Solar-powered
AI-enabled hotspots
for Hayden Island

Project Description:

Four solar-powered hotspots are placed on Hayden Island to enable broadband access after an earthquake and to the large number of minority residents on the island who live in mobile homes, RVs, floating homes and boat moorages.

Importantly, they also enable people of many different cultures to interact using Artificial Intelligence to translate their native tongue. Using a speaker (Google Assistant) you can ask questions and get answers in your native tongue. Voice access to information is provided with AI-assisted access in nearly any language.

Project Need:

There is a large low income and minority population on Hayden Island. They include the 1,000+ residents living in the manufactured home park (on the West side) and the Prose apartment building (on the East side), as well as many living on floating homes or boats.

The island recently lost its city-supplied BEECN node (Basic Earthquake Communications), after our hotel storage for the gear was permanently closed. The emergency communications gear was then removed from the island. Hayden Island depends solely on one source of electrical power and the I-5 bridge as the sole access on and off the island.

This proposal provides cellular hotspots available publicly on picnic tables. It can provide free public internet access while the battery is solar charged for free phone and laptop charging. Satellite connectivity, if cellular communications is lost, is also provided as backup using two Starlink terminals (used only 6 months of the year).

Project Goals and Outcomes:

- Providing free broadband access to the public and solar charging for phones and laptops is the main goal. It provides communications when electricity or communications to the island are lost. Free public WiFi connections are provided by four cellular hot-spots on the island.
- Four picnic tables, two on the East side & two on the West side, have solar-powered cellular hotspots. Two of the four picnic tables are also equipped with Starlink terminals, acting as a cellular back-up.
- A small 100 watt solar panel charges a 280 watt/hour battery under the table which powers the cellular hotspot. It can also charge phones and laptops. A Starlink satellite connection, available on two of the four nodes, provides cellular backup.
- Encouraging community connections and providing a broadband lifeline after an emergency is the main goal.
- A secondary goal is to enable people of many different cultures to interact with Artificial Intelligence. Everyone can use a speaker (Google Assistant) to ask questions and get answers.
- Achieving personal and community goals with these tools is the desired outcome.

Project Description:

- Four public picnic tables ($500/each) are available for the general public with free WiFi access.
- WiFi (2.4/5 Ghz) HotSpots (with a 5G cellular backhaul) provide free community WiFi.
- The Calyx Institute provides the InSeeGo 5G hotspot for $750 (year one) and $500 (year two). Total cost (including hotspot ownership) is $1250 over 24 months (about $50/mo) for unlimited service.
- A 10’ square canopy ($500) covers each of the four picnic tables.
- Mounted on top of each canopy is a 100 watt solar array ($150).
- The solar panels charge up a 288 watt/hr battery in 3 hrs (with good sun).
- Two tables also include Starlink mini satellite terminals ($500/each) with plug-in battery packs ($300). That roaming 50 Gigabyte/month service costs $50/mo. But it is suspended for 6 months (during the winter). It provides emergency communications backup.
- The WiFi service (hotspot and battery) are moved indoors to community meeting rooms over the 6 month winter season.

1. The Four WiFi HotSpots (with unlimited data service) - $5,000

A dual band WiFi (2.4/5 Ghz) HotSpot (with a 5G cellular backhaul) is utilized. The Calyx Institute is a long-time non-profit dedicated to providing broadband access to various communities across the USA. Their plans are open to anyone - no income verification is needed.

Both the InSeeGo MiFiX Pro device and service costs are covered by the Calyx Institute fee of $750 for year one and $500 for year two. A total cost of the device and its unlimited data plan are covered by the $1250 total cost over two years.

Side view

No other costs are required. The total cost of four devices, unlimited data plans for four devices, and two years of operation, totals $5,000.

Currently Available Plans/Membership Levels:

- Contributor - Unlimited 4G data with a **Franklin T10 hotspot**
- Sustainer - Unlimited 5G data with an **Inseego MiFi X Pro 5G**

Calyx Membership Plans : Calyx

Membership Level	Data Allotment	Hotspot Device	First Year	Subsequent Years	Per Month First Year	Per Month Subsequent Years	Quarterly Optio
Contributor	Unlimited 4G	Franklin T10	$500	$400	$42	$33	$150 every 3 mo
Sustainer	Unlimited 5G	MiFi X Pro 5G	$750	$500	$63	$42	$175 every 3 mo (renewal only)
Contributor Plus (not currently available)	Unlimited 5G	Franklin JEXtream RG2100	$600	$500	$50	$42	N/A

https://calyxinstitute.org/

https://calyxinstitute.org/help/hotspot-devices/hotspot-models/mifi-x

https://inseego.com/products/mobile-hotspot-routers/mifi-x-pro/

https://calyxinstitute.org/files/mifixpro-manual.pdf

https://www.rvmobileinternet.com/gear/sprint-non-profit-unlimited/

2. Anker SOLIX C300-dc Portable Power Station ($250), times four units - $1000. It can be recharged in about 3 hours of sun using a 100 watt solar panel.

- This 288Wh battery delivers 300W and includes two 140W two-way USB-C fast charging ports.
- Fast Recharge to 80% in an hour minutes with the dual PD 3.1 USB-C port. You can also use solar panels or your car.
- An XT-60 plug connects the solar panel to the battery for charging in about 2.5 hrs on a sunny day.

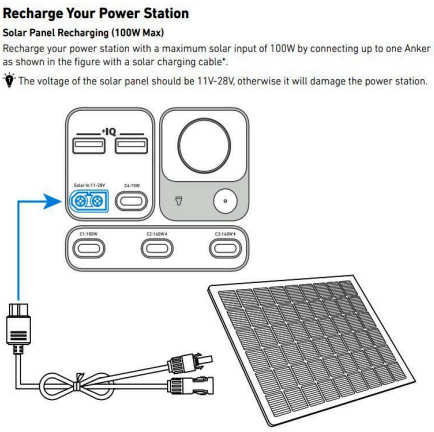
With a 100W Anker Solar Panel ($160), a 140 watt USB 3.2 plug, or a 12V cigarette lighter input you get 80% charge in about 2.5 hours.

https://www.ankersolix.com/products/c300

https://www.ankersolix.com/products/c300-dc Anker SOLIX C300 DC (90,000mAh), 288Wh, Portable Power Station, 300W ($200)

https://www.amazon.com/Anker-Portable-Generator-Traveling-Emergencies/dp/B0D62PMB3R/ref=sr_1_1

- With a 288Wh (90,000mAh) battery, it easily powers multiple devices for extended periods. Charges a laptop and phone (40 watts total), while powering the cellular hotspot (30 watts) and satellite terminal (50 watts) for 2-3 hours.



- 7 Device Charging Ports: Power all your tech with versatile ports, including 1× car socket (120W), 2× USB-C (140W), 1× USB-C (100W), 1× USB-C (15W), and 2× USB-A (12W).

- Uses 11-28V 100 watt solar panels with an XT60 connector input to the battery.

- With a 100 watt solar panel or cigarette plug in a car, charges in about 2.5 hours. In about an hour using two, 140 watt USB ports.

https://www.ankersolix.com/camping-battery-portable-power-station-a1726-a1722-pps

3. 120W Foldable Solar Panel ($130), 23% High-Efficiency Portable Charger with USB-C/2xUSB-A/DC Outputs, ETFE Monocrystalline IP65 Waterproof ($120W Foldable Solar Panel, 23% High-Efficiency Portable Charger with USB-C/2xUSB-A/DC Outputs, ETFE Monocrystalline IP65 Waterproof for RV Power Stations.

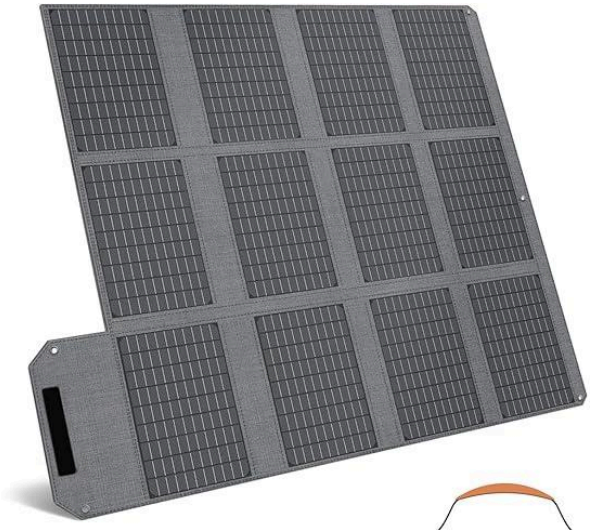
- With a folded size of 12.7 x 9.8 x 3.1 inches and a weight of 8.6 pounds (3.9kg). Folds up, making it easier to mount, transport, hang, and remove. Featuring 4 carabiners, allowing for easy and flexible attachment to the canopy roof or RV, etc.

- 4 Output Ports. The 120W camping solar panel has 3 distinct output ports on a small junction box: 1 DC output (5A Max), 1 USB-C output, and 2 USB A. It can charge a phone, iPad, drone, and, using the XT-60 connector, our SOLIX 288Wh power bank.

-With 7 in 1 solar connector (XT60,Anderson,DC5521 DC15135,DC5525,DC7907,DC8020), the 120W solar panel for power stations is compatible with the majority of portable power stations and solar generators that exist on the market.

https://mhpowos.com/products/mhpowos-120w-portable-solar-panel

https://www.amazon.com/MHPOWOS-High-Efficiency-Monocrystalline-Waterproof-Backpacking/dp/B0DR245W2B/ref=sr_1_4



4. Cedar picnic table ($400). RECTANGULAR PICNIC TABLE — Comfortable place to 8 persons to socialize with friends or family for kids or adults

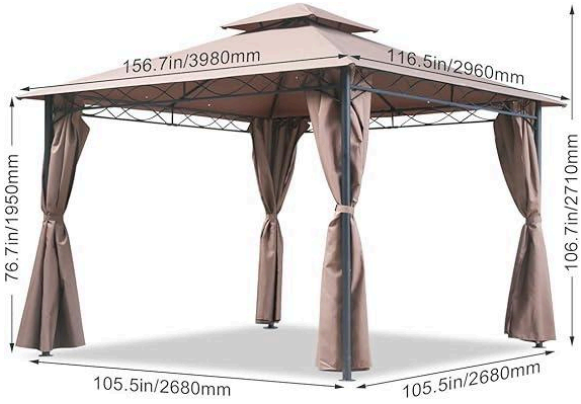
https://www.amazon.com/Jack-June-Cedar-Rectangular-Picnic/dp/B0CPQ4GH2L/ref=sr_1_61

- MADE OF PREMIUM CEDAR— Clear stain finish for natural cedar wood tone look and can be stained
- EASY ASSEMBLY — Rectangular table ships partially built with detailed instructions to assemble in minutes
- ROUNDED CORNERS — Edges of the table are rounded for added safety and security
- DIMENSIONS — 72" Long x 54" Wide x 30" Tall and Supports 800 lbs.

5. Gazebo Canopy Outdoor Canopy Outdoor Tent ($400)

Made of heavy duty stainless steel that is rust and corrosion resistant brown powder coated steel framework. The cross-bar with stable triangle structure is very bold and can bear the weight of 300lbs. Use ground nails on the grass to add stability.

(Durable and Waterproof Fabric): The double roof effectively withstands strong sunlight and helps remove heat. And the removable windshield with the double-sided zipper can prevent the entry of mosquitoes and the cold wind. When you don't need the windshield, you can tie them up with the velcro storage belt.



https://www.amazon.com/Outdoor-Waterproof-Backyard-Curtain-Activity/dp/B08BPC7GZD?th=1

6. Starlink, the SpaceX satellite terminal ($500), plus integrated battery ($300). Residential Starlink service has reached capacity limits in the Portland region, but not for the (limited) roaming service ($50/mo for 50 GB). Ravion is a high-performance, waterproof battery solution that clips onto your device for convenience. Add 100 watts of solar to feed the USB input for power. Works anywhere. No AC power or cell service required.

https://www.rvmobileinternet.com/starlink-adds-restrictions-to-roam-unlimited-in-sold-out-areas

The smaller mini terminal can be powered by USB plug and consumes just 25-40 watts. The local WiFi is integrated into the small one-piece satellite terminal. Dimensions: 12” x 11”. The 158 watt/hr battery plugs into the satellite terminal for 1-piece satellite/WiFo operation.

https://www.starlink.com/residential
https://www.starlink.com/map
https://www.starlink.com/roam
https://www.starlink.com/specifications
https://ravion.us/products/ravion-battery-for-starlink-mini
https://www.amazon.com/s?srs=120336274011

https://www.amazon.com/Starlink-Mini-Kit-internet-Go/dp/B0DH3PLZ6N/ref=sr_1_10
https://www.amazon.com/Starlink-Charger-Cigarette-Lighter-Adapter/dp/B0DM7YK123/ref=pd_sim_hxwPM1_sspa_dk_detail_d_sccl_4_5/144-1700574-1027666

STARLINK

Package Weight	2.89 kg (6.37 lbs)
Package Dimensions	430 x 334 x 79 mm (16.92 x 13.14 x 3.11 in)
Antenna	Electronic Phased Array
Field of View	110 °
Orientation	Software Assisted Manual Orienting
Weight	1.10 kg (2.43 lb) 1.16 kg (2.56 lb) with Kickstand 1.53 kg (3.37 lb) with Kickstand & 15 m Cable
Environmental Rating	IP67 Type 4 with DC Power Cable and Starlink Plug/Cable installed
Operating Temperature	-30°C to 50°C (-22°F to 122°F)
Wind Speed	Operational: 96 kph+ (60 mph+)
Snow Melt Capability	Up to 25mm / hour (1 in / hour)
Power Consumption	Average: 25-40W
Input Rating	12-48V 60W (12v short Starlink cable coming soon in Shop)
USB PD Requirement	100W, 20V/5A Minimum (with Starlink USB-C to Barrel Jack Cable Accessory)
Wi-Fi Technology	802.11a/b/g/n/ac
Generation	WiFi 5
Radio	Dual Band 3 x 3 MU-MIMO
Ethernet Ports	One (1) Latching Ethernet LAN port with Starlink Plug
Coverage	Up to 112 m² (1,200 ft²)
Security	WPA2
Power Indicator	LED | rear face plate, lower left corner
Mesh Compatibility	Compatible with all Starlink mesh systems *Not compatible with 3rd party mesh
Devices	Connect up to 128 devices

We use the Starlink $50/month Limited Roam option. The cellular data plan is our main connection. The satellite is mostly for backup if cellular is down.

The Anker SOLIX C300-dc Portable Power Station ($250) may also be used and packaged with the satellite terminal inside a Pelican case. That makes a one-piece, portable satellite access point. It will operate up to 6 hours using the 288 watt/hr battery. Ravion's Clip-On Battery Pack ($329) on the small ($500) Starlink dish, will provide one-piece Starlink Mini portability. The Etsy Hard Case for the Sat terminal & battery

https://www.amazon.com/dp/B0DBMND3SK

7. Outdoor Smart Speaker

Smart Speakers like Amazon's Alexa, Google Assistant, and Apple's Siri, can interact with you without a phone. Just talk to it. As with all Google Assistant–powered devices, you can ask the Nest Audio to set timers, play music, or tell you the weather, and you can ask it anything you'd search on Google.

With AI on the back-end smart speakers can tap into genius level thinking and engauging conversation. We will download book-length expertise on the Columbia River, fishing, boat traffic, weather, history, wildlife and other common points of interest. Plus an unlimited knowledge library on the internet. https://translate.google.com/

Feature	Traditional Interfaces (GUI)	Voice-Controlled Assistants (VUI)
Input Method	Visual (click, tap, type)	Voice (speak commands)
Accessibility	Limited by physical ability	Highly accessible, hands-free
Multitasking	Limited	Easy, supports multitasking
Contextual Understanding	Low	High (especially Google Home)
Integration	App/device-specific	Centralized, cross-device
Automation	Technical, less intuitive	Simple, conversational
Limitations	Visual/physical barriers	Noise, language, context issues

How to Use AI on Samsung S25 phone (2 months ago).

https://www.youtube.com/watch?v=-j5tn9BBgOg

8. Unique Interactive Features. Located on the Columbia River, the AI-enabled hots pot will have a book-length database of specific topics users may access. These localized databases include information about today's fishing, boating, and shipping activity. The GPS location of our hotspot is known, so queries can be specific to this location. That includes shipping destinations through queries of Marine Traffic and Columbia River Pilots, aircraft destinations through queries of Flight Aware and fishing info from the State of Oregon and Wasington.

One unique feature could be the Poetry Pharmacy. It offers literary prescriptions,with poetry and stories for your every emotional ailment. It will formulate a poem for you on-the-spot.

https://www.poetrypharmacy.co.uk/

9. Misc components. ($1000).

Waterproof, secure metal cabinets for the battery, and pelican cases for the four wireless hotspots and two satellite terminals, plus connecting and securing cables, USB charging cables for phones, misc fixtures, etc. Under the picnic table the 288 watt/hour Portable Power Station is stored and secured from weather or theft in a steel box.

The power hub cables connect to a USB hub on the table (for charging phones). Another cable powers the speaker. The speaker uses Bluetooth to connect with the hotspot (or a phone).

The small 7"x 3" hotspot has its own weatherproof case. It is attached and locked to the top of the umbrella roof. One USB cable on the 100 watt solar panel feeds the hotspot. A 2nd power cable from the solar panel connects to the XT-60 connector on the Power Station which is stored beneath the picnic table.

10. Budget.

Total Equipment Cost:

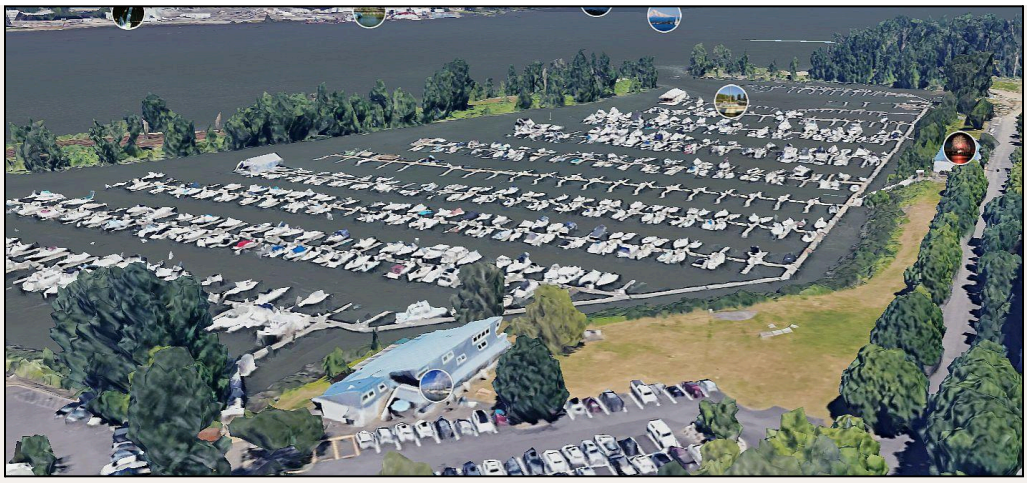
1. **The Four WiFi HotSpots** (with unlimited data service). Covers cost of cellular hotspot and *unlimited data service over 2 year period.* $1250/each x 4 units **TOTAL: $5,000**
2. **Anker SOLIX C300-dc Portable Power Station** ($250) x 4 units **TOTAL: $1000**
3. **Foldable 100 watt solar panels** ($160/each) x 4 units. **TOTAL: $640**
4. **Cedar picnic table** ($400/each) x 4 units. **TOTAL: $1600**
5. **Gazebo Canopy Outdoor Canopy Outdoor Tent** ($400/each) x 4 **TOTAL: $1600**
6. **Starlink satellite terminal** ($500), plus battery ($300) x 2 units **TOTAL: $1600**
7. **Starlink 50GB roaming service ($50/mo)** for 6 mos x 2 yrs x 2 units **TOTAL: $600**
8. **Outdoor Smart Speaker** ($200/each) x 4 units . **TOTAL: $800**
9. **Misc components.** ($500/each) x 4 units. **TOTAL: $2000**

TOTAL HARDWARE COST: $14,840

Management:

Two property management companies on the island are anticipated to be partners with The Hayden Island Neighborhood Association (Hi-Noon), the island-wide neighborhood association, a 501c3 non-profit corporation which is overseeing this project.

1. Columbia Crossing. Two locations; (1) their large lawn overlooking the Tomahawk Bay moorage and (2) overlooking the South Shore, near the middle of the island. Columbia Crossing, manages the largest marina in the Portland-Vancouver area. Their large lawn is a popular spot for BBQ's and plays host to summer and spring boater parties and concerts. It's also near the prosehaydenisland.com/neighborhood/ apartment building.



https://columbiacrossings.com/

https://columbiacrossings.com/tomahawk/

https://earth.google.com/web/@45.605371,-122.65733347,-0.99139156a,231.80313457d,35y,66.42624113h,73.37773054t,0r/data=CgRCAggBMikKJwolCiExbzd0b3hYd2x3VGhKQVR5QU56bEdQdU8weG0zRjRmTFogAToDCgEwQgIIAEoICPigrZACEAE

The 2nd location on the Eastside is their property by the (being remodeled) Menjiro Restaurant, near I-5 and overlooking the South Bay. https://maps.app.goo.gl/8i2mRX5753gxSryu6

The 2nd property management company is the Hayden Island Manufactured Home Community, located on the west side of the island. The manage some 450 manufactured homes housing over 1,000 of the island's 3500 inhabitants. One location would be on the North side of the island, next to the office, picnic area and playground.

https://maps.app.goo.gl/cvJqq37HHyVuWQQz6

The 2nd location is on the South Shore, next to the largest community center on the island and overlooking Hayden Bay, to the south. High Noon would oversee the operation of these public, Since the WiFi hotspots and picnic tables would be placed in private property, that is owned and operated by Columbia Crossing and Hayden Island Manufactured Home Community, they would have the ultimate say as on their operation.

C. Management and Consultant Fees ($10,000)

We have budgeted three consultants and partners on this project:

1. **Manufactured Home Park ($2500)**. Approximately 70 hours at $35/hr is budgeted for the installation and oversight of two solar powered picnic tables, one by the office near the playground and one on the south shore near the club house.
2. **Columbia Crossing ($2500)**. Approximately 70 hours at $35/hr is budgeted for the installation and oversight of two solar powered picnic tables, one by the Columbia Crossing office on the lawn, overlooking the moorage, and one on the south shore near the old Menjiro cafe, overlooking the moorage.
3. **Hayden Island Neighborhood Association (Hi-Noon), $5000**. Approximately 200 hours at $25/hr is budgeted for daily management and operation of all four hotspots, over a period of two years. That includes instruction, promotion, community events to demonstrate the facility, and creation of a Facebook and TikTok page.

D. Misc Promotional and materials Budget ($2,000)

Each summer during the two year period, we will sponsor a community barbeque. During this event we will demonstrate how the community AI-enabled hotspot works. We will show how people can connect using only voice input/output, as well as using phones and laptops connected via WiFi in a more traditional manner.

We will also demonstrate how the facility can automatically translate between languages as well as how the AI can access all sorts of real-time information related to river traffic, boating, fishing and event information.

E. Misc Incidental Expenses ($2,000)

Includes insurance, maintenance, breakage, unanticipated on-line expenses, etc.

Total Projected budget for 24 months:

1. **TOTAL HARDWARE COST: ……. $14,840**
2. **Management and Consultant Fees …….. $10,000**
3. **Promotional and materials Budget ……. $2,000**
4. **Misc Incidental Expenses ……. $2,000**

TOTAL BUDGET FOR 24 MONTHS …. $28,840

Post-grant operation analysis.

Approximately 18 months after the first operation we will discuss with our partners the success or failure of the project and any changes that should be made. The grant covers the running cost of the cellular operation and will end after 24 months, so a decision will be made on how to pay for the $42/month cellular backbone continuing expense and other incidentals. Partners may pay the $42/monthly fee to enable their residents continued free access, charge an access fee, or apply or another grant to continue free operation for island residents.

Satellite Terminal available to the city for emergencies.

The portable Starlink mini terminal, with portable power supply, 100 watt folding solar panel, and Pelican case would be available to the Portland Bureau of Emergency Management (PBEM) and to BEECN users in case of emergency at any time.

The rugged briefcase holds the mini Starlink terminal with integrated WiFi, a battery and (optionally) a 100 watt solar panel. It can operate for 4-8 hours on battery, then be recharged by a car cigarette lighter in two hours or solar panels in 3-4 hours.

It can provide broadband connections for phones or computers anywhere on the island or the city.

Slim Waterproof Hard Case ($50). Precision Cut Foam For Starlink Mini, Kickstand, Pipe Adapter, Power Supply.

https://www.amazon.com/dp/B0DBMND3SK

10. Summary.

This proposal provides cellular hotspots available publicly on picnic tables on Hayden Island. It can provide free public internet access and the battery can provide free phone and laptop charging. Satellite connectivity, if cellular communications is lost, is also provided as backup using two Starlink terminals (used only 6 months of the year).

Voice access to information is provided with AI-assisted access in nearly any language. An important goal is to explore societal changes and opportunities of Artificial Intelligence.

A budget of some $30,000 is requested through a Portland Clean Energy Grant.

https://www.portland.gov/bps/cleanenergy/community-grants/technical-assistance

What are your thoughts on this first draft?

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