KeepOregonCool
Oregon Global Warming Commission

MEMORANDUM

TO	Commission Members
FROM	Angus Duncan, Chair
SUBJECT	DRAFT 2020 Transportation Emissions Reduction Options
DATE	December 6, 2019

Below is a first draft of potential Commission recommended actions to the Oregon Governor and Legislature to arrest the upward creep of transportation greenhouse gas (GHG) emissions and drive them downward toward State emissions reduction goals. The OGWC has received presentations, reviewed the literature (including local government carbon plans) and consulted with qualified observers and practitioners to consider what significant changes Oregon might consider going forward to reduce greenhouse gas (GHG) emissions in this sector. The Commission will deliberate on these, will consider additions and subtractions proposed by stakeholders, and will seek to arrive at a transportation GHG emissions agenda of next measures for Oregon.

These recommendations will build upon the Roadmap to 2020 Report provided the Governor and Legislature from the 2010 OGWC. In many cases they will repeat some of the ten-year-old recommendations from that earlier Report where little or no progress has been made over a decade's passing.

DRAFT 2020 Transportation Emissions Recommendations

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Introduction

Almost 40% of Oregon's total greenhouse gas (GHG) emissions derive from transportation; and almost 25% just from light duty vehicles – cars and small trucks. Transportation emissions have risen nationally and in most states (including Washington, Oregon and California) in the last several years. Oregon's (proportionate) 2020 goal for transportation was about 19 million tons, while 2017 emissions were clocking in at close to 25 million tons. That's up from 21 million tons in 1990, a level also reached as recently as 2014 when this latest surge began. We can ascribe many reasons for this: cheaper gasoline and diesel fuels; more miles traveled, and by more people as Oregon's population grew; a shift in customer purchases away from fuel-efficient smaller vehicles to larger SUV's; owners keeping their fuel-inefficient vehicles on the roads longer. The larger picture is that more people buy more cars when they feel prosperous, and they buy bigger and more expensive; while national temporizing over climate change gives them (us) apparent license to do so.

It's not quite business as usual in transportation. There are many more electric and hybrid vehicles to choose from, at first costs that continue to decline while range grows apace. Oregon's accomplishments and goals for decarbonizing the electrical grid will accelerate emissions reductions as EV's increasingly penetrate the state and national fleets. Worth noting is that national EV sales grew by 80% from 2017 to 2018, to 361,000 units. By contrast, SUV year-over-year sales grew only 8% from 2017 to 2018. But that amounted to 11,700,000 units . . . or 32 SUV's for every EV/PHEV.

US light-duty vehicle emissions (83% of total transportation emissions) have increased by 14% since 1990, they've actually declined since 2000; while emissions from medium and heavy-duty trucking (about 23% of total transportation emissions) have consistently increased and now are almost double their 1990 levels[1][2].

Because Oregon is a relatively small player in national and global vehicle markets, it must rely on partnerships with other entities (e.g., by adopting the fuel economy standards developed by California) and setting end use incentives and disincentives that can accelerate purchases of carbon-efficient cars and trucks. And it must focus on influencing how vehicles are used, in part by offering attractive alternatives to pulling the car out of the driveway (or the delivery truck out of the lot). Oregon has some of these tools in place, including EV goals and incentives[3], investments in transit/bike/pedestrian options, and land use rules that foster more efficient transportation. But as the emissions data attest, we need to find measures commensurate with the degree of peril that climate change threatens, and with the emissions reduction goals we have set for ourselves.

[1] Data from USEPA (nepis.epa.gov). Emissions from all other transportation sources – air, shipping, rail, pipelines -- have remained roughly level and not declined as climate science tells us they must.

[2] These emissions from transporting goods and materials reflect the large increase in emissions associated with goods and services produced, consumed and disposed of, as described in Oregon's Consumption-Based Inventory – see 2017 Biennial Report from the Commission.

[3] See Governor's Executive Order No. 17-21, "Accelerating Zero Emission Vehicle Adoption in Oregon to Reduce Greenhouse Gas Emissions and Address Climate Change", November 6, 2017. Commission recommendations are intended to build on this EO, on ODOT's STS, and on actions already taken by Oregon's legislature and local governments.

The STS offers dozens of measures that the State can undertake[4]. In the end, they boil down to three priority categories of actions: (1) low carbon-fueled vehicles, mostly electric; (2) transit; (3) land use and urban design policies and practices. The Commission offers the following recommendations, in these categories, for consideration.

[Vehicles]

1. Electric Vehicles.

Accelerate the displacement of fossil-fueled vehicles by zero-carbon vehicles. These will be mostly EV's[5], as most of Oregon's vehicles are light (autos) or medium duty (SUV's, pickups, delivery vans) where battery technologies and access to refueling/charging increasingly invite such displacement.

The value proposition for EV's is easy to state. EV's offer advantages in fuel costs – a half to a third the cost per mile of a comparable internal combustion engine. Maintenance costs are also a third or less than for a comparable gasoline vehicle (fewer moving parts, lubrication needs; no gaskets or spark plugs; etc.). The significant disadvantages – vehicle choice, first cost, range and refueling convenience – are real but rapidly diminishing as the industry offers more models (including pickups) at comparable purchase prices, range is increasing to and past 300 miles on a charge, and faster recharging infrastructure is being deployed, albeit still far too slowly, in urban areas and along major highways.

The potential for EV's is very great; the realized levels for both vehicles and charging infrastructure is far less encouraging.

Metrics and accountability are essential elements of any local transportation carbon strategy. For purposes of the Commission's recommendations the ultimate metric is carbon emissions, but these can be difficult to estimate at a neighborhood level. Proxy metrics such as walk scores and transit accessibility will be necessary. Planning departments are going to be more skilled at devising these than is this Commission, so our recommendation is that they be tasked with identifying such metrics. Setting goals and benchmarks is critical to ensuring that traditional transportation engineering experts understand that a GHG emissions goal is newly integral to their evaluations, findings and recommended actions

There is legitimate concern how rapidly EV technology – vehicles, but also charging infrastructure -- will reach into Oregon's rural areas, and low-income urban areas, in meaningful ways. Certainly urban areas that are denser and wealthier are seeing EV systems deployed earlier. The State has an abiding interest in compensating for this market effect by offering incentives that move the technologies further and faster to harder-to-serve communities – particularly rural and low-income communities – that will benefit from such improved access. If the State can also make common purpose with other states where more specialized

[4] These recommendations pass over Autonomous Vehicles (AV's), which may hold promise for reducing total vehicles on the road but may also – because they augment the convenience of vehicle travel – have the perverse effect of increasing Vehicle Miles Traveled. Likewise we defer on congestion pricing as a carbon reduction tool – where evaluations have been mixed – while acknowledging its demonstrated value as a tool for reducing vehicle congestion in many urban areas.

[5] This memo uses "EV" as encompassing both electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV).

construction, farm and forest equipment could be designed for electric propulsion, rural communities would benefit in especially helpful ways.

While Oregon by itself will not have great influence over vehicle offerings, it can leverage alliances with other states and stakeholders. Meanwhile the State and local governments play an essential part in deploying charging infrastructure. The State of Oregon and local governments could:

a. Authorize the Energy Trust of Oregon to provide marketing, financing and technical support for home charging systems where physically doable. If legislation is needed to increase the Public Purpose Charge or develop a parallel charge specific to this purpose, such legislation should be drafted and enacted.

b. Building on the authority in SB 1547, authorize and direct Oregon utilities – investor-owned and consumer-owned -- to deploy fast charge public charging network with the goal of statewide coverage and recharging speeds that can allow vehicles to return to the road within fifteen minutes of connection. To the extent that a rate benefit to all ratepayers can be shown, the system could be rate-based. The State should provide supplementary financing (or tax credits) as needed to augment private sector cost carrying beyond this point.

c. All new garage structures should be required to be pre-plumbed during construction for conduit that can support recharging at all parking spaces. As numbers of EV's using the structure increase, charging stations can be introduced (or induction charging as this becomes an economical and technical option).

d. By 2025 (?), all existing garage structures should have been retrofitted with conduit to enable similar levels of charging service unless the local authority agrees that such retrofit is physically and/or economically not feasible.

e. Find solutions to charging infrastructure for EV users without home or workplace garage charging. Local governments can look for EV charging solutions for those without access to home charging. The government should determine whether street parking spaces adjacent to apartment houses without parking could be devoted to streetlight-mounted or other charging units, to give occupants a practical option to a conventional vehicle. Such a solution likely would depend also on fast-charging stations being feasible, and on an enforced reservation system.

f. Charging providers should collaborate on an app-based reservation system for public fast charge units, to reduce uncertainty about refueling and to ensure turnover of vehicles in fast charge spaces.

g. Utilities and their regulators (as appropriate) should work with the national labs and national standards organizations to develop Vehicle-to-Grid (V2G) and Vehicle-to-Home (V2H) standards and protocols that increasingly enable EV's to interact with the electric grid in ways advantageous to both vehicle and grid. Such capabilities may also enable vehicles to play a critical part in developing and operating micro-grid systems (see Built Environment memo).

h. Devise solutions to the first cost barrier for EV's and home/workplace charging. To further redress the first cost issue, the State, and/or public utilities, should consider using their stronger credit capabilities to extend favorable financing terms to support new EV purchases and charging equipment installation. Terms should take into consideration the differing abilities of households to enter into such purchases. The current State EV purchase incentive should be extended past 2023.

i. The State and local governments should adopt rules for operating within jurisdictional boundaries that ensure increased shares of private delivery and service fleets will be EV's.

j. Recognize that public charging exists largely to relieve range anxiety and support inter-urban travel, and that it serves these purposes even when actual utilization hours are low. Allow public EV charging providers to generate credits in the Clean Fuels Program based on capacity (as CA does) rather than actual kWh consumption. This will give private firms a base income on their investment encouraging them to increase their networks.

2. Transit/Bike/Pedestrian Uses

a. The State and Local Governments Should Adopt Mode-blind Transportation Planning and Funding. The State should require that all local jurisdiction transportation planning utilize a mode-blind planning tool[6] that can be calibrated to achieve a certain level of GHG emissions as well as other outcomes. Such a tool can select for low-carbon options such as increased transit service. In any reordering of State and local transportation funding structures, transit/bike/ped options should be enabled to compete for resources on an equal footing with roadway solutions to transportation needs.

b. Afford Transit Priority Passage on Roads. To increase efficiencies and timeliness, transit agencies should be adopting Bus Rapid Transit (BRT) service on appropriate arterial roadways. BRT requires a dedicated right-of-way that can be acquired either by adding a lane where the alignment allows, or by reallocating arterial lane space to this dedicated use. Many urban areas (including Eugene/Lane County) have successfully developed such systems. Where BRT is not possible or more difficult, bus service should be given priority passage along arterial routes through traffic signal controls and other methods familiar to transit planners.

c. Transit services – including school bus services – should increasingly be relying on EV bus technology, reflecting improvements in equipment and battery technology, and lower operating and maintenance costs. Savings from lower equipment operating costs should flow to increased service levels, especially into low-income neighborhoods and work areas where need for transit service improvements is most demonstrable. Capital spending budgets and maintenance facilities planning must be projected forward to a

[6] ODOT developed such a "least cost planning" tool – MOSAIC – that can be used by local governments in corridor planning, and can be adapted by planning entities to reflect local needs and priorities . . . but transparently, so a plan that may give zero weight to minimizing greenhouse gas emissions will visibly reflect that priority.

100% EV fleet at the soonest possible date. Until this conversion is complete, the existing diesel bus fleets should be identifying biodiesel fueling options.

d. Urban Transit Should Be Free. Local governments and transit agencies should plan for a near future in which transit is free. Fare revenues for TriMet comprise about 20% of operational revenues (+ $100 million), a not insignificant amount. And free transit would boost ridership but also operating costs. But that boosted ridership would take many polluting vehicles off the road, affording both carbon and local pollution savings. We note that the City of Corvallis passed a tax tied to its water utility services, with revenues dedicated since 2011 to pay for free transit in that community. In its first year of free service, the City saw ridership increase by 38%, from 700,000 to almost a million rides[7]. In the Portland area there would be issues to manage beyond costs, including homeless riders seeking shelter, and ridership competition from Uber/Lyft services. The latter already is a concern of course, and free transit should only make MAX and buses more competitive.

e. Devise bicycle facilities and other solutions to urban transportation needs that increase bicycle usage for daily commuting and errands, and that accelerated and that focus increasingly on separating bicycles (and related small vehicles such as E-bikes and E-scooters) from facilities dedicated to pedestrian or auto use, and allocating space where the primary user is on a bicycle or related vehicle. This involves (1) connecting presently disconnected bicycle lanes to create a continuous, connected system; (2) establishing streets that are primarily bicycle routes with local auto traffic only allowed; and (3) ensuring secure parking and storage facilities are available.

f. Devise pedestrian facilities and other solutions to urban transportation needs that convert drivers to walkers by elevating pedestrian values of accessibility and connectivity. While sidewalks, crosswalks and pedestrian signaling are the usual components of a pedestrian strategy, no less important are neighborhoods designed to place pedestrian goals – shopping, schools, professional services, recreation – within easy, accessible distances and along accessible routes. Redesigning existing neighborhoods is more difficult than stipulating these values for new residential and commercial development, but both need the urgent attention of planning departments.

3. Trucks

a. State and Utility Policies Should Support Development of Electrolytic[8] Hydrogen Fuel Cell Engines for Over-The-Road Trucks. While electric trucks for heavy-duty, over-the-road use, are being designed, developing an alternative hydrogen fuel cell engine would be prudent. Oregon is one of the states that has the potential to store renewable energy over-generation in the form of electrolytic hydrogen. While the hydrogen could be introduced into the home-and-business gas fuel supply for space and water heating, a higher and better use may be as a heavy-duty truck fuel that is sufficient transportable and energy-dense that it can replace gasoline and diesel as a reliable, available trucking

[7] Ridership in Corvallis has been at sustained levels above `one million rides annually ever since.

[8] Presently most of the very limited US hydrogen production comes from "reforming" natural gas (by driving off the Carbon atom from the CH4 gas molecule. The carbon is generally released into the atmosphere; not a good idea. Electrolytic conversion splits hydrogen off from a water molecule (H2)), releasing only oxygen into the atmosphere.

fuel. The disadvantage of hydrogen – that no ubiquitous fueling infrastructure exists, and such a system would be costly to construct – is less a disadvantage for point-to-point trucking over trafficked highways. Oregon should collaborate with the national energy labs, utilities and other parties to support exploration of the potential of hydrogen as an energy storage medium that could also support zero-carbon trucking.

b. The State should evaluate B-20 biodiesel, R99 Renewable Diesel, and RNG (Renewable Natural Gas) as bridge fuels for over the road trucking. If supply sufficiency and price support deploying these alternatives, the State should consider requiring these options be available and used as an interim lower carbon truck fueling solution for such vehicles. Until zero carbon truck technologies are available, Oregon should consider aligning with California in making B-20 diesel fuel available to over-the-road trucks. As soon as sufficient fuel and fueling points are available, B-20 (20% biodiesel) should be required in lieu of 100% fossil-based diesel. As lower carbon-emitting fuels become sufficient and available, they should be required.

[Land Use/Urban Design]

While land use and design directions are especially applicable in denser urban areas, many concepts will be useful in smaller communities as well. Walkable residential neighborhoods with services and recreation opportunities in walking distance are no less attractive and carbon efficient in such communities, as alternatives (for example) to large shopping centers on the edge of town. The following recommendations may be principally focused on larger urban areas but should be considered on an "if the shoe fits" basis by any community.

4. Carbon-Efficient Planning and Implementation.

Urban area planning should include a finding of carbon emissions outcomes of planning decisions wherever appropriate. Carbon-efficient outcomes should be prioritized as threshold criteria along with public health and safety considerations.

a. The State should Condition State Transportation Funding on MPO Scenario Planning and Implementation. Oregon's eight Metropolitan Planning Organizations already are "encouraged" to incorporate carbon scenarios into their planning, and two – Metro (Portland region) and Central Lane (Eugene-Springfield) are so mandated[9]. The State Department of Land Development and Conservation (DLCD) is directed to set MPO carbon reduction targets. The Commission recommends that (1) all MPO's should be required to complete the scenario planning, and should receive from the State the funding and analytic support to do so. Thereafter, State discretionary transportation funding should only be available to MPO's that are implementing their plans in a complete and timely manner.

b. Planning Should Prioritize Mixed Use Development to the Fullest Extent Practical. Comprehensive community transportation and land use plans should show how they prioritize carbon-efficiency in choosing among development options. Supporting mixed-use neighborhoods, for example, can reduce the need to pull the car out of the driveway

[9] Only the Portland Metro area is mandated by State law to implement its scenario planning, a status sought and agreed to by Metro. The Corvallis area MPO has voluntarily undertaken to do its scenario planning as well.

for all errands. Schools, shopping, health services and recreation opportunities should be car-free accessible to the greatest extent possible. This will not eliminate the need for and usefulness of autos, but it can increase convenience and accessibility for household members while reducing auto dependence (and saving household budget money).

c. Planning Should Prioritize Transit-Supportive Development Designs and Densities. Urban planning should support denser home and workplace development along existing and desirable new transit corridors weighted to emphasize increased service levels to low-income communities. The densities support more frequent transit services, which in turn support the greater densities – a virtuous circle effect. The body of understanding about how these choices interact are well understood by urban planners. While this may modify the character of some neighborhoods at least at their margins, it will surely modify them less than will unchecked climate change impacts. In rural areas of Oregon, transit may mean something else that's different but no less useful; travel from community to community to allow efficient access of students to schools, patients to medical services, and households to shopping, for examples.

d. Cities Should Electrify Transit. Portland already relies substantially on electricity to power its MAX train system. Electric buses are becoming increasingly available and reliable in cities around the world. While they require different vehicle and route management strategies, and differently-designed fueling and maintenance facilities, other cities have shown these are readily developed. Higher (for now) capital costs of electric buses are recoverable from lower fuel and maintenance costs, leading to more annual budget dollars freed up to increase service levels. Electric buses that displace diesel buses will also result in cleaner air in neighborhoods served. The vehicles may also serve to provided compensated grid management services back to their electric utilities. And as those utilities remove fossil-fueled power plants from their resource pool, emissions from electrified transit will fall commensurately.

e. Cities Should Physically Separate Car and Truck Traffic from Bicycle, Scooter and Pedestrian Ways. Safer, easier movement by low-carbon alternatives to cars and trucks will encourage use of these alternatives. Prioritizing certain street networks for non-auto use (except for local traffic as appropriate) will also improve safety for all modes. We already do this for pedestrian traffic, for similar (obvious) reasons.

f. Cities Should Adopt Parking Strategies That Support Low Carbon Outcomes. Such strategies range from apps that identify and reserve parking spaces, eliminating block-circling searches that increase fuel use and emissions, to pricing parking as the scarce resource it is (with due regard for ensuring transportation alternatives for low-income households, to limit regressivity). It may also mean cities giving bonus development points to developers who submit thoughtful plans for facilities that require less vehicle parking because low-carbon transportation alternatives are identified and available.

g. Cities Should Assure Full and Timely Traveler Information Availability. Commuters, shoppers and others needing to traverse urban areas should be able to access smartphone apps that identify congestion-caused delays and alternative routes. They should also be able to propose lower-carbon (and lower cost, and preferably lower time consuming) mode alternatives, such as bus rapid transit, to another auto trip.