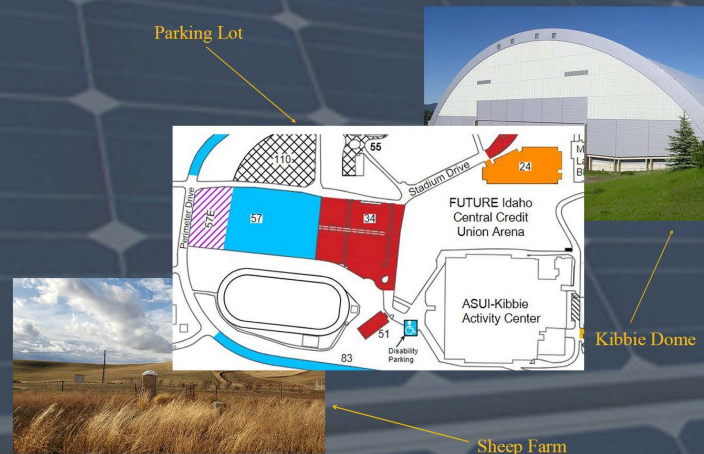


Problem

Assist the University of Idaho in the planning of a Solar Panel array to power two wells to ensure reliable water delivery. To perform this the following tasks will be performed:

1. Investigate the three locations and select one to be designed
2. Design the selected PV array including a solar site assessment, module selection, inverters, support structure, relays, meters, etc.
3. Conduct an economic analysis of the system

Location Assessment



Solar Carport Specifications



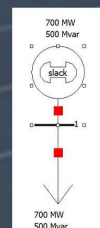
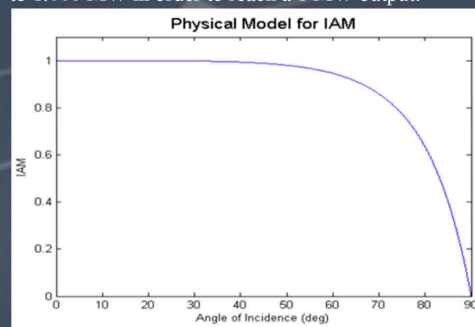
T-type



Monocrystalline

Solar Angle

Our ideal angle on average is around 46° , a panel tilt of 5° would result in an AOI of 41° . According to the calculation, AOI of 41° will result in an efficiency reduction of 0.8%. To compensate for this reduction in efficiency, we would oversize the array by 0.8% to 1.008 MW in order to reach a 1 MW output.



Source Model

Design Requirements

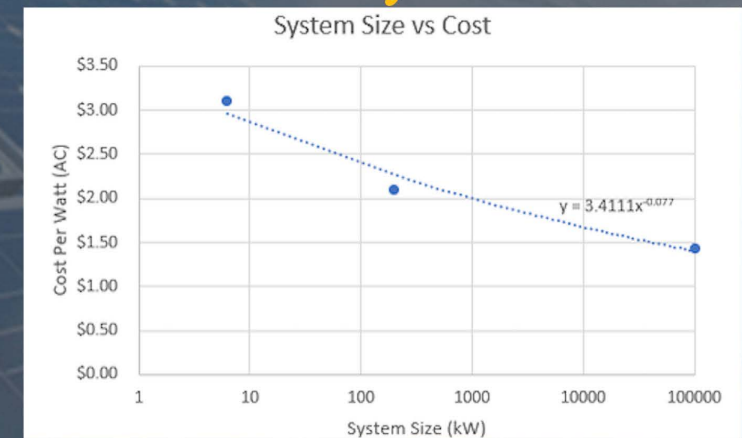
Component Selection Requirements

1. Our choice for metering the wells is the SEL 735 meter
2. Inverters
3. Protection as discussed with the microgrid team, or with Avista depending on if we connect to microgrid or main grid
4. Energy storage
5. Solar Panels

One-Line Diagram Requirements

Depending on the parking lot as we selected, we created Thevenin Equivalent Circuits and a full one-line diagram of the system. We work closely with our client and the Microgrid Expansion team to ensure that all necessary circuit equivalencies are created.

Economic Analysis Estimation



	System Size (KW)	Cost per Watt (AC)
Residential	6.2	\$3.11
Commercial	200	\$2.10
Utility-Scale	100,000	\$1.44

	NREL-10%	NREL Estimate	NREL+10%
MWh per Year	1229.4	1366	1502.6
Lifetime (years)	25	25	25
MWh Lifetime Total	30735	34150	37565
kWh Lifetime Total	30735000	34150000	37565000
Price per kWh	\$0.09959	\$0.09959	\$0.09959
Total Energy Cost Offset	\$3,060,898.65	\$3,400,998.50	\$3,741,098.35
Estimated Project Cost	\$2,068,000	\$2,068,000	\$2,068,000
Alternative Generator Cost Offset	\$600,000	\$600,000	\$600,000
Net Lifetime Savings	\$1,592,898.65	\$1,932,998.50	\$2,273,098.35