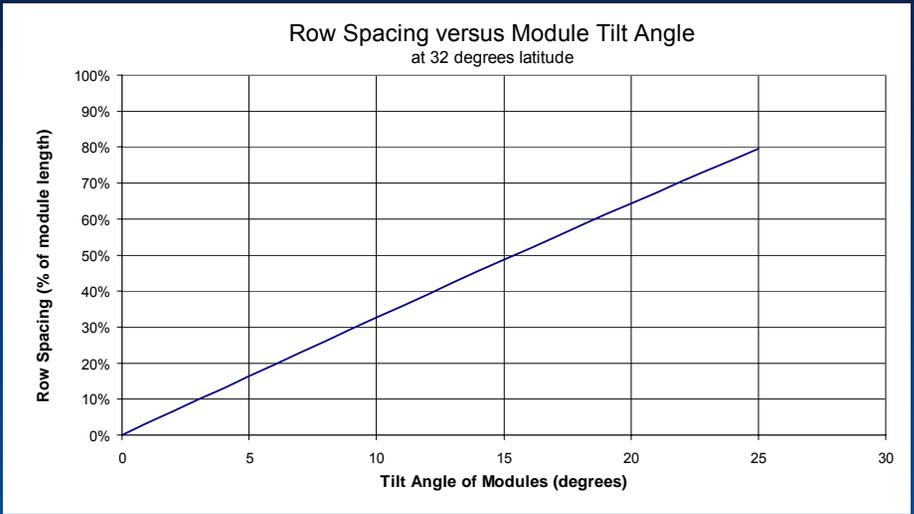
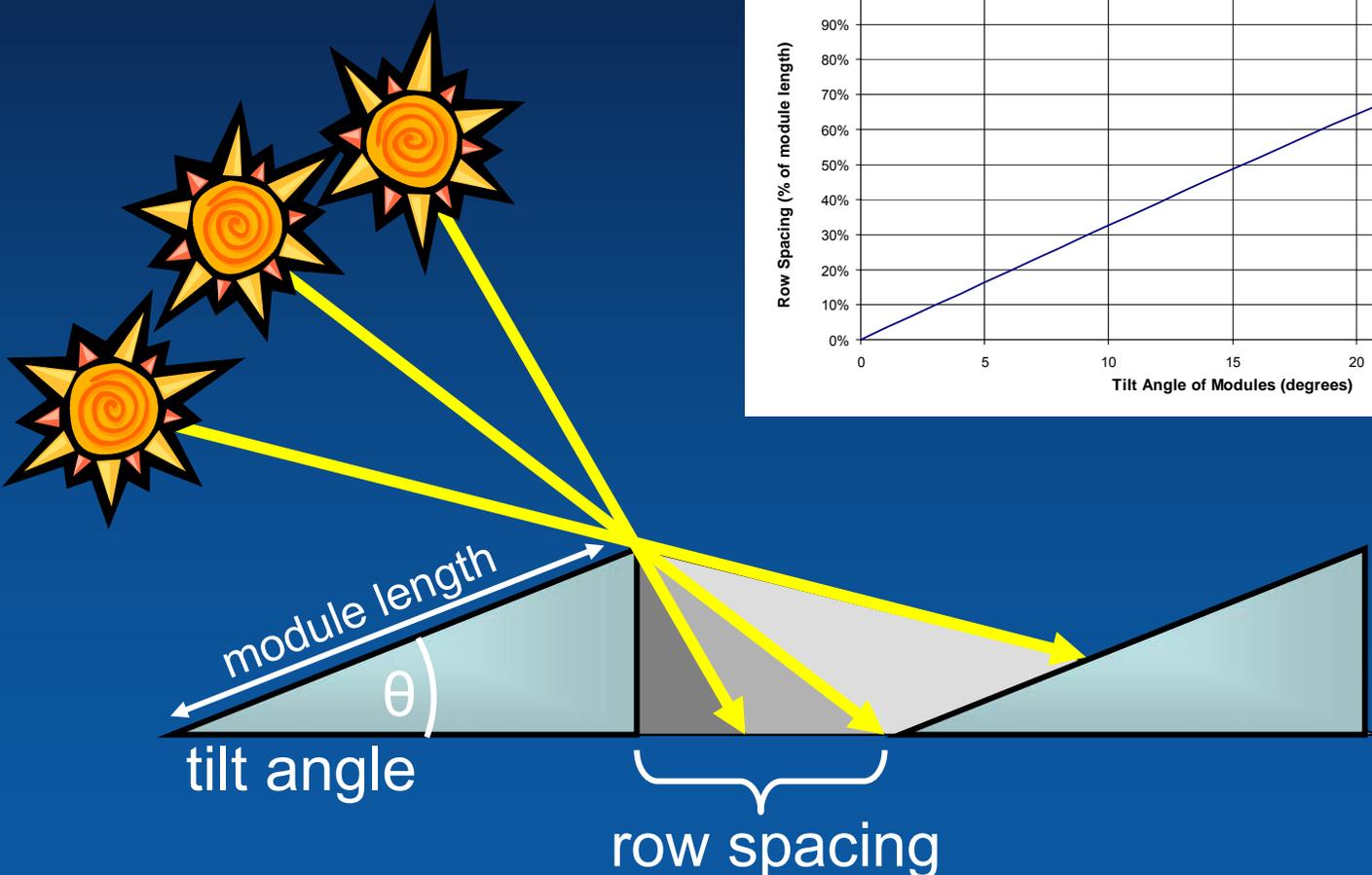


Rated at 25.1 kW<sub>dc</sub>

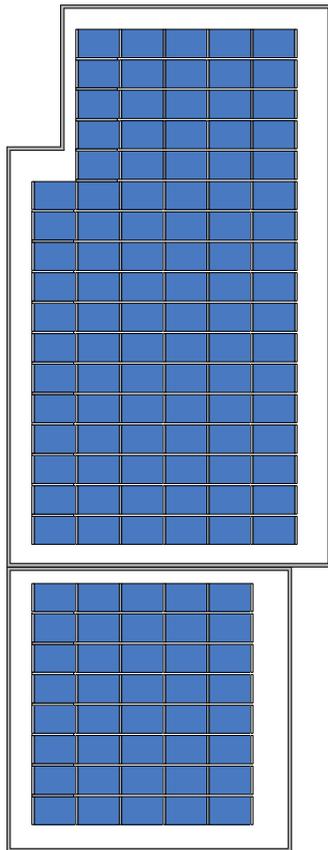


Photo credits: Byron Stafford, NREL

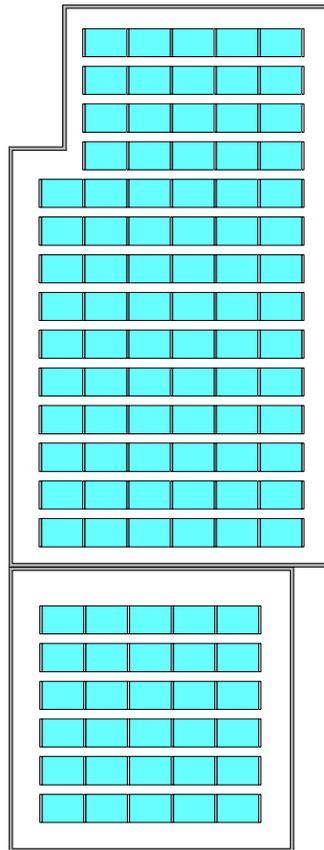
# Effect of Tilt Angle on Row Spacing



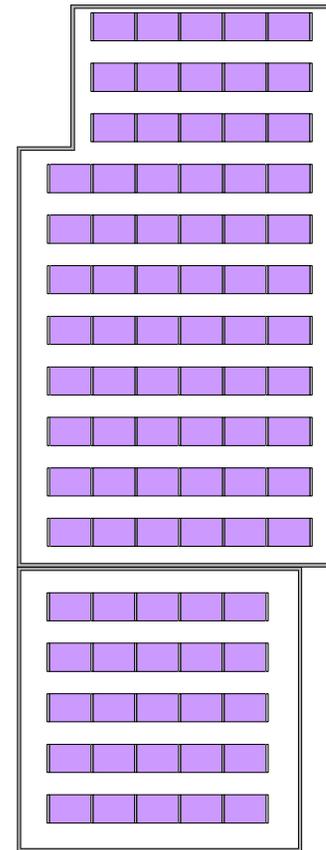
# Case Study in El Paso, TX



0 degree tilt  
41.1 kW<sub>dc</sub>



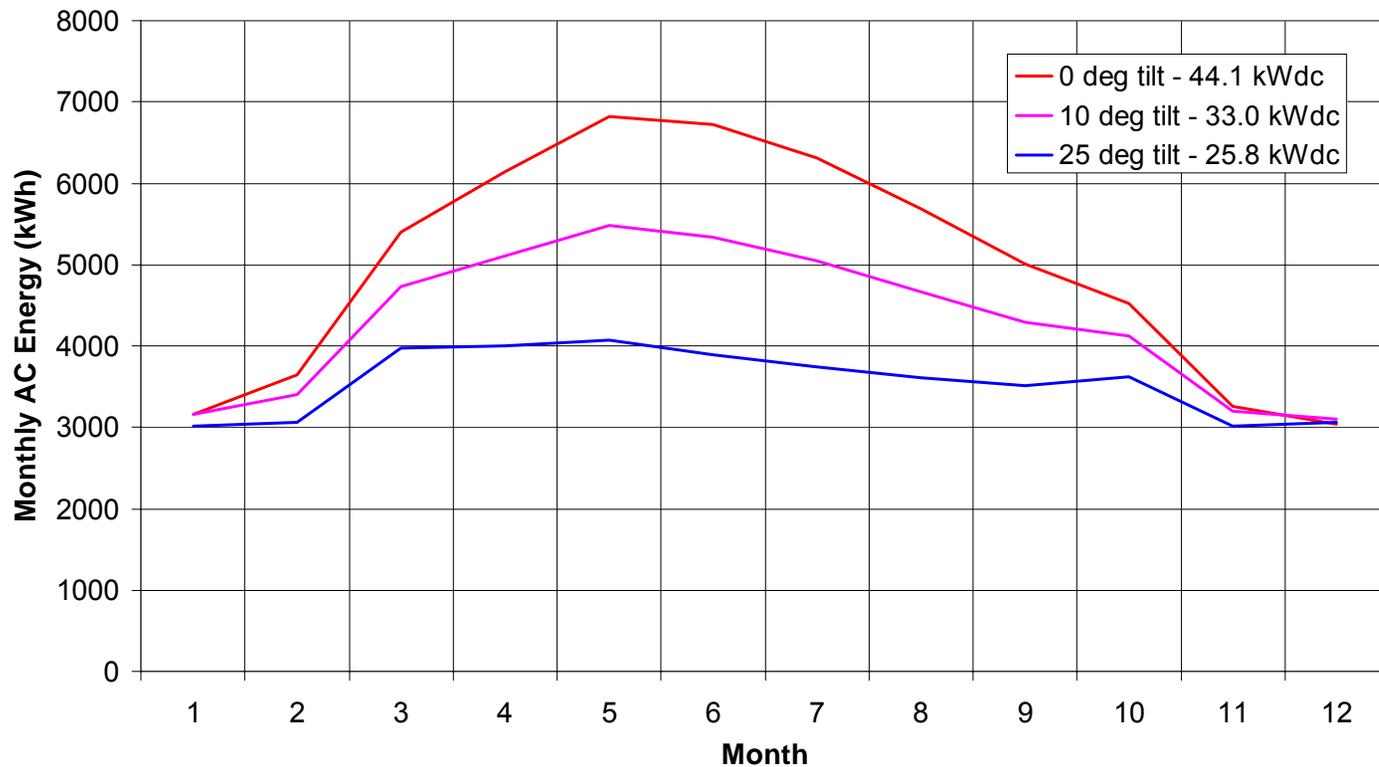
10 degree tilt  
33.0 kW<sub>dc</sub>



25 degree tilt  
25.8 kW<sub>dc</sub>

# Monthly Energy Production in El Paso, Texas

(Calculated results are for three different PV systems for the same roof area)



# Ground Mounted PV Systems



Photo credit: Sun Power & Geothermal Energy

622 kWdc

Regional  
wastewater  
treatment plant

Oroville  
Sewerage  
Commission,  
Oroville, CA

# Carports



Photo credit: Schott Solar

130 kW<sub>ac</sub> Carport  
Riverside, CA

750 kW<sub>ac</sub> Carport  
Naval Base Coronado, CA



Photo credit: PowerLight

Be creative!



Photo credits: Byron Stafford, NREL

# All PV System Designs Are a Compromise

- Cost – the initial and long term costs
- Schedule – how soon can it be done
- Performance – time-of-day and monthly
  
- Do not compromise on engineering and architecture – make it last and make it look good