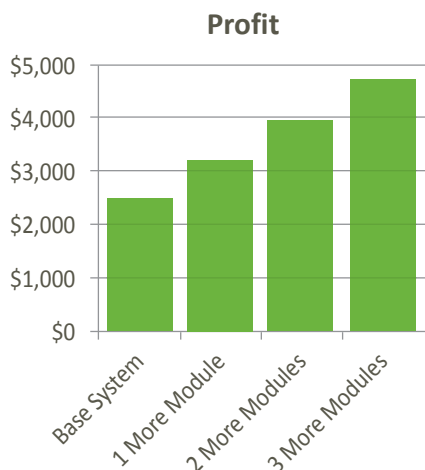


What is the Value of One More Panel?



“On average, we expect installers to see at least one more module per job. And that is on top of higher energy yields, enhanced safety and module level monitoring which could drive even more of a premium against the competition.”

> Peter Mathews, General Manager SolarEdge North America



In the past year, US residential PV system sizes have grown by an average of 20 percent from a 5kW system to a 6kW system. Meanwhile, PV system prices have dropped by about 10 cents/watt per quarter. What is the best way for a solar company to weather these transitions? Our analysis into this question has yielded some amazing results and an opportunity for solar companies to boost profits by as much as 30 percent!

Economics of Fixed Cost and Variable Cost

Let's look at the numbers behind a typical PV system. For a 5kW array using 250 Watt modules, an installer would build a 20 module array. The average revenue for this type of system is around \$3.50 per watt or \$17,500¹. All-in installation cost would run around \$3.00 per watt or \$15,000, leaving \$0.50 per watt or \$2,500 as profit.

What if we install one more module? The pricing stays the same at \$3.50 per watt. But, the 21st panel only costs about \$1.00 per watt to install. The added "variable" costs of module, wiring, racking, and labor are small compared to the upfront "fixed" costs of customer acquisition, site visits and permitting. NREL estimates that these fixed costs represent 64% of PV system prices today. The cost to install the modules themselves is only 1/3 of the total price of the system. That means that the profit on one more module jumps to about \$2.50 per watt (\$3.50/watt revenue-\$1.00/watt cost) or \$625 dollars.

This tells us two lessons. First, in an average PV system, all of the profit is made in the last few modules. The other modules are required to offset the fixed costs of installing, selling and permitting. Second, if all of the profit comes in the last 4 or 5 modules, just one more module can increase your profits by 20-30%.

¹ Solar Market Insight Report 2014 Q2

Case 1: Rooftop Vents



A southern facing array was quoted with 21 panels using traditional string inverters. However, after the rooftop inspection the company noted that the rooftop contained several vents that were overlooked in the design. Designers removed the modules

from the layout leaving only 17 modules on the roof. Using a traditional string inverter, they were limited to 13 panels per string due to voltage requirements and needed to divide the string into substrings. However, the inverter only used a single max power point tracker. This required the strings to be balanced or of equal length. Thus the total of 17 modules was reduced again to 2 substrings of 8 – a total of 16 modules.

How is this Situation Optimized?



Obviously, SolarEdge won't allow you to install over rooftop vents but its capabilities are just as powerful. First of all, with SolarEdge, the string lengths are not limited by voltage – they are limited by power. This means that you can place 60 percent more modules in a string with SolarEdge vs. traditional string inverters. All 17 modules can be placed onto the rooftop in a single string. Furthermore, strings do not need to be balanced with SolarEdge and you can place the modules on any facet. This opens the west facing rooftop to SolarEdge with a string of 9 modules. With SolarEdge, the total installation size is now 26 – five more modules than the original installation quote! That could have been an increase in profit of 30%!

Case 2: Afraid of the Dark?



This quote was for 21 panels with an orientation to the southwest. Upon measuring the rooftop for shade, one zone measured low. This zone represented six modules that the designers were concerned would affect the entire array's performance. They avoided the area leaving only 15 modules on the rooftop. As before, they could not place all 15 modules in a single string and needed to balance the strings. The resulting installation was 2 substrings of 7 modules each – a 33 percent reduction in panel installation.

How is this Situation Optimized?



SolarEdge cannot remove the shade, but it can reduce the effects of shade. In a traditional string inverter, if one module performs lower than its neighbor then all modules in the string are reduced to the current of the lowest performing module. Thus, shading, soiling, architectural structures and even module aging will all drive down module and string power. With SolarEdge, every module is optimized, meaning that each module is free to produce at its maximum power. So, with SolarEdge, all 21 modules can be installed offering the homeowner a larger offset from utility payments and the installer a more profitable job. With the one more module philosophy, you don't have to avoid shaded areas and you increase the profitability of each job you quote. Do not be afraid of the dark with SolarEdge!

The Odds are in Your Favor With SolarEdge

Today's declines in pricing means that systems must maximize profit regardless of architectural and environmental constraints. In these examples, installations increased in size from 16 to 26 modules and from 14 to 21 modules. With the ability to approach each jobsite with the optimized flexibility and reliability of SolarEdge, every job can become more profitable with the "One More Module" philosophy. And that is on top of higher energy yields, enhanced safety and module level monitoring which could drive even more of a premium against the competition.