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Breakfast Plenary

Transportation Decarbonization

Kevin Tempest, CAPI R&D Scientist
June 23, 2022

Low Carbon Prosperity Institute

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Research Interest:
Carbon Reducing Investments

GHG Reduction Explorer Modeling Tool (2016)

Building Back Better (2020 Report) – *Resilient Recovery Portfolio*

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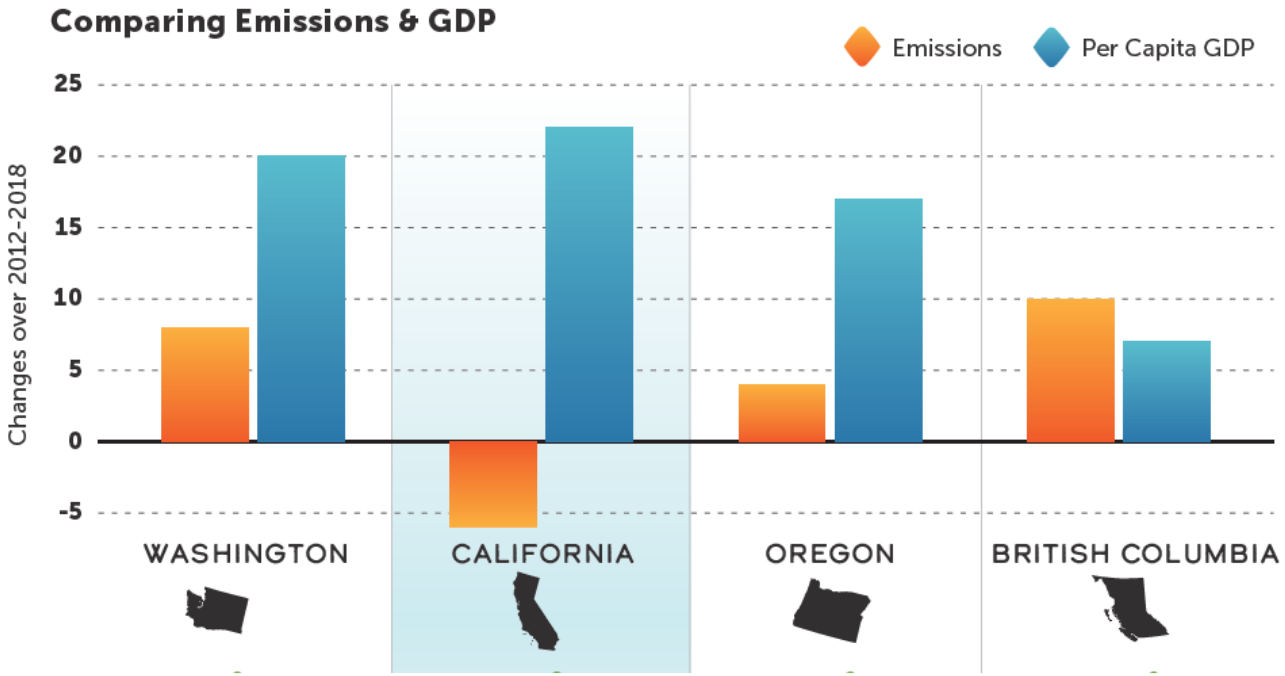
Research Interest:
Lessons Learned from California



Source: https://www.cleanprosperouswa.com/cap-invest-works-heres-proof/

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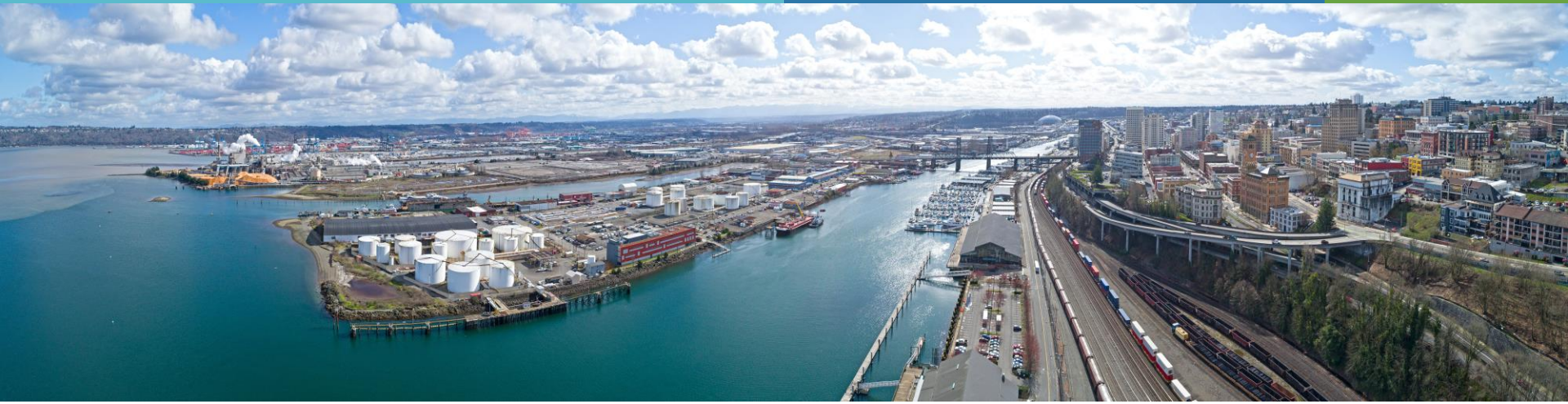

WASHINGTON'S DECISIVE DECADE

AN EMERGING ROADMAP FOR TRANSPORTATION DECARBONIZATION & CLEANER AIR

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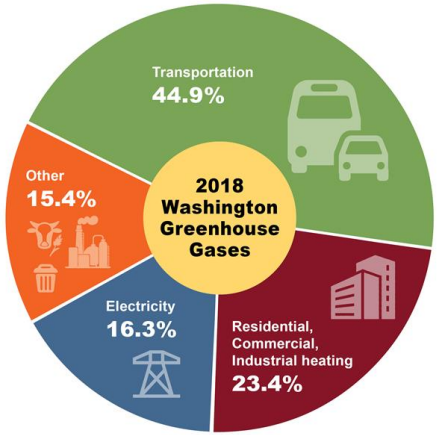
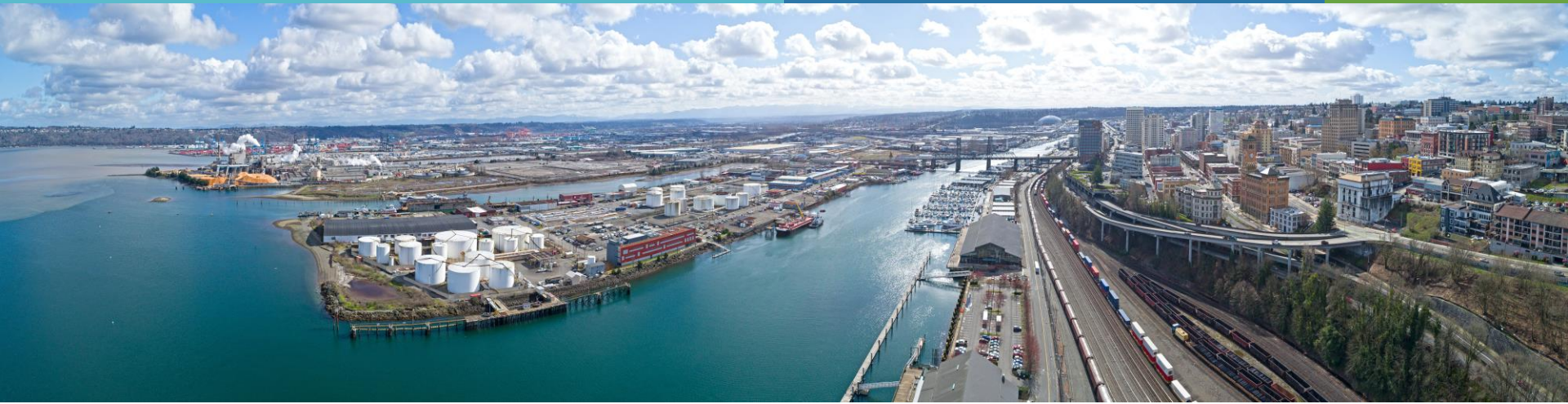
Decisive Decade: Transportation, GHGs, Air Quality

Washington's largest emitting sector, including 45% of GHGs, 22% of $PM_{2.5}$

$3+ billion through 2030 via *Climate Commitment Act* and *Move Ahead WA* Transportation Package ($5.2 billion over 16 years)

2021's paradigm setting Climate-Environmental Justice Framework





7 CASE STUDIES
6 CORE METRICS
AN APPROACH

RESEARCH AIM: ***To enhance our understanding of the potential of interventions to reduce pervasive sources of air pollution on our roads, in our ports, and across our waterways, that impact both local and global communities and our economic efficiency.***

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7 CASE STUDIES

FERRY SYSTEM ELECTRIFICATION

SHORE POWER

DRAYAGE TRUCKS

MOTOR COACHES (Heavy-Duty Vehicles)

PASSENGER VEHICLES

CHARGING INFRASTRUCTURE

CARGO-HANDLING EQUIPMENT

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Core Evaluation Metrics

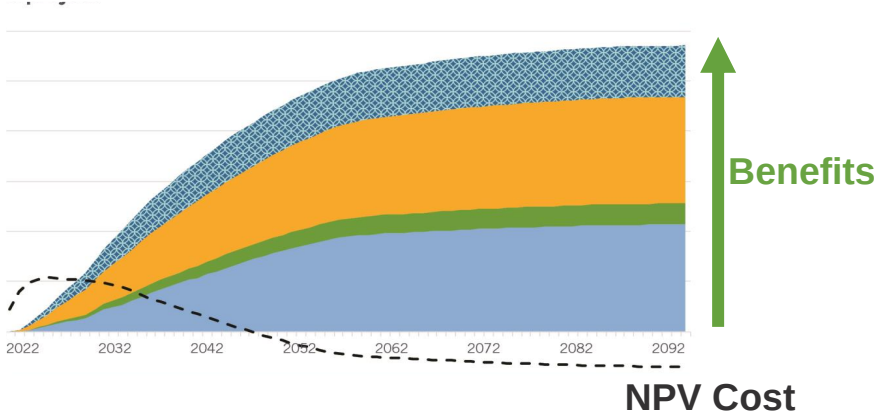
- Average Public Health Benefits Multiplier ($/tCO2e emitted)
- Cumulative Avoided Emissions (million metric tons CO2e)
- NPV Public Health and Climate Benefits ($, M)
- NPV costs ($, M)
- NPV Abatement Cost ($/tCO2e)
- NPV CFS Credit potential ($, M)

COMPARING ALL INVESTMENT OPPORTUNITIES ACROSS A CORE SET OF METRICS, INCLUDING THOSE FEATURED THROUGHOUT THIS REPORT, IS A CRITICAL STEP TO MATCHING AVAILABLE FUNDING WITH PRIORITY OUTCOMES.

Range of Outcomes

Range of Outcomes

$ savings, additional benefits



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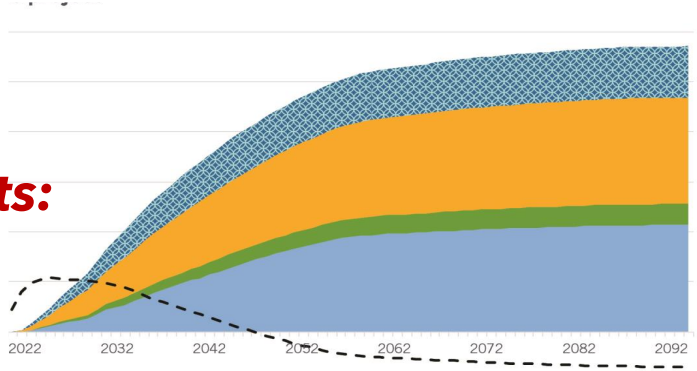
Range of Outcomes

$ savings, additional benefits

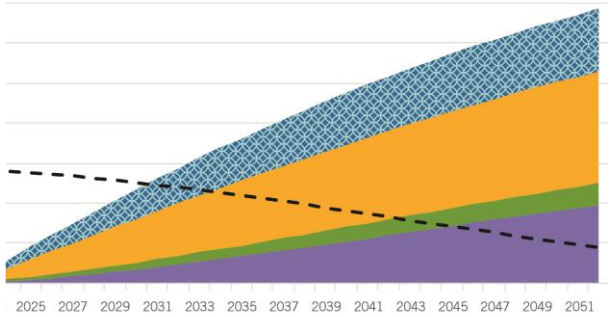
widely variable public health benefits: engine type/vintage matters!



Range of Outcomes

$ savings, additional benefits

Net Benefits > Net Costs

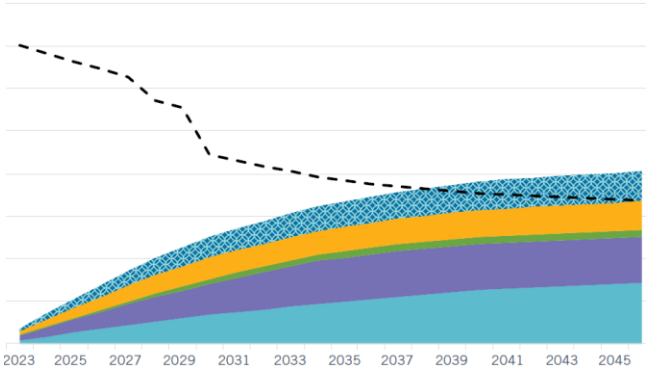


Range of Outcomes

$ savings, additional benefits

Net Benefits > Net Costs

Net Costs > Net Benefits, other role to play (such as market readiness)



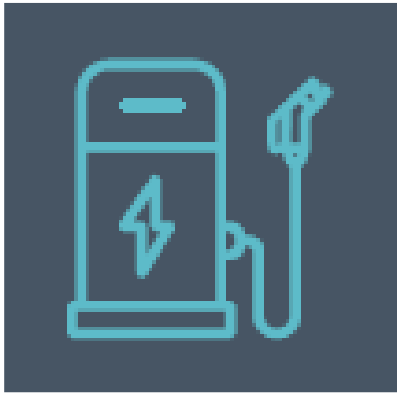
Range of Outcomes

$ savings, additional benefits

Net Benefits > Net Costs

Net Costs > Net Benefits, other role to play (e.g. market readiness)

Investment needed, direct benefits not readily quantifiable



FERRY SYSTEM ELECTRIFICATION

Timeframe
75 years

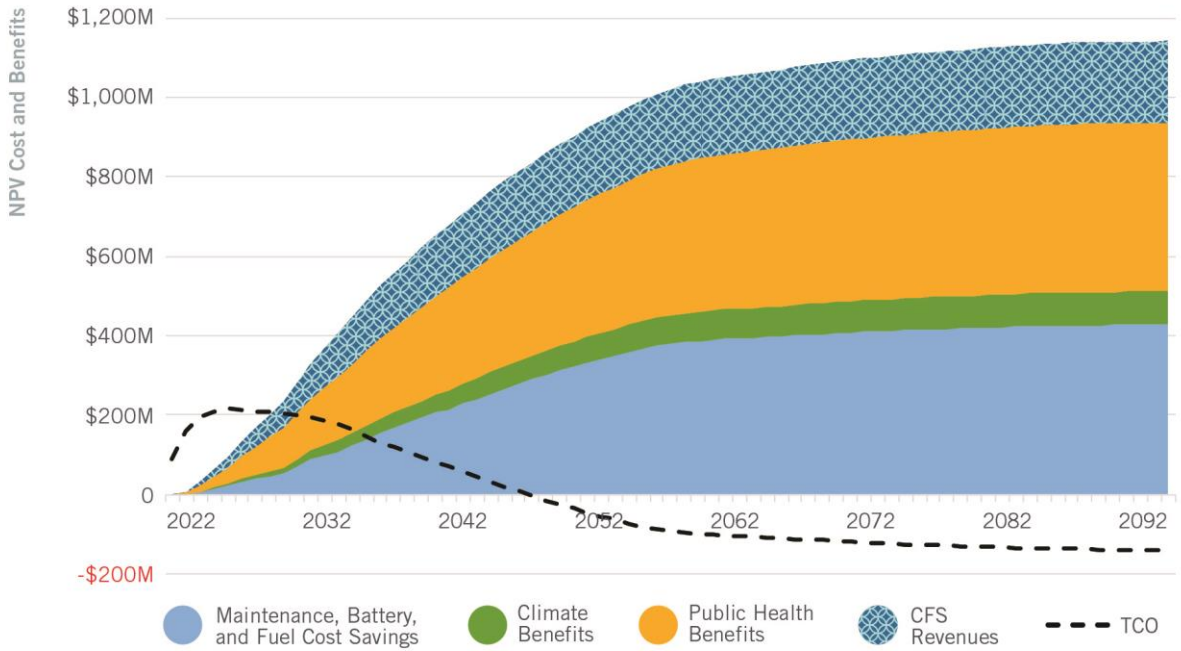
Public Health Benefits
$280 / tCO_2e emitted

Cumulative Avoided Emissions
4.4 million tCO_2e

Cumulative Public Health and Climate Benefits, NPV
$510 million

Total Costs, NPV
-$140 million

Abatement Cost, NPV
-$90 / tCO_2e



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CHARGING INFRASTRUCTURE

Preliminary Needs Assessment

STATE ENERGY STRATEGY FORECAST

1 MILLION EVS BY 2030

2.3 MILLION EVS BY 2035

Needs Assessment in other states:

California: 7 vehicles per Level 2, 200 vehicles per DC fast-charger

Oregon: 21 vehicles per L2, 71 vehicles per DC fast-charger

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CHARGING INFRASTRUCTURE

Preliminary Needs Assessment

Estimated LDV public charging investment needs

$1.1 BILLION to $4.2 BILLION BY 2035

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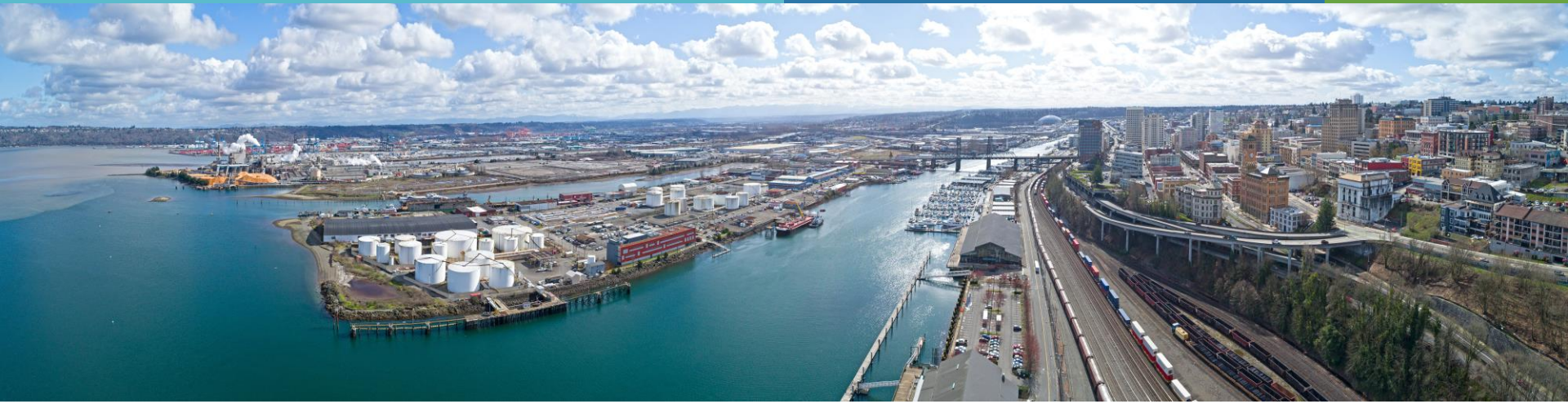

Needs exist, scalable to available investment.

An approach, *not a portfolio*. Investment priorities matter and each intervention has unique characteristics.

Wide variability in air-quality co-benefits based on technology and age.

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