OVERVIEW

• Purpose of the study
• Historical context
• Results 1: GHG impacts from Transit
• Results 2: GHG benefits of Transit
• Next Steps
• Q&A
PURPOSE

• Understand how LTD’s emissions fit into regional, state, local goals
• Understand implications for operational decisions
• Update 2007 sustainability policy (Resolution No. 2007-027)
• Set GHG reduction goals
HISTORICAL CONTEXT

• 2007 - LTD Sustainability Policy, State GHG reduction goals set
• 2014 – LTD APTA Sustainability Commitment - Silver
• 2015 - Central Lane Scenario Planning
• 2016 - Eugene CRO – 4 goals set
• 2018 – LTD Sustainability Program Manager position; Fleet Plan grant
• 2019 - Electric bus testing, MOD pilots
GHG BENEFITS AND IMPACTS FROM TRANSIT

Net Greenhouse Gas Impacts of Transit
Emissions Produced – Emissions Displaced

Emissions Produced by Transit

Transit Operations
- Fleet vehicles fuel use
- Electricity & natural gas from buildings and stations
- Refrigerants used in vehicle air conditioning
- All other emissions sources

Emissions Benefits of Transit

Ridership Benefit
- Reduced VMT from taking the bus instead of a private auto

Land Use Benefit
- Compact development around transit facilities reduces VMT for all
- Shorter trips makes biking/walking more attractive

GHG ACCOUNTING – 3 SCOPES

SCOPE 1 DIRECT
- Fuel combustion
- Purchased electricity for own use
- Company owned vehicles

SCOPE 2 INDIRECT
- Production of purchased materials
- Outsourced activities
- Product use

SCOPE 3 INDIRECT
- Employee business travel
- Waste disposal
- Contractor owned vehicles

Gases:
- CO₂
- SF₆
- CH₄
- N₂O
- HFCs
- PFCs
GHG EMISSIONS FROM TRANSIT FY 2018

KEY LESSONS:
• Fleet matters most!
• Emissions from producing our fuel and emissions from other goods and services we buy matter too.
SCOPE 1 & 2 EMISSIONS - FY12-18

**KEY LESSONS:**
- Aggregate Fleet emissions have been fairly consistent over time.
- Fleet emissions represent 94%+ of emissions LTD has full control over.
FLEET EMISSIONS BY SERVICE TYPE

KEY LESSONS:
• Fixed route is largest share of total emissions
• EmX and Ridesource emissions are similar in scale
• 2018 EmX increase from EmX West opening
• Fixed Route efficiency gains between ‘12-’13; reduced vehicle miles and minor efficiency gains in ‘18.

KEY LESSONS:
• Note difference in scale between two charts
• Non-Revenue vehicle increase from increased staff/miles
• Vanpool changes due to demand
• Rural Connections: added Rhody Express and Florence-Yachats reporting to this category in ‘18.
FLEET ENERGY CONSUMPTION BY FUEL TYPE

KEY LESSON:
• 5% of LTD fleet fuel consumption is from renewables (B5 diesel, E10 gasoline).
THE CARBON CYCLE
Anthropogenic emissions: come from mining fossil fuels previously sequestered in the Earth’s crust or significant land use changes.
ANTHROPOGENIC vs. BIOGENIC EMISSIONS

**Anthropogenic emissions**: come from mining fossil fuels previously sequestered in the Earth’s crust.

**Biogenic emissions**: considered part of the natural carbon cycle.

**KEY LESSON**:
- Not all emissions are created equal.
- Anthropogenic ≠ biogenic
- Fossil fuels ≠ renewable fuels
FY 2018 EMISSIONS, INCLUDING BIOGENIC

KEY LESSON:
- LTD’s Biogenic emissions from renewable fuel use, not included in Scope 1 “Fleet”.

![Graph showing greenhouse gas emissions by scope and category.](chart-image-url)
LIFECYCLE EMISSIONS BY FUEL TYPES

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>GHGs by Fuel Type for 40,000 miles of travel (with error bars for range of carbon scores)</th>
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</thead>
<tbody>
<tr>
<td>Diesel (B5)</td>
<td></td>
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<tr>
<td>B20</td>
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<tr>
<td>R20</td>
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<td>R50</td>
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<td>R99</td>
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<tr>
<td>Diesel Hybrid (B5)</td>
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<td>B20</td>
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<td>R99</td>
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<td>Gasoline Shuttle (E10)</td>
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<td>Battery Electric</td>
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<td>CNG</td>
<td></td>
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<tr>
<td>RNG</td>
<td></td>
</tr>
</tbody>
</table>

Greenhouse Gas Emissions (MTCO$_2$e) / 40,000 vehicle miles

KEY LESSONS:
- Opportunity abounds to reduce fleet emissions.
- LTD will study the opportunities in detail in 2020 for long-term fleet plan.
KEY LESSON:
• Supply chain emissions vary with expenditure on major projects.
KEY LESSON:
• Bus manufacturing and construction projects represent between 40-80% of supply chain emissions.
GHG BENEFITS AND IMPACTS FROM TRANSIT

Net Greenhouse Gas Impacts of Transit
Emissions Produced – Emissions Displaced

Emissions Produced by Transit

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Graphic Adapted from Quantifying Greenhouse Gas Emissions from Transit, APTA, 2009.

Graphic from TCRP 176 GHG Benefits from Transit User guide, 2015.
GHG BENEFITS OF RIDERSHIP

KEY LESSONS:
- Ridership benefits from transit are more than 2x the emissions from transit operations.
- Public transit is an important strategy to reduce community emissions.
GHG BENEFITS OF LAND USE EFFECT

Community Emissions vs. Transit-related GHG Benefits

**KEY LESSON:**
- Without transit, Eugene/Springfield emissions from passenger vehicles could be 25% larger than they are today.
NEXT STEPS

• Electric bus procurement, WA State Contract
• Technology / Fuel analysis for Fleet Plan
• GHG reduction modeling for goal setting
• Sustainability policy update
1. GET PEOPLE ON THE BUS

KEY LESSONS:

- Ridership benefits from transit are more than 2x the emissions from transit operations.
- Public transit is an important strategy to reduce community emissions.
2. FOCUS ON FLEET; THINK LIFECYCLE...

KEY LESSONS:
- Fleet matters most!
- Thinking about tailpipe emissions only is not enough. Scope 1 + Scope 3 “lifecycle” emissions matter.

![Greenhouse Gas Emissions diagram](chart.png)

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<thead>
<tr>
<th>Category</th>
<th>Emissions (MT CO₂e)</th>
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<tbody>
<tr>
<td>Fleet</td>
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<tr>
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<td>Refrigerants</td>
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<td>Electricity</td>
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<td>Business Travel</td>
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<td>Commute</td>
<td>770</td>
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<tr>
<td>Supply Chain</td>
<td>6,000</td>
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</tbody>
</table>
3. EMISSIONS REDUCTIONS ARE POSSIBLE

Lifecycle GHGs by Fuel Type for 40,000 miles of travel (with error bars for range of carbon scores)

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- LTD will study the opportunities in detail in 2020 for long-term fleet plan.
KEY LESSON:
- Bus manufacturing and construction projects represent between 40-80% of supply chain emissions.
Q&A? Thank you!

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Kelly.hoell@ltd.org