ATLAS PUBLIC POLICY

ANALYZING ELECTRIFICATION OF PUBLIC VEHICLE FLEETS IN WASHINGTON STATE

Presentation on Project Background and Current Progress

Charles Satterfield and Nick Nigro, Atlas Public Policy

May 21, 2020

OVERVIEW

- Project Plan and Objectives
- Task Breakdown
- Current Project Status
- Questions and Next Steps

ABOUT ATLAS PUBLIC POLICY

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- **Access**: Collect and disseminate publicly available information.
- **Interpret**: Create technology to spur insights and conduct data-driven analyses.
- **Empower**: Strengthen policymakers, businesses, and non-profits' ability to meet emerging challenges and identify and seize opportunities.

ATLAS
PUBLIC POLICY

Key Personnel

- **Nick Nigro**: Project Director
- **Charles Satterfield**: Project Manager
- **Nicole Lepre**: Lead Analyst
- **Conner Smith**: Project Analyst
- **Josh Rosenberg**: Project Analyst

ABOUT WASHINGTON STATE UNIVERSITY ENERGY PROGRAM

ENERGY.WSU.EDU

Energy Program
WASHINGTON STATE UNIVERSITY

- Staff of energy engineers, technical experts, data analysts, and software developers located in Olympia, WA
- Address evolving energy challenges in the Pacific Northwest, nationally, and internationally.
- Provides program management, technical expertise, on-site assessments, analytical tools, and training

Key Personnel

- **Jim Jensen**: WSU Team Lead
- **Gary Kaufman**: Project Analyst
- **Nels Christianson:** Senior Software Engineer
- **Sheila Lynn Riggs**: Project Analyst

ABOUT NATIONAL RENEWABLE ENERGY LABORATORY

NREL.GOV

- Spearheads transportation research, development, and deployment to accelerate adoption of low-emission passenger and freight vehicles.
- Collaborates with industry, government, and research partners to create better vehicles, fuels, infrastructure, and policy.
- Expertise in infrastructure analysis for plug-in electric vehicles

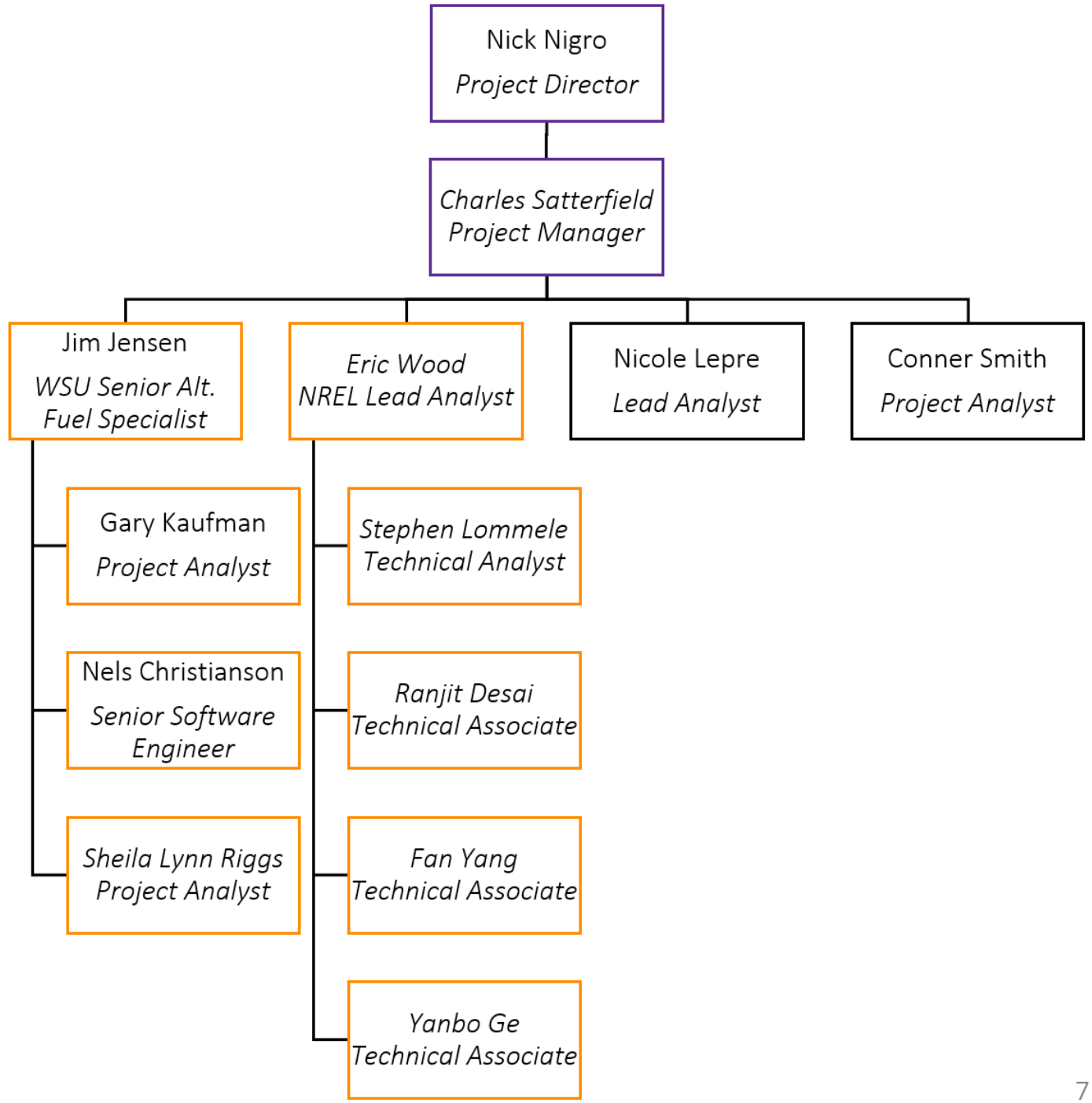
Key Personnel

- **Eric Wood**: NREL Team Lead
- **Stephen Lommele**: Lead Analyst
- **Ranjit Desai:** Technical Associate
- **Fan Yang:** Technical Associate
- **Yanbo Ge:** Technical Associate

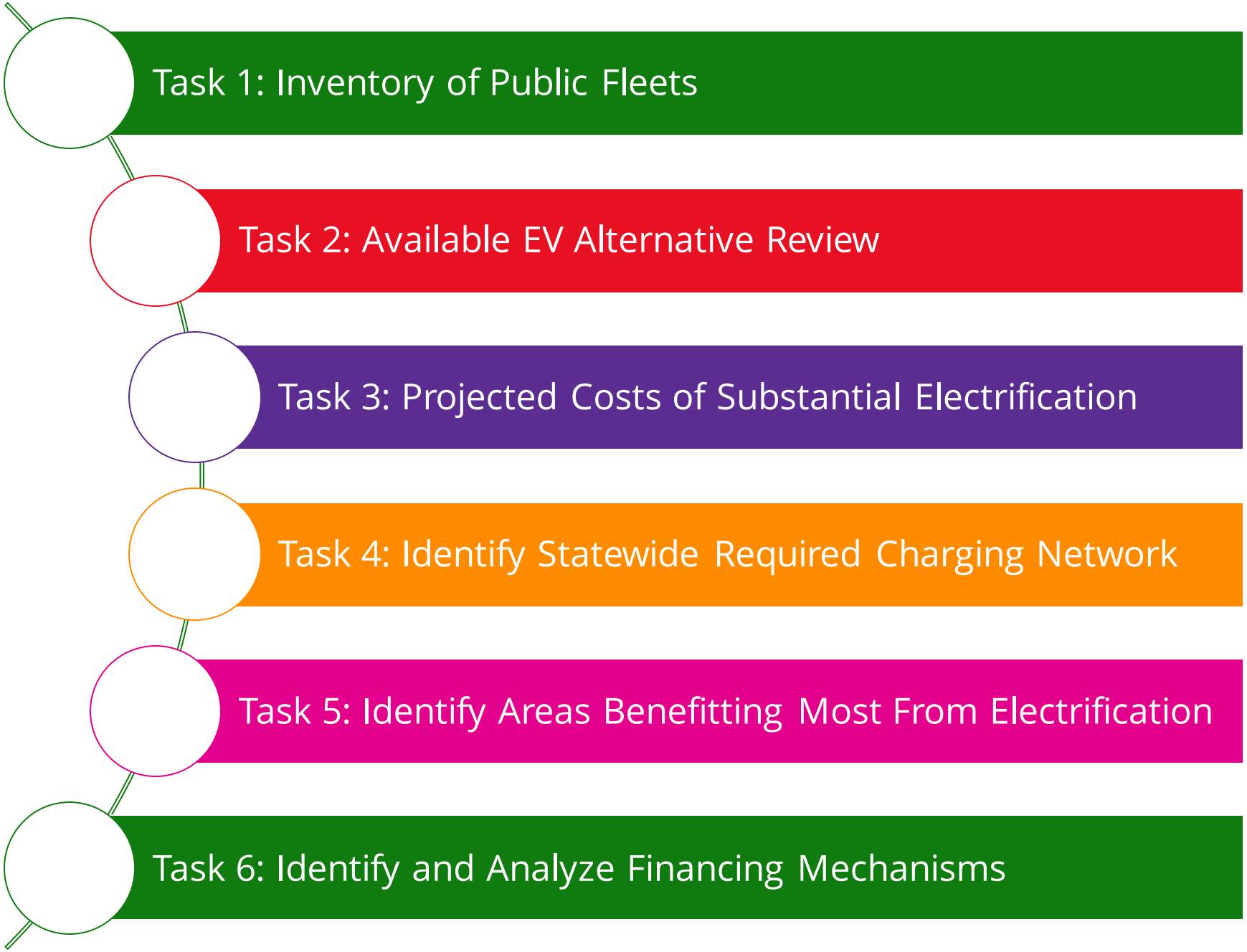
PROJECT PLAN AND OBJECTIVES

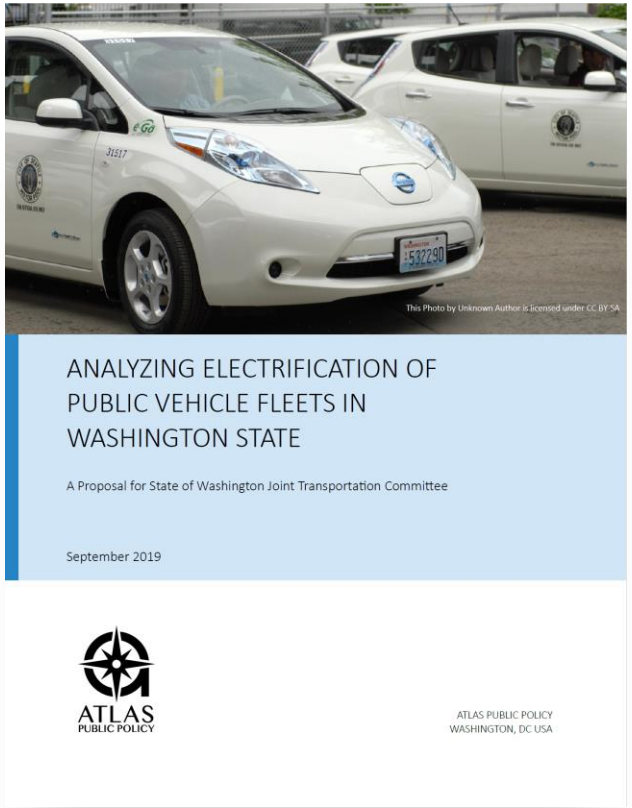
- Organization Chart
- Project Tasks
- Overview of Deliverables
- COVID-19 Impacts

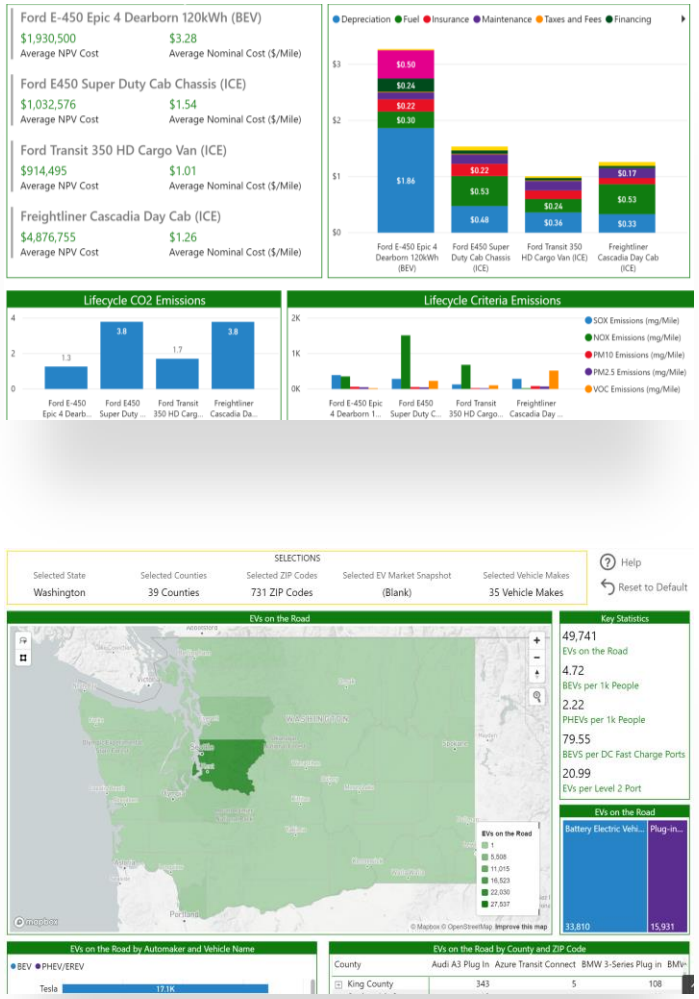
PROJECT ORGANIZATION CHART



PROJECT TASKS



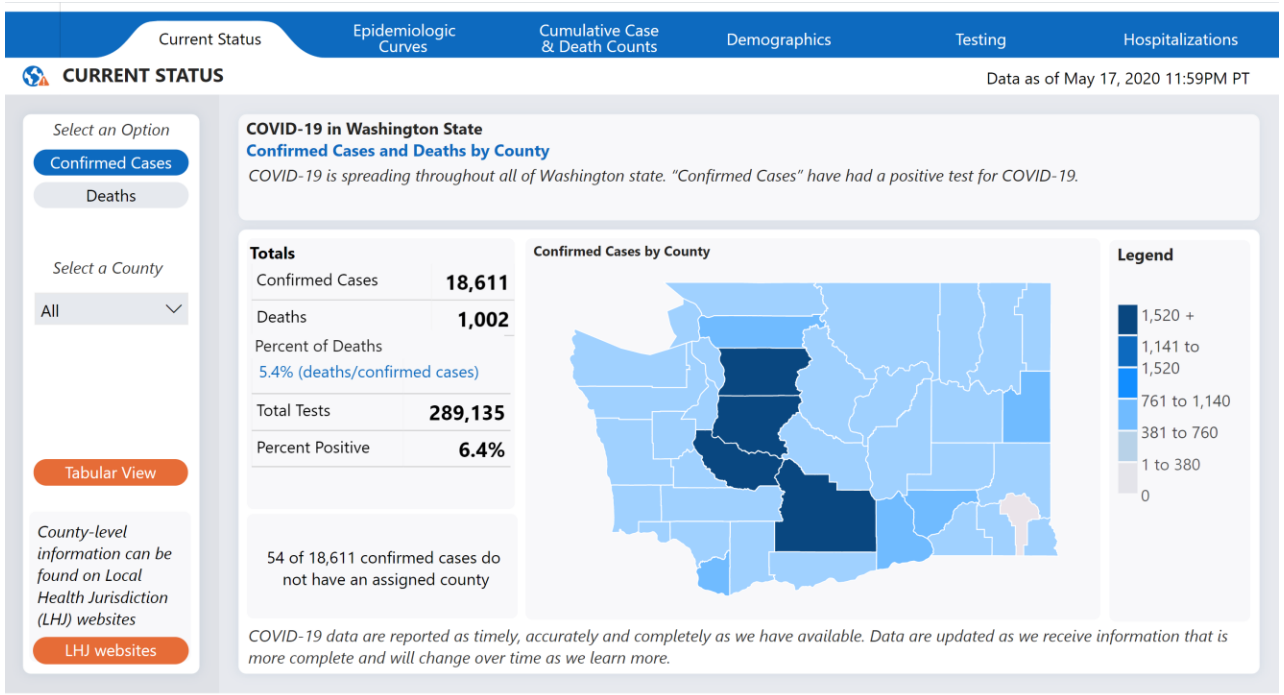




PROJECT GOALS AND DELIVERABLES

- Interactive data visualizations of:
  - Fleet inventory and current electrification status
  - Total cost of ownership comparisons
  - Potential emissions abatement
  - Financing strategies
- Final project report

- **Goal**: Provide Washington with comprehensive, vehicle-specific electrification cost estimates both today and in the future and deliver actionable information on how to efficiently move forward with fleet electrification



COVID-19 IMPACTS

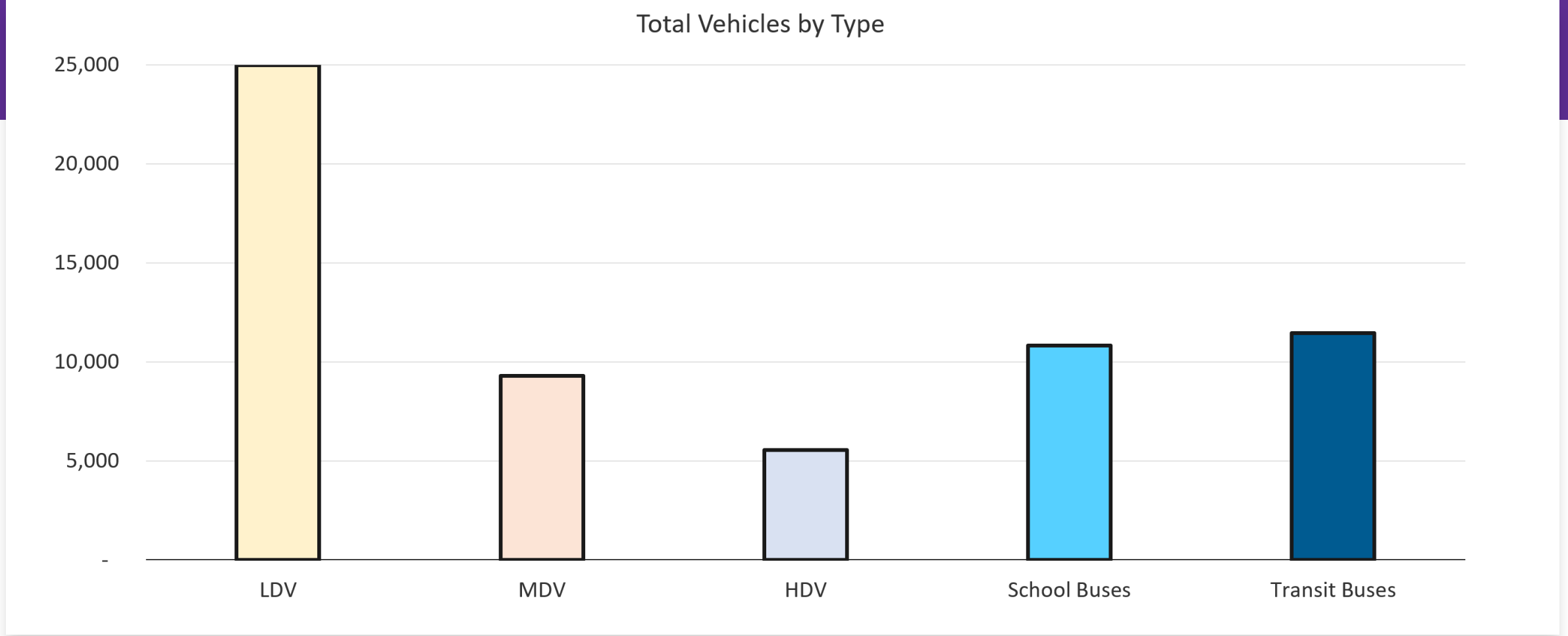
- Identified as risk to project timeline
  - Delays in project coordination and availability of data
- Currently operating under original schedule
  - Discussion of any potential changes in timeline ongoing; revisited on a biweekly basis
- Increased focus on Task 6 to proactively address any COVID-related WA budget shortfalls
- Assessment of effect on automotive industry and EVs ongoing

CURRENT PROJECT PROGRESS

- Task 1 Results
- Task 2 EV Inventory and Analysis details
- Task 3 Substantial Electrification Definition
- Task 4 Methodology and Initial Results
- Task 5 Methodology
- Task 6 Financing mechanisms

TASK 1: PUBLIC FLEET INVENTORY RESULTS

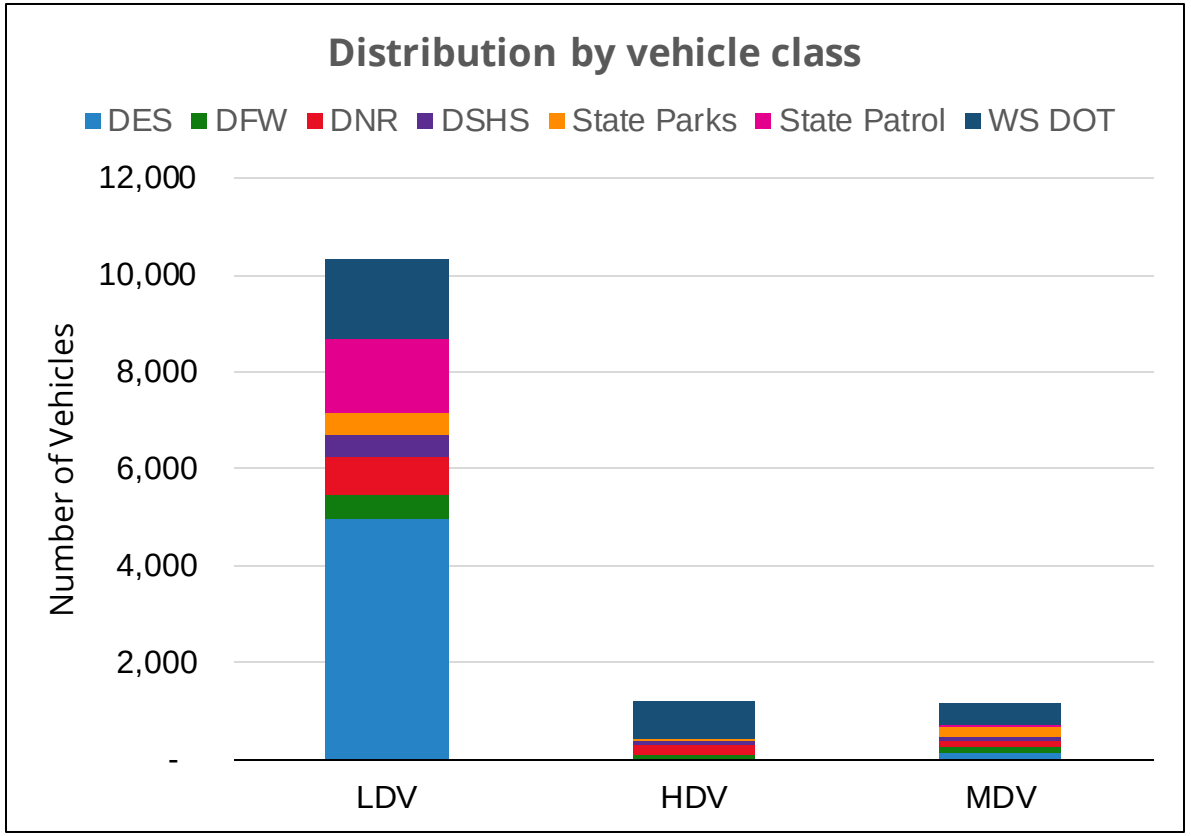
State Agencies,
Transit Agencies,
School Districts, and
Cities and Counties

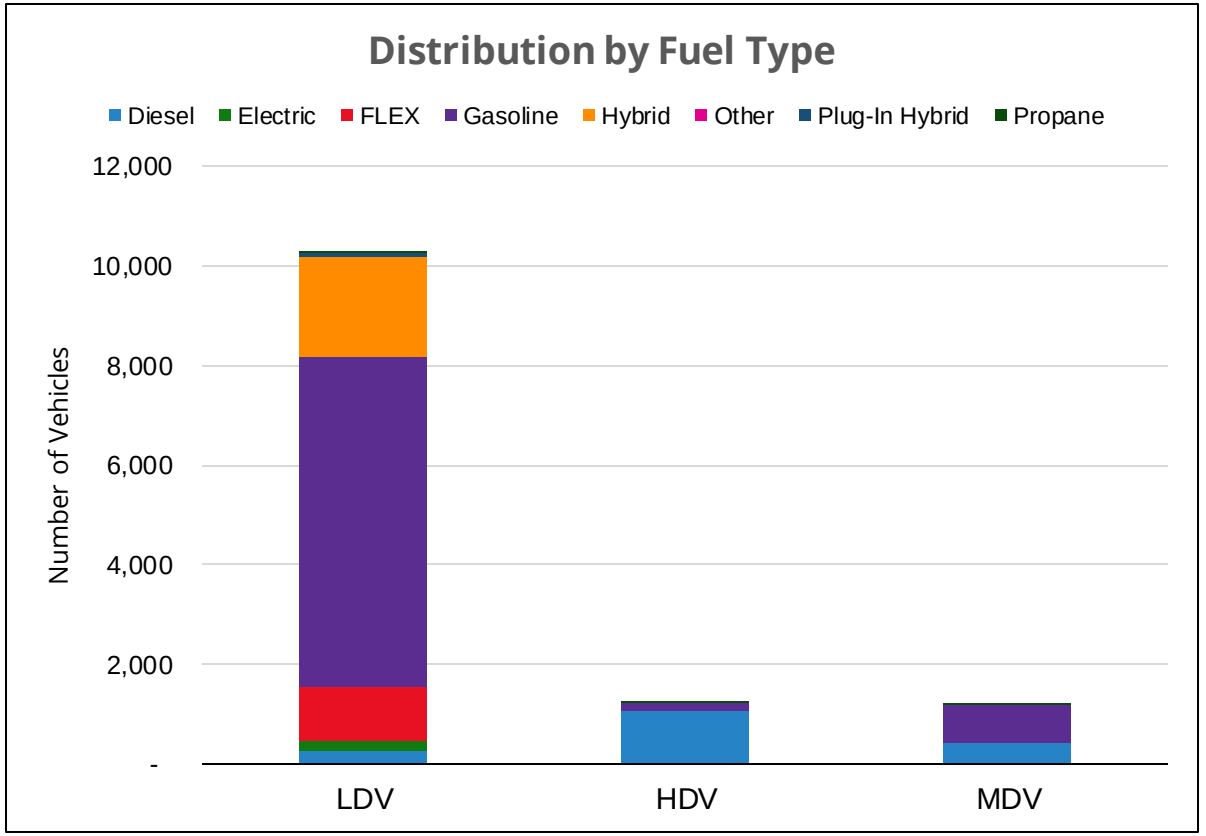


TASK 1 INVENTORY

- State and Transit Agencies
- School Districts
- Representative selection of cities from all population levels and geographic location
- Representative selection of counties from varying population sizes and geographies

VEHICLE CLASSES & FUEL TYPES IN STATE AGENCY FLEETS

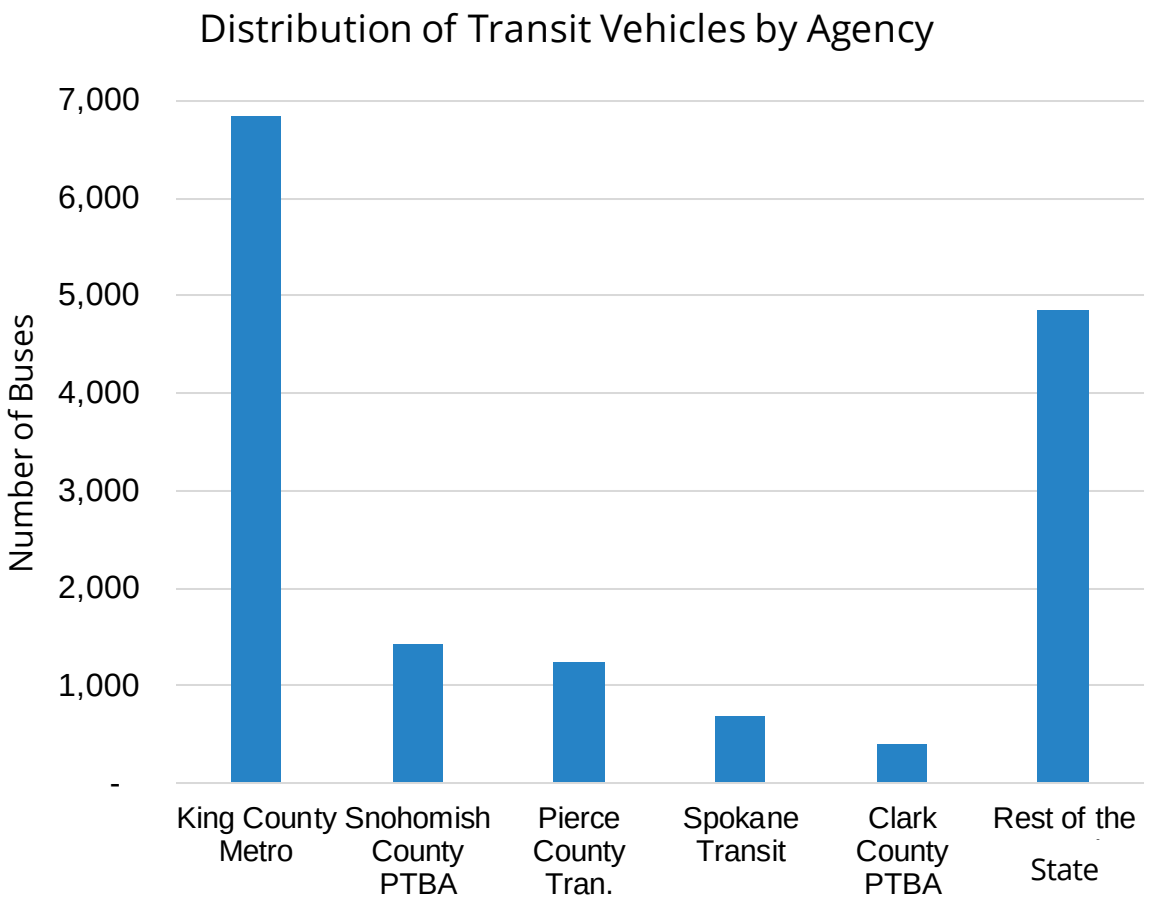


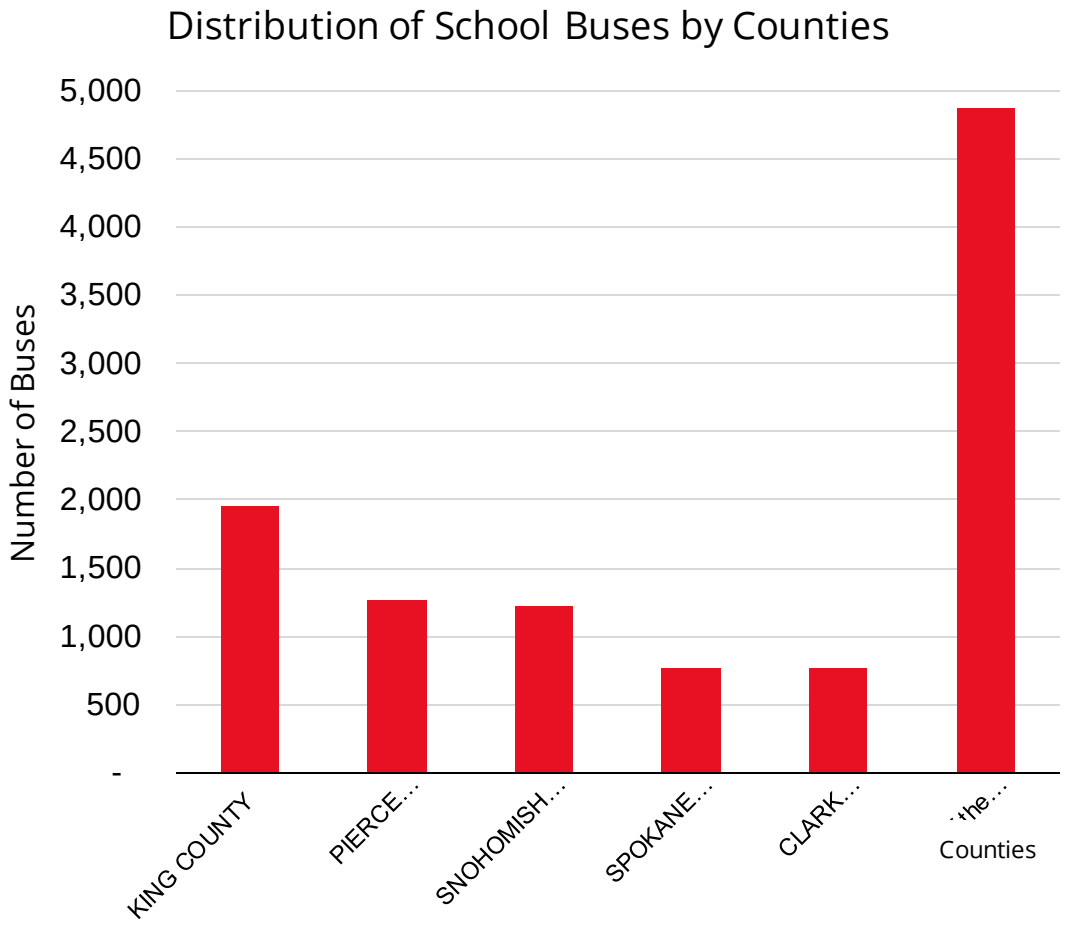


- Light duty passenger vehicles comprise the bulk of the state agency fleet
- Among state and local governments, the police patrol/interceptor vehicle is a sizeable group

- Low levels of electrification, roughly 3 percent of light-duty vehicles
- No electric vehicles yet in the medium- or heavy-duty classes

TRANSIT AND SCHOOL BUS FLEETS





- While King County dominates in numbers, many other transit and school bus fleets have responded to recent e-bus grant opportunities
- OEMs have focused on electrifying common bus sizes

EV FLEET QUESTIONNAIRE

- Purpose was to gather EV readiness insights with fleet data
- Data feeds next level of work
- Moderate participation
- Low electrification efforts, with a few exceptions

Joint Transportation Committee 2020 Fleet Electrification Study

Fleet Management Analysis Study

Organization

What is the public fleet name?

Respondent Information

Name

Phone number

Email

Administrative Location

Address

City

State

TASK 1 CHALLENGES

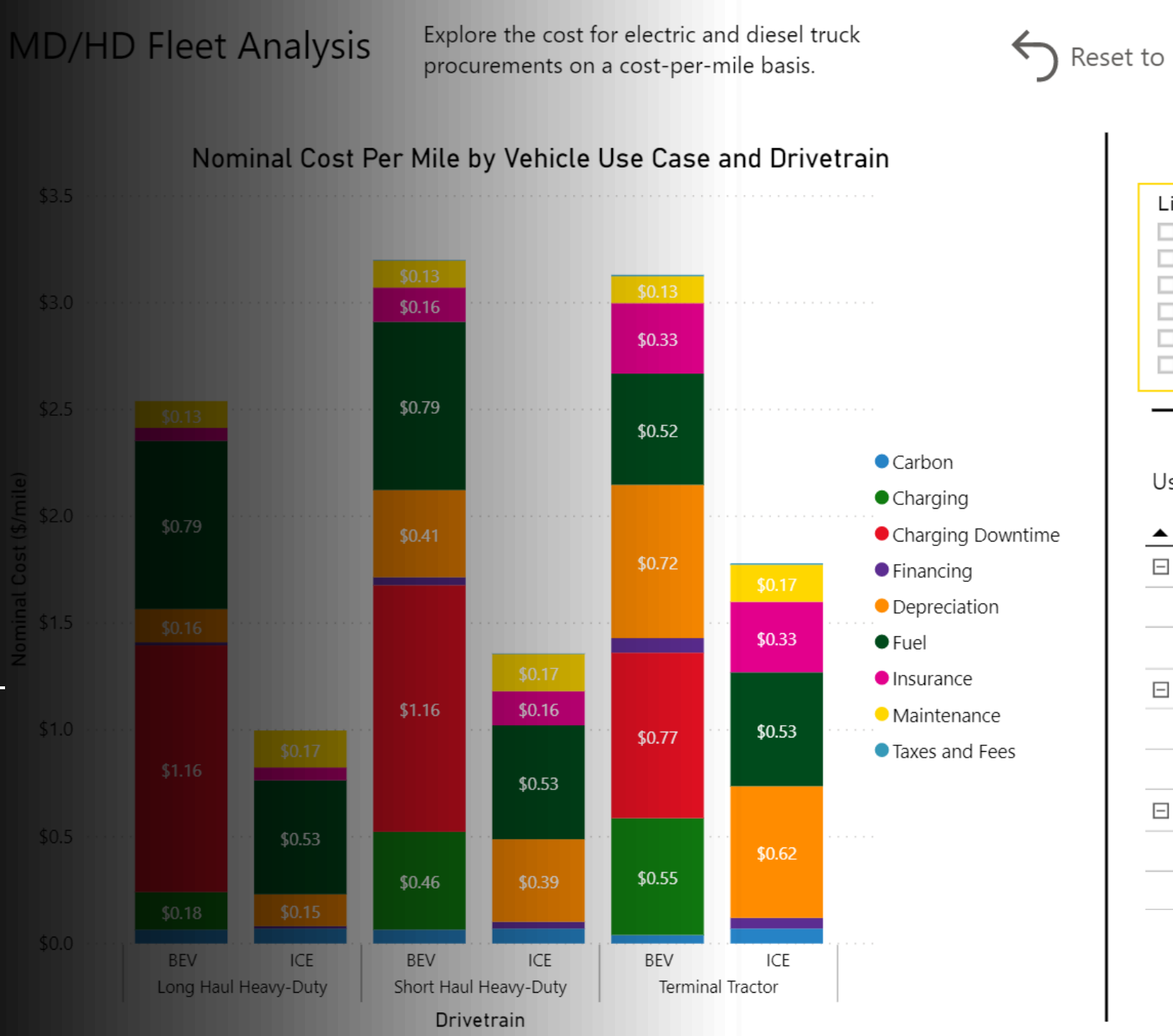
Low Data Availability	No centralized database; reliant on survey responses
Delays in Data Sharing	Delays in data sharing agreements; responsiveness of city and county fleet managers
Data Discrepancies	Inconsistencies in vehicle class or fuel type data
Differences in data conventions across entities	Varying definitions for vehicle class or make/model naming conventions or level of detail being recorded

TASK 1 RECOMMENDATIONS

Support standardized tracking of key data fields across state and/or local government entities
Capture fleet information for tracking through data sharing agreements
Coordinate definitions for vehicle attributes like weight class or mileage tracking
Share the results of this project with recommendations for improved data tracking

TASK : 2 AVAILABLE ALTERNATIVE ELECTRIC VEHICLE REVIEW

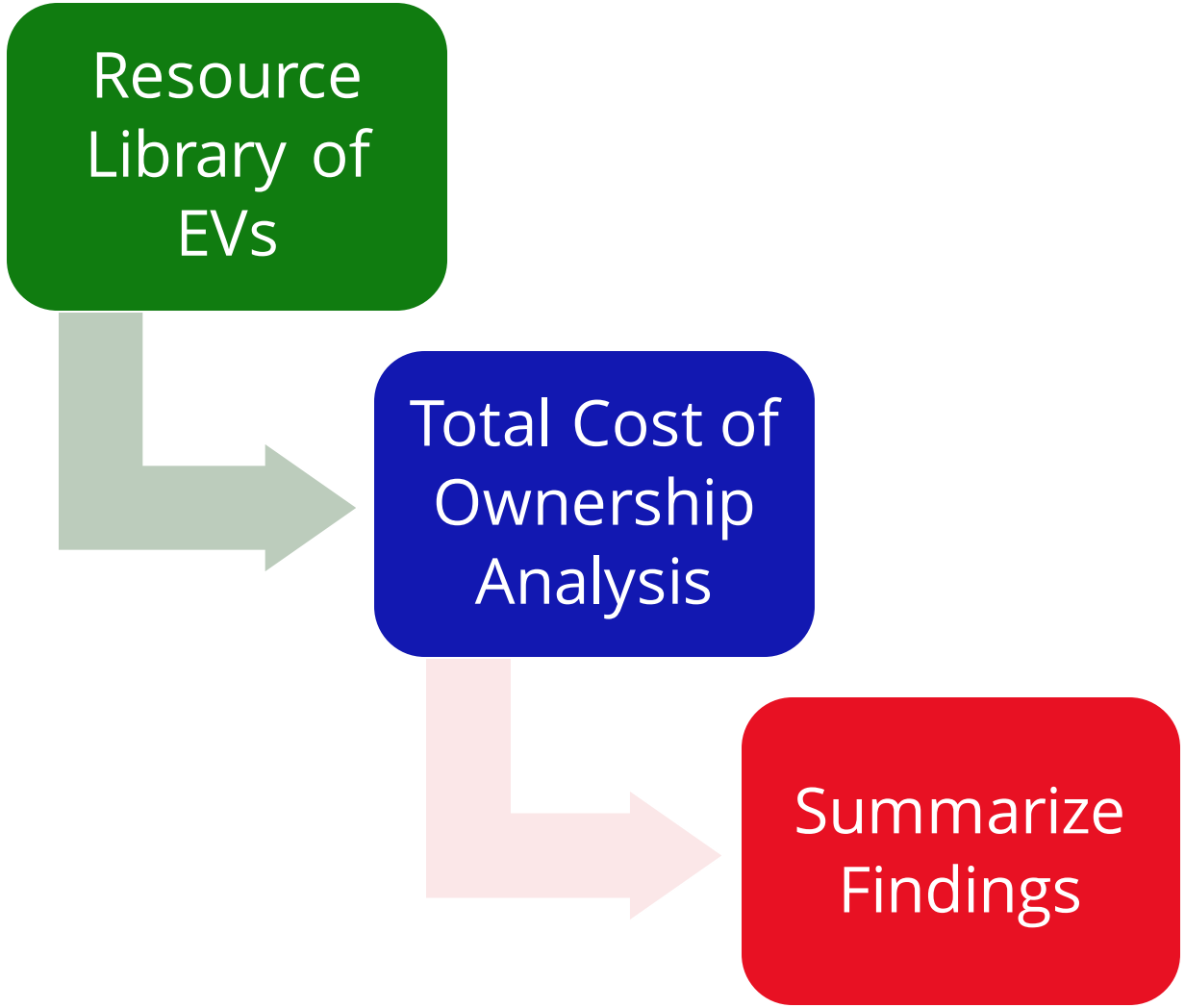
Data collected and analysis methodology



TASK 2: APPROACH

Task Goals

- Highlight vehicle classes and types for which electric alternatives are available and most cost effective
- Upfront and total cost of ownership analysis



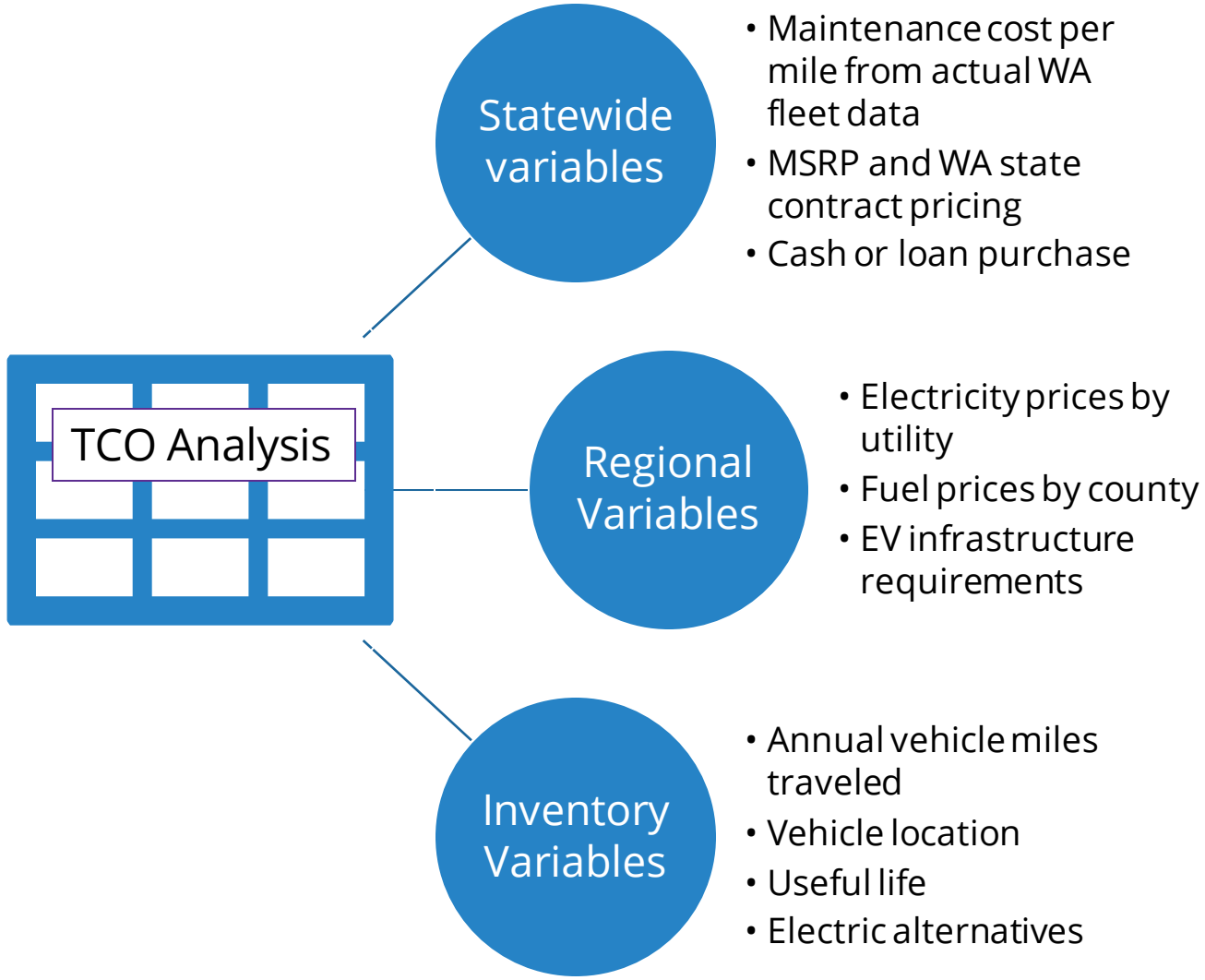
AVAILABLE EV RESOURCE LIBRARY

- Data gathered on an additional 300+ makes and models
  - Currently the most comprehensive source for EV alternatives available
  - 50+ makes and models in the existing tool
  - Available and soon-to-be available models
  - Battery Electric and Fuel Cell
- Added complete specification and pricing data on 90+ makes and models
- Pricing data from manufacturers and public sources including WA state competitive contracts; EV specifications from manufacturer websites
- Makes and models covering:
  - Sedans
  - SUVs
  - Pickup Trucks
  - Motorcycles
  - Box/Flatbed Trucks
  - Work/Service Trucks
  - Step Vans
  - Shuttle Buses
  - Cargo/Passenger Vans
  - Transit Buses
  - Refuse Vehicles
  - School Buses
  - Class 8 Tractors
  - Terminal Tractors

Shuttle Bus	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC E-450 - Shuttle Bus	BEV	106	
Step Van	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC E-450 - Step Van	BEV	106	
Box Truck	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC E-450 - Box Truck	BEV	106	
Work Truck	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC E-450 - Work Truck	BEV	106	
Specialty Vehicle	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-53 - Specialty Vehicle	BEV	127	
Trolley	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-53 - Trolley	BEV	127	
Type C School Bus	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Type C School Bus - 106 kWh	BEV	106	
Type C School Bus	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Type C School Bus - 127 kWh	BEV	127	
Shuttle Bus	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Shuttle Bus - 106 kWh	BEV	106	
Shuttle Bus	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Shuttle Bus - 127 kWh	BEV	127	
Step Van	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Step Van - 106 kWh	BEV	106	
Step Van	Medium Duty Vehicles (Class 3-6)	2018	Motiv	EPIC F-59 - Step Van - 127 kWh	BEV	127	
School Bus	Heavy-Duty Vehicles (Class 7-8)	2018	Blue Bird	All American RE Electric	BEV	160	1
Mini School Bus	Medium Duty Vehicles (Class 3-6)	2020	Lion Electric	LionA 80 kWh	BEV	80	
Mini School Bus	Medium Duty Vehicles (Class 3-6)	2020	Lion Electric	LionA 160 kWh	BEV	160	1
Type C School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionC 88 kWh	BEV	88	
Type C School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionC 132 kWh	BEV	132	1
Type C School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionC 176 kWh	BEV	176	1
Type C School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionC 220 kWh	BEV	220	1
Type D School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionD 132 kWh	BEV	132	1
Type D School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionD 176 kWh	BEV	176	1
Type D School Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionD 220 kWh	BEV	220	1
Shuttle Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionM 80 kWh	BEV	80	
Shuttle Bus	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	LionM 160 kWh	BEV	160	1
Class 3 truck	Medium Duty Vehicles (Class 3-6)	2020	Lion Electric	Lion6 168 kWh	BEV	168	1
Class 4 truck	Medium Duty Vehicles (Class 3-6)	2020	Lion Electric	Lion6 252 kWh	BEV	252	1
Class 5 truck	Medium Duty Vehicles (Class 3-6)	2020	Lion Electric	Lion6 336 kWh	BEV	336	2
Class 6 Single Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Single Axle 168 kWh	BEV	168	
Class 7 Single Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Single Axle 252 kWh	BEV	252	1
Class 8 Single Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Single Axle 336 kWh	BEV	336	1
Class 6 Double Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Double Axle 168 kWh	BEV	168	
Class 7 Double Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Double Axle 252 kWh	BEV	252	1
Class 8 Double Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Double Axle 336 kWh	BEV	336	1
Class 8 Double Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Double Axle 420 kWh	BEV	420	2
Class 8 Double Axle Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8P - Double Axle 504 kWh	BEV	504	2
Class 7 Tractor	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion 8T 252 kWh	BEV	252	1
Class 8 Tractor	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion 8T 336 kWh	BEV	336	1
Class 8 Tractor	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion 8T 420 kWh	BEV	420	1
Class 8 Tractor	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion 8T 504 kWh	BEV	504	2
Class 8 Tractor	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion 8T 558 kWh	BEV	588	2
Class 8 Refuse Truck	Heavy-Duty Vehicles (Class 7-8)	2020	Lion Electric	Lion8 Refuse Truck - Double Axle 168 kWh	BEV	168	

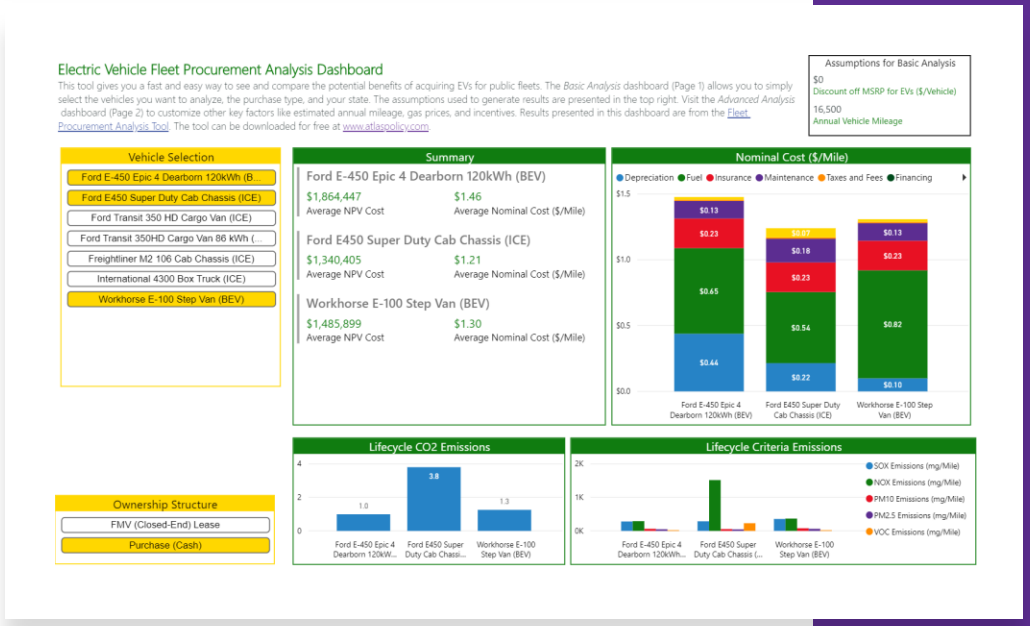
TOTAL COST OF OWNERSHIP ANALYSIS

- Combine data at local, regional, and state level to complete localized TCO analysis
  - Use actual fleet inventory data (Task 1) to estimate costs of fleet transition by vehicle
    - State agencies
    - Transit agencies
    - School districts
  - Use infrastructure cost estimates (Task 4)
- Approach will result in detailed, localized estimates for conversion to electric vehicles
  - 8,000+ light-duty vehicles have been mapped onto present-day replacements and suitable electric alternatives
  - Includes localized lifetime emissions estimates for Task 5



TASK 2: SAMPLE OUTPUT

- Interactive analysis results dashboards
- Vehicle-specific total cost of ownership comparisons between conventional and electric alternative vehicles for over 20,000 vehicles
- Highlight use cases, regions, and even specific vehicles which could be optimal targets for electrification
- Actionable, decision relevant information for policy-makers and fleet managers
    - Empowers end users to perform their own analyses on the data

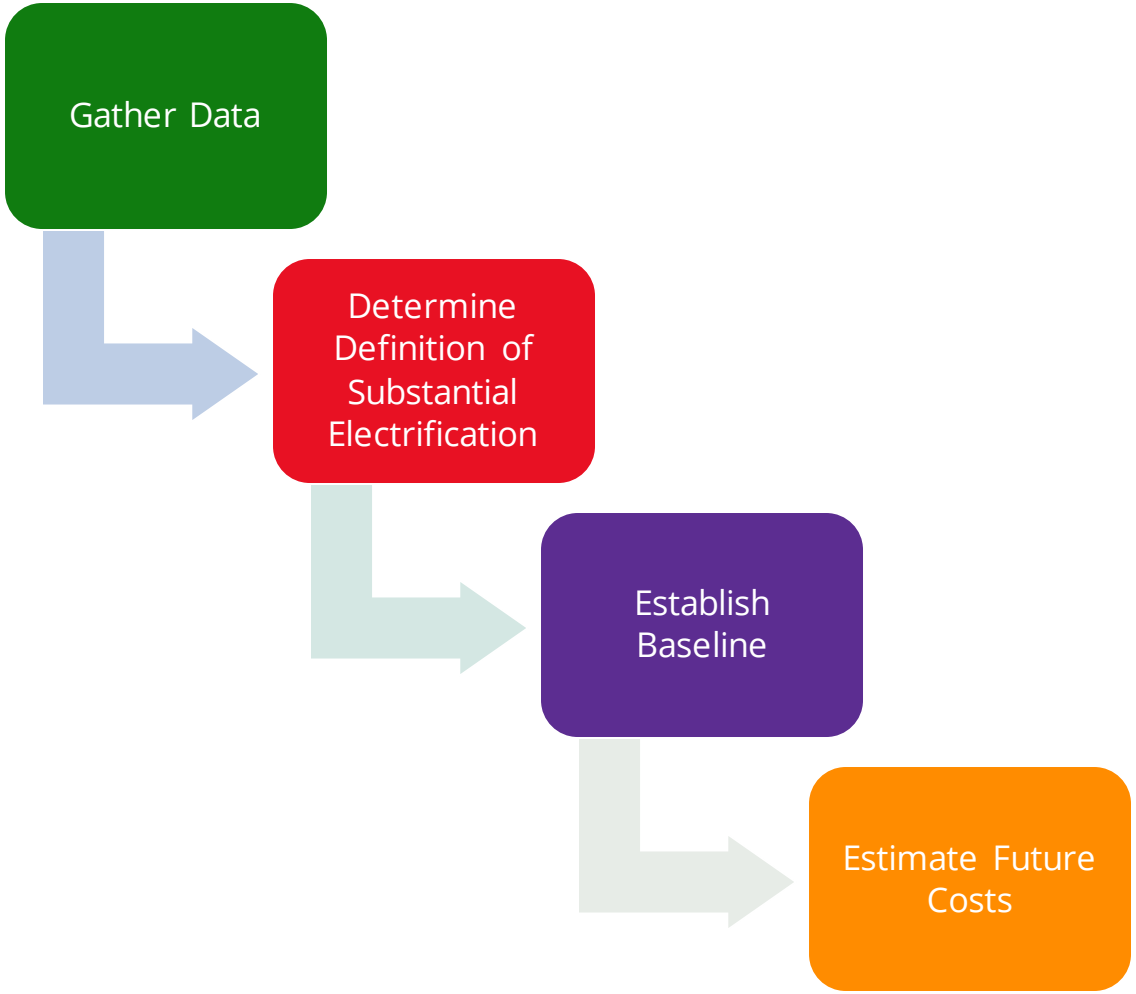


TASK 3: PROJECTING COSTS OF SUBSTANTIAL ELECTRIFICATION

TASK 3: APPROACH

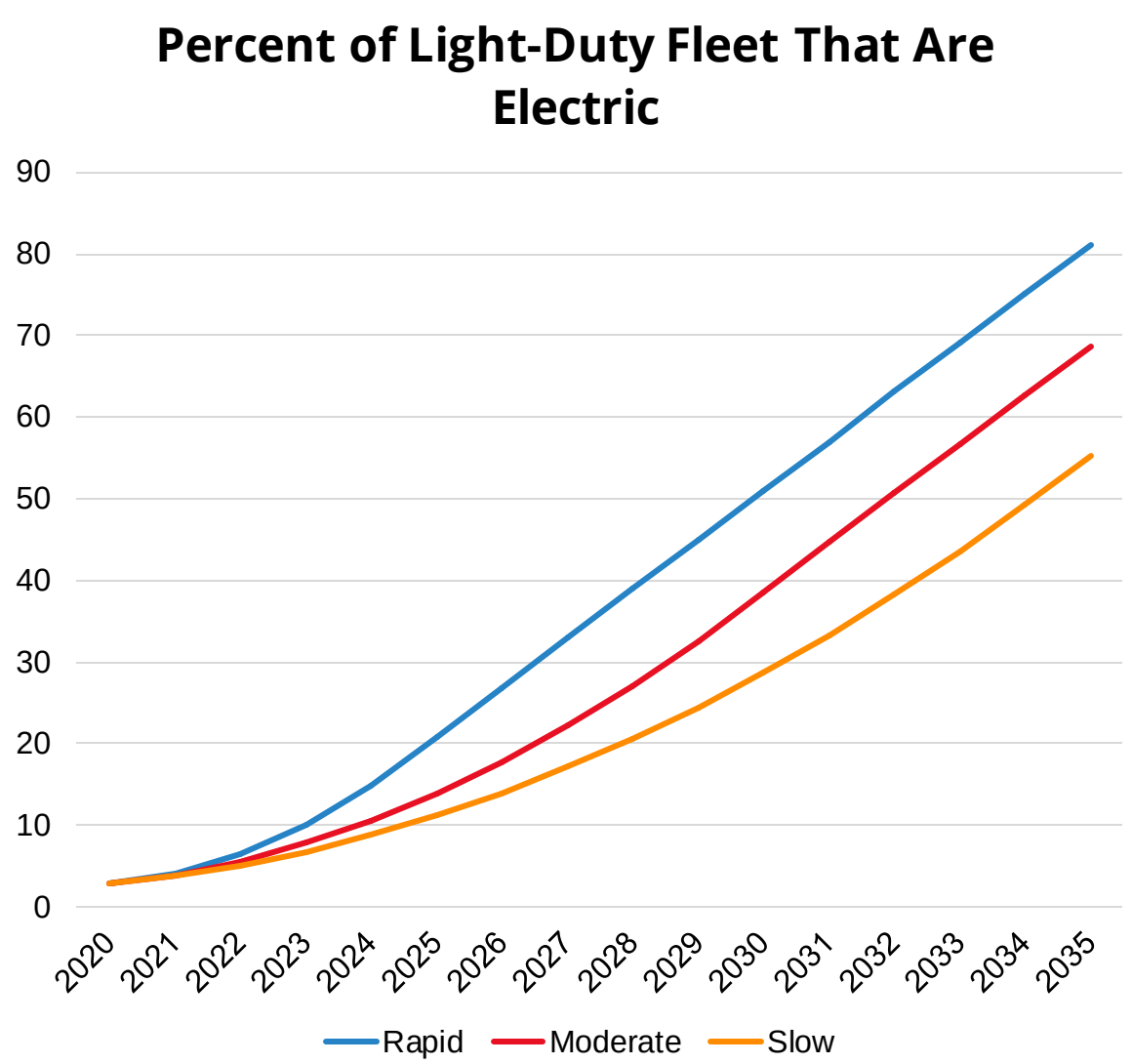
Task Goals

- Project costs of substantial conversion to battery/fuel cell fleets by 2025, 2030, 2035
  - Vehicle acquisition costs
  - Infrastructure costs
  - Other associated costs
- Identify financial and other barriers to electrification



LIGHT-DUTY SUBSTANTIAL ELECTRIFICATION

- Substantial electrification set at achieving 50 percent of yearly new vehicle purchases by 2025, 2030, or 2035
  - Based on Washington EV Fleets Initiative and input from Staff Workgroup
  - Calculating additional cost will provide estimate of necessary capital commitment
- "Top down" view of electrification across entire fleet
  - Allows for regional or agency variances
- Scenarios calculated based on average rates of fleet turnover in state agency fleets
  - Final adoption curves will be based on total cost of ownership projections



MEDIUM- AND HEAVY-DUTY SUBSTANTIAL ELECTRIFICATION

- "Top down" view of electrification across entire fleet
  - Allows for regional or agency variances
- Medium- and Heavy-duty substantial electrification set based on California Air Resources Board targets for new vehicle purchases and input from Staff Workgroup
  - Granular breakdown of vehicles based on typical use cases for various weight classes
  - Allows for collaboration between states
- Scenarios calculated based on average rates of fleet turnover by vehicle class from transit and state agencies
  - Final adoption curves will be based on total cost of ownership projections
- Approximately 7% of transit buses are electrified already
  - Less than 1% electrification for all other vehicle classes based on most recent data

Vehicle Class	Electric Vehicle Purchases in Target Year (%)*	% of Total Fleet that are Electric in 2035		
		Rapid	Moderate	Slow
Class 2B-3	15%	21%	17%	13%
Class 4-7	50%	68%	55%	42%
Class 8 Tractor	15%	15%	12%	9%
Transit Buses	100%	100%	93%	78%
School Buses	50%	53%	43%	33%

** Target Year is 2025 for Rapid, 2030 for Moderate, and 2035 for Slow*

CONSIDERATIONS

Credit for PHEVs

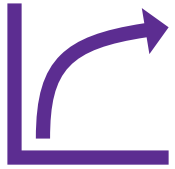
Based on number of electric miles traveled

Set level of electric purchases or timeline by entity

Budget

Population or fleet size

Existing Infrastructure



Likely EV adoption curves

Based upon total cost of ownership projections

Adheres to existing rules WAC 194-28 and 194-29 requiring fleets to pursue alternative fuel vehicles “to the extent practicable”

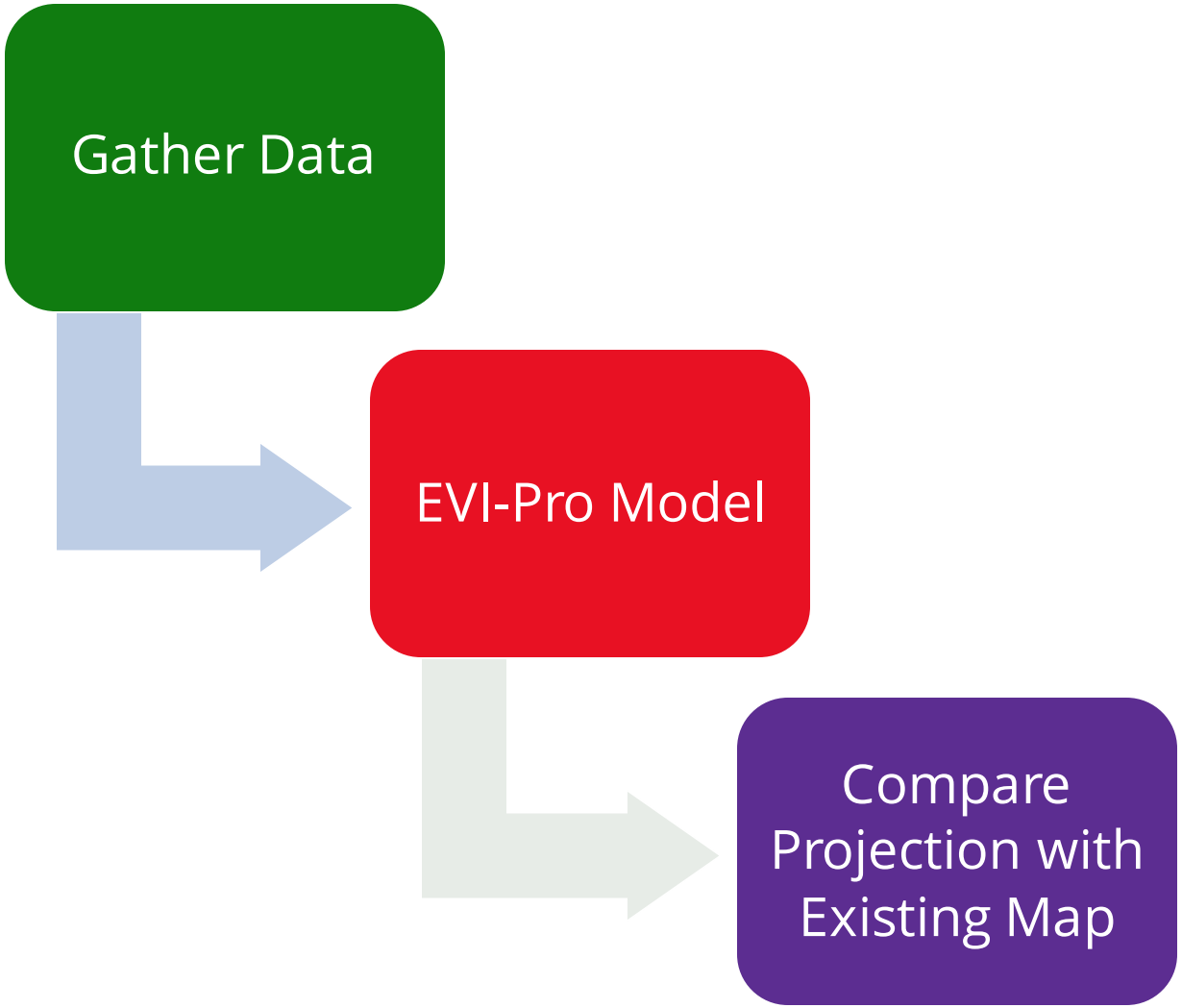
TASK 4: REQUIRED STATEWIDE CHARGING NETWORK

Methodology and Preliminary Estimates

TASK 4: APPROACH

Task Goals

- Identify the projected number and location profile of electric vehicle fueling stations needed statewide to provide fueling for public fleets
- Identify existing public and private charging stations



TASK 4: PRELIMINARY OUTPUT

- Majority of charging demand coming from medium- and heavy-duty vehicles
- Home Charging an inexpensive option currently representing a small share of overall charging demand
- State vehicles modeled to rely on public charging options sparingly
  - Charging infrastructure for state vehicles will be primarily installed and operated by the state

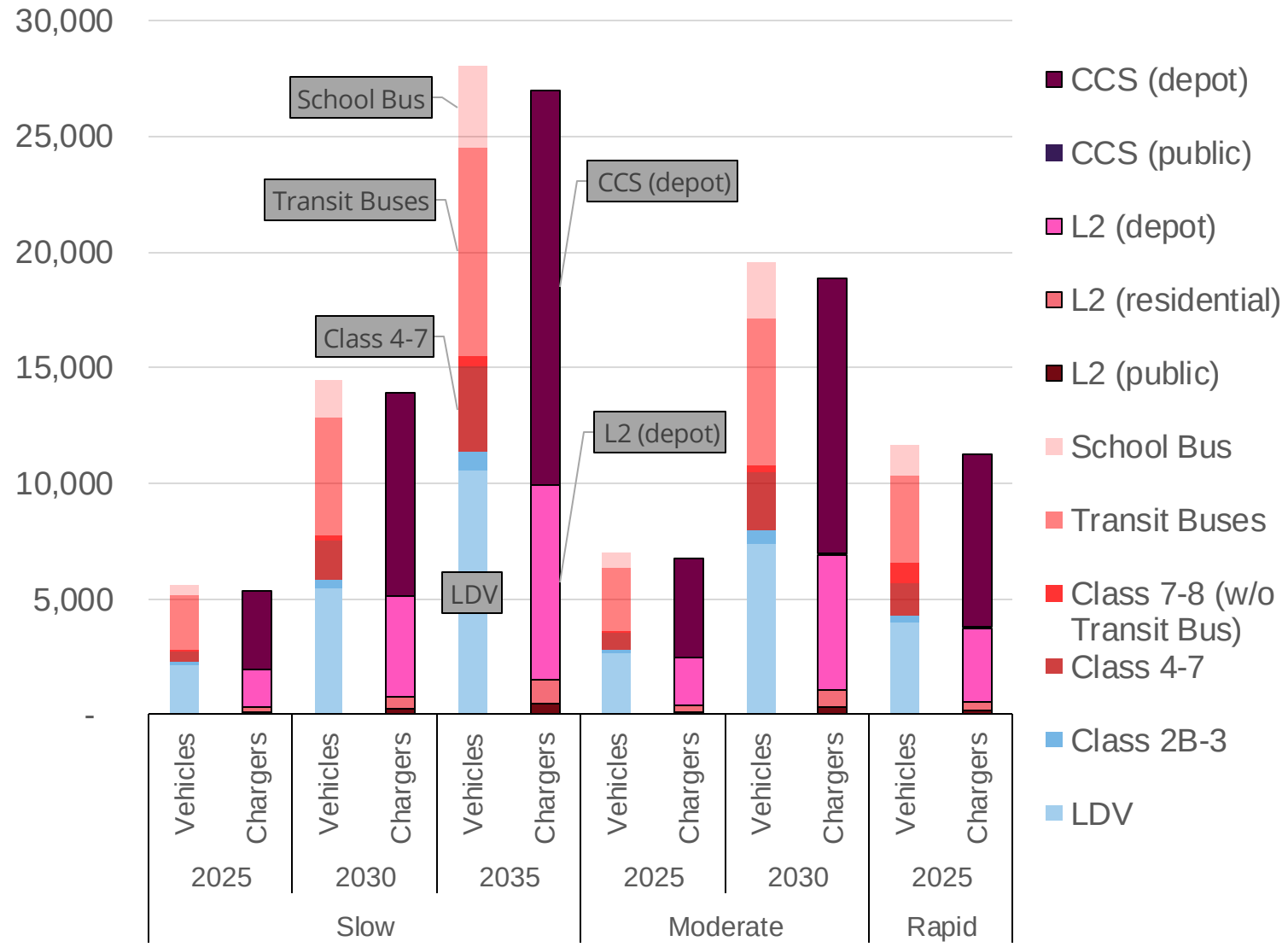
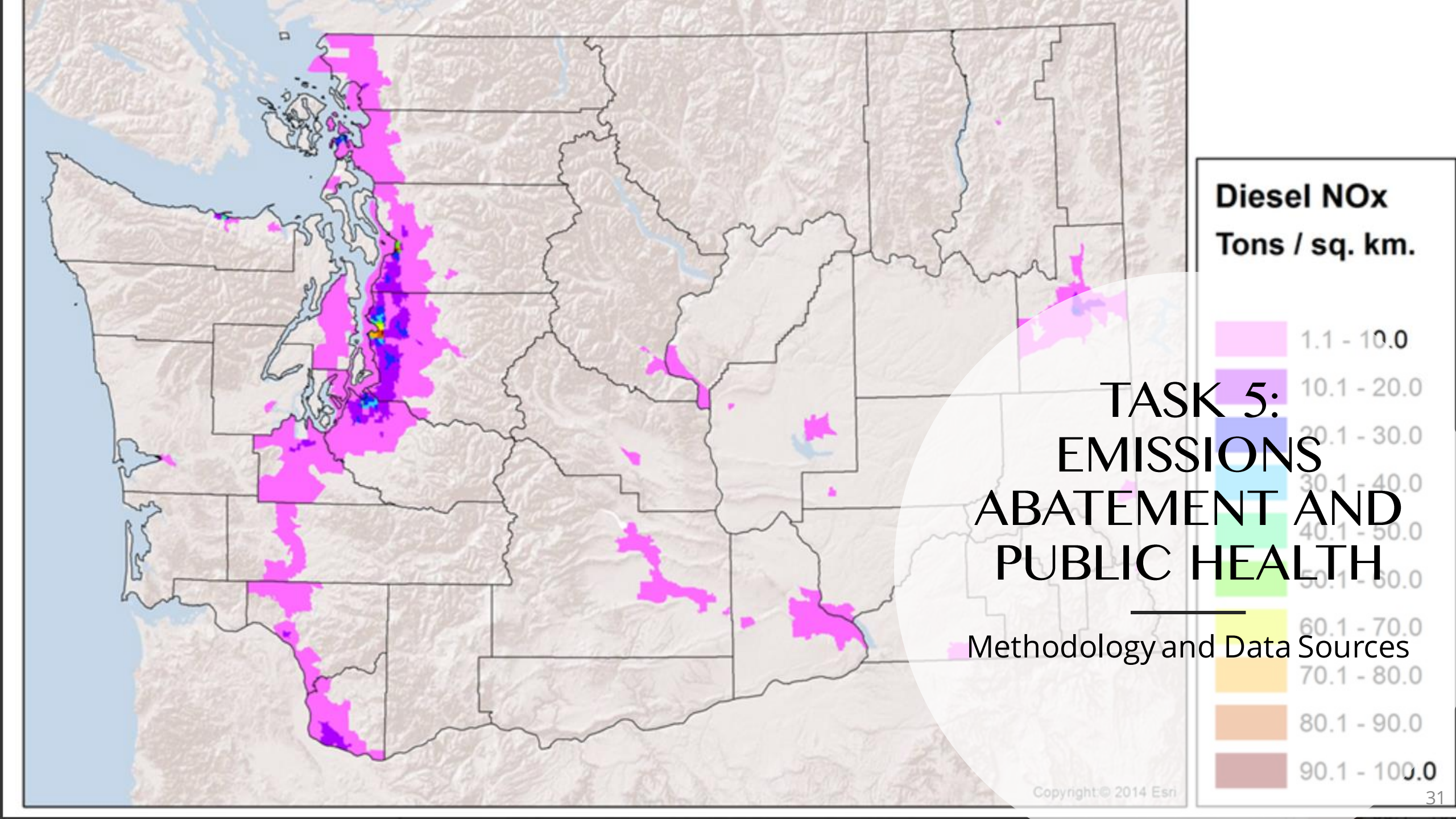


*Chart includes all charging scenarios, final figures will depend on determination of optimal charging strategy



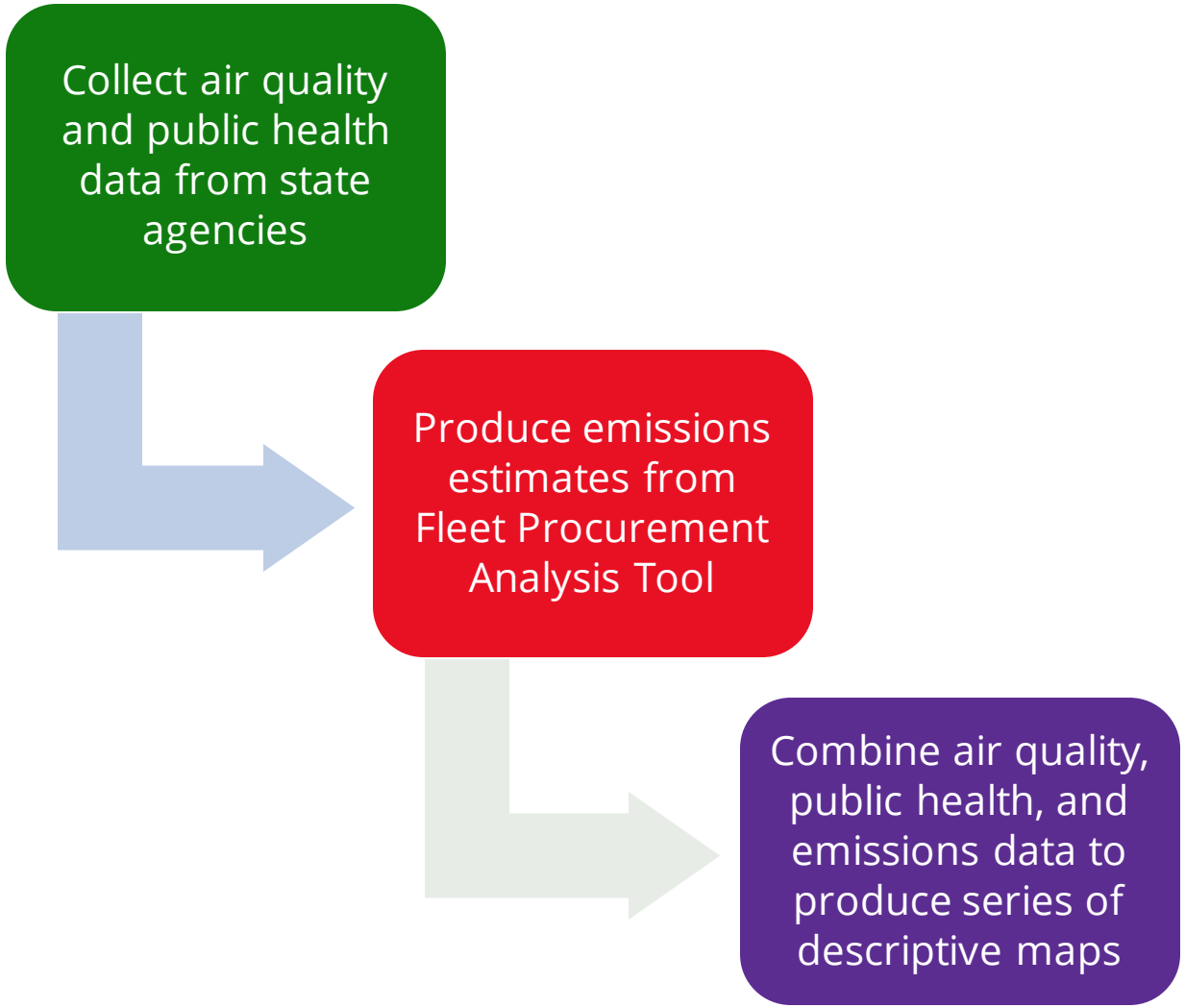
TASK 5: EMISSIONS ABATEMENT AND PUBLIC HEALTH

Methodology and Data Sources

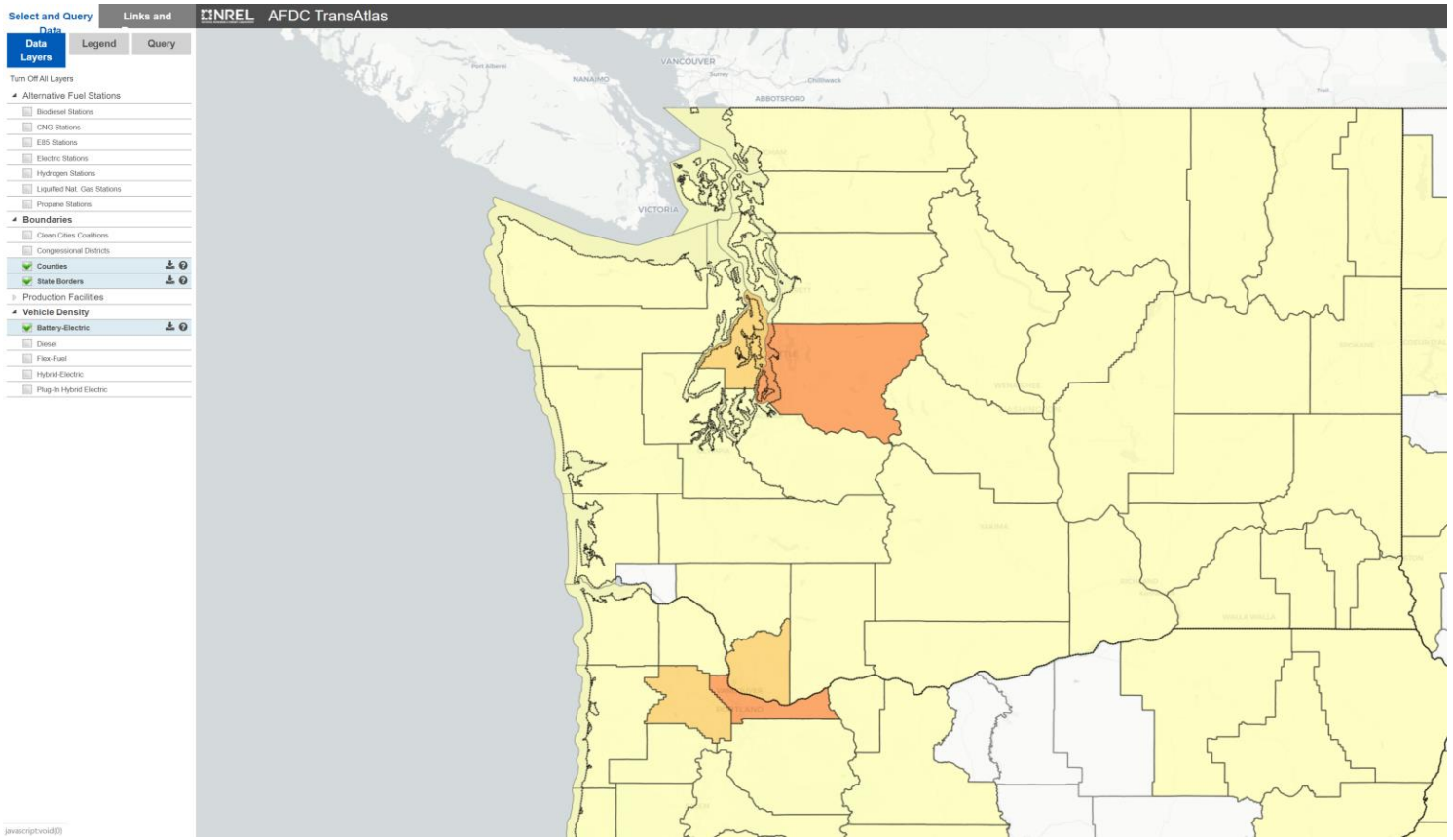
TASK 5: APPROACH

Task Goals

- Identify the areas of the state that would experience the greatest public health benefits from air pollution reductions resulting from fleet conversion
- Estimate the pollution reduction that would result from fleet conversion



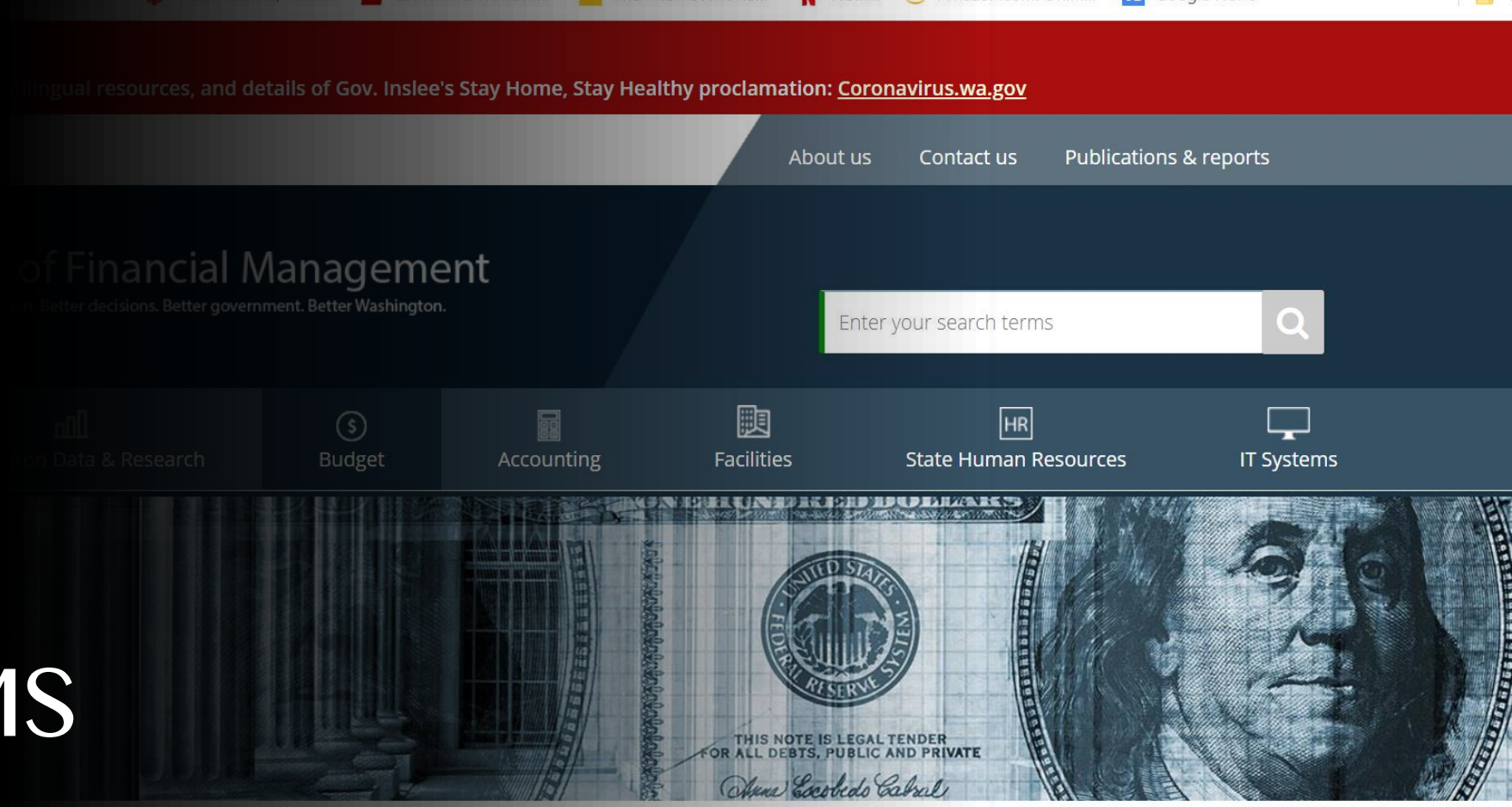
TASK 5 DATA SOURCES



- Emissions:
  - WA Department of Ecology
  - Task 2 Emissions analysis
- Public Health:
  - WA department of public health

TASK 6: FINANCING STRATEGIES AND MECHANISMS

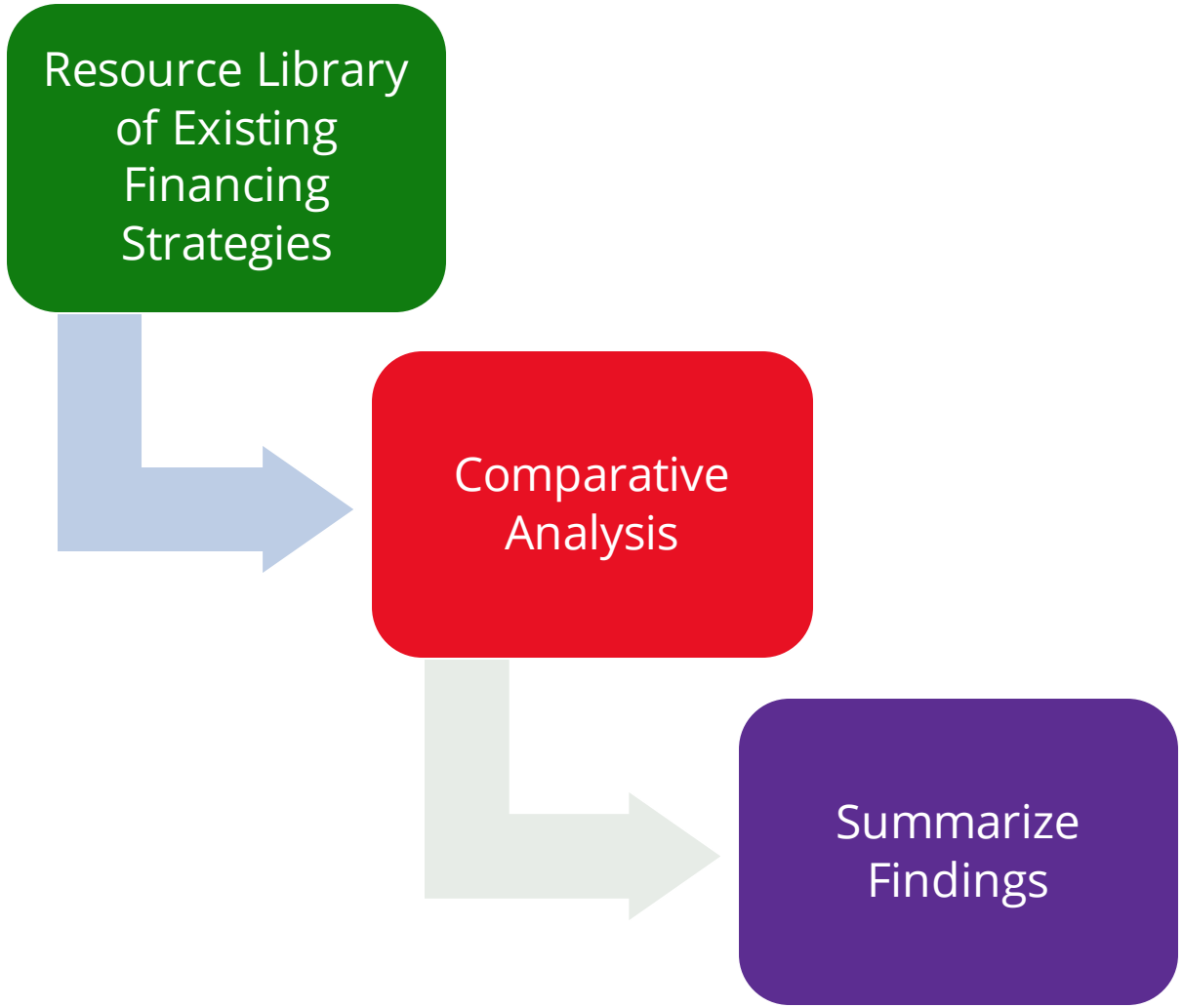
Background Research and Analysis Methodology



TASK 6: APPROACH

Task Goals

- Identify and analyze financing mechanisms and strategies that could accelerate the transition of publicly owned vehicles to battery and/or fuel cell electric vehicles
  - Energy or carbon savings performance contracting
  - Utility grants and rebates
  - Revolving loan funds
  - State grant programs
  - Private third-party financing
  - Fleet management services
  - Leasing
  - Vehicle use optimization
  - Vehicle to grid technology



COMPARATIVE ANALYSIS

- Reviews completed for all financing strategies outlined in proviso
  - Focus on examples of policies in neighboring states
  - Highlights of success and failures
- Apply estimates of financing strategies to Task 2 Cost Analysis
  - Location- and vehicle-specific estimates of public policies' effect on cost and electrification potential
- Estimates based on data gathered from existing programs in Washington or other states
- Highlights actionable, decision-relevant information for Washington policy makers
  - Allows for users to continue to run their own analyses after the completion of the project

Pictures demonstrate cost comparisons of the same vehicles with and without vehicle incentives

QUESTIONS AND NEXT STEPS

NEXT STEPS: MAY - JULY

Task 1	Create interactive dashboard for fleet inventory and write draft report chapter
Task 2	Refine estimates and run full cost analysis and write draft report chapter
Task 3	Finalize research and development scenarios and apply to Task 2 baseline results and write draft report chapter
Task 4	Build out analysis inputs based on Task 3 output and write draft report chapter

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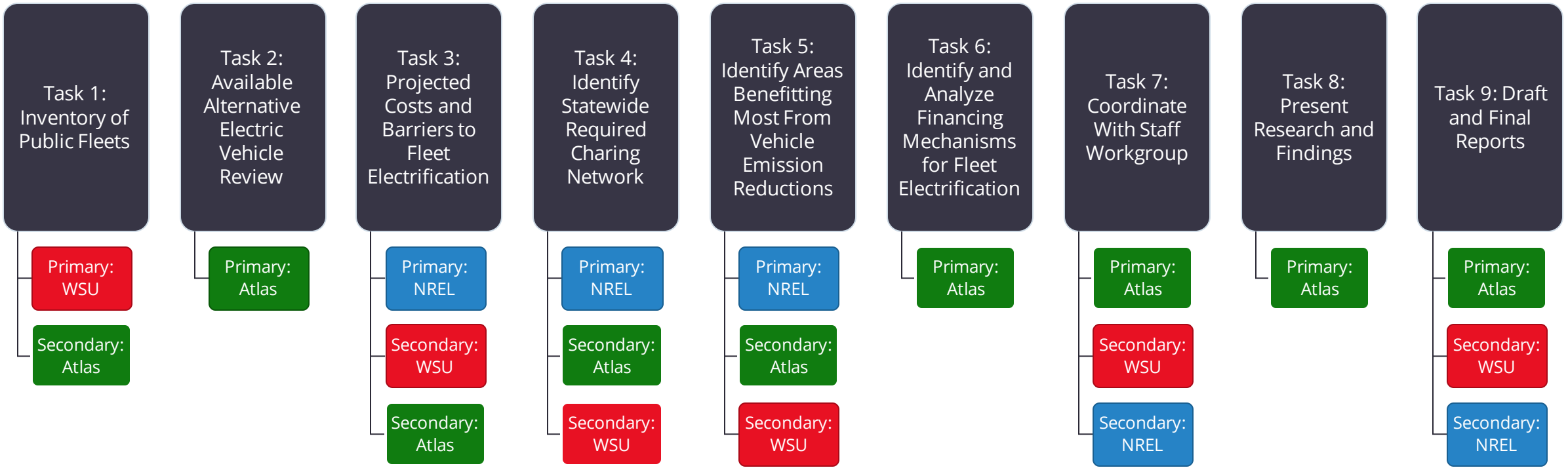
APPENDIX

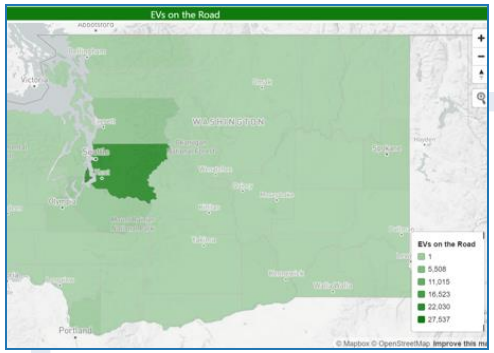
PROJECT GOALS BY TASK

Task 1: Inventory of Public Fleets	• Establish a baseline for the size and current electrification status of the public vehicle fleet in Washington state
Task 2: Available EV Alternative Review	• Highlight vehicle classes and types for which electric alternatives are available and most cost effective • Upfront and total cost of ownership analysis
Task 3: Projected Costs of Substantial Electrification	• Project costs of substantial conversion to battery/fuel cell fleets by 2025, 2030, 2035 • Identify financial and other barriers to electrification
Task 4: Identify Statewide Required Charging Network	• Identify the projected number and location profile of electric vehicle fueling stations needed statewide to provide fueling for public fleets • Identify existing public and private charging stations
Task 5: Identify Areas Benefitting Most From Electrification	• Identify the areas of the state that would experience the greatest public health benefits from air pollution reductions resulting from fleet conversion • Estimate the pollution reduction that would result from fleet conversion
Task 6: Identify and Analyze Financing Mechanisms	• Identify and analyze financing mechanisms and strategies that could accelerate the transition of publicly owned vehicles to battery and/or fuel cell electric vehicles
Task 7: Coordinate with the Staff Workgroup	• Solicit inputs • Review findings and draft materials
Task 8 & 9: Present Research & Draft and Final Reports	• Present research at May and September meetings • Prepare Draft by Aug 10, Draft Final Sep. 10, and Final Sep. 30

AREAS OF RESPONSIBILITY

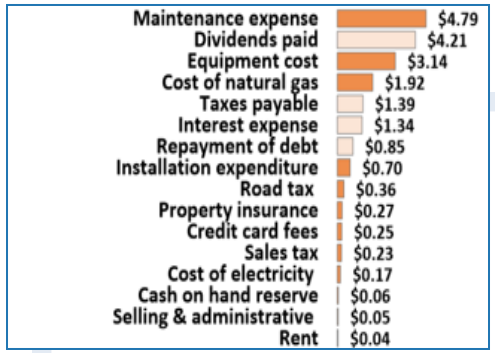


DELIVERABLES BY TASK



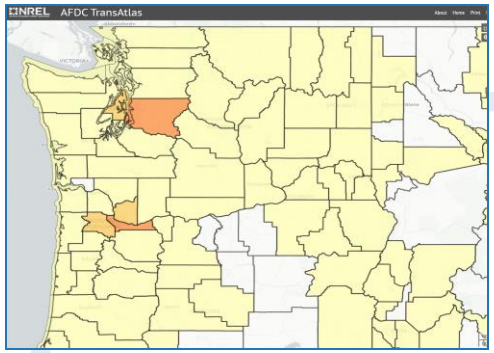
Task 1: Inventory of Public Fleets

- Vehicle Inventory Database
- Web-based Interactive Dashboard
- Report Chapter



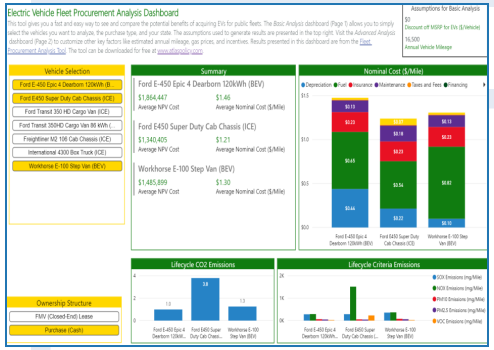
Task 3: Projected Costs of Substantial Electrification

- Report Chapter of Descriptive Analysis



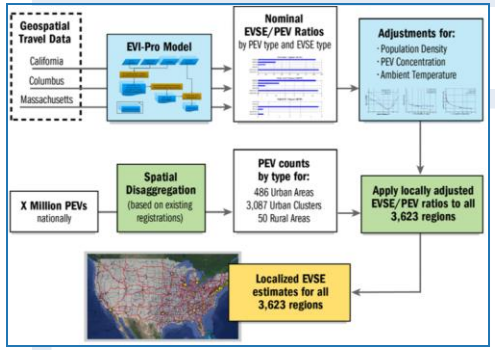
Task 5: Identify Areas Benefitting Most From Electrification

- Report Chapter
- Interactive GIS Map



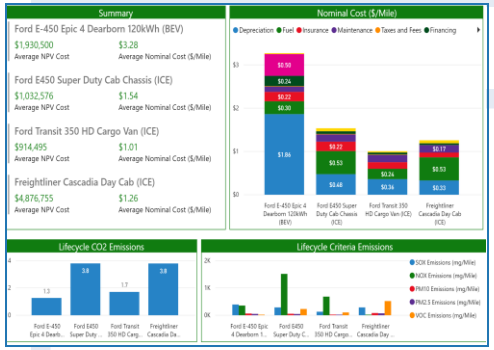
Task 2: Available EV Alternative Review

- Report Chapter
- Interactive Analysis Results Dashboard



Task 4: Identify Statewide Required Charging Network

- Report Chapter of Descriptive Analysis
- Updated Infrastructure Map



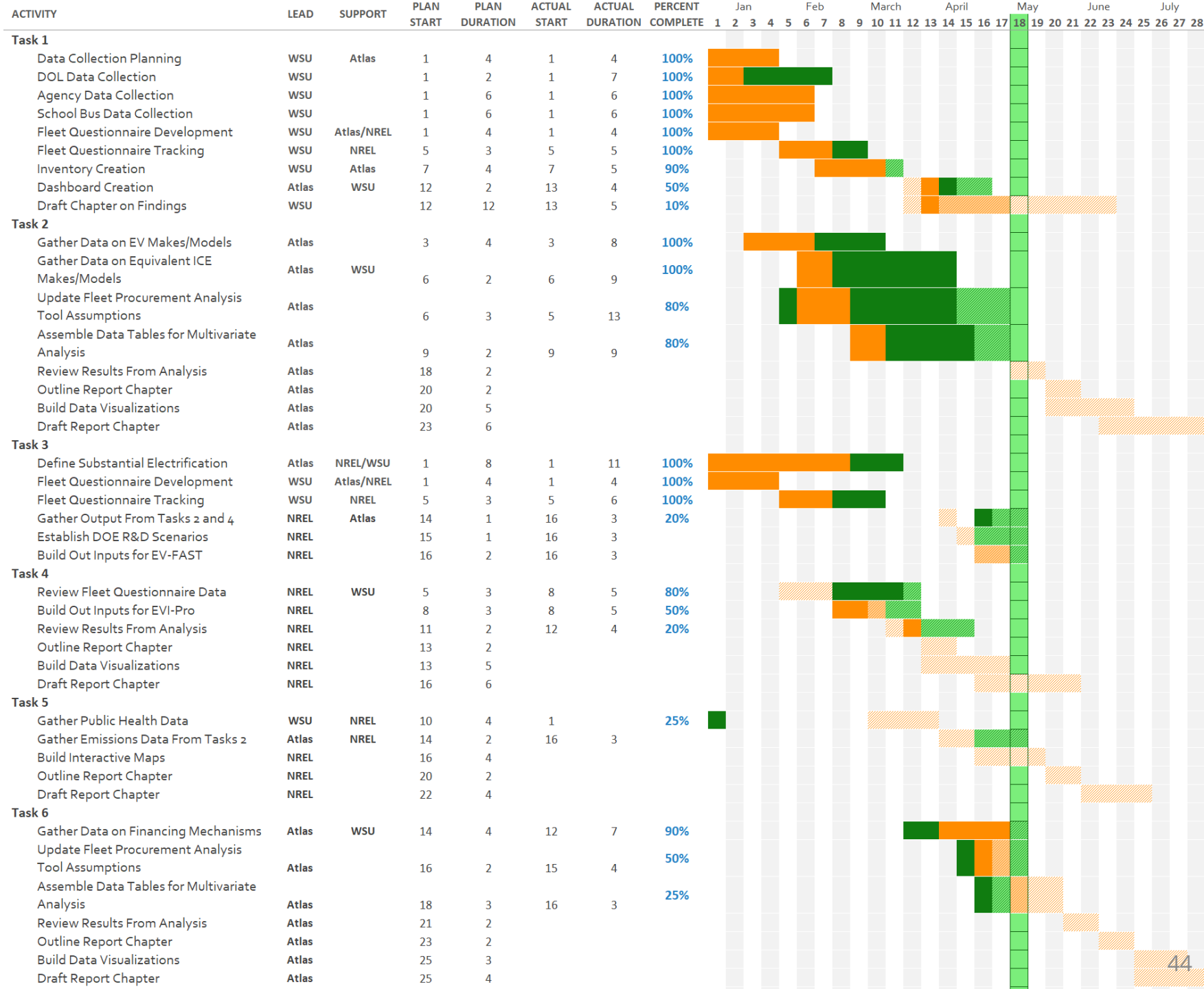
Task 6: Identify and Analyze Financing Mechanisms

- Report Chapter
- Interactive Analysis Results Dashboard

PROJECT STATUS

- Task 1:
  - Complete outside of draft report chapter
- Task 2:
  - All data on available alternative electric vehicles gathered
  - Cost analysis in final stages of preparation
- Task 3:
  - Substantial electrification threshold set and measurement defined
  - Analysis approach defined; awaiting output from Task 2
- Task 4:
  - modeling inputs complete and sample analysis run
  - Awaiting output from Task 3
- Task 5:
  - Delayed; Awaiting data gathering and analysis outputs
- Task 6:
  - Ahead of schedule; financing mechanisms defined and background research complete
  - Draft report chapter begun
- Project has experienced delays due to coronavirus
  - Task 2, 3, 4, and 5 are roughly one month behind
  - Currently still operating on original schedule

ACTIVITY	LEAD	SUPPORT	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Task 1							
Data Collection Planning	WSU	Atlas	1	4	1	4	100%
DOL Data Collection	WSU		1	2	1	7	100%
Agency Data Collection	WSU		1	6	1	6	100%
School Bus Data Collection	WSU		1	6	1	6	100%
Fleet Questionnaire Development	WSU	Atlas/NREL	1	4	1	4	100%
Fleet Questionnaire Tracking	WSU	NREL	5	3	5	5	100%
Inventory Creation	WSU	Atlas	7	4	7	5	90%
Dashboard Creation	Atlas	WSU	12	2	13	4	50%
Draft Chapter on Findings	WSU		12	12	13	5	10%
Task 2							
Gather Data on EV Makes/Models	Atlas		3	4	3	8	100%
Gather Data on Equivalent ICE Makes/Models	Atlas	WSU	6	2	6	9	100%
Update Fleet Procurement Analysis Tool Assumptions	Atlas		6	3	5	13	80%
Assemble Data Tables for Multivariate Analysis	Atlas		9	2	9	9	80%
Review Results From Analysis	Atlas		18	2			
Outline Report Chapter	Atlas		20	2			
Build Data Visualizations	Atlas		20	5			
Draft Report Chapter	Atlas		23	6			
Task 3							
Define Substantial Electrification	Atlas	NREL/WSU	1	8	1	11	100%
Fleet Questionnaire Development	WSU	Atlas/NREL	1	4	1	4	100%
Fleet Questionnaire Tracking	WSU	NREL	5	3	5	6	100%
Gather Output From Tasks 2 and 4	NREL	Atlas	14	1	16	3	20%
Establish DOE R&D Scenarios	NREL		15	1	16	3	
Build Out Inputs for EV-FAST	NREL		16	2	16	3	
Task 4							
Review Fleet Questionnaire Data	NREL	WSU	5	3	8	5	80%
Build Out Inputs for EVI-Pro	NREL		8	3	8	5	50%
Review Results From Analysis	NREL		11	2	12	4	20%
Outline Report Chapter	NREL		13	2			
Build Data Visualizations	NREL		13	5			
Draft Report Chapter	NREL		16	6			
Task 5							
Gather Public Health Data	WSU	NREL	10	4	1		25%
Gather Emissions Data From Tasks 2	Atlas	NREL	14	2	16	3	
Build Interactive Maps	NREL		16	4			
Outline Report Chapter	NREL		20	2			
Draft Report Chapter	NREL		22	4			
Task 6							
Gather Data on Financing Mechanisms	Atlas	WSU	14	4	12	7	90%
Update Fleet Procurement Analysis Tool Assumptions	Atlas		16	2	15	4	50%
Assemble Data Tables for Multivariate Analysis	Atlas		18	3	16	3	25%
Review Results From Analysis	Atlas		21	2			
Outline Report Chapter	Atlas		23	2			
Build Data Visualizations	Atlas		25	3			
Draft Report Chapter	Atlas		25	4			



Current Week: 18

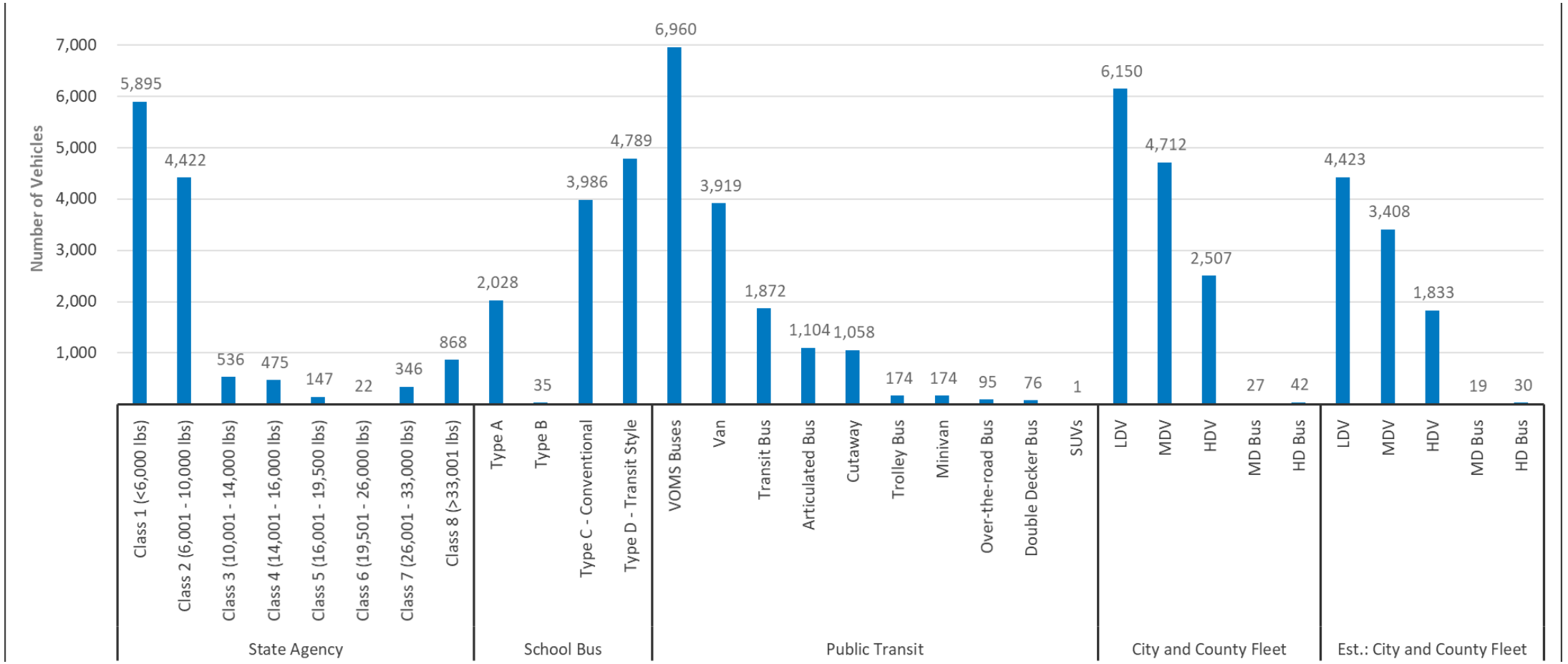
Plan Duration

Actual Start

% Complete

Actual (beyond plan)

% Complete (beyond plan)



TASK 1 INVENTORY

- State and Transit Agencies
- School Districts
- Representative selection of cities from all population levels and geographic location
- Representative selection of counties from varying population sizes and geographies

TASK 4: CHARGING SCENARIOS

Charger Type	Level 2	Level 2 (Home)	Level 2 (Depot)	DCFC	DCFC	Heavy DCFC
Location	Public	Home	Depot	Public	Depot	Depot
Connector Type	J1772	J1772	J1772	CHAdeMO/CCS 50 kW	CHAdeMO/CCS 50 kW	CHAdeMO/CCS 60-150 kW
LDV	Y	Y	Y	Y	Y	
Class 2B-3	Y		Y	Y		
Class 4-7					Y	Y
Class 8					Y	Y
Class 7-8 (Transit Bus)					Y	Y
School Bus					Y	Y

- Low power (Level 2) and high power (DCFC) charging scenarios included for all vehicles up to class 3
  - Public and private charging networks
- Only high power (DCFC) charging scenarios included medium- and heavy-duty vehicles
  - Private depot charging only
  - Varying power levels

TASK 6: FINANCING STRATEGIES

- Atlas EV Hub
  - Tracks policy and financing programs by state
  - Review of existing policies, particularly in neighboring states, highlighting success or failures
- Reviews of financing strategies completed for:
  - Energy or carbon savings performance contracting in California and Colorado
  - Utility grants and rebates in California and Washington
  - Revolving loan funds in Washington and California
  - State grant programs in California and New York
  - Private third-party financing in Indiana and Vermont
  - Fleet management services in Indiana
  - Leasing in California
  - Vehicle to grid technology in California and Virginia
  - Clean Fuel Standards and Credit Systems in California and Oregon
  - Bundled Procurements and Cooperative Purchasing in New York