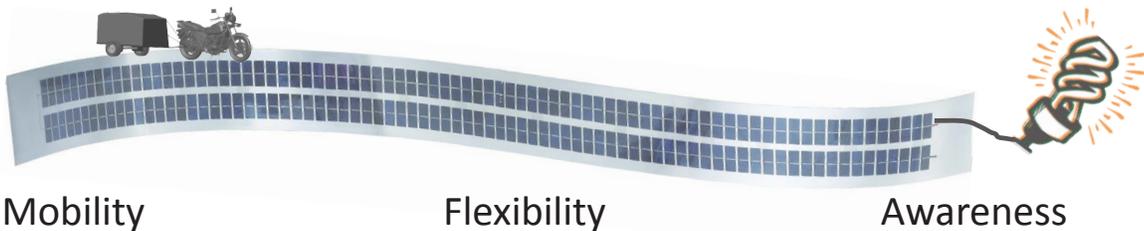


3,200 Miles, Powered by the Sun



Mobility

Flexibility

Awareness

Nice To Meet You

We are two Ph.D. students at the School of Engineering and Applied Sciences (SEAS) at Columbia University. Every day, we do research and experiments on solar energy, carbon capture and storage (CCS) and other sustainable energy technologies. The implementation of innovations has become our main focus in extracurricular projects and we are big advocates of showing how solar power and other renewable technologies can be integrated in people's daily lives.

With this project, we hope to accelerate the implementation of solar power and increase the public's knowledge on photovoltaics. So we came up with a plan to reach out to the public by traveling across the U.S. on electric vehicles using only solar power. The awareness created along this journey will promote the sales of the technologies.



Garrett Fitzgerald MS



Rob van Haaren MS

"We are advocates of showing how solar power can be integrated in people's daily lives."

Mileage and range

Electric motorcycles typically get 10-15 miles per kWh. Most models only hold 5-10 kWh of electricity in their batteries, so the range is limited to ~100 miles. Our trailer will hold an additional 15 kWh, which will be enough to extend the range to at least 200 miles. All of the batteries on board will be recharged by the sun and we therefore have net-zero CO₂ emissions. A trip like this has never been done before in the United States, and we'd like to change that.

According to our calculations, we can drive ~25 miles per day from the electricity generated per 320 Wp (Watt peak) of Ascent solar panels (1 panel provides 320 Wp, [Ref. 2]). So with 8 panels we would be able to drive around 200 miles per day.



[Ref. 1]

"Forget miles per gallon, lets talk miles per kWh."

The Trip

Our trip will start on the Columbia University Morningside campus, where we will charge the batteries for the first 200 miles. On that first day, we show the Columbia students and faculty-members our design and explain the purpose of our trip. When the sun goes down, we roll up the flexible panels and drive off to the next stop: Baltimore. Some other cities we will visit are: St. Louis, Kansas City, Denver, Las Vegas, Los Angeles and final destination: Santa Clara, CA. The total trip will take us 17 days, in which we will cover roughly 3,200 miles.

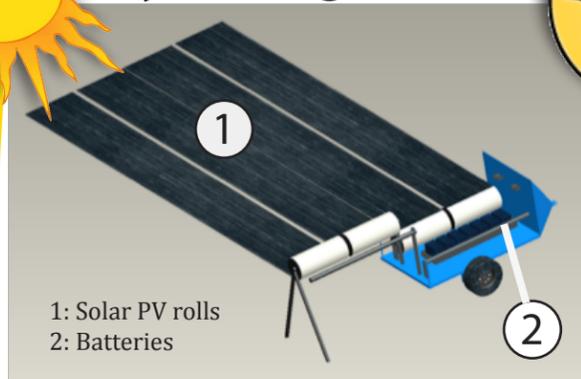
Our itinerary is designed in order to reach the largest audience possible. We will be making stops at schools, universities and sustainability fairs to offer talks on PV and electric vehicles and how they can be implemented into the energy infrastructure. With the help of sponsors we can make these innovations much more tangible to the public and promote the adoption of these promising technologies.

Our trailers can fit educational posters that we will put up during the day, as we hand out flyers and explain to people how we use flexible photovoltaics to travel across the USA.

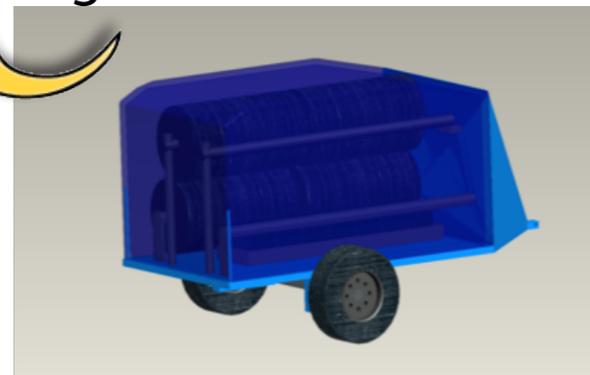


"3,200 miles, 17 days, 0 emissions."

Day: Charge



Night: Drive!



The Idea

The promotion of flexible PV technology and electric motorcycles is the main goal of our trip. The promo tour will be a trip from the East Coast (New York, New York) to the West Coast (Santa Clara, California) powered only by solar electricity.

We will be using electric motorcycles and trailers that each hold 2.5 kWp of flexible solar panels. During the trip,

"With flexible solar panels, you can pack a lot of power in a small space."

we will charge the batteries throughout the day, while we educate people with posters and flyers about the technologies that are used. When the sun goes down, we roll up our panels and drive off to the next stop.

The CAD model displayed above is a preliminary design, intended to show the overall idea of the device. We will use this as the starting point of the design process and come up with more detailed models once we reach a 'critical mass' of interest.

The Motorbike

Brammo Empulse
100+ mile range
10 kWh battery
100+ mph
40 kW peak power

Solar Resource
6.8 kWh/m²/day

Cities to visit

New York
Baltimore
St. Louis
Kansas City
Denver
Las Vegas
Los Angeles
Santa Clara



The Budget

We greatly appreciate sponsorship by either donation of the outlined items or in the form of monetary contributions.

Item	Cost per vehicle (\$):	Total Cost (\$):
Electric Motorcycles	14,000	28,000
Extra Batteries & Equipment	6,000	12,000
Gear (suit, shoes, helmet, etc.)	1,200	2,400
PV-rolls (\$2.5/Wp)	6,400	12,800
Trailer & Construction materials	2,000	4,000
Total		59,200

Contribute!

Without your help, this project cannot succeed. The sponsors will be acknowledged on our website (www.solarjourneyusa.com), flyers, posters and in all promotional events during the trip. Besides that, we will reserve space on our vehicles for the main contributors' logo's.

Please contact Rob van Haaren (rv2216@columbia.edu) if your organization is interested in contributing to the USA Solar Journey. Also, if you have any questions, do not hesitate to contact us!



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