Project Deliverable C: Design Criteria
GNG1103 - Solar I
Design Criteria and specification

Need	Design criteria and specification		
Green energy resource	Functional requirements	Non-functional requirements	Contraints
Solar panels	2 260W black solar panels Waterproofed Weight per panel: 18kg Operating voltage: 30.4V Operating current: 8.56A Module efficiency: 16.16% Front cover: 3.2 mm tempered glass	Efficient Stable Non-pollution Dimensions per panel: 1638*982*40 mm	(Under STC standard condition) Max. System Voltage:1000v Max. Power :260W Operating Temperature:-40°C ~ +85°C Max. Series Fuse Rating :15A Power Tolerance: 0 ~ +5 W
Inverter	Converts 12V DC to 110V - 120V AC Connects to a 12V battery Can run home appliances	Clean and stable Safety features: Low battery shut down, DC input overload voltage, output overload, overload temperature, short circuit shut down, and high speed cooling fan Wireless remote control Inverter Dimensions (L x W x H): 33.5cm x 23.5cm x 9.5cm Weight: 4.3kg	Continus power: 1000W Surge wattage: 2000W Output AC voltage: 110V-120V Input DC voltage: 12V

Solar charge controller	USB Port LED display Charge Current: 20A Discharge Current: 20A	Low failure rate and will last a long time Size: 133mm x 70mm x 32mm Weight：150g All necessary protections equipped Adjustable controlling parameter of the system	Battery Voltage: 12V/24 auto Working Temperature: -35 to +60 degree C Float charge: 13V Discharge stop:10.7V Discharge reconnect: 12.6V Self consume: ≤10mA
Storable power (Battery)	Cell：6 Type: Eaton 12V 500W Battery Internal resistance:3.7 mΩ Batteries can be stored for six months at 77°F (25°C). Capacity: 500W @ 15-minute rate to 1.67V per cell @ 77°F (25°C)	Small volume, lightweight discharge efficiency Can be used for more than 260 cycles at 100% discharge in cycle service Weight: 45.7kg	Maximum discharge current: 800A (5 sec) Operating temperature range: Discharge: -15°C~50°C Charge: -15°C~40°C Storage:-15°C~40°C Nominal operating temperature range: 25°C ± 3°C Recommended maximum charging current limit: 50A Float charging voltage: 13.5 to 13.8 Vdc/unit (25°C)
Small household appliances Outlets for chargers	Fridge, TV, lights etc. 4 sets of outlets	Useful Can last for a long time	Voltage: 120V Frequency: 60 HZ
Heating	Central heating	Adjustable and stable Warm the house quickly	Appropriate temperature for saving energy: 22 deg - 24 deg
Windows	Have good transmission of light	Safe and strong	3 layers

	Ventilation	Easy to assemble	
Build-in	Furniture Basic rooms like kitchen, bedrooms etc.	Can be used for a long time Easy to assemble and clean	Limited number of furniture: 20-30
Easy to be assembled and disassembled	Easy to transport Reduce the cost		
Able to be used for a long time			
Bed	Foldable and elevated	Safe for children	1m*2m
Storable space	Room for storing	Clean and big enough	200L
For disabled people	Disabled toilet Handrails Automatic door	Safety and convenient	
Safety for children	Safety fence Medical kit	Protective	
Enough living time	Two months (at least one person)	Basic life insurance	

Benchmarking

Specifications	Canadian solar	Sunpower	LG Electronics
Cost	$201-259	$565	$507.08
Weight	18 kg (39.7 lbs)	18.6kg (41 lb)	21.7 kg(47.84 lb)
Size	1638x982x40 mm (64.5x38.7x1.57 in)	1558*1046*46 mm (61.3*41.2*1.8 in)	2,024 x 1,024 x 40 mm (79.69 x 40.31 x 1.57 in)
Material	Anodized aluminium alloy and 3.2 mm tempered	96 Monocrystalline Maxeon Gen III solar cells;;	Anodized Aluminium and tempered

	glass	Class 1 black anodized frame; High-transmission tempered anti-reflective tempered glass	Glass with AR Coating
Efficiency	16.16-16.79%	19.9%-21.5%	16.8% - 20.8%
Temp Coefficient	-0.41 % /°C	−0.29% / °C	0.42%/°C to -0.30%/°C
Product Warranty	10 years	25 Years	25 Years
PTC rating	320 W	334.4-400 W	368 W