

MEMORANDUM

To: Portland, Oregon Sustainability Office

From: Julia Arnold, Maggie Dong, Luqman Sumartono, Graham Turk

Date: October 24, 2021

Subject: Accelerating Equitable Electrification in Portland and South Portland, Maine

Executive Summary

Team DATAS is supporting the cities of Portland and South Portland (the Cities) to plan and implement a just and equitable transition to a net-zero future in 2050. To complement existing actions identified in the One Climate Future (OCF) plan, focusing on addressing the potential challenges the Cities may face, we recommend that the Cities: 1) Increase equity in public transit by implementing on-demand microtransit; 2) Construct multi-purpose fast charging hubs in partnership with the local utility; 3) Improve access to overnight charging infrastructure and EV ownership; and 4) Accelerate transit, school, and municipal fleet electrification.

Context

The *One Climate Future* (OCF) plan is a joint climate action and adaptation plan to address the climate emergency declared by the cities of Portland and South Portland, Maine. The Cities aim to reduce community-wide greenhouse gas emissions 80% from 2017 baseline by 2050, and all municipal operations will run on 100% clean renewable energy by 2040. However, to achieve this ambitious climate goal, the Cities face significant challenges: 1) While populous in parts of the Cities, a large portion of urban space remains mid- to low-density, rendering it difficult to achieve economy of scale; 2) Transit ridership in the Cities is still low, at 3.2%; 3) Transitioning to a 100% electric transit fleet can be costly and practically challenging; and 4) Some communities may not have the infrastructure ready to support electric buses.

Recommendations

The OCF plan establishes ambitious targets for building up the accessibility and electrification of Portland and South Portland's transportation systems. The Cities have significant control over transit, municipal, and school fleet purchasing decisions, as well as ride-sharing fleet composition; when coupled with Maine's Renewable Portfolio Standard for clean electricity procurement, the proposed actions supporting electrification are likely to achieve the OCF plan's goals. Yet emissions from these operations are a fraction of total community-wide transportation emissions, which largely come from personal vehicle travel.¹ We believe additional action is needed to encourage the transition away from internal combustion engines and personal vehicle ownership more broadly. The following actions would supplement the existing proposal, while accelerating fleet electrification:

1. Increase equity in public transit access by implementing electric on-demand microtransit

The OCF plan intends to expand local bus connections, but this will take time to assess optimal routes and construct stations. The



Figure 1: Map of Metro Micro coverage zones

Cities should implement electric on-demand microtransit to decrease wait times and expand public transit to less dense residential neighborhoods. The City could either directly own and operate the microtransit as part of its existing transit service or partner with a third-party technology provider, as modeled in Jersey City and Via's partnership². The city of Los Angeles has implemented the "Metro Micro" service³ to target low density neighborhoods that are disconnected from the established transit system to move passengers within designated zones or to a nearby Metro stop, shown in Figure 1. 10-person vans operate in each of the blue zones, where commuters can schedule a ride in advance for \$1 and be picked up within 15 minutes. The VIA Link⁴ provides a similar service in San Antonio, Texas.

2. Construct multipurpose fast charging hubs and emergency backup shelters

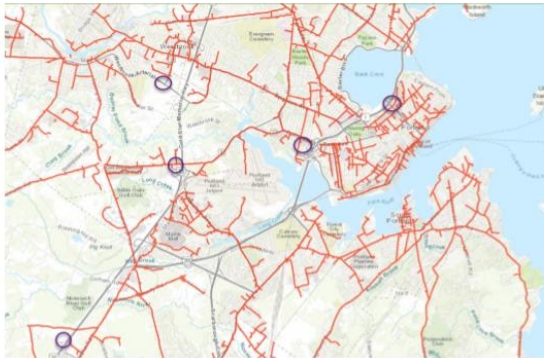


Figure 2: Central Maine Power 3-Phase Circuit Map with park and ride locations circled

We recommend partnering with Central Maine Power (CMP) to create fast charging hubs. Availability of rapid charging is essential for the successful transition to all-electric transit and ride-sharing fleets, and CMP is well-positioned to deploy this infrastructure; not only does the utility have deep knowledge of grid locations with excess capacity to host charging sites, they also can leverage third-party capital and recover the investment in electricity rates. An analysis of CMP's 3-phase circuit map shown in Figure 2 reveals a close overlap between high-voltage power (essential for fast charging) and existing park-and-ride locations (purple circles), as well as with departure/arrival piers for many common ferry routes. The Cities should partner with CMP to

advocate at the Maine Public Utilities Commission for the creation of a program similar to Consolidated Edison's PowerReady, which offsets a portion of the "make-ready" costs associated with fast charging stations.⁵ The first PowerReady supported charging hub location is a 7-MW superhub for the all-electric ride-sharing company Revel, which is available to the public when not needed for fleet charging. Co-locating multiple services will be more cost-efficient by spreading fixed construction costs over more charging ports. These hubs would include chargers for private electric vehicles (EVs) and overnight parking for the proposed micro-transit fleets. We also recommend pursuing "vehicle-to-grid" (V2G) partnerships with CMP to leverage large bus batteries to provide clean emergency backup power to transit centers, converting them into emergency shelters during large outages or climate disasters.

3. Improve access to EV charging infrastructure in residential areas (single-family homes, multi-family residences, and curbside) and pilot EV carshare and replace your ride programs

We recommend deploying curbside charging and partnering with CMP to offer incentives for residential smart chargers. After sticker price, charging availability is the top barrier for EV adoption.⁶ Since overnight parking in Portland and South Portland is dominated by curbside and private driveways & garages, charging at these locations must be simple and convenient. The Cities could achieve that outcome by changing municipal zoning laws and deploying public charging stations attached to streetlights and utility poles (which avoids expensive and disruptive underground trenching), modeled after a program by the Los Angeles Department of Water & Power⁷ and with community involvement as recommended in a Cadmus study on EV charging for renters.⁸ Financial incentives for property owners to install chargers would increase feasibility for low-and-moderate income (LMI) EV owners. The cities can also advocate for an EV charging station incentive by CMP or Efficiency Maine. Many utilities, including Consumers Energy in Michigan,⁹ cover the full cost for smart chargers at home, through which they can manage electricity demand and avoid infrastructure upgrades.

Even with an excise tax credit, the high sticker price of electric vehicles puts them out of reach for many LMI residents despite savings on total cost of ownership. The Cities should allocate funding for a program modeled after Vermont's Replace Your Ride¹⁰ that incentivizes owners of older, higher polluting vehicles to switch to cleaner transportation options. The voucher could be used towards the purchase of an EV, transit pass, or bicycle. This would reduce transportation cost burdens for participants, improve equity, and have an outsized impact on emissions by retiring high-emitting vehicles. For participants purchasing EVs, the Cities could partner with local credit unions to create "pay as you save" loan programs and coordinate bulk purchasing with local dealerships similar to one developed by Drive Electric Northern Colorado.¹¹

To further improve EV access for LMI residents, the Cities should create EV car-share programs with housing authorities and transit providers. For example, Zipcar, an app allowing members to reserve nearby company-maintained cars for an hourly price, has been incredibly successful in many cities around the US.¹² Owning a personal vehicle is expensive both up front and long-term. Shared cars eliminate the risk of losing transportation access due to personal vehicle malfunction and the need for expensive maintenance costs, which benefits LMI commuters who may not have funds available. The Cities should engage the Portland Housing Development Corporation and similar organizations to survey residents on whether they would participate in a community car-share program. The Cities could then distribute grants to deploy charging infrastructure at participating developments and then issue a Request for Proposals for a program modeled after BlueLA, which specifically targets LMI drivers.¹³

4. Effectively incentivize and finance public & private conversions to EVs

Several actions under TLU 2.3 and 2.4 rely on federal and state grants to offset the purchase price disparity between electric and non-electric options. Yet this funding may not always be available. Transitioning to an all-electric fleet can still be done today if evaluated on a total cost of ownership basis, especially if the social cost of carbon is taken into account.¹⁴ There are several fleet providers that use innovative pricing plans (e.g. pay-per-mile) to overcome the upfront cost barrier and often incorporate V2G components, including Highland Electric Transportation.¹⁵ The Cities should commit to purchase only light-duty EVs by 2025, evaluate all fleet purchasing decisions on a total cost of ownership basis rather than upfront cost, and explore subscription models to avoid capital constraints. Figure 3 shows the total cost of ownership comparisons based on data from Drive Electric Vermont.¹⁶

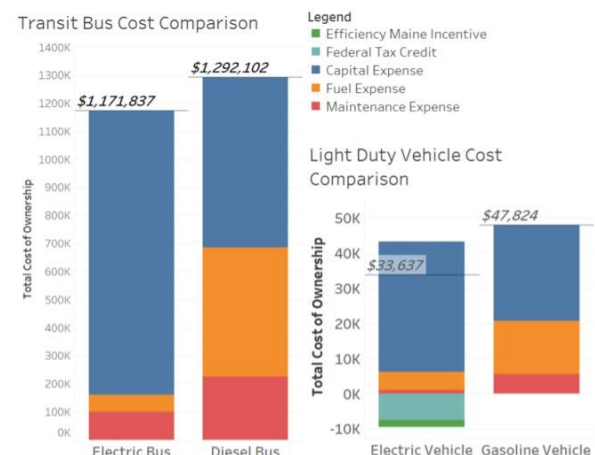


Figure 3: Total cost of ownership comparison for transit buses and light duty electric vehicles

Alternatives

One alternative to our recommendations is to implement a congestion tax to disincentivize travel to heavily trafficked areas. However, a congestion tax, like many of the tax alternatives we avoided, is regressive and would disproportionately impact low-income commuters who can't afford to live near work. We also recommend avoiding means-tested programs since these create barriers that disincentivize people to utilize public transit. We suggest a micro-transit system as an alternative to traditional rideshares, since "research finds that rideshares tend to contribute to congestion, lead to higher vehicle miles traveled (VMT) to serve the same number of people, and displace other lower-carbon types of transportation, including walking, biking, or public transit."¹⁷

References

- ¹ <https://www.portlandmaine.gov/DocumentCenter/View/6278/GHG-Inventory-2010>
- ² <https://www.masstransitmag.com/alt-mobility/shared-mobility/car-sharing/article/21231115/via-jersey-city-success-story>
- ³ <https://micro.metro.net/>
- ⁴ <https://www.viainfo.net/link/>
- ⁵ <https://www.coned.com/en/our-energy-future/technology-innovation/electric-vehicles/power-ready-program>
- ⁶ <https://www.geotab.com/white-paper/barriers-to-ev-adoption/>
- ⁷ <https://bsl.lacity.org/smartcity-ev-charging.html>
- ⁸ https://cadmusgroup.com/wp-content/uploads/2021/05/USDN_EVChargingAccess_UpdatedReport_Final-11.18.20-002.pdf
- ⁹ <https://www.consumersenergy.com/residential/programs-and-services/electric-vehicles/home-charger-rebates>
- ¹⁰ <https://vtrans.vermont.gov/planning/projects-programs/vehicle-incentives>
- ¹¹ <http://driveelectricnoco.org/group-buy-fleet/>
- ¹² <https://www.yourtechstory.com/2019/02/17/zipcar-success-story-oldest-car-rental-services/>
- ¹³ <https://blinkmobility.com/>
- ¹⁴ <https://www.epa.gov/environmental-economics/working-paper-social-cost-carbon-made-simple>
- ¹⁵ <https://www.businesswire.com/news/home/20211013005688/en/Massachusetts-Electric-School-Bus-Helps-Power-Electricity-Grid-in-Breakthrough-for-Vehicle-to-Grid-Technology>
- ¹⁶ <https://www.driveelectricvt.com/>
- ¹⁷ https://www.oneclimatefuture.org/wp-content/uploads/2021/02/OneClimateFuture_FinalJan2021_Downsized.pdf