Hayden Island Solar Charge Station *draft proposal*

by Sam Churchill (1503 Hayden Is. Drive, #868)

SYSTEM DESCRIPTION

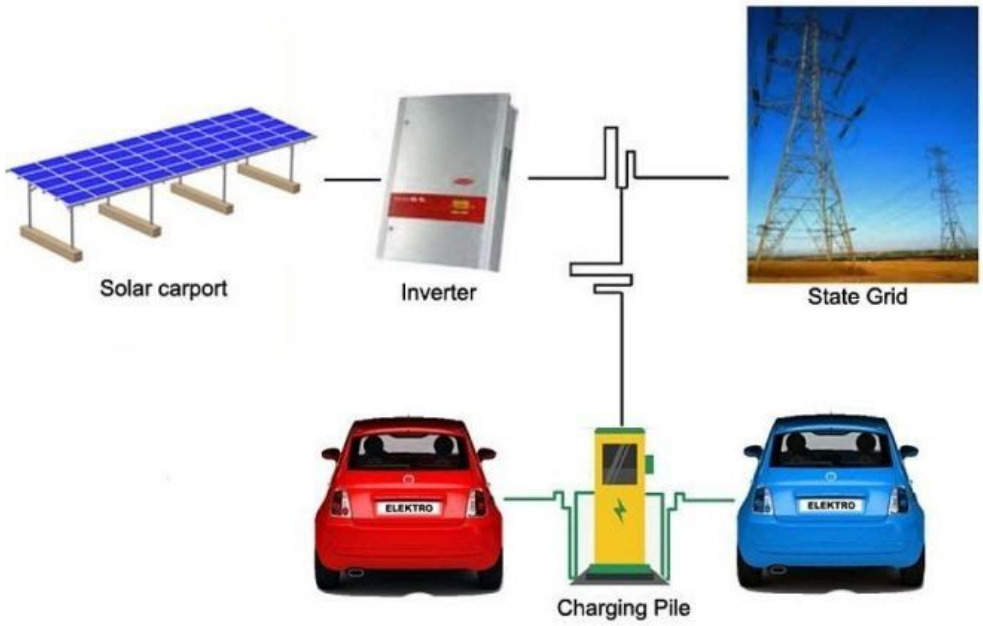
This proposal describes a unique asset for Portland and the Hayden Island Manufactured Home Park. It combines a solar-powered EV charge station with a Nissan Leaf to provide low income residents with low cost car rental ($3/hr to rent). Electric bike rentals would also be available for $1/hr (for residents).

In addition, it utilizes a bi-directional charge station, enabling the park to save money by powering the adjoining laundry and shower facility FROM the vehicle's battery. Combined savings on electricity ($200) with income from EV rental ($300) totals an estimated $500/month, enabling self-sustaining operation.

SYSTEM COMPONENTS

Components of this proposal include

- One, 2018 Nissan Leaf ($15K)
- One, 6kW solar array canopy ($20K)
- One, Solar Edge single phase inverter ($3K)
- One, bi-directional Wallbox with an input/output of 7.7 kW ($4K)
- Misc equipment and construction costs ($8K)
- TOTAL: $50k



The 40 kW/hr EV battery is charged by the 6kW solar array, feeding into a SolarEdge Single Phase Inverter ($1300).

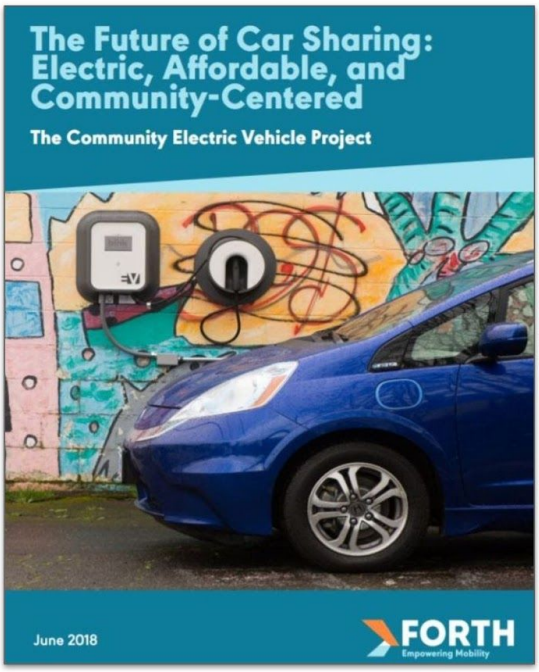
It connects the electric vehicle to both solar panels and the power grid. The inverter is connected to a bi-directional Wallbox car charger ($4000) with an output of 7.7 kW.

BENEFITS

A solar powered charge station has several benefits:

Electric Car Rental

- $3/hr rental, $5/hr visitors
- Free solar car charging
- Self sustaining at $300/mo
- Provides battery backup
- Lowers pool & laundry costs
- Free WiFi

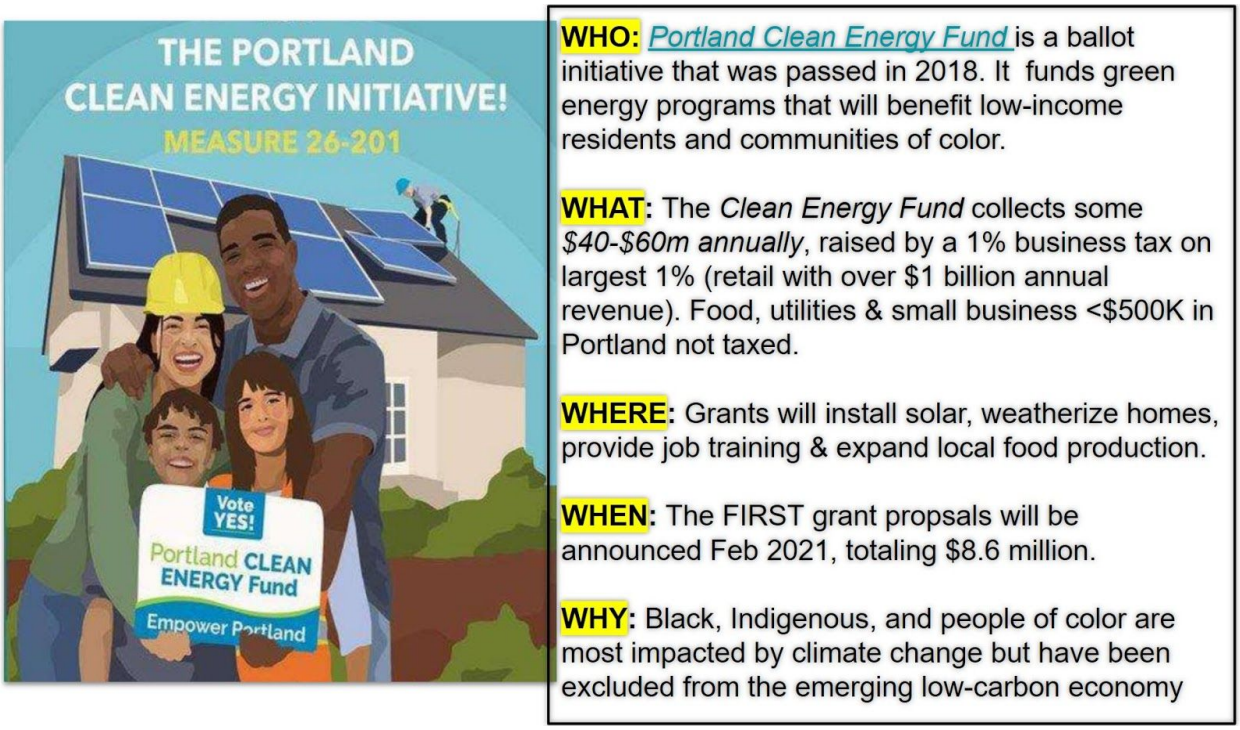


A bike rental facility could offer electric bikes as well as user supplied bikes for public rental. Bike rental might be facilitated by Biketown or by a non-profit using 3rd party software such as Turo.

Electric Bike Rental

- $1/hr rental
- Self-sustaining at ~$100/mo
- Can supply own bike to rent
- 3rd party service provider

The Portland Clean Energy Fund is a climate action program that taxes large retailers, and is expected to generate $40-60 million a year. All of it is reserved for communities of color and those with low income who are more likely to suffer from the effects of climate change.



Portland City Commissioner Jo Ann Hardesty created the program to diversify the world of renewable energy.

“We’re talking about energy efficiency, but we’re also talking about workforce development," she told OPB. An announcement of the first grants is expected to be announced in February, 2021.

The Portland Green Energy Fund is delivering $44 to $61 million in new annual funding for clean energy homes and jobs in Portland. Can Hayden Island communities qualify for a Green Energy Fund Grant? What benefits could be expected? How would it work? What would it look like? This paper attempts to answer those questions as a possible applier of a grant.

The Portland Clean Energy Community Benefits Fund (PCEF) was created in 2018 by a successful local ballot measure. It provides a source of funding for projects and programs to meet Portland's Climate Action Plan goals in an equitable manner.

The measure passed with 65 percent of voters in support, making it Oregon's first ever environmental initiative created and led by communities of color. It is anticipated to bring $44 to $61 million in new revenue annually for developing living wage jobs, sustainable agriculture, green infrastructure, and residential and commercial renewable and efficiency projects in the Portland area.

Climate change has a disproportionate impact on communities of color and low-income residents of our city. The initiative ensures that Portland's Climate Action Plan is implemented in a way that supports social, economic, and environmental benefits for all Portlanders. PCEF offers a community-led vision, grounded in justice and equity, that builds citywide resilience and opportunity.

What is a Green Energy Fund Grant?

The Portland Clean Energy Fund generates approximately $30-$60 million a year in new revenue for energy efficiency upgrades, home weatherization, rooftop solar, job training, local food production, and green infrastructure. It imposes a new 1% business license surcharge on the total in-city revenue of retail corporations that have over $1 billion in previous annual national sales and $500,000 in annual Portland sales (groceries and medicine would be exempt). The fee only hits the largest corporate retail chains in the country while generating significant revenues for renewable energy and job creation.

How are funds distributed?

At least 50% of the Fund's energy efficiency/renewable energy projects "should specifically benefit low-income residents and communities of color;" and at least 20% of all Fund grants "shall be awarded to nonprofit organizations with a mission and track record of programs that benefit economically disadvantaged community members." Nonprofit organizations, alone or in partnership with for-profit companies, schools and/or other government agencies, can apply for grants from the Fund to weatherize homes, install solar and other renewable energy projects, provide job and contractor training, expand local food production and build green infrastructure.

Administration of Funds

A grant committee modeled after the successful Portland Children's Levy comprising nine city residents, appointed every two to four years by the City Council, will oversee

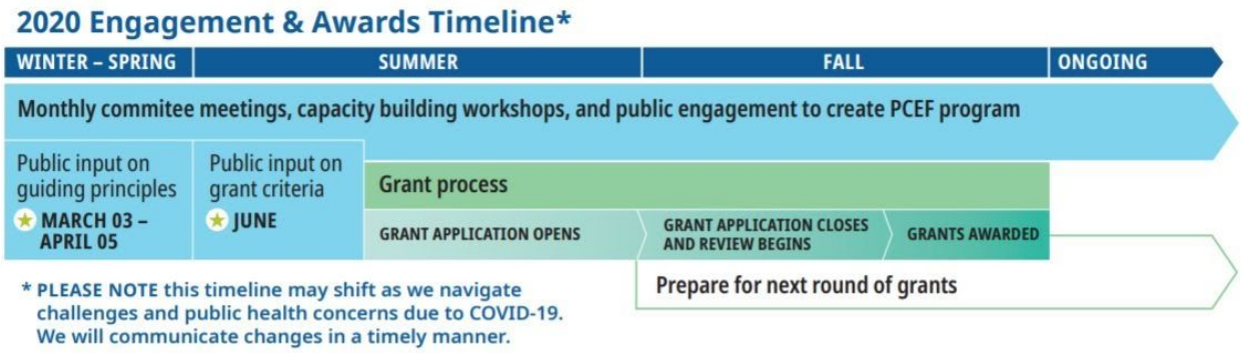
competitive proposals for use of the funds. All members of the commission will reflect the racial, ethnic, and economic diversity of experience and backgrounds important for successful implementation of the measure. Administrative costs will be limited to 5% of the annual fund.

Is this like Measure 97?

Measure 97, a statewide initiative in 2018, raises some $3 billion a year by raising taxes on large corporations' gross receipts. That increased the state's budget by roughly a third. The Portland Clean Energy Fund, by contrast, only applies to major retailers in the City and exempts groceries and medicine. It will raise some $60 million a year which is targeted to support residential energy efficiency and community solar programs.

Aren't there incentives that already exist for solar power?

The Oregon Department of Energy's Residential Energy Tax Credit (RETC) program ended in 2017. Nearly 600,000 Oregonians participated in the program between 1977 and 2017, receiving incentives for ductless heat pumps, rooftop solar, electric vehicle chargers, and more. Energy efficiency projects like this need funding, and the loss of the Renewable Energy Tax Credit program further underlines the need for the Portland Clean Energy Fund.



Learn more:
www.portland.gov/BPS/cleanenergy

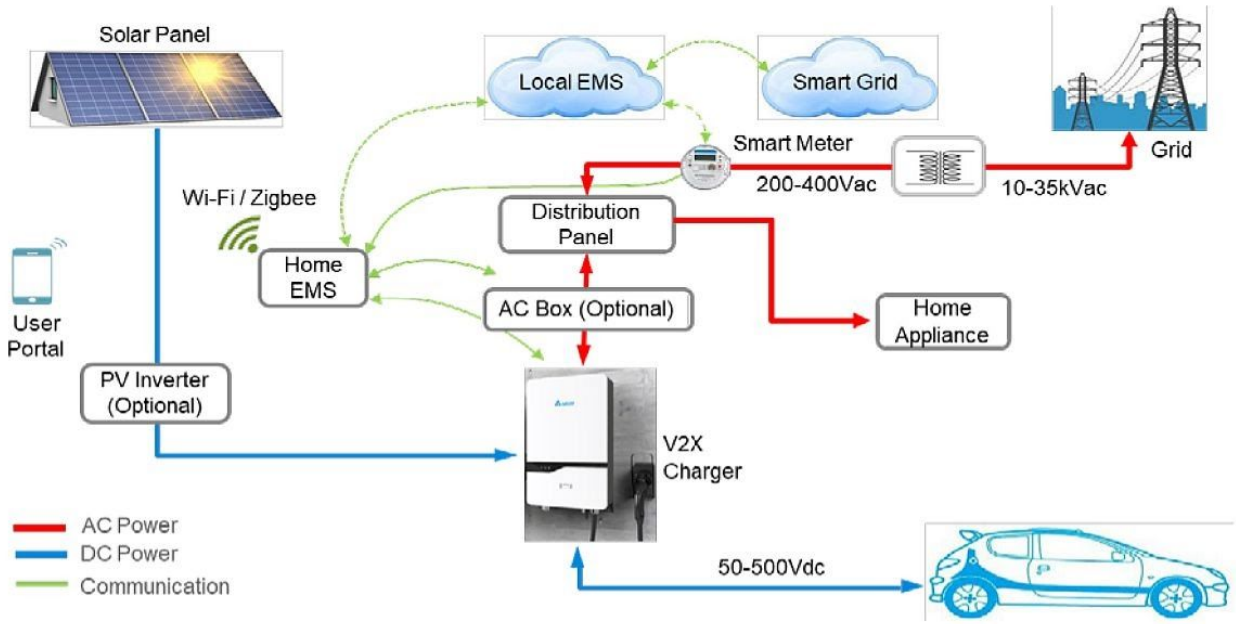
For any questions, please contact:
CleanEnergyFund@portlandoregon.gov | 503-823-7713

MANUFACTURED HOME COMMUNITY; AN IDEAL TARGET POPULATION

Residents of the 450+ manufactured homes on Hayden Island are generally of lower means with a high percentage of LatinoX and other minorities as well as seniors on fixed incomes. Many do not have cars and have difficulty grocery shopping since the island's only grocery store, Safeway, closed some two years ago. Another 150+ residents live in the adjoining RV park. About half are permanent residents and many also lack automobiles.

ADDITIONAL APPLICATIONS FOR SOLAR CHARGE STATION

Hayden Island is located in the middle of the Columbia River. All electricity comes from a single sub-station on the west end of the island. Because the island is dependent on the mainland power and because the Manufactured Home Community has an integrated RV Park, it enables post-earthquake and emergency scenarios where electricity is down for weeks or months .



Powering the community center from the sun

For example, a solar canopy charging a 60 kW/hr Nissan Leaf could continuously power a small settlement of emergency vehicles. I live in the RV Park and use less than 600 kW/hrs of electricity a month (about 20kw/hrs a day). With an average of 4 hours of sun landing on a 6kW solar array, each day would generate broadly speaking ~24kW/hrs of electricity that would be stored in Nissan Leaf's battery. The bi-directional capability of a 7kW Wallbox charger means the car's 40-60 kW/hr battery could be used to power the Park's community center, complete with lights, kitchen, heat and air conditioning.

Heat the pool, showers and power dryers

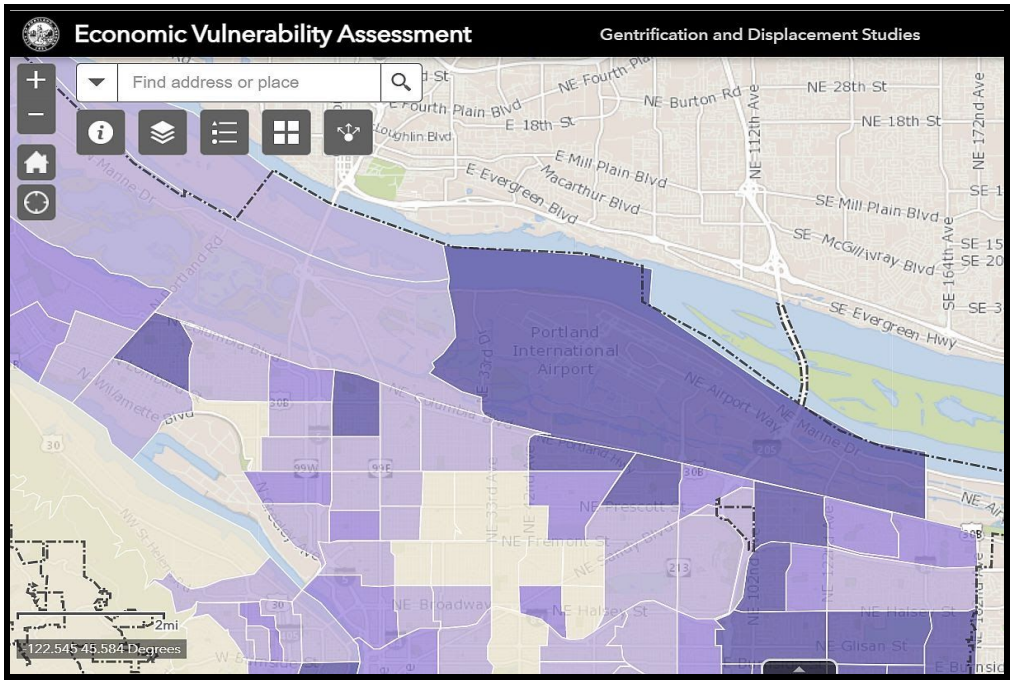
The Leaf's battery could also power the swimming pool heater or the public laundry room and shower -- completely from the sun. That would save about $100/month. A 60 kw/hr battery might get topped off - and used - daily for heating the pool for running the dryers. It still leaves 40kW/hrs left in the car for about 150 miles of driving. At night, if the car needs charging, it would simply plug in to the AC power. During the day, when the car is gone,

sunshine powers the pool heater. The 7 kWatt solar array goes through the DC to AC inverter, which then powers the pool heater.

NEEDS ADDRESSED

The Manufactured Home Community on Hayden Island and a solar charge station for EVs uses green energy efficiently and addresses the needs of the target audience.

- High percentage of low income and minority clientele
- Many residents have no car
- Island dependent on shore power
- Lowers cost of car and bike rental
- Lower cost of electricity for Park management
- Bi-directional emergency power after blackout
- Low cost - no Tesla Powerwall required
- Low risk - Car/bike requested by residents and RVers



SUMMARY

This draft proposal looks at the Manufactured Home Park on Hayden Island as a possible location for a solar powered electric vehicle charge station. The benefits to the community would be access to inexpensive transportation, resiliency, lower operational cost of facilities and added inducement for residents. A bidirectional charge station is specified for a 2018 Nissan Leaf. That lowers cost by eliminating the need for a home storage battery and allows the sun to power the swimming pool heater as well as showers and laundry room. The solar charge station and car could be located at several different locations, near the entrance to the RV Park and near the swimming pools at the property.

Possible locations
at Manufactured Home Park:
(needs south facing exposure)

1. South Shore Pool
2. Main Office by Pool
3. RV Park Laundry
4. 1501 Laundry room
5. 1501 Parking area

The proposal is expecting total costs to be in the neighborhood of $60K, which includes the cost of purchasing and installing the solar canopy (~$25K), a used 2018 Nissan Leaf with a 60 kW/hr battery ($15), the bi-directional charger ($4K), labor ($8K), and misc equipment ($4K), for a total of $56K.

Revenue is expected to be in the neighborhood of $500/month or $6K/year. Monthly revenue comes from car rental (~$350/mo) and bike rental (~$150/mo). Park management gets to keep the approximate $100/month savings in utility bills from running a portion of the pool heaters and laundry facilities off the car battery. With $500/month revenue, the non-profit entity would be basically self-sustaining while offering below market rates are bike and car rentals.

Solar EV Charge Station Cost Model

- **Free Level 2 (7kw) charging (4-8 hrs)**
- **DC fast chargers >50kW (1hr), too expensive**
- **7.5 kW bi-directional charger can heat pool ($4K)**
- **Provides both CSS and CHADEMO plugs**
- **4kW EV solar station has internal 24kW battery ($50K)**
- **One used 2018 Leaf ($15K), plus two bikes ($3K)**
- **Car is $3/hr. Bikes are $1/hr. Non-residents $2 more.**
- **Residents may provide own vehicle (managed by Turo)**
- **Self-funding. Average revenue ~$450/mo ($15/day)**
- **Total cost ~$75K. Annual revenue ~$5K**

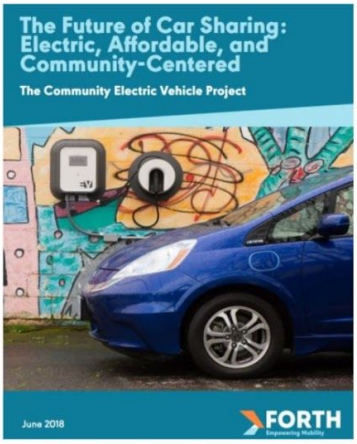
How low income users benefit:

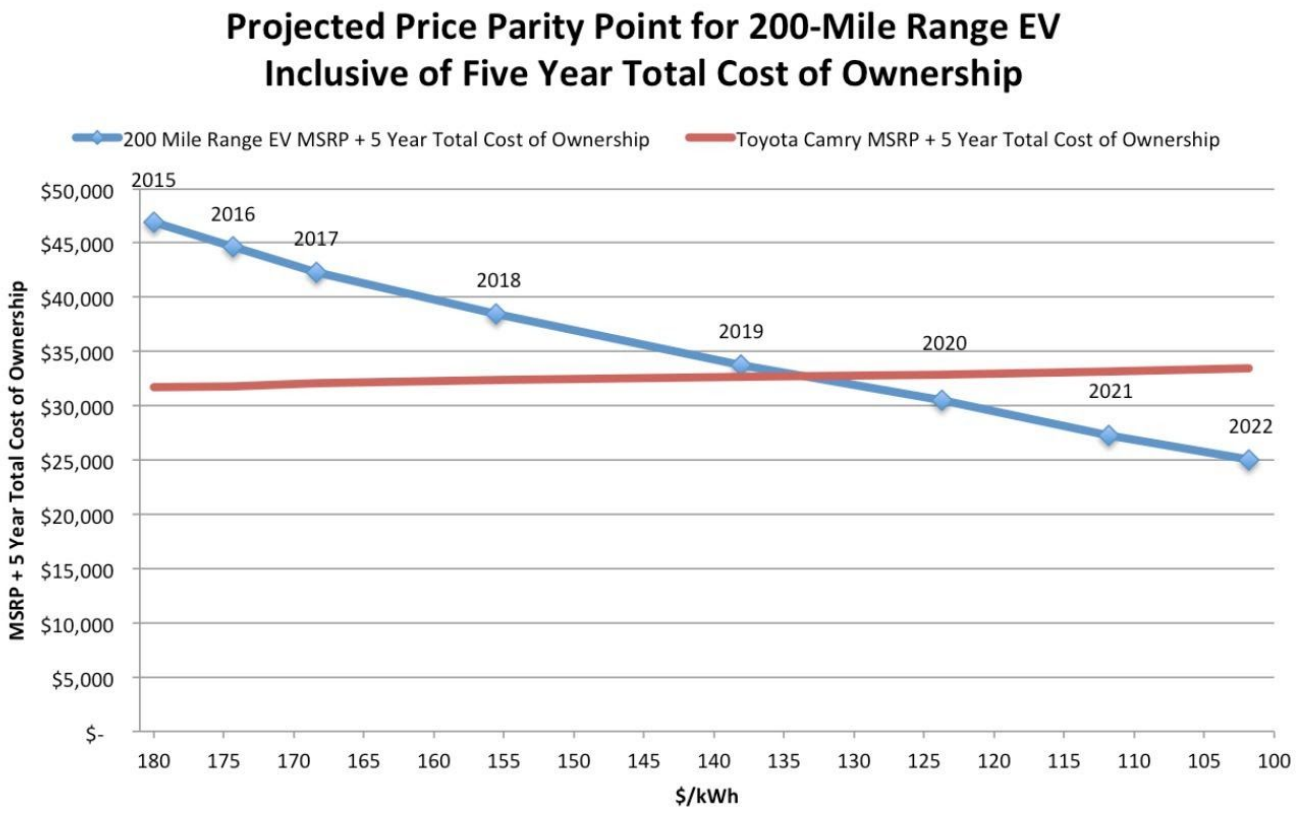
Electric bike rentals

- Self sustaining at $100/mo
- Managed by 3rd party software

Electric car rentals

- Grocery shopping
- School & errands




Projected Price Parity Point for 200-Mile Range EV
Inclusive of Five Year Total Cost of Ownership
200 Mile Range EV MSRP + 5 Year Total Cost of Ownership
Toyota Camry MSRP + 5 Year Total Cost of Ownership
MSRP + 5 Year Total Cost of Ownership
$50,000
$45,000
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2015
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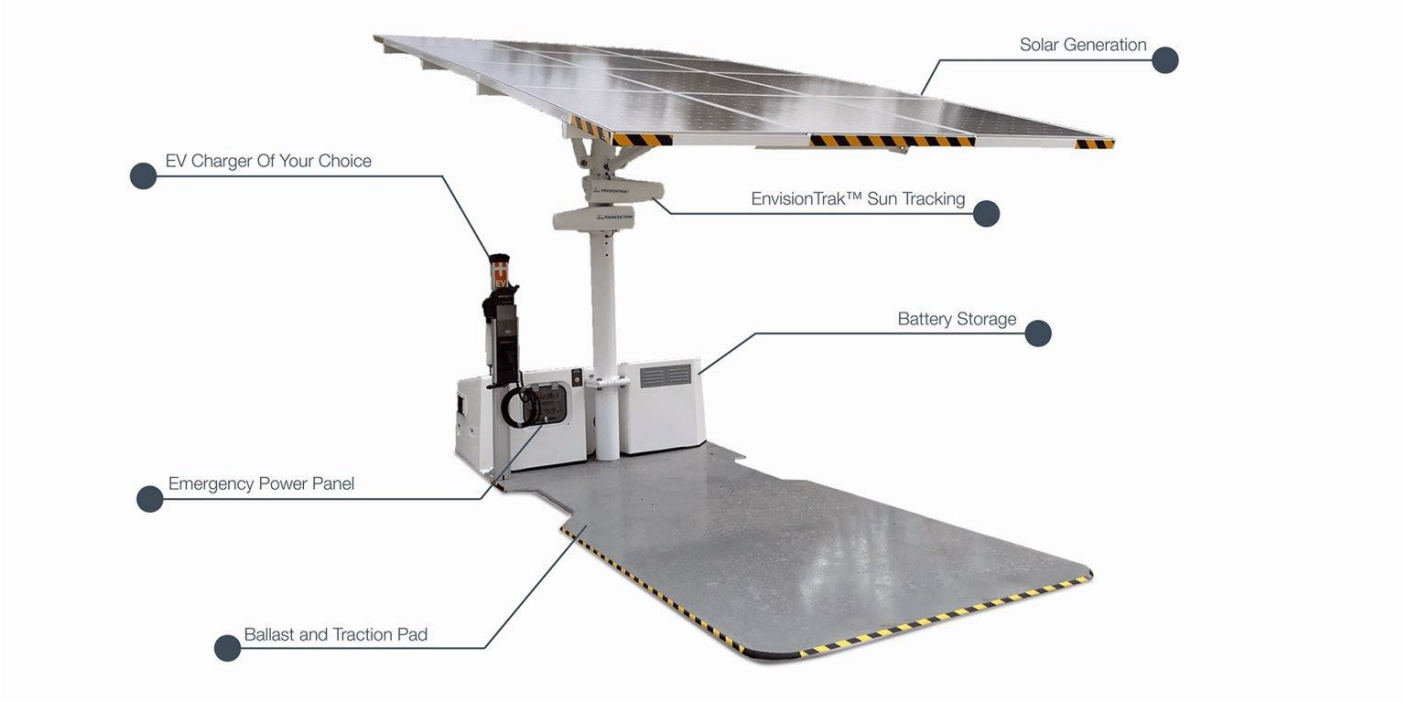
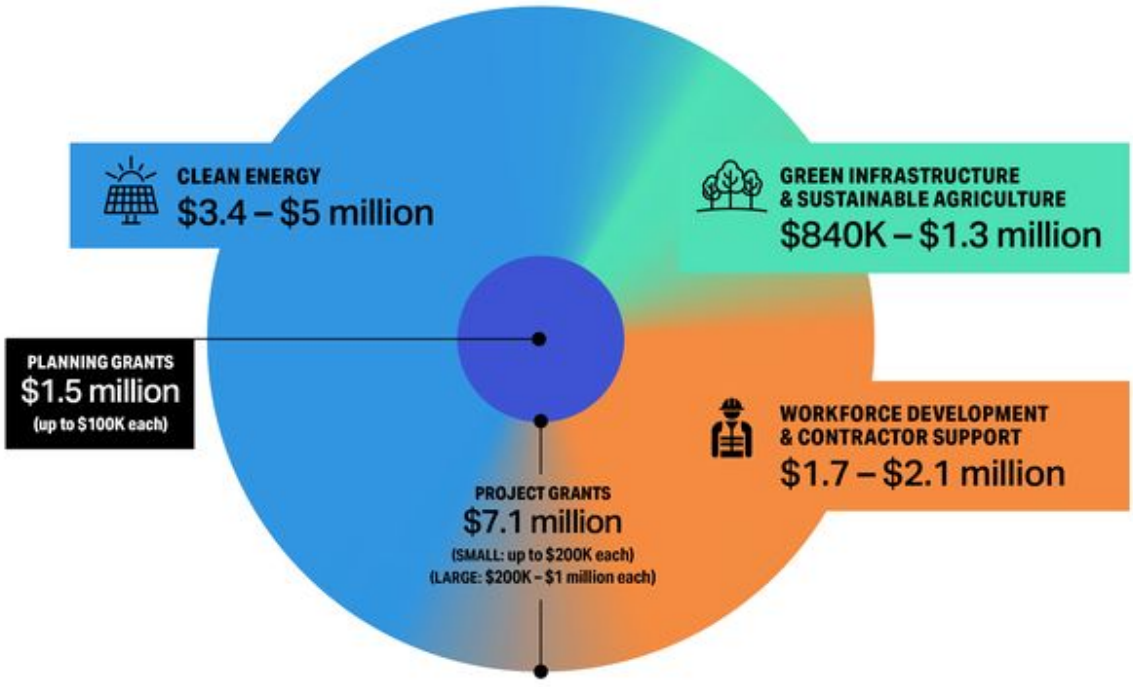
180 175 170 165 160 155 150 145 140 135 130 125 120 115 110 105 100
$/kWh



$8.6 Million available now

$40–60 MILLION ANNUALLY IN FUTURE YEARS



For further information:

1. **Portland Green Energy Fund**

   https://portlandcleanenergyfund.org

2. **PowerPoint of this paper**
   https://docs.google.com/presentation/d/e/2PACX-1vTvlzYEVewA0GOkxlp5Y-pYeQ4lf6zViEV5nlUTO8WsrWL17AQHACsJCXdpH_4FtzpVOvjUAb0-ou2z/pub

3. **Oregon Solar EV Charger**
   https://ev4.website/business-model/

4. **Wall Box Bidirectional Charger:**
   https://wallbox.com/en_us/bidirectional-ev-charger

5. **Off Grid Solar EV Charging**
   https://offgridinstaller.com/off-grid-ev-charging/

6. **Electrify America's Solar Chargers**
   https://electrek.co/2020/02/27/electrify-america-to-deploy-30-off-grid-solar-ev-chargers-in-rural-california-communities/

7. **VW 22kW Bi-Directional Charger (CSS)**
   https://electrek.co/2020/12/11/vw-22-kw-bi-directional-dc-charging-station-electric-vehicles/

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