Techno-Economic Feasibility Study of Aggregated Small Scale Off-grid Photovoltaic Systems for Use by Renters: A Case Study in New York City

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Hardware Expenses for CAPEX Calculations

Smart Controller Prototype Components and Costs as of January 2024			
Item	Cost	Quantity	Total
RASPBERRY PI 4 B 2GB ¹	\$45.0	1	\$45.0
32GB Micro SD card ²	\$9.97	1	\$9.97
USB to USB C cable ³	\$7.99	1	\$7.99
4 Channel Relay⁴	\$7.45	1	\$7.45
NA260 Power Sensor⁵	\$9.95	1	\$9.95
30A AC Current Sensor ⁶ + voltage divider	(\$10.95+ \$1)	1	\$11.95
Cable with Plugs ⁷	\$11.99	1	\$11.99
10% Contingency	\$10.43	1	\$10.43
		Total:	\$114.73

Variable Costs				
Component	Unit Cost	Units	Discounts	Total per System
PV modules	\$1/W	Varies	30% Tax Credit	\$0.70 * Array W
PV Mount	\$0.40	Varies	None	\$0.40 * Array W
Power Station	\$149 to \$1800	1	None	\$149 to \$1800

Fixed Costs				
Component	Unit Cost	Units	Discounts	Total per System
Controller (includes	\$114.73	1	None	\$114.73
sensors and relay)				

¹ https://www.digikev.com/en/products/detail/raspberry-pi/SC0193-9/10258782

²https://www.amazon.com/SanDisk-Ultra-UHS-I-Memory-Adapter/dp/B00M55C0NS/ref=sr_1_6?crid=2S5PC9CZ6 8MO&keywords=32%2Bgb%2Bmicrosd%2Bcard&qid=1705080680&sprefix=32%2Bgb%2Bmicrosd%2Bcard%2C aps%2C93&sr=8-6&th=1

https://www.amazon.com/SUNGUY-Android-Charging-Compatible-External/dp/B0B28ZCV2Y/ref=sr_1_12_sspa?crid=YT523Z9SXQKR&keywords=usb%2Bto%2Busb%2Bc&qid=1700844659&s=industrial&sprefix=usb%2Bto%2Busb%2Bc%2Cindustrial%2C88&sr=1-12-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9tdGY&th=1

⁴https://www.digikey.com/en/products/detail/sunfounder/TS0011/18668621

⁵https://www.digikey.com/en/products/detail/adafruit-industries-Ilc/4226/10130492?utm_adgroup=&utm_id=go_cm p-20243063506_adg-_ad-__dev-c_ext-_prd-10130492_sig-CjwKCAiAsIGrBhAAEiwAEzMICxPETNUmYG9_-kWa Ii2RAUggJTMoO1AkOilBnkTvZgeJtsIHbcc_MxoC5RUQAvD_BwE&gad_source=1

<u>https://www.sparkfun.com/products/11005</u>

^zhttps://www.amazon.com/DEWENWILS-Extension-Weatherproof-Outdoor-Grounded/dp/B0891VDLV5/ref=sr_1_8?crid=1WYDH986C1QN0&keywords=short%2Bextension%2Bcord&qid=1700844405&s=industrial&sprefix=short%2Bextension%2Bcord%2Cindustrial%2C89&sr=1-8&th=1

Weather Sealing	\$4.38 (\$2.938 to	1	None	\$4.38
Foam Insulation	\$5.83. ⁹)			
UL listed 10 AWG	\$0.77 (0.62 ¹⁰ to	2x15ft	None	\$23.10
black PV cable	0.93 ¹¹)			
			Total Fixed Costs	\$142.21

⁸https://www.homedepot.com/p/Frost-King-1-1-4-in-x-1-1-4-in-x-42-in-Grey-Air-Conditioner-Weatherseal-AC42H/1 00059869?source=shoppingads&locale=en-US&pla&mtc=SHOPPING-BF-CDP-GGL-D25H-025_004_BUILDER_HARD-NA-Multi-NA-PMAX-NA-NA-NA-NA-NA-NA-BuildersHardware&cm_mmc=SHOPPING-BF-CDP-GGL-D25H-025_004_BUILDER_HARD-NA-Multi-NA-PMAX-NA-NA-NA-NA-NA-NA-NA-NA-NA-NA-BuildersHardware-7 1700000113162683--&gad_source=1&gclsrc=ds

⁹https://www.amazon.com/Frost-AC42H-Conditioner-Weatherseal-42-Inch/dp/B000117C40/ref=sr_1_10?hvadid=6 16859154705&hvdev=c&hvlocphy=9129391&hvnetw=g&hvqmt=e&hvrand=15260319149517766745&hvtargid=k wd-386988790532&hydadcr=8428_13573168&keywords=ac+foam+seal&qid=1700845248&sr=8-10

¹⁰ https://www.ecodirect.com/EcoCable-10-AWG-Solar-PV-Cable-by-the-Foot-p/eco-cable-10awg-solar-pv.htm ¹¹https://www.altestore.com/store/cables-wiring/wire-by-the-foot/pv-wire-by-the-foot-10awg-1-conductor-1000v200 0v-p11096/