
# EcoMotion: Electrifying Washington Park's Circulator for a Greener Future

**EV Conversion Proposal**
02/14/2024

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**Proposal Submission Partners**
Open Commons | Pangea EV | Elywhere | Urban Systems
Explore Washington Park |MTR Western

**Project Endorsements**
LG Nova | Oregon Innovation Fund

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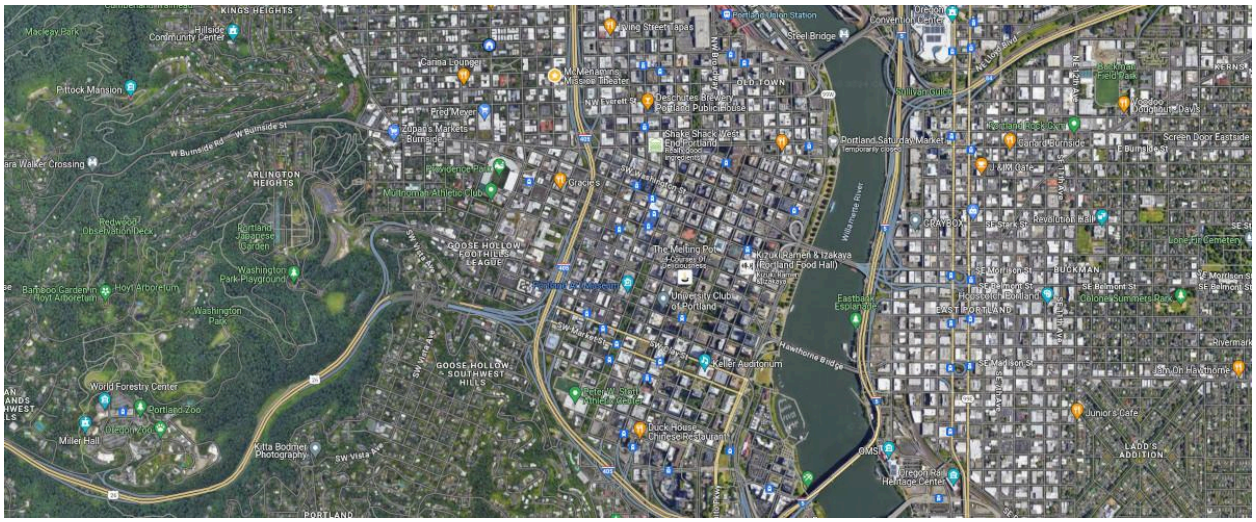
## Project Overview

Washington Park is the crown jewel of Portland. This 410-acre park is home to the Oregon Zoo, the World Forestry Center, the Hoyt Arboretum, the Rose Garden, and the Japanese Garden. Washington Park brings in 3.5 million visitors annually. Close to the heart of Portland, this park is a vital resource connected to communities across the area by TriMet's electric light rail service. Once in the park there is a free shuttle that connects to these key attractions.




Beyond its role as a convenient shuttle, this bus represents an opportunity for transformative change rooted in social justice, economic empowerment, and environmental sustainability. Our project aims to spearhead transportation decarbonization efforts by electrifying the shuttle that connects to the Park's key attractions. This initiative aligns with broader objectives of energy efficiency, renewable energy integration within the transportation sector. By transitioning to electric buses powered by renewable energy sources, we not only mitigate greenhouse gas emissions but also advance equitable access to sustainable transportation.

## Renewable Energy and Transportation Decarbonization

The Circulator Bus currently runs every 15 minutes, 9 hours per day in the summer and 6 hours per day in the winter. The route serves 9 stops and is 4.4 miles in length. Last year the bus fleet operated for a total of 5653 bus hours across a fleet of five buses. We estimate that the bus electrification project will reduce the current carbon footprint by 113 Tons of $CO_2$ per year, while also affecting other positive socio-economic and climate resilience outcomes.

This represents a significant step towards reducing carbon emissions within Washington Park and the broader Portland metropolitan area. Furthermore, integrating renewable energy sources ensures that  bus operation remains carbon-neutral.

Our plan converts five existing Ford transit buses to electric power. This conversion not only reduces cost over buying new it ensures the gasoline engine is removed from the road and recycled instead of being sold for another use. It also retains the chassis and other equipment saving emissions over a new purchase. By taking five gasoline engines off the road and replacing them with electric counterparts powered by sustainably generated electricity we expect to reduce emissions by more that 113 tons of $CO_2$ every year.

For the charging infrastructure we have chosen an integrated storage and charging unit made by Elywhere North America based in Portland. Unlike traditional charging stations this unit offers a solution that installs in a matter of hours compared to other stations where the process can take up to 18 months. In addition this unit is cost effective requiring no electrical upgrade, no digging and no extra sight work. The station is configurable and movable so we can customize it for Washington Park's needs. By using storage in our solution we can capitalize on overnight charging and deliver DC fast charging to the buses during the day.

There is already some solar capacity in the park but this is dedicated to the Zoo. We intend to provide sufficient solar capacity to ensure the buses run mostly on power generated in the park. Our plan is to place these solar panels over the charging station in order to provide a covered bus boarding area close to the light rail stop.

## Advancing Racial and Social Justice

Our proposal seeks to electrify this circulator bus, not just as a means of modernizing transportation, but as a catalyst for equity and progress in one of Portland's most disadvantaged communities. The buses used for the shuttle are operated and maintained by MTR Western located in the Multnomah County Drainage District (MCDD).

The MCDD is home to the Amazon, Fedex, DHL and UPS logistics hubs, Jubitz truck stop, and Portland International Airport to mention just a few. MTR Western's facilities are already in this area and we plan to build and maintain the buses here too. By investing in infrastructure and workforce development here, we're not just upgrading buses; we're investing in the future of the neighborhood. We're equipping businesses with the skills and opportunities needed to thrive in the rapidly growing market of electric vehicle technology.

There is a growing community of electric vehicle companies in and around the Multnomah County Drainage District. We plan to use local companies for parts, systems and labor. By doing this we're not just reducing emissions; we're paving the way for a greener, healthier city for generations to come.

## Project beneficiaries

Our project is designed to benefit multiple stakeholders, including the 3.5 million visitors to Washington Park, project employees, and residents and businesses in the Multnomah County Drainage District.

**Park Visitors**: By transitioning from gasoline-powered vehicles to electric buses, the park will experience a reduction in greenhouse gas emissions and air toxics. This will result in cleaner air, contributing to improved public health outcomes for park visitors. Additionally, the shift to electric transportation aligns with the park's commitment to sustainability and environmental stewardship, enhancing the overall visitor experience.

**Project Employees**: The project will create employment opportunities and provide training in electric vehicle conversion and maintenance. By equipping workers with these skills, they will be prepared to meet the growing demand for electric vehicle technology over the next 20 years.

**Multnomah County Drainage District Residents and Businesses**: By choosing the Multnomah County Drainage District as the site for the conversion and maintenance of the buses, we are seeding a potential center for transportation electrification in the community. This has the potential to bring much-needed jobs and economic prosperity to a historically underserved area. The establishment of a hub for electric vehicle conversion and maintenance could attract investment, foster innovation, and catalyze economic development, benefiting residents and businesses within the district.

**Project Partners:** There are a number of uncertainties in how the charging station, storage and buses are configured. By supporting this project PCEF will enable the participants to gain valuable knowledge that will help reduce the cost of future deployments and support business growth.

## Milestones

| Milestones | Activities to support milestones | Day | Date |
|---|---|---|---|
| 1 | Complete drawings and placement of Bus charging area, including power requirements, Elywhere and Solar Array location, Order Elywhere and long lead components. | 30 | 06/01/24 |
| 2 | Work with Explore Washington Park on an outreach program to include the Stakeholders at the Park, Portland City Council, Metro, TriMet, PGE, and general public | 60 | 07/01/24 |
| 3 | Retain first bus, setup pre-production bay, complete engineering drawings; order batteries and key components and ancillary equipment. | 75 | 07/15/24 |
| 4 | Complete drawings and placement of Bus charging area, including power requirements, Elywhere and Solar Array location. Identify Solar installer, start permitting process for Solar Array. | 75 | 07/15/24 |
| 5 | Removal of Internal combustion engine of first vehicles | 100 | 08/30/24 |
| 6 | Industrial design complete and layout complete. | 150 | 10/20/24 |
| 7 | All Permitting Completed | 200 | 01/01/25 |
| 8 | Hardware design complete | 225 | 01/05/25 |
| 9 | Build begins for all vehicles, all parts ordered for 4 more vehicles | 240 | 01/20/25 |
| 10 | Utility connection Complete | 250 | 01/30/25 |
| 11 | Software programming is complete. | 270 | 02/20/25 |
| 12 | Solar Array Deployment Completed | 290 | 03/10/25 |
| 13 | Test, certify, and deliver complete documentation, implement any design changes. | 300 | 03/20/25 |
| 14 | Repeat build process, sequentially to reduce vehicle shortage. | 350 | 05/30/25 |
| 15 | Complete acceptance checks with MTR Western on all five busses | 365 | 06/01/25 |
| 16 | Year 2 Service, software and performance upgrades complete | 730 | 06/01/26 |
| 17 | Year 3 Service, software and performance upgrades complete | 1095 | 06/01/27 |
| 16 | Year 4 Service, software and performance upgrades complete | 1460 | 06/01/28 |
| 17 | Year 5 Service, software and performance upgrades complete | 1820 | 06/01/29 |

## Anticipated Challenges and Barriers

**Supply Chain**: In the rapidly growing market for electric vehicle parts we anticipate potential supply chain challenges, particularly batteries and motors. Large automotive companies are currently dominating available capacity, potentially causing delays or shortages in obtaining essential components. To further mitigate this risk, we have formed a strategic partnership with Pangea Electric Vehicles, a company with established relationships in the electric vehicle supply chain. By leveraging their expertise, buying power and connections, we be able to navigate supply chain issues and ensure timely access to the necessary parts.

**Cost Fluctuations**: the costs of key components in this supply-constrained market can be volatile. To address this, we will take proactive measures by ordering parts as soon as possible after receiving notification of a successful proposal. This approach allows us to lock in prices and delivery dates, minimizing the impact of market fluctuations and ensuring efficient project planning and execution.

**Charger Location**: Securing suitable land for the charging systems and solar panels in and around the Washington Park facility requires coordinating with multiple stakeholders, including Metro, TriMet, the City of Portland, and MTR Western, who own different potential locations. Delays in negotiating ideal locations could affect project timelines. To mitigate this, we have devised a flexible solution: placing the charging system in a temporary location to support bus charging initially. Once negotiations for the ideal location are finalized, the charging facility can be relocated with minimal additional cost. This adaptive approach ensures continuity in bus operations while addressing the challenges associated with securing land for infrastructure development.

## Requirements

Our project has identified several requirements crucial to its successful completion, all of which we are fully prepared and committed to meeting.

**Location for Battery Storage/Charging System and Solar Facility**: Securing the ideal location for the charging facility is essential. We have devised a flexible solution to initially place the charging system in a temporary location, ensuring bus operations while negotiations for the ideal location are finalized. Our team is dedicated to securing the necessary approvals and agreements to move forward with this aspect of the project efficiently.

**Conversion Facility Location**: Finding an appropriate location for the fabrication and maintenance facility is a priority. We have a temporary location on Swan Island for removal of Gasoline drive train, and installing batteries, electric drivetrain, and system integration at Pangea EV. The battery storage and charging company, ElyWhere North

America Inc, is currently operating out of while they secure their North America Assembly and Engineering Center in the Portland area.

In 2024, Elywhere will also set up a lab and testing facility that will be used to develop new technologies, hardware, and software for truck and bus charging and bidirectional energy storage that can support the electrical grid and transportation ecosystem.They will hire local labor and provide electrician apprenticeship opportunities here in Oregon.

**Operating Licenses**: Because the buses are conversions, the testing and certification for the original manufacturers,  they are street legal and are currently licensed, and there is no requirement  for further testing or certification by regulatory agencies. The vehicle, electronic drive, battery and battery management system, battery storage and charging of systems go through rigorous testing by Pangea EV and ElyWhere during commissioning and installation.. . Our team is committed to meeting all regulatory requirements and obtaining any required permits to ensure the legal operation of the electrified circulator buses.

The solar Array will require the normal permitting requirements for solar. Open Commons is currently working with PGE and Explore Washington Park on the location and power availability.

Elywhere has CE certification in Europe and are working on UL approval in the United States. We do not anticipate any problems in meeting any U.S. Laws or directives.  The first United States units are expected to be installed in the second quarter of this year. Our team is fully prepared to adhere to any regulatory requirements and ensure compliance throughout the project's duration.

**Workforce Certifications**: We plan to collaborate with Oregon institutions of higher education to ensure our workforce possesses all relevant qualifications to work on electric vehicles. Additionally, we will establish a safe work environment to prioritize the well-being of our employees. We do not anticipate any barriers in obtaining the necessary workforce certifications, as our team is committed to providing comprehensive training and support to our workforce.