

Photovoltaic Systems

For presentation during Natural Resources Canada's
Local Energy Efficiency Partnerships (LEEP) in Lower Mainland, BC

Adapted for Webinar Series with CHBA Net Zero Energy Home Council

Webinar #3 on February 9 @ 1:30 ET

301, 1103 - 95 Street SW
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Recap of this Builder Group's Request to SOLARMAX Power Inc.

Part A: Introduce our company and our PV Solutions (up to 5 minutes)

Part B: Respond to the following questions and requests (~10 minutes)

1. Describe the shading implications for different types of systems you supply (information on different types of systems, or wiring configurations)?
2. Describe the monitoring monitoring/metering systems available for the installations you provide? What feedback do they provide to homeowners on an ongoing basis?
3. Warranty: Will roof applied PV system affect the roof warranty (racking systems, and flashings)? What is best practice to maintain shingle system warranty? What warranty comes with the panels? the PV shingles? Installation into structural systems (5 lbs per ft2 solar ready)?

Part C: Describe and cost a suitably sized (based on roof area) PV system for the home provided (~5 minutes)

Key Challenges

- Building Integrated vs Building Applied
- String inverter vs micro-inverters

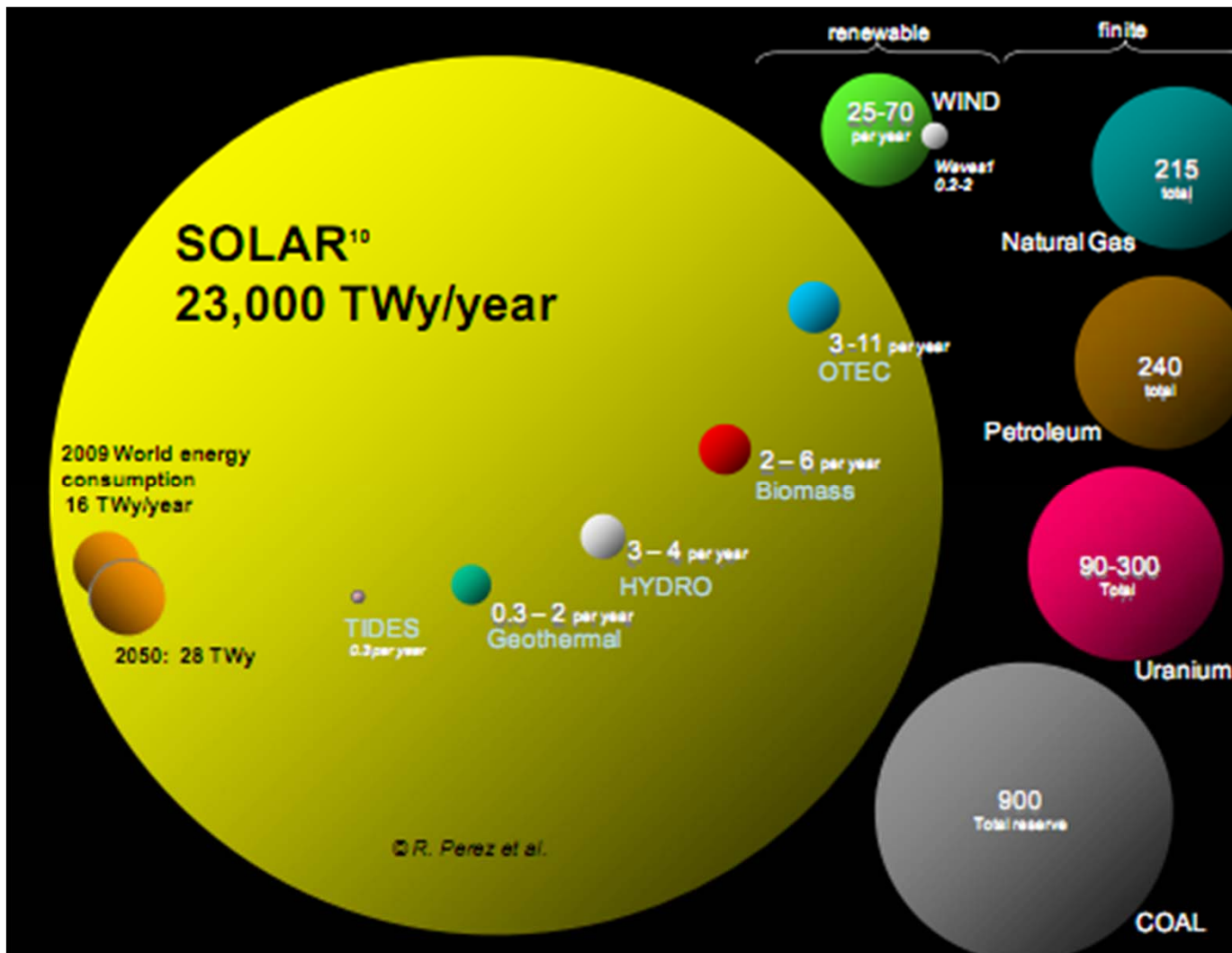
Part D: SOLARMAX Power's choice of a few additional slides (if applicable - total presentation capped at 25 minutes)

Follow on Discussion: 10 minutes



Part A: Introduction

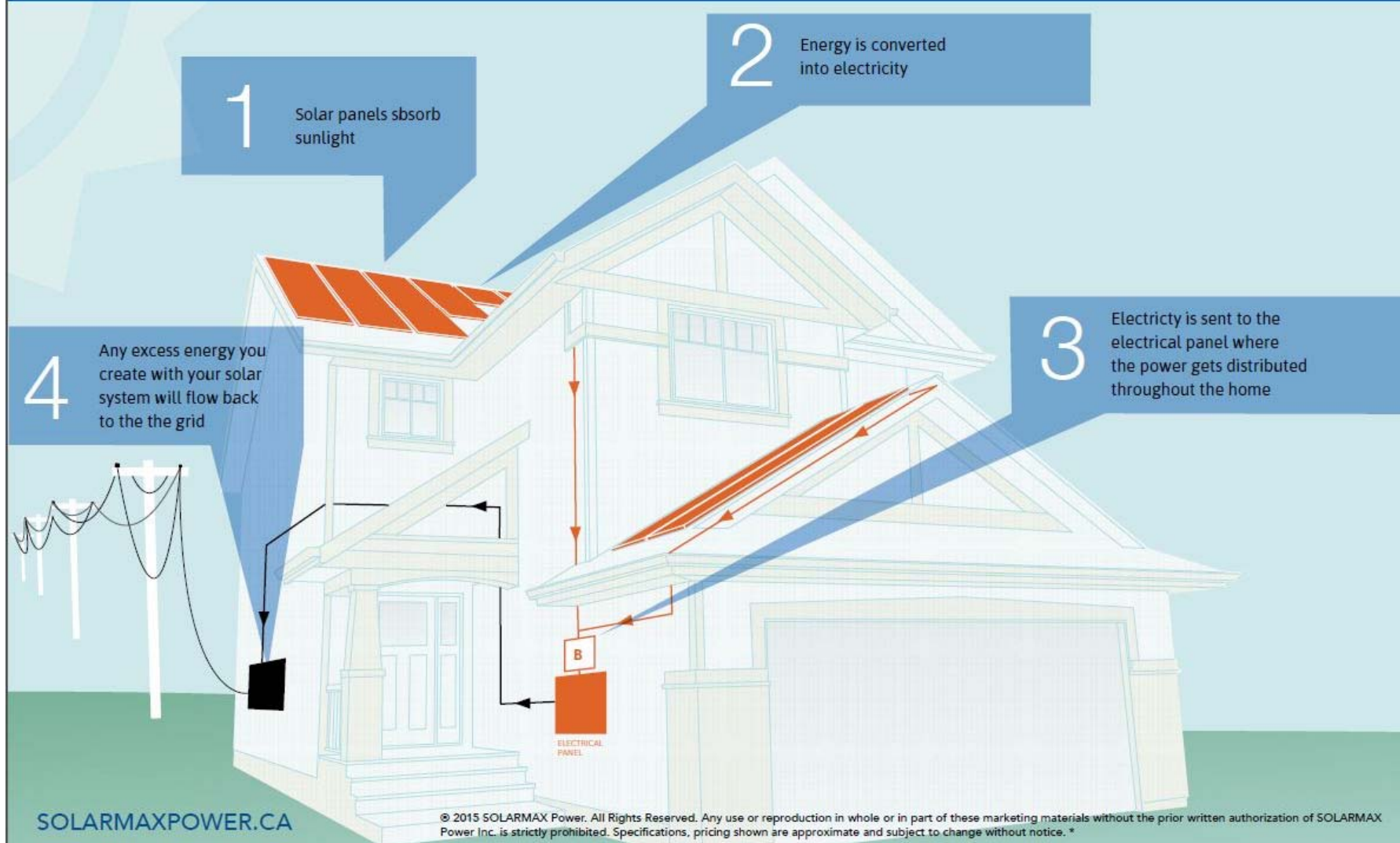
- How Solar Works
- Our company profile
- Our training, support and local distribution
- Our PV systems
- 3 key features of these systems
- Installation examples



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HOW SOLAR WORKS

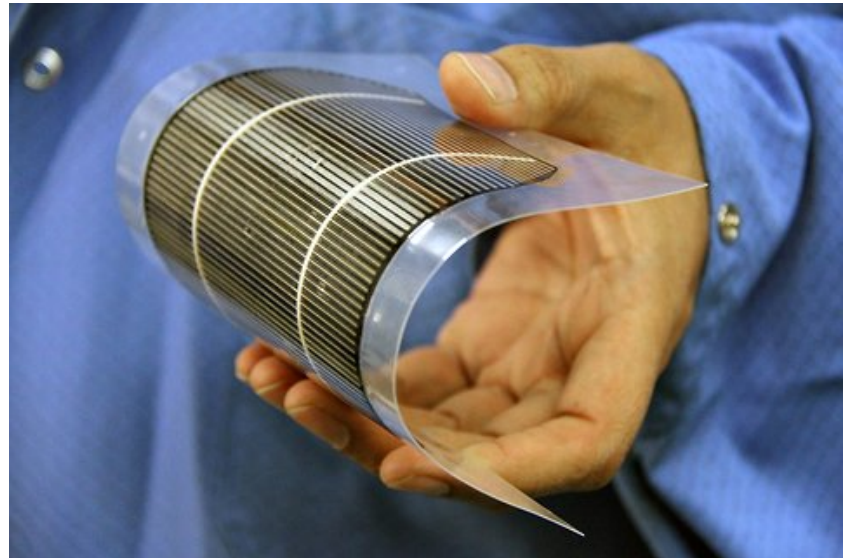


Photovoltaic Material

Silicon Wafers



Always Improving



Already pretty amazing!

Company Profile



ACQBUILT INC.

SOLARMAX
POWER^{INC}

Company Profile

“Our mission is to accelerate the transition to a solar powered world.”

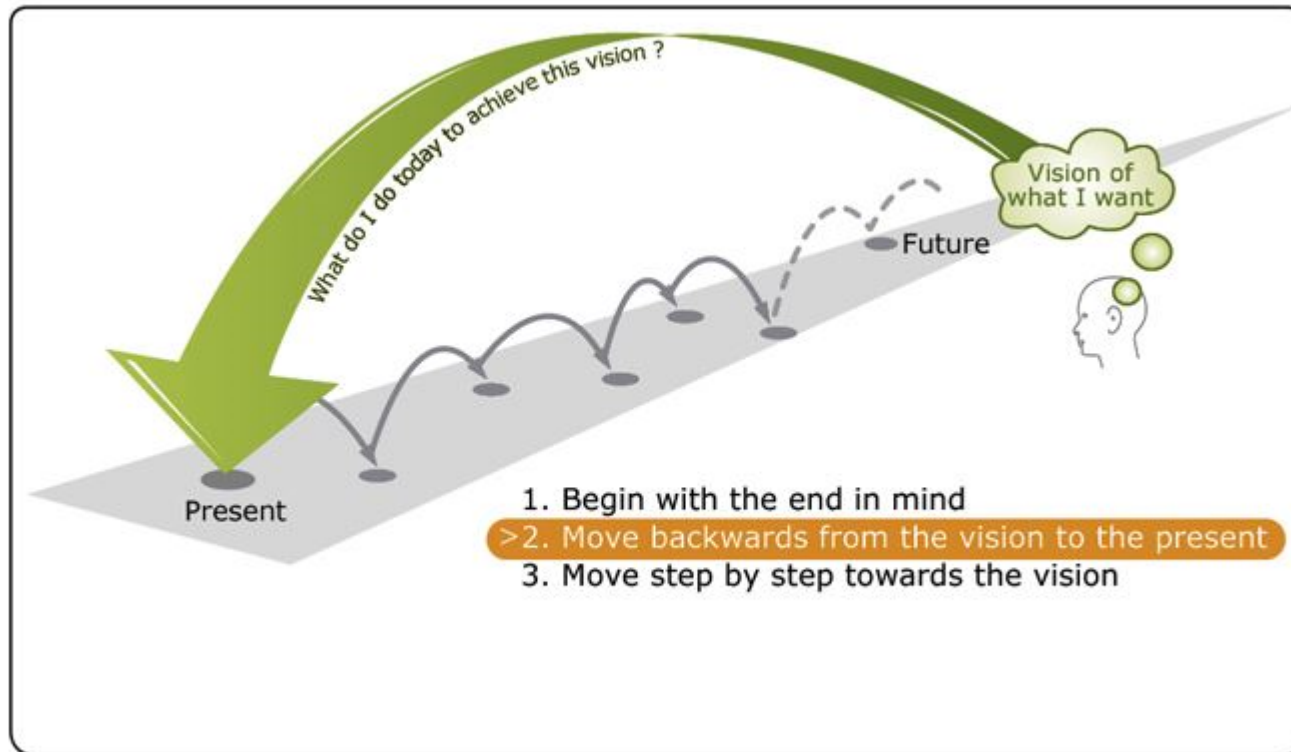
Today we retail lower cost energy options:

Electricity, Natural Gas, REC & Solar Panels

100% solar powered energy solutions is our future.



The Story of Landmark's Net Zero Journey



AQCBuilt Builds Houses in Metric

- 135,000 sf Prefabrication Facility
- Engineered Lumber Products
- 3 Structures Framed & Erected per day
- Reduce Scrap Management System
- Introduction of exterior siding from prefabrication facility.
- Trialing of solar panel mounting brackets from prefabrication facility.



Selling Solar



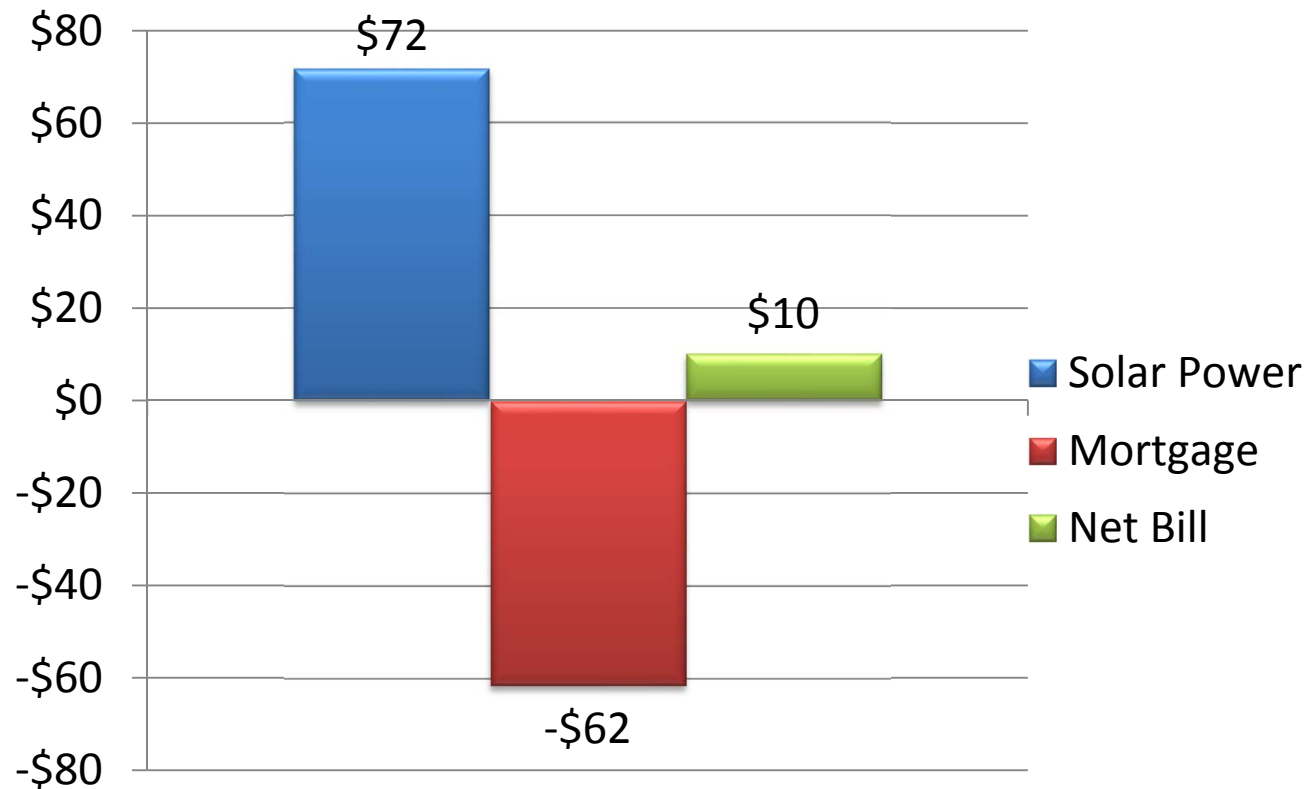
SOLARMAX
POWER^{INC}

Marketing to Home Owners



Solar Mortgage Impact

Monthly Energy Savings vs Monthly Mortgage Payment



- 5.2 kW – 20 Solar Panels \$13,000 (Average Residential System \$2.50/Watt)
- 3.00% 5 Yr. Fixed 25 Yr. Mortgage
- Energy Savings from Solar Power @ \$0.12/kWh

3 Key Features of our PV Systems

- The key to our success has been our process of integration into the home building industry.
- Over 30 Zero Energy Homes and 250 Solar Houses Since starting within the Landmark Group in 2012.
- **It is our process not our product.**

Our PV Systems









Installation Examples

Lessons Learned



Sundance Ridge
The Sales Person Matters



Cranston

Net Zero vs Solar House

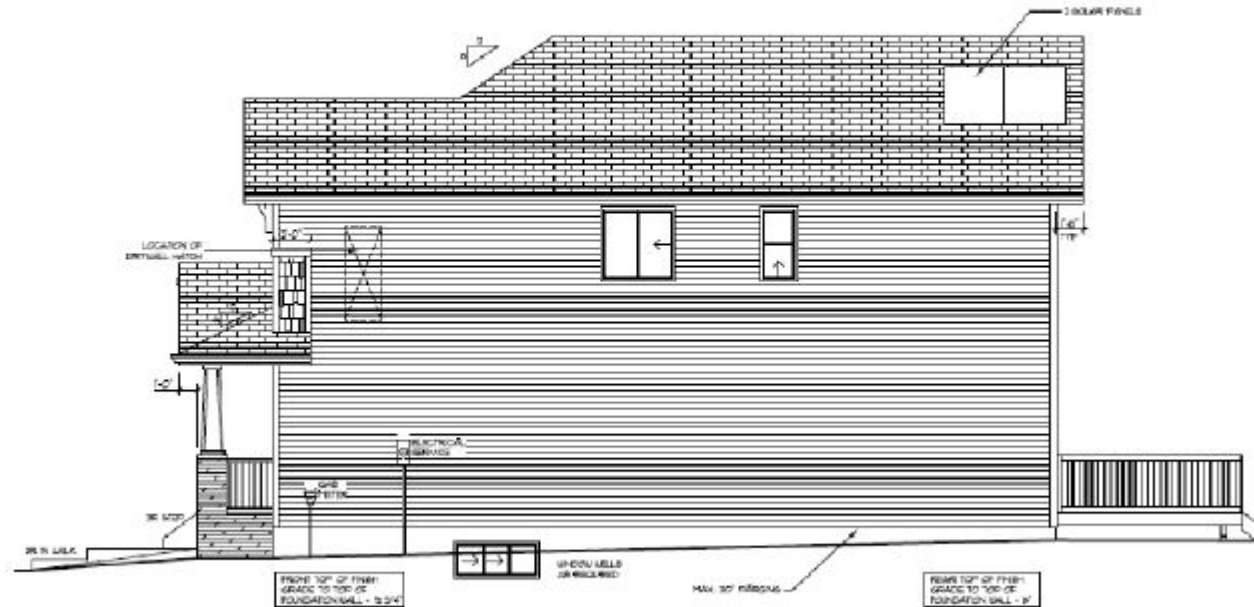
Solar sells.



Larch Park I Context Matters

Solar won't sell land years before the market wants it and it won't sell a design that doesn't suit a location.

— 2 SOLAR PANELS



Promoting 2 Panels Free
Normalize Solar
Recommend Minimum of 8 Panels or 2.0kW

Part B: Responses to specific questions from LEEP-Builder Group

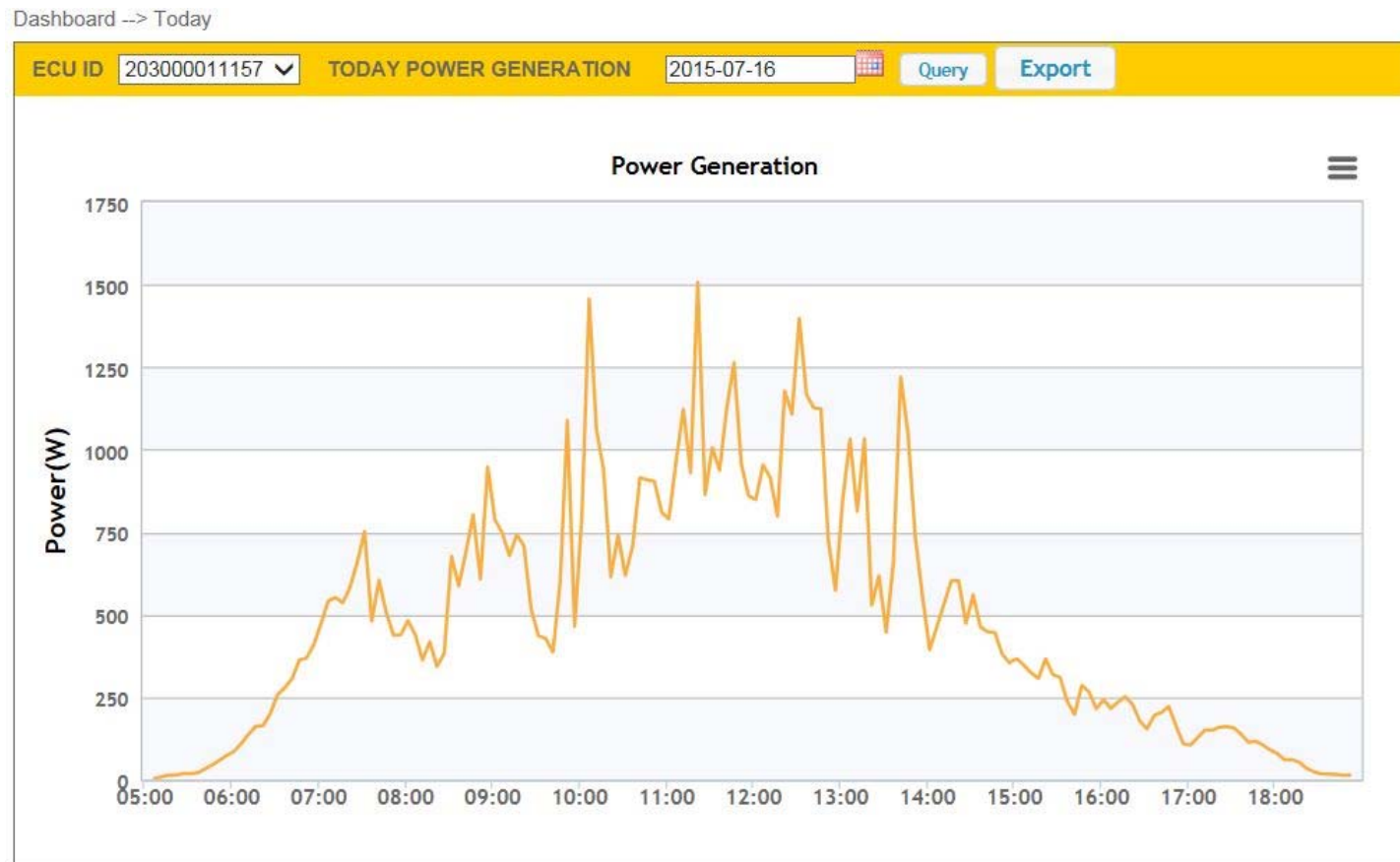
#1: System performance

Describe the shading implications for different types of systems you supply?

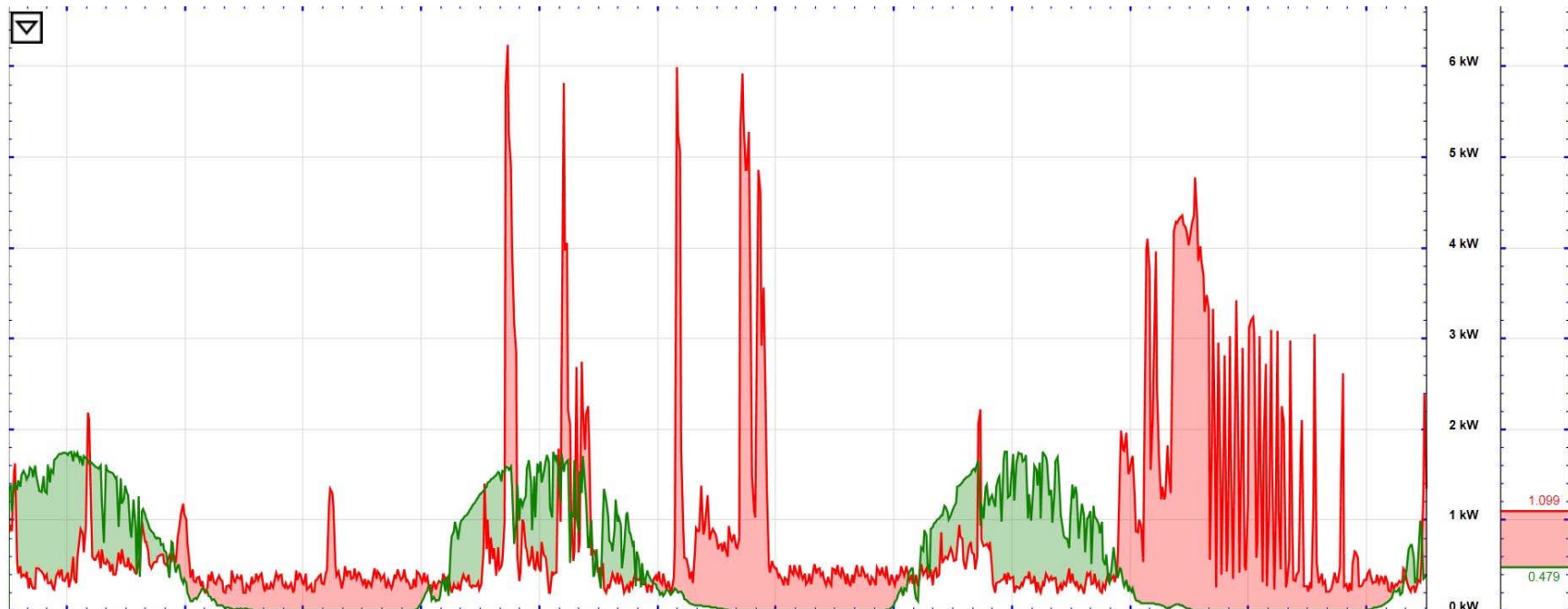
- We account for shading in our energy estimation.
- However, we accommodate rather than discriminate on a location because of siting.
- Our job is to put solar panels to work and help manage customer expectations.

#2: Monitoring/Metering:

Describe the monitoring/metering systems available for the installations you provide? What feedback do they provide to the homeowners on an ongoing basis?



Net Zero Metering Power Generation & Consumption



#3: Warranty:

Will a roof applied PV system affect the roof warranty? What is best practice to maintain shingle system warranty? What warranty comes with the panels? the PV shingles? What is the lifespan of both types of PV system (degradation)?

Flashing



Part C: Costed Application

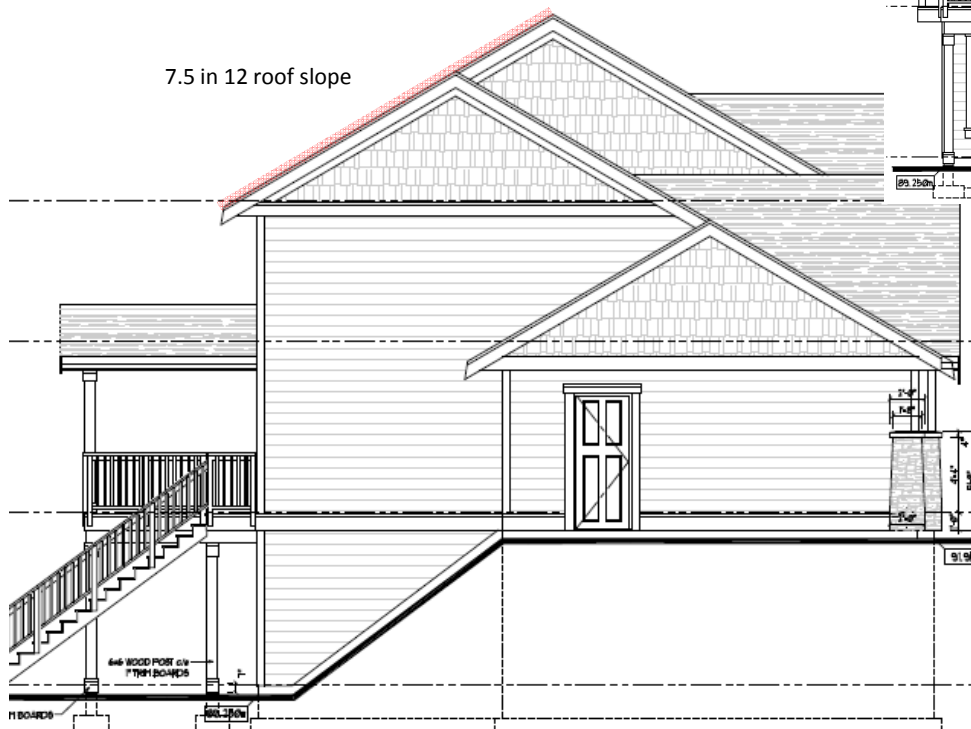
Building Applied vs Building
Integrated

Costing PV installation options in sample home

Front Elevation



7.5 in 12 roof slope

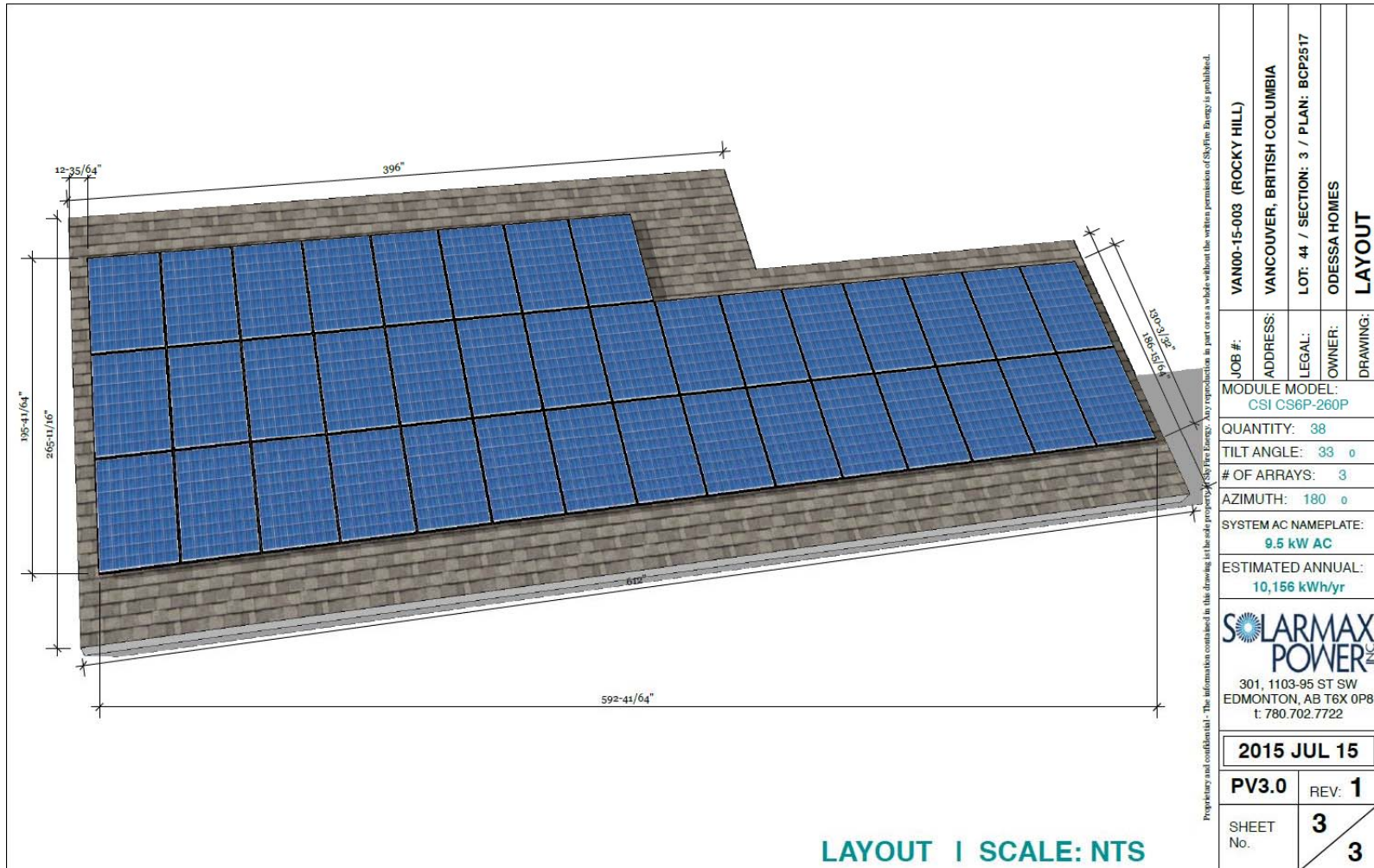


Rear Elevation (Apply on this upper face only)



Assume within 5 degrees of perfect orientation

Sample Layout



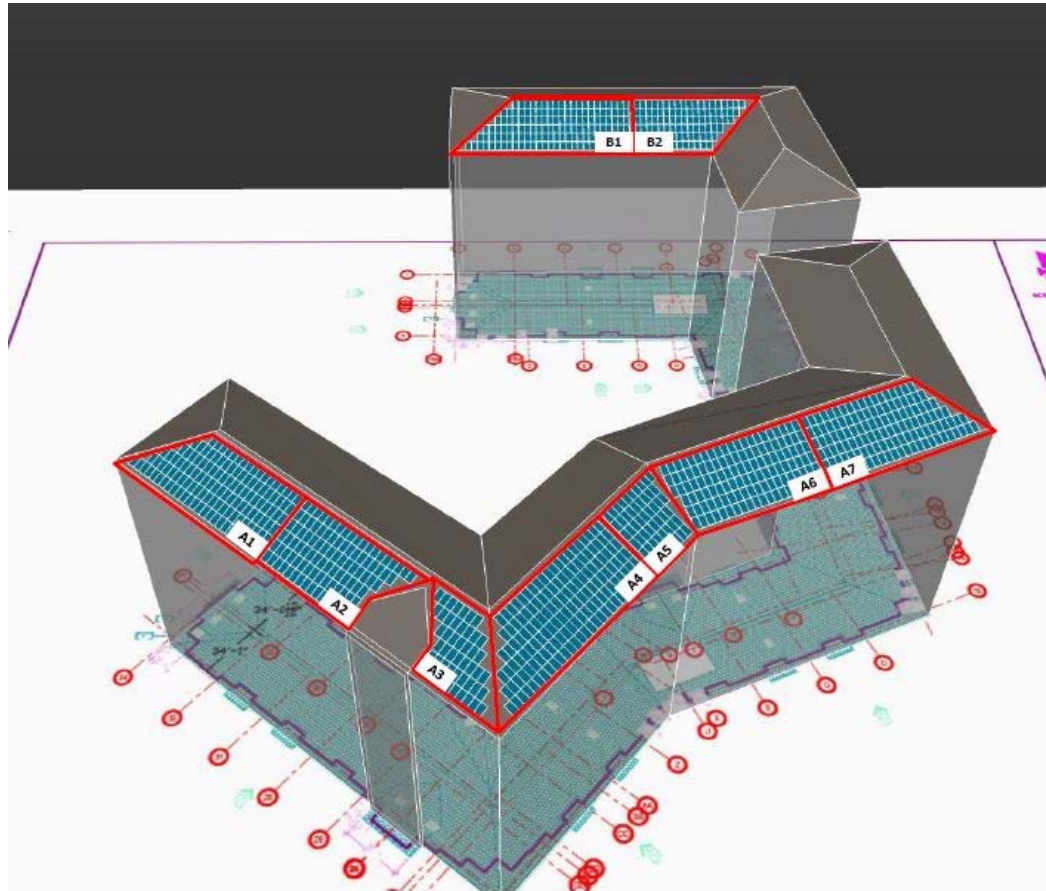
Specifications and Costing – New Residential

	Scenario 1 – Roof Applied	Scenario 2 – Roof Integrated
Function	Descriptor – Workhorse PV	Descriptor – Solar Shingle
PV System Size (kW)	9.88 kW	4.53 kW
Efficiency (%)	16 %	12 %
Inverter type	APS Micro-Inverter	String Inverter
Element	Cost to Builder	Cost to Builder
PV panels	32%	66%
Inverters	21%	9%
Racking (as required)	11%	0%
Installation (add rows as required)	36%	24%
Total Installed Cost	\$24,700	\$27,200
\$/Watt	\$2.50	\$6.00

Energy Impacts & Revenue Generated/Costs Saved

	Scenario 1 – Roof Applied	Scenario 2 – Roof Integrated
Facing South		
Annual Energy Generated	11,000 kWh	5,040 kWh
Value per kWh (based upon BC Hydro net metering)	0.18 \$/kWh vs Traditional Hydro 0.12 \$/kWh	0.42 \$/kWh vs Traditional Hydro 0.12 \$/kWh
Annual \$ benefit to homeowner	1,320 \$	605 \$
Fractional Performance		
Facing East	79 % of South	79 % of South
Facing West	83 % of South	83 % of South
Facing North	57 % of South	57 % of South

Commercial/Residential Buildings



Array	Direction	Modules	Annual Gen (MWh)
A1	SW	126	36.63
A2	SW	97	28.97
A3	SW	50	14.94
A4	SE	142	42.41
A5	SE	52	15.53
A6	SE	123	36.74
A7	SE	125	37.12
B1	S	144	45.47
B2	S	96	30.30
Total		955	288.11
Total kW			248.30

Specifications and Costing – Commercial Buildings

	Scenario – Roof Applied
Function	Descriptor – Workhorse PV
PV System Size (kW)	104 kW
Efficiency (%)	16 %
Inverter type	APS or Other Micro-Inverters
Element	Cost to Builder
PV panels	37%
Inverters	19%
Racking (as required)	18%
Installation (add rows as required)	15%
Feasibility & Design Costs	11%
Total Installed Cost	\$260,500
\$/Watt	\$2.50



Thank You.

Please feel welcome to contact me
for further questions and interesting
business opportunities!

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