

Baylands Rooftop



MSC trackers and carport

Cubberley Rooftop and Awning

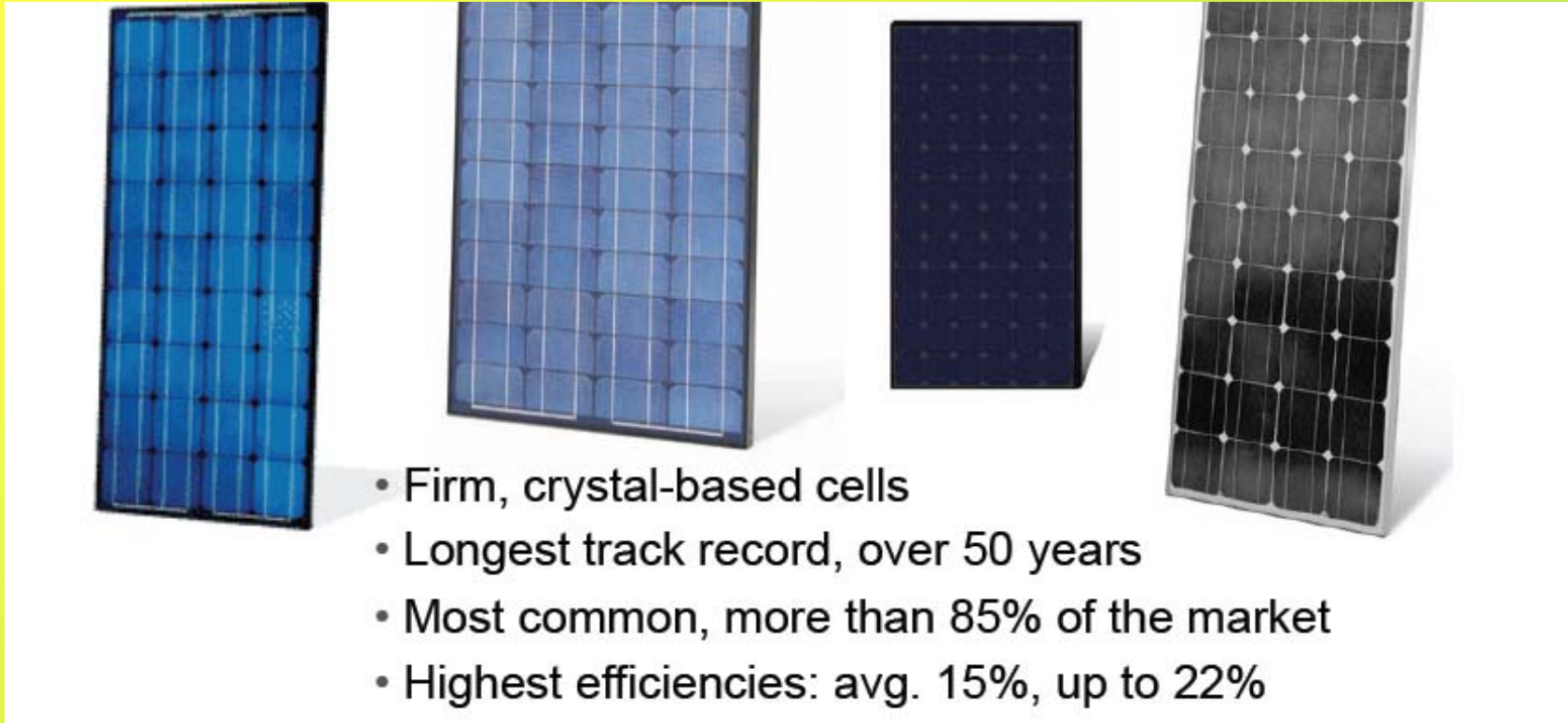
Palo Alto Demonstration PV Project

PV Components

- Modules (aka panels): assembled into groups called arrays
- Inverter: converts direct current from modules into alternating current suitable for use in building
- Balance of System: rack mounting hardware, wires (in conduit), disconnects (CPA requires both DC and AC disconnects)
- Battery back-up: less common but need to have batteries to have power during outage



Crystalline Modules



- Firm, crystal-based cells
- Longest track record, over 50 years
- Most common, more than 85% of the market
- Highest efficiencies: avg. 15%, up to 22%

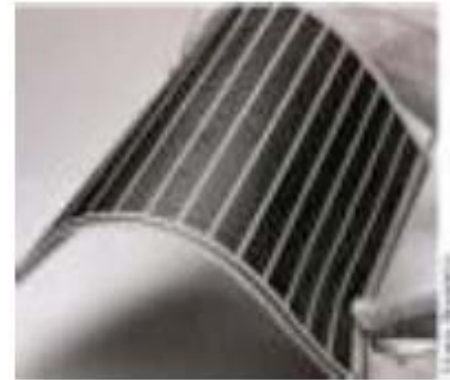
- Need about 100 SF of roof area for 1,000 watts of power (10 watts per SF)
- Avg. size has increased from 70 to >200 watts

Thin Film Modules

■ UniSolar



Standing seam metal roof



- Takes a bit more space
- Does slightly better in slight shade
- Easily building integrated



Solar Integrated Technology

Building-Integrated (BIPV)



California Academy of Sciences - SF
Glass PV Awning



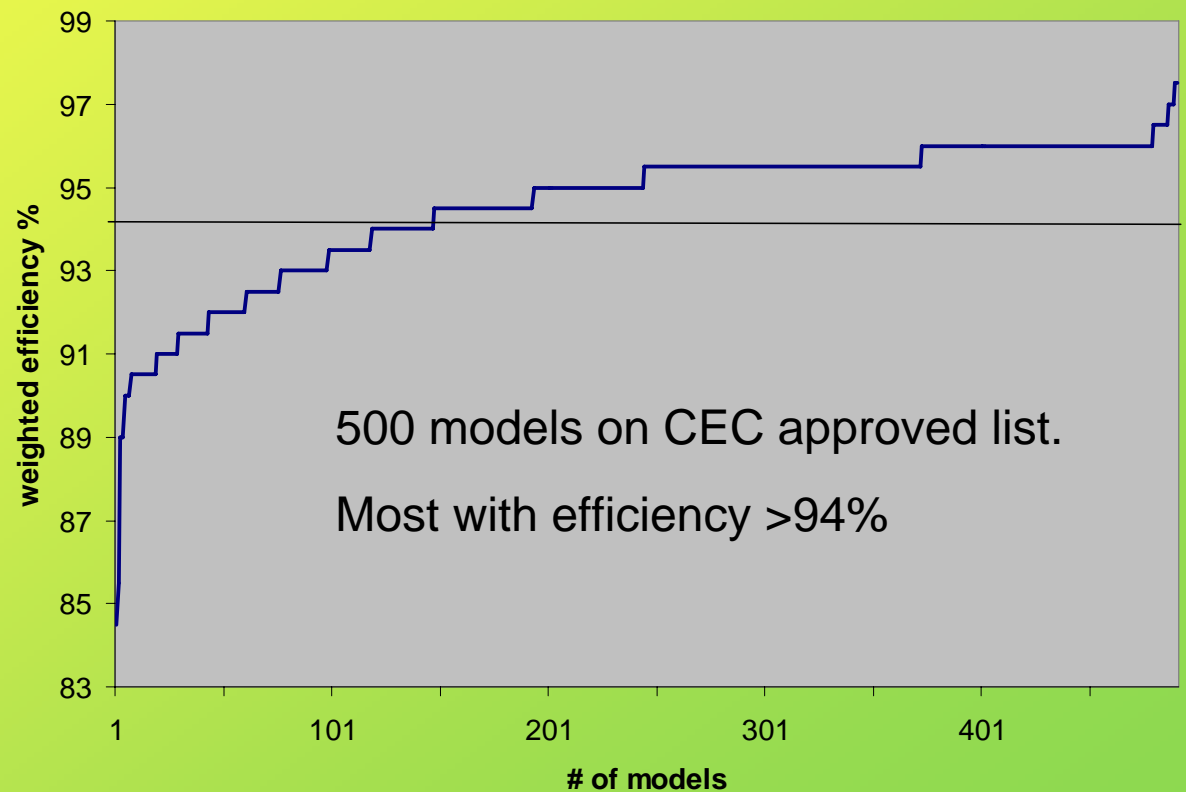
Sharp PV roof tiles

Inverters



- Maximum power point tracking (get more energy over the year)
- Good interface for monitoring (upload to web)
- Weakest link of PV system. Will need to replace 1-2/life of modules
- 10 yr. warranty

CEC Approved Inverters



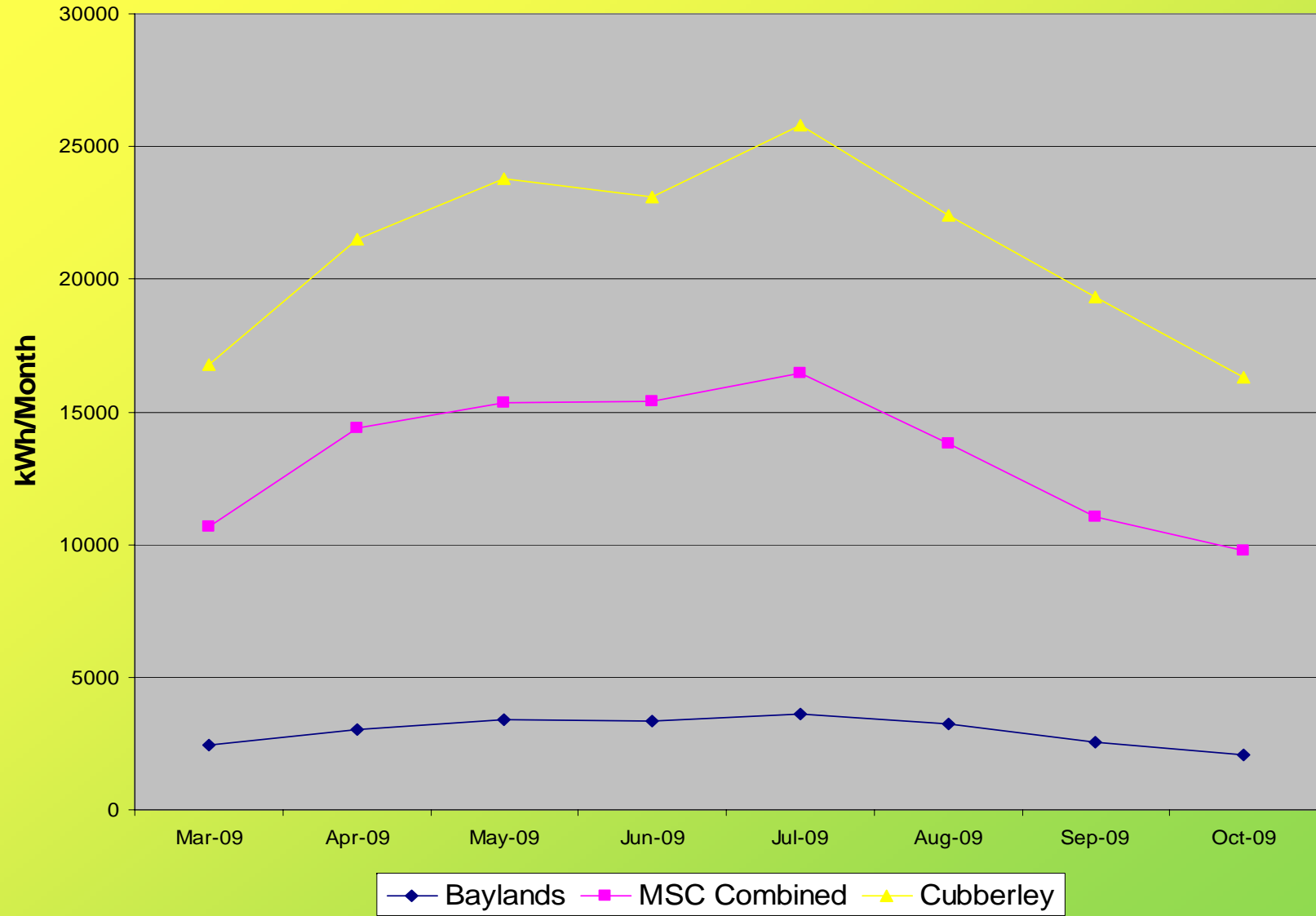
PV Basics

- PV Systems are sized by their power capacity- rated in watts
- Annual energy generation is ~ 1,600 kWh for each 1,000 watts
- Typical home needs 3 kW to 5 kW
- Net Cost for 4 kW system= \$20K
 - (\$36,000 first cost - \$6,400 PV Partners rebate - \$8,800 Fed tax credit)
- 7% ROI or better

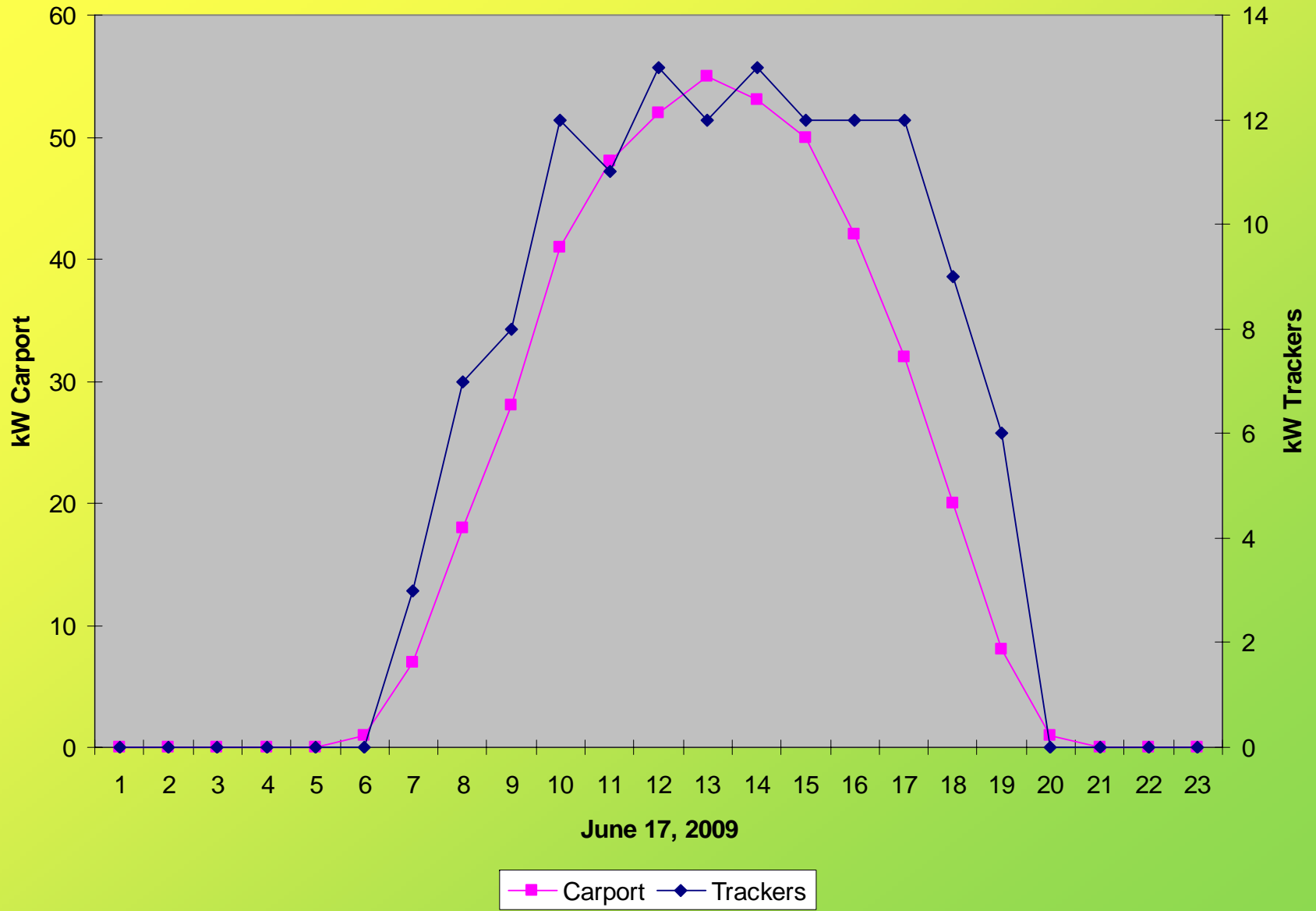
City Demo PV Project

- Federal grant for \$1.2M (CPAU share \$1.2M)- no cost to general fund!
- Diversity of equipment and mounting structure
- Energy generation goes to **PAGreen**
- 208 kW total:
 - 15 kW Baylands
 - 75 kW MSC
 - 117 kW Cubberley

City Demo. PV Monthly Generation



MSC PV Hourly Energy Generation



Roche vs City Demo PV Monthly Energy Comparison

kWh/rated kW

