

VALUE PROPOSITION

Addressing the need for a portable, reliable, rechargeable energy source that can be used to power a 100 Watt laptop up to 30 hours without a charge.

Low cost application that can be built without extensive technical expertise.

Can be used to power LED lighting, cell phone chargers, computers with the same plug as standard AC.

Programmable charging schedule during off-peak hours to take advantage of rate scheduling.

Scalable project that can be upgraded to power an entire house.

Integrates well with solar, system can be charged without inverter.

UNESCO GOALS

I Affordable, Clean energy

- Provide affordable energy

I Industry, Innovation and Infrastructure

- Provide energy in areas with infrequent or intermittent access to electricity

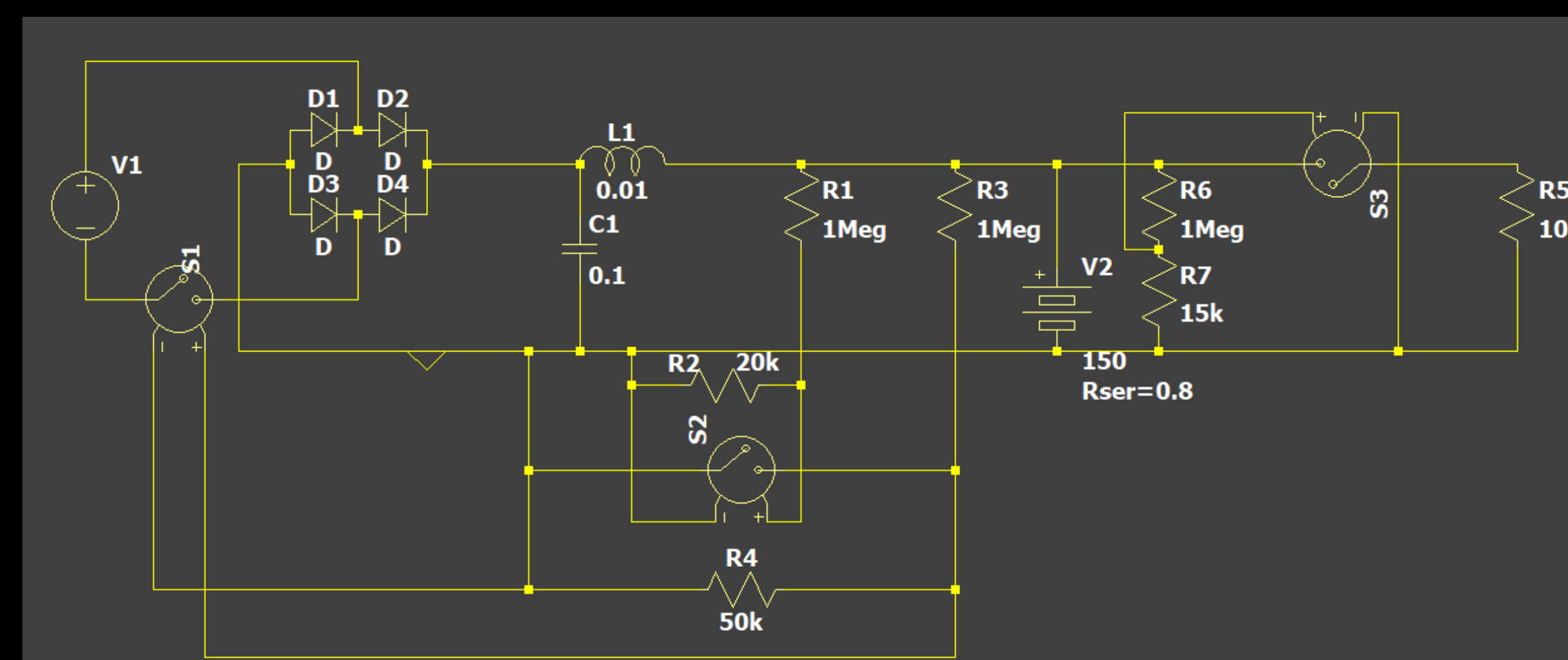
I Sustainable Cities and Communities

- Portable energy always available during disasters and developing areas

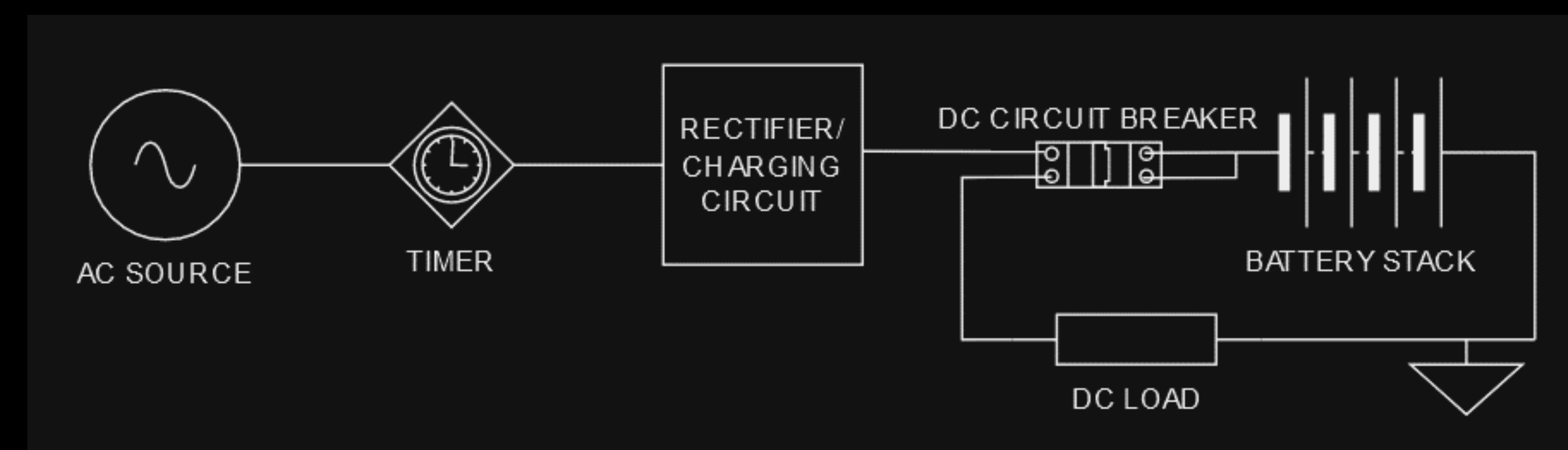


DC POWER BUS

TEAM MEMBERS Shihao Bian, Christopher Pierson, Yuncong Zhou



Rectifier and charging circuit diagram



Interconnect diagram

FEATURES

I Portability, easily moved and carried

I Rechargeable with standard 120 VAC plug

I Powers laptops, LED lights, cell phone chargers with standard AC plug.

I 3 kW energy storage that can power a standard laptop, three lights with LED bulbs and a cell phone charger for over 20 hours.

I Programmable charge schedule



ACKNOWLEDGEMENTS:

LEAD INSTRUCTOR Kip Sikes

IDAHO POWER CLIENT Paul Ortmann



Proof of Concept Prototype

RECOMMENDATIONS

I Improve charging circuit to increase efficiency

I Increase battery capacity

I Provide detailed parts lists, schematics and build instructions to underdeveloped areas with need of dependable electrical power

Integrated Unit Cost	3595	Energy Storage Per Day (kWh) (Complete Unit)	3
(150 V 3 kWh)		Nat. Ave. per USEIA	29.56438
(Includes AC inverter)		Approximate Charge Period (hrs)	8
		Charge Current (A)	2.5

150V 15kWh Battery	2349	Energy Storage Per Day (kWh) (Setup 2)	15
shipping	2194	Nat. Ave. per USEIA	29.56438
DC breaker \$48 each x 3	144	Approximate Charge Period (hrs)	8
		Charge Current (A)	12.5

150V 35A Charge Controller	181	Energy Storage Per Day (kWh) (Setup 3)	3
Enclosure, others	200	Nat. Ave. per USEIA	29.56438
Setup 2	5068	Approximate Charge Period (hrs)	8
		Charge Current (A)	2.5

DC Power Bus	556	Efficiency multiplier	0.85
--------------	-----	-----------------------	------

Integrated Unit							
Location	rates per kWh		Savings per kWh	Savings per day	Savings per year	Incrsd. yrlr cost (lost efficiency)	Years to break-even
	peak	off peak					
Hawaii	0.594	0.25	0.344	1.032	376.68	97.56	12.88
Southern California Edison	0.5	0.27	0.23	0.69	251.85	82.13	21.18
New York ConEd	0.3305	0.0233	0.3072	0.9216	336.384	54.28	12.74
Florida Power & Light	0.193	0.055	0.138	0.414	151.11	31.70	30.11

Setup 2							
Location	rates per kWh		Savings per kWh	Savings per day	Savings per year	Incrsd. yrlr cost (lost efficiency)	Years to break-even
	peak	off peak					
Hawaii	0.594	0.25	0.344	5.16	1883.4	487.82	3.63
Southern California Edison	0.5	0.27	0.23	3.45	1259.25	410.63	5.97
New York ConEd	0.3305	0.0233	0.3072	4.608	1681.92	271.42	3.59
Florida Power & Light	0.193	0.055	0.138	2.07	755.55	158.50	8.49

Setup 3							
Location	rates per kWh		Savings per kWh	Savings per day	Savings per year	Incrsd. yrlr cost (lost efficiency)	Years to break-even
	peak	off peak					
Hawaii	0.594	0.25	0.344	1.032	376.68	97.56	1.99
Southern California Edison	0.5	0.27	0.23	0.69	251.85	82.13	3.28
New York ConEd	0.3305	0.0233	0.3072	0.9216	336.384	54.28	1.97
Florida Power & Light	0.193	0.055	0.138	0.414	151.11	31.70	4.66

