Balance of System and Energy Production Comparison: DC-Optimized Solution Vs. Traditional String Solution

Technical Paper

Table of Contents

Introduction

This technical paper estimates the electrical BoS cost and energy production differences between design variations for a sample light commercial project for a 208Vac grid. This analysis used Helioscope and PVsyst modelling tools to compare a DC-optimized solution against a traditional string inverter solution of equivalent capacity.

A Comprehensive Look at BoS Costs and Energy Production in a Typical Commercial 208V Grade Application

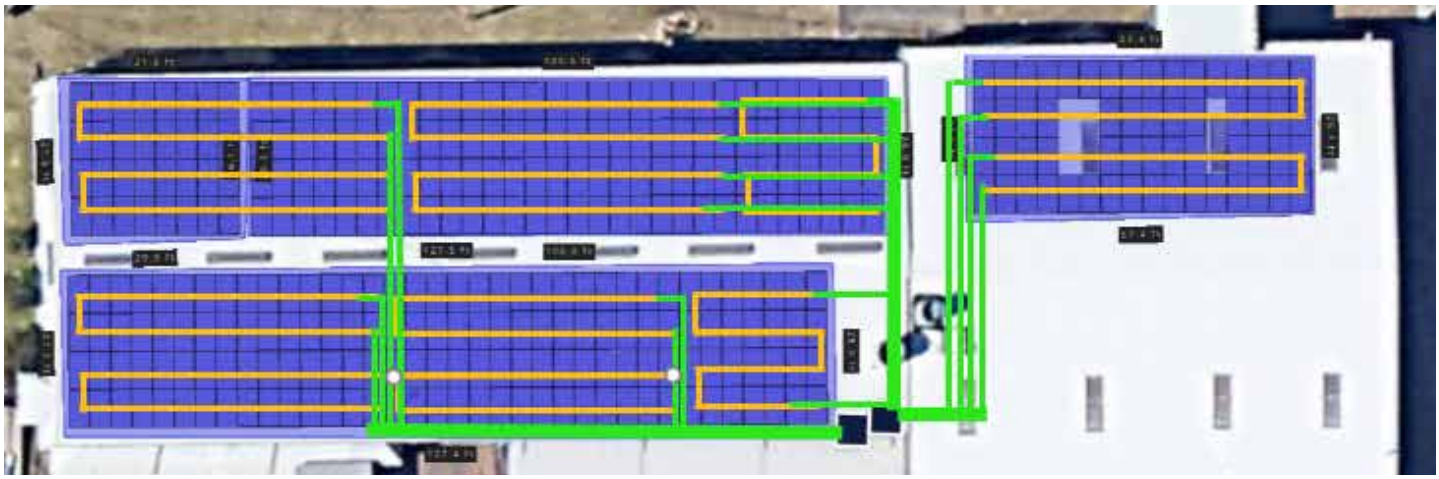
In the competitive solar landscape, optimizing the Balance of System (BoS) costs is crucial. BoS includes all solar system components—mounting systems, cabling, electrical elements, conduit, and installation labor. This case study showcases the cost efficiency achieved using SolarEdge technology, leading to streamlined installations and overall cost reductions.

- System Size: 140kW DC
- SolarEdge Inverters: 2*50kW
- Traditional String Inverters: 4*25kW
- Location: San Leon, Texas

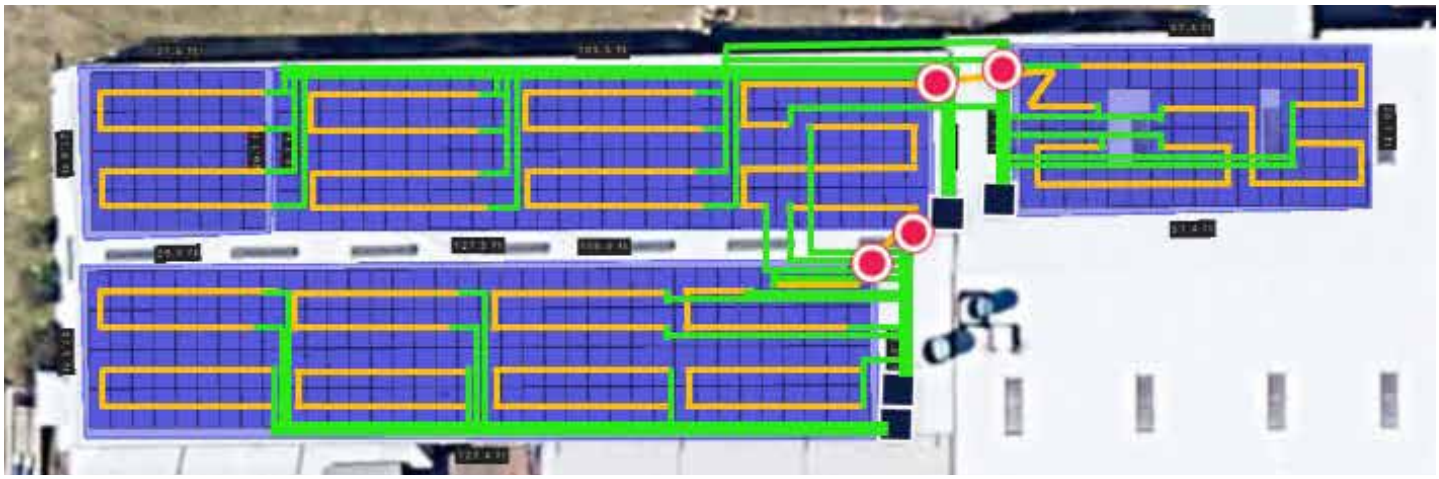
Higher BoS Savings Over Traditional String Inverters

Example 140kW Project

SolarEdge Inverter



Traditional String Inverter



Inverters PVRSE PV String PV Home Run

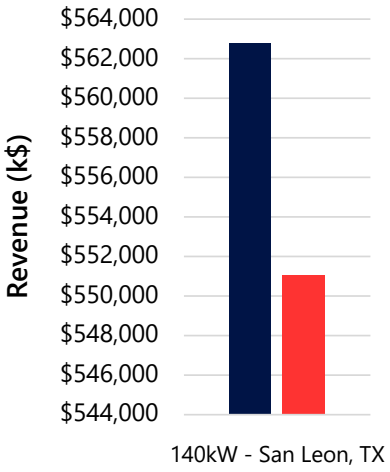
BoS Breakdown	SolarEdge System	Traditional String Inverter System
DC Power (kWp)	140	140
AC Power (kVA)	100	100
395Wp Modules	354	354
Inverters	2	4
No. of Strings	12	20
Modules per String (typ.)	30	19
#10 Cu PV Wire (ft)	2808	3247
DC Combiner Box	-	-
AC Cable (ft)	160 (#4/0 Al)	848 (#2 Al)
Conduit (ft)	40 (2.5”)	212 (1.25”)
AC Combiner Box	1	1
Datalogger	1	-
AC Labor & Material ($)	**$2,587**	**$4,916**
DC Labor & Material ($)	**$5,454**	**$7,819**
Overall BoS Savings	**$4,694**	**-**

1. DC BoS includes MLPEs (labor only), cabling, conduit, combiner boxes, fuses, etc.
2. AC BoS includes inverter (labor only), cabling, conduit, AC combiners, circuit breakers, etc.

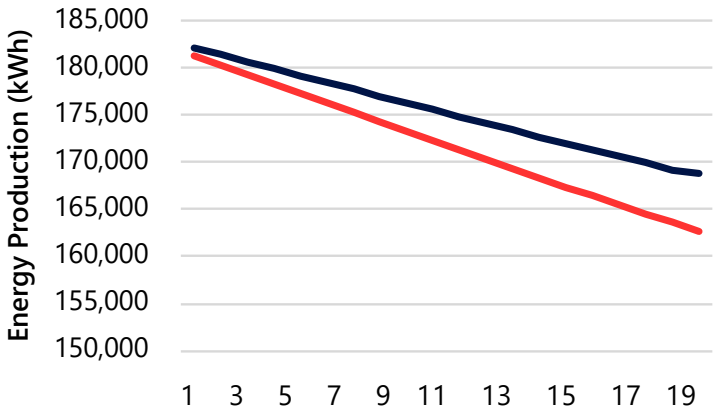
Increased Energy Yield & Revenue

SolarEdge Inverter
Traditional String Inverter

Added Revenue over 20 years



Year 1 - 20



Comparison

	SolarEdge System	Traditional String Inverter System	SolarEdge Advantage
PVsyst Year 1 Yield (MWh)	168.7	181.3	**0.44%**
PVsyst Year 20 Yield (MWh)	168.7	162.7	**3.69%**

In Summary: The SolarEdge Advantage

SolarEdge DC-optimized inverters generate ~4% more energy over system lifetime when compared to traditional string inverters. In addition to BoS cost savings of up to 50%, other system benefits include:

- Fewer components
- Reduced labor, installation time, and material cost
- Minimized electrical losses due to optimized cabling design