

Case Study: Palo Alto, California



Saved \$21,500 with 30% Longer Strings

Location: Sunnyvale, CA
System Size: 429 kW
Modules: 1,716 Trinasmart PA05.20
Inverter: KACO new energy 50 TL3
Installer: Cobalt Power Systems



Figure 1: Picture of the commissioned system in Palo Alto, CA

Summary

The JCC project in Palo Alto, CA demonstrates the unique advantage of Tigo Energy's patented smart module technology, which enables 30% longer strings. The project saved over five cents per watt on balance of systems costs by reducing the number of strings required on the installation.

Lower Balance of Systems Costs

On the JCC project, ThinkNRG was able to take advantage of the new capability of Tigo Energy's smart module technology, increasing string length from the traditional 14 modules to 18 modules while still remaining under 600 Volt safety norms.

By increasing the number of modules in a string they were able to install 27 fewer strings, 3 less combiner boxes, and 13,500 feet less wire. This reduced significant material costs while also allowing for a much quicker installation.

Table 1 shows that the installer was able to save \$0.05 per watt or nearly \$21,500 by reducing the number of strings on this array from 123 to 96. This translates to a 25% reduction in total electrical balance of systems costs.

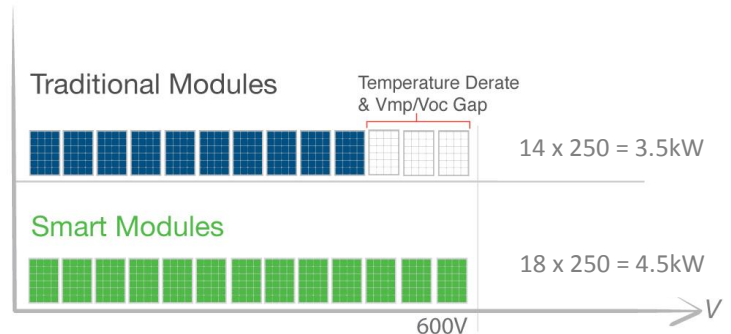


Figure 2: Trinasmart enables string lengths of 18 modules as compared to 14 modules in 600V system configurations.

"We evaluated Trinasmart optimized by Tigo Energy and found that it offered a superior solution for our project economics. With Trinasmart we can increase our string lengths by 30%, reducing balance of systems costs by over five cents per watt, while also enhancing the energy output of the array over the lifetime of the system. We think of ourselves as innovation leaders and we think this project represents the future of commercial solar."

- Zach Rubin, CEO ThinkNRG



“We estimate that stretching string length by 30% can result in \$0.03/W - \$0.07/W savings in commercial rooftop balance of systems.”

-MJ Shiao, Senior Analyst



	Traditional	Trinasmart	Difference
Module quantity	1716	1716	
Max string size	14	18	28.60%
Number of strings	123	96	-22.00%
Number of combiner boxes	11	8	-27.30%
Total wire content (ft)	61500	48000	-22.00%
Conduit quantity (ft)	1100	800	-27.30%
Total labor hours	211	160	-24.20%
Total cost	\$87,280	\$65,800	-24.60%
Total cost (\$/W)*	\$0.20	\$0.15	-24.60%
Electrical BoS cost delta (\$/Wp)		-\$0.05	
Electrical BoS cost % improvement		24.60%	
Cost delta (\$)		-\$21,480.00	

Table 1: Project Economics of JCC Installation

Longer Strings

Tigo Energy’s smart module technology enables the module manufacturer to program a hard-stop voltage into their module. This means that the module output will never exceed this programmed number regardless of temperature or insolation.

This is represented on the module spec sheet, replacing the Voc of the traditional module with whatever number the OEM chooses to use and 0% is used as the temperature coefficient.

This easily enables installers to put up to 18 modules in a 600V system or 30 modules in a 1000V system while still being compliant with NEC 690.7

The Result

The project is expected to save the campus over \$1.5 million in energy savings over 20-years. The installation successfully demonstrated the advantages of Tigo Energy’s smart module technology enabling up to 30% longer strings. The balance of systems cost savings and the expected 3% additional energy the project is expected to produce represented strong improvement in the IRR expected by the system owner.

Want more information? Read our whitepaper [online here](#) or at Tigoenergy.com. You can also contact us at sales@tigoenergy.com

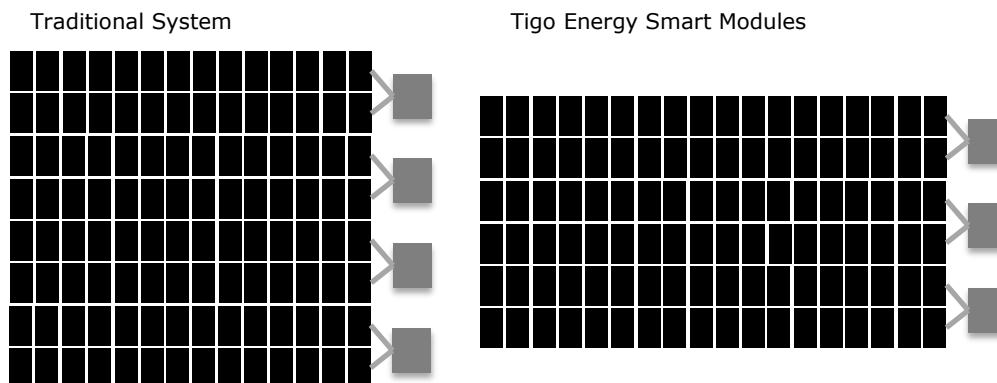


Figure 3: Fewer strings means less combiner boxes, fuses, copper, and man-hours per installed kW