



Jaunt

Feasibility Study of Alternative Fueled Buses
Advisory Committee Meeting 1: June 27, 2022



Agenda

- Introductions
- Overview of Project
 - FTA Requirements
 - Project Tasks
 - Roles & Responsibilities
 - Project Schedule
- Project Goals
- Technology Overview
- Questions & Discussion



Introductions



Project Overview

- FTA “Lo-No” Funding:
 - Requirements (6 items)
 - Due May 31, 2023
- DRPT Goals (E&M Study)
- Project Tasks:
 1. Project Management
 2. Feasibility Study
 3. Stakeholder Coordination

1. Long-term fleet management plan
2. Current and future resources
3. Policy and legislation
4. Existing and future facilities
5. Partnership with utility or fuel provider
6. Workforce transition

Feasibility Study Elements

- Comparison of multiple fuel types, including:
 - Battery Electric
 - Compressed Natural Gas
- Peer agency interaction
- Presentation of tradeoffs, advantages, and disadvantages for technologies
- Start the relationship with utilities/fuel providers
- Impact of technology on operations and procurement
- Stakeholder Coordination:
 - 3 Advisory Group Meetings
 - 1 Jaunt Board Presentation of Findings



Roles & Responsibilities

- Jaunt Staff and Advisory Committee
 - Provide strategic direction
 - Review and provide comments on deliverables
- Jaunt Staff
 - Provide agency data, technical input, and review
 - Support analysis and conceptual design
- Consultant Team
 - Guide project and decision-making processes
 - Aggregate and analyze client input
 - Produce planning and conceptual documentation

Project Schedule

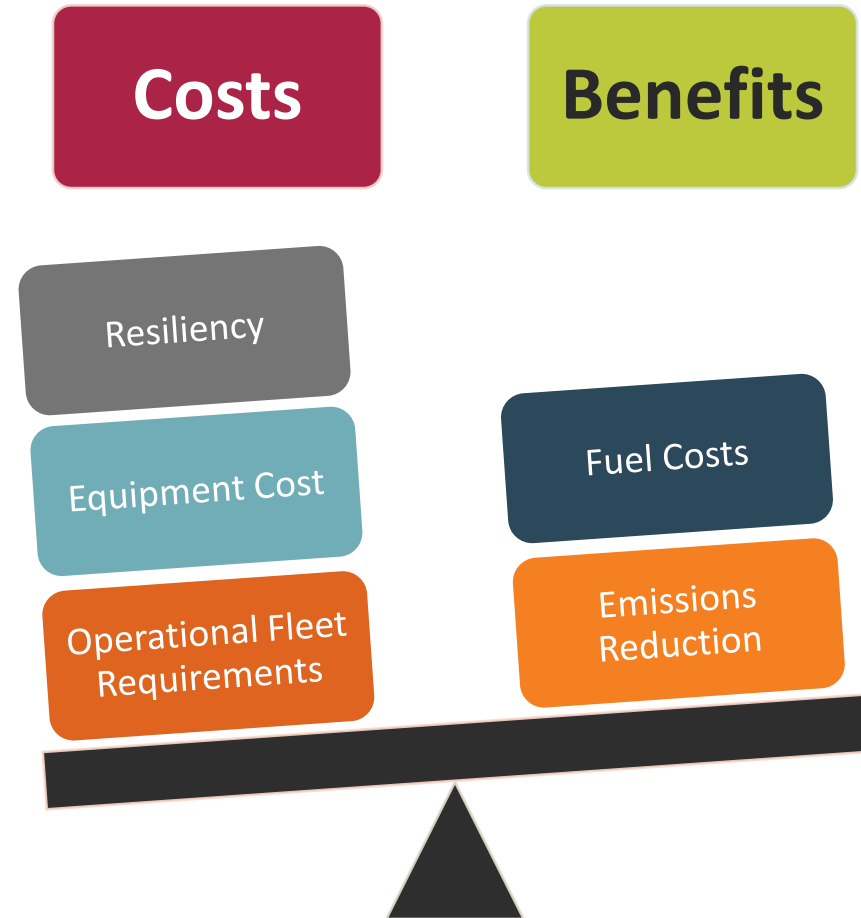
- Duration: Approximately 5 months after kickoff
- Key dates:
 - Jaunt budget process begins at end of 2022
 - DRPT MERIT Grants Due February 2023
 - Low-No and Bus Facilities Grants Due May 2023
- Two More Advisory Committee Meetings:
 - Existing Conditions and Opportunities: September 2022
 - Recommendations and Implementation Plan: November 2022
- Presentation to Jaunt Board of Directors: December 2022

Project Goals



Comparisons and Tradeoffs

- Project will weigh costs and benefits for Jaunt
- Align outcomes and recommendations with goals
- Present scenarios for consideration
 - Single or combination of options
 - Quantify the impacts for emissions and costs



Project Goals

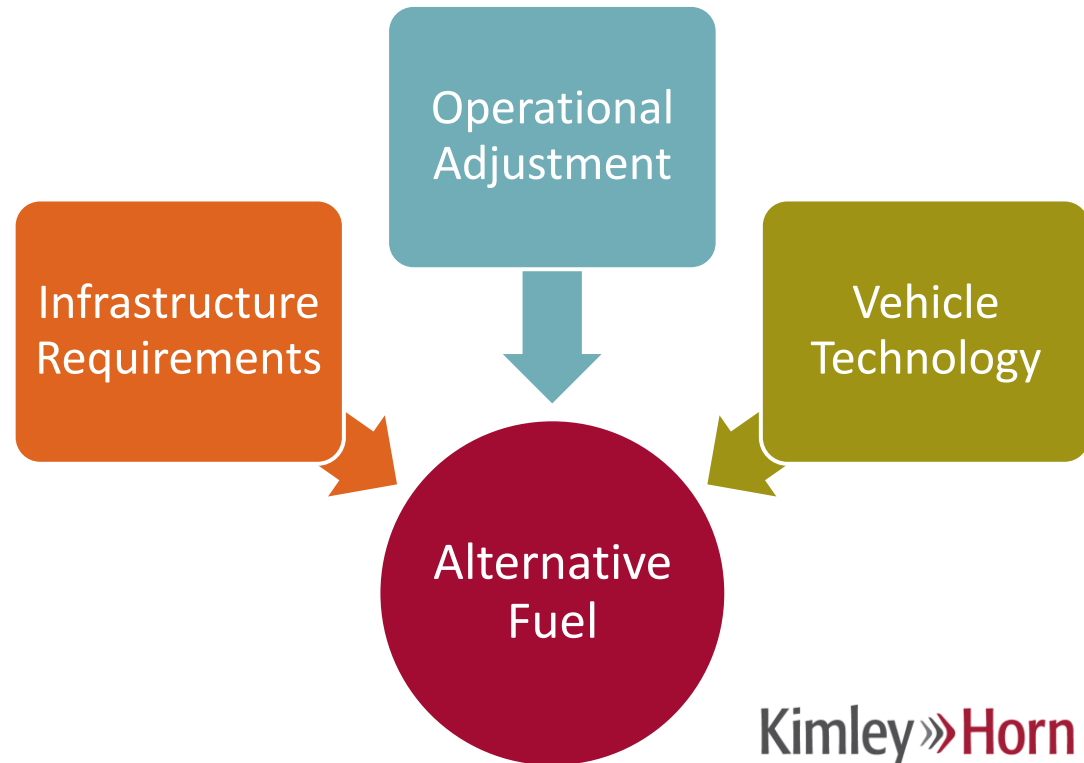
- Achieve 30% GHG reduction by 2030; net zero by 2040
- Determine a preferred cleaner fuel type for Jaunt
 - Consider trade-offs including operating and capital cost, emissions impact, and operational viability
 - Balance the current level of service with practicality of low or no emissions vehicles (minimize impact to operations)
 - Consider well-to-wheel impact of propulsion technology on emissions
- Determine high level implementation strategy and timeline of the preferred fuel type

Technology Overview



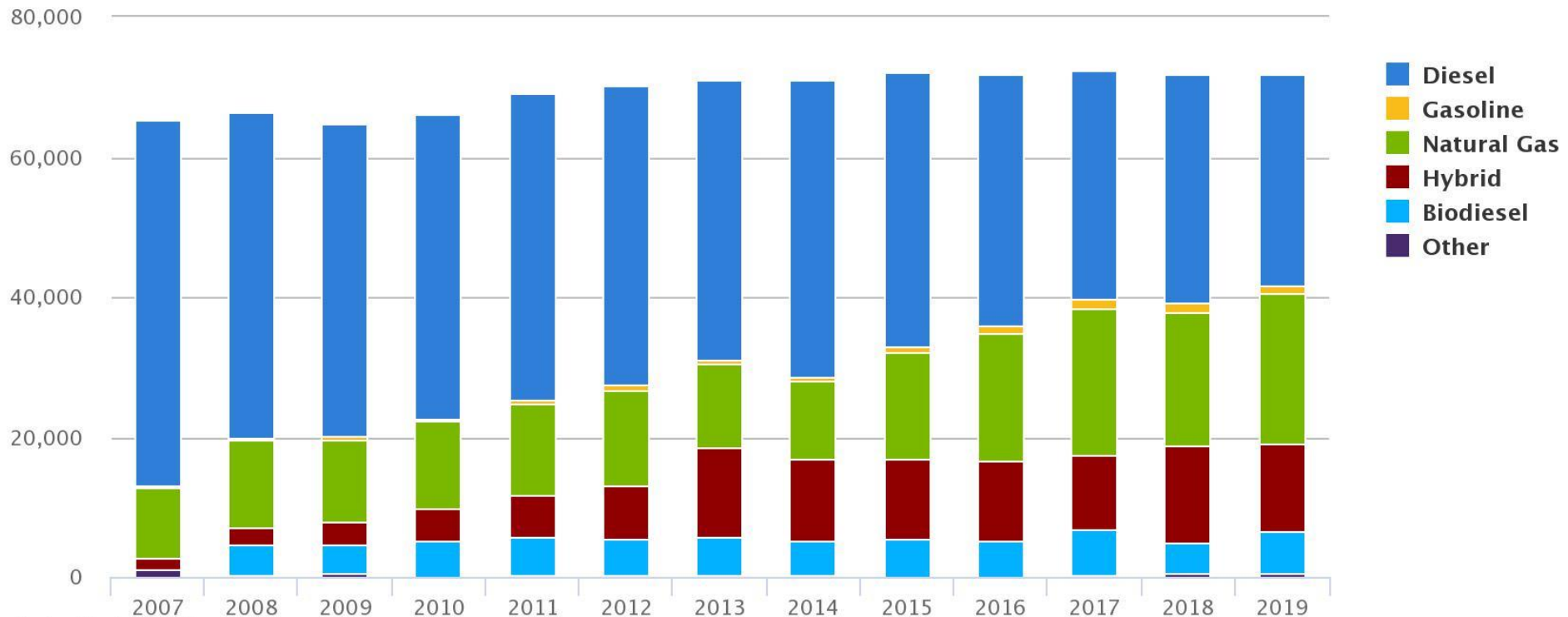
Technologies

- ‘Traditional’ Diesel or Gasoline Fossil Fuel
- **Compressed Natural Gas (CNG)** – *Natural or Renewable*
- **Battery Electric**
- Others:
 - Hybrid Electric
 - Hydrogen Fuel Cell Electric
 - Propane (Liquified Petroleum Gas, LPG, or AutoGas)
 - Biodiesel



Current Share of Transit Bus Fuel Type

Transit Buses by Fuel Type



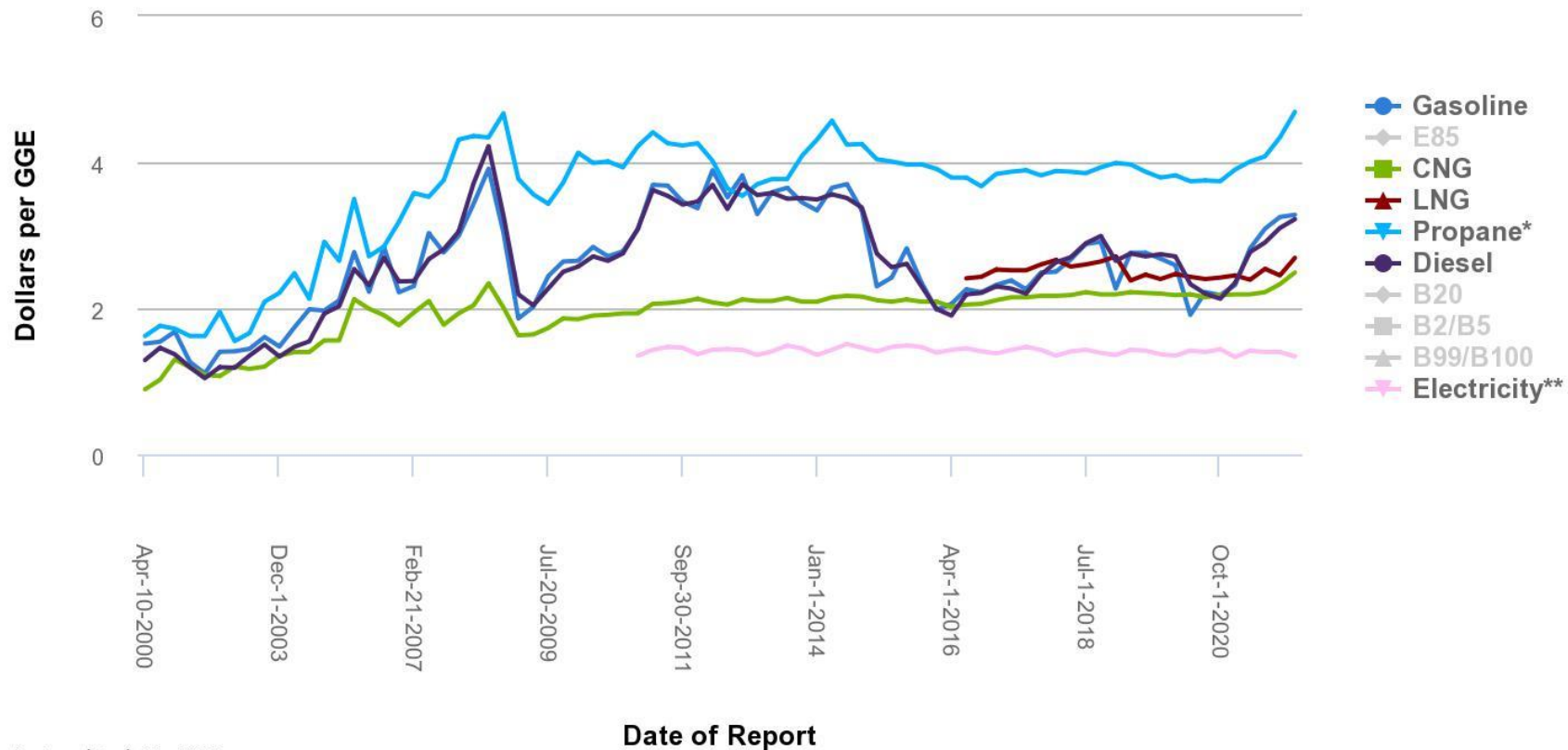
Last updated: July 2021
Printed on: June 9

Source: Derived from Tables 21 and 34 in Appendix A of the 2020 [Public Transportation Fact Book](#) from the American Public Transportation Association

Notes: "Natural Gas" includes compressed and liquefied forms. "Other" up to 2007 included propane, bio/soy fuel, and biodiesel. After 2007, "Other" included battery-electric, hydrogen, and propane.

Cost of Fuel per Gasoline Gallon Equivalent (GGE)

Average Retail Fuel Prices in the United States

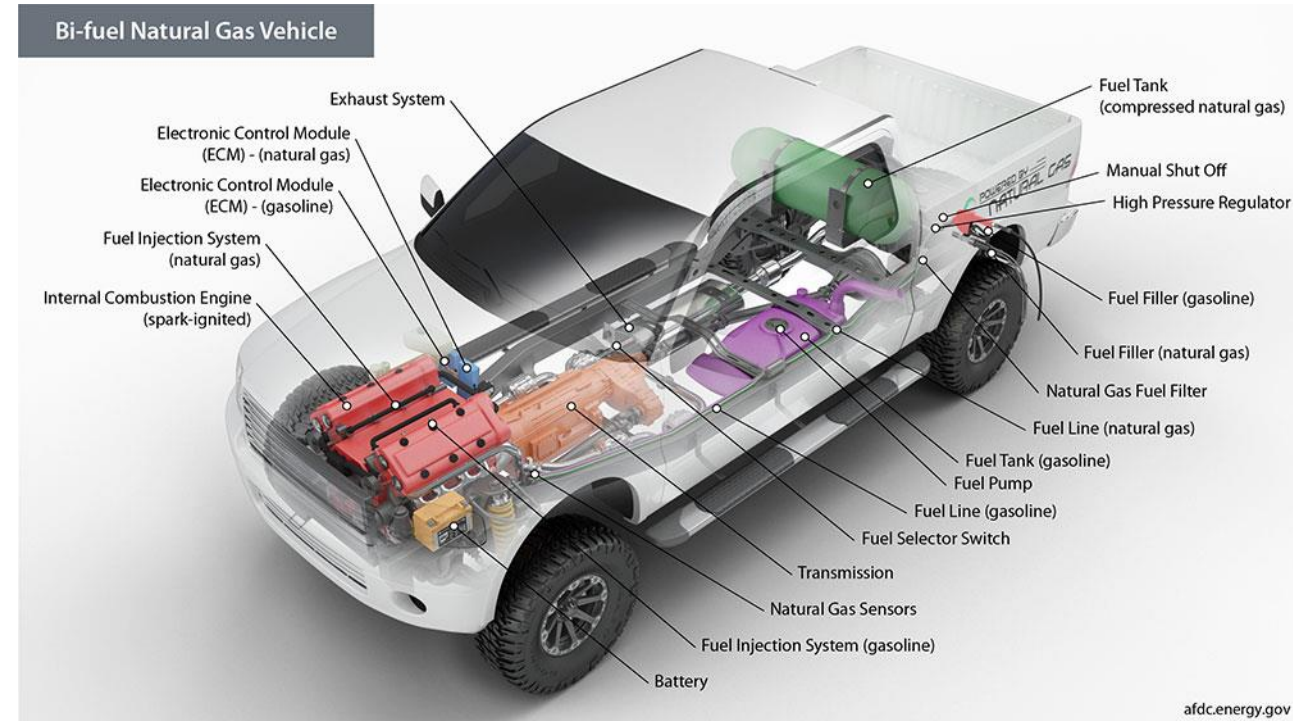


Last updated: May 2022
Printed on: June 10

Source: Clean Cities Alternative Fuel Price Reports | Electricity prices are from EIA's Real Prices Viewer.
Notes: Fuel volumes are measured in gasoline gallon equivalents (GGEs).

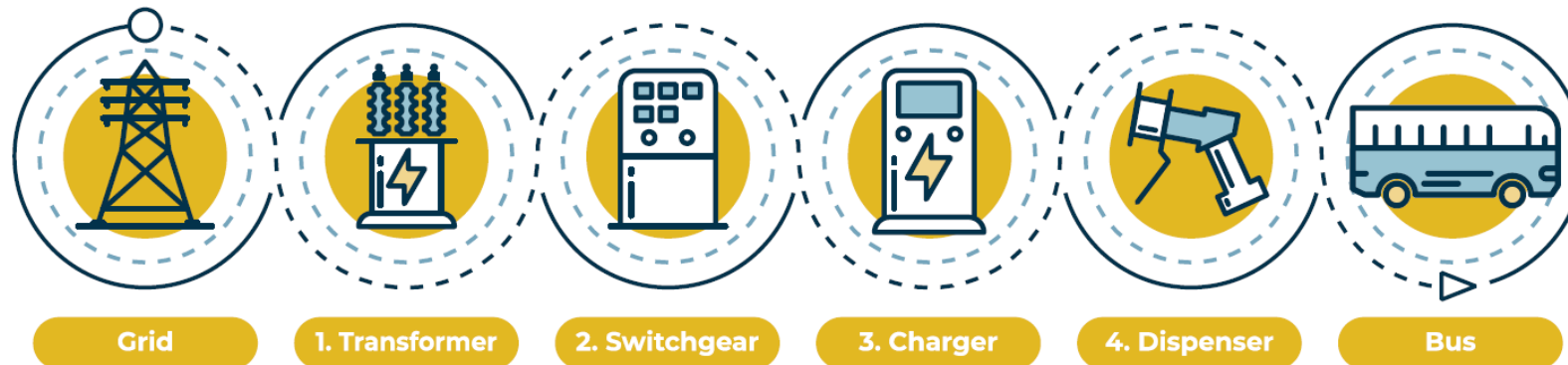
Compressed Natural Gas and Propane AutoGas

- Combustion-based fuel
- Similar to conventional gasoline and diesel vehicles (can even be bi-fuel)
- Range is similar to traditional
- Emissions are dependent on fuel sourcing
 - Natural Gas is primarily Methane and may be derived from fossil sources, anaerobic digesters, agriculture, or landfills
 - Propane can also be made renewably, or sourced as a fossil fuel



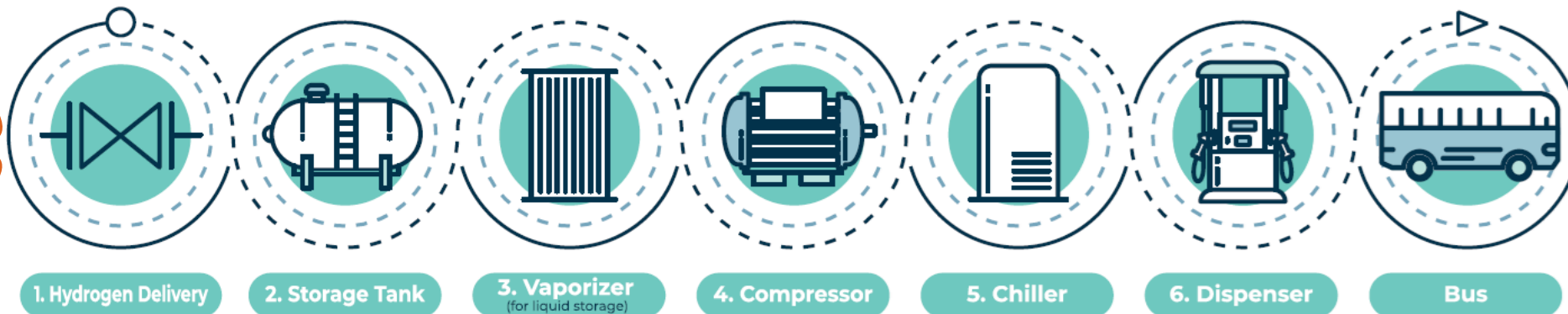
Battery Electric

- Non-combustion propulsion
- Range can vary based on equipment, weather, and a number of other factors, but most vehicle will perform 100-200 miles
- Can be supplemented with fossil fuel heating units to extend range in cold weather
- Emissions are dependent on electric grid generation source



Hydrogen Fuel Cell

- Non-combustion propulsion, similar to Battery Electric
- Fuel is either gaseous or liquified hydrogen
- Range varies based on operating conditions, though generally in parity with traditional diesel vehicles
- Emissions are highly dependent on hydrogen generation





Questions & Discussion

Backup Slides

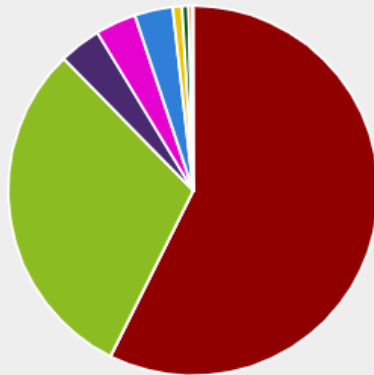
Supplemental Data



Electric Grid Mix for Virginia

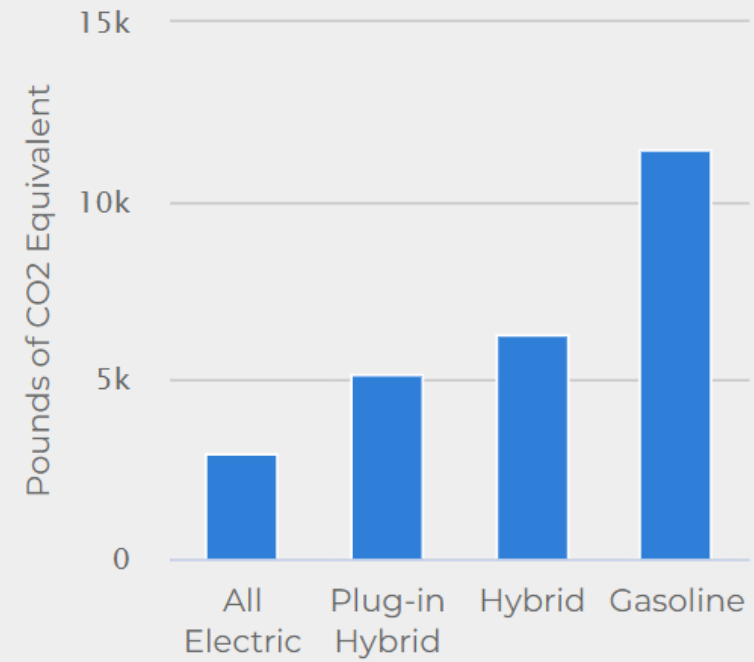
State Averages for Virginia

Electricity Sources



- Natural Gas: 57.3%
- Nuclear: 30.30%
- Biomass: 3.66%
- Solar: 3.57%
- Coal: 3.32%
- Hydro: 0.82%
- Other Fossil: 0.51%
- Oil: 0.35%
- Wind: 0.05%

Annual Emissions per Vehicle



Lifecycle GHG

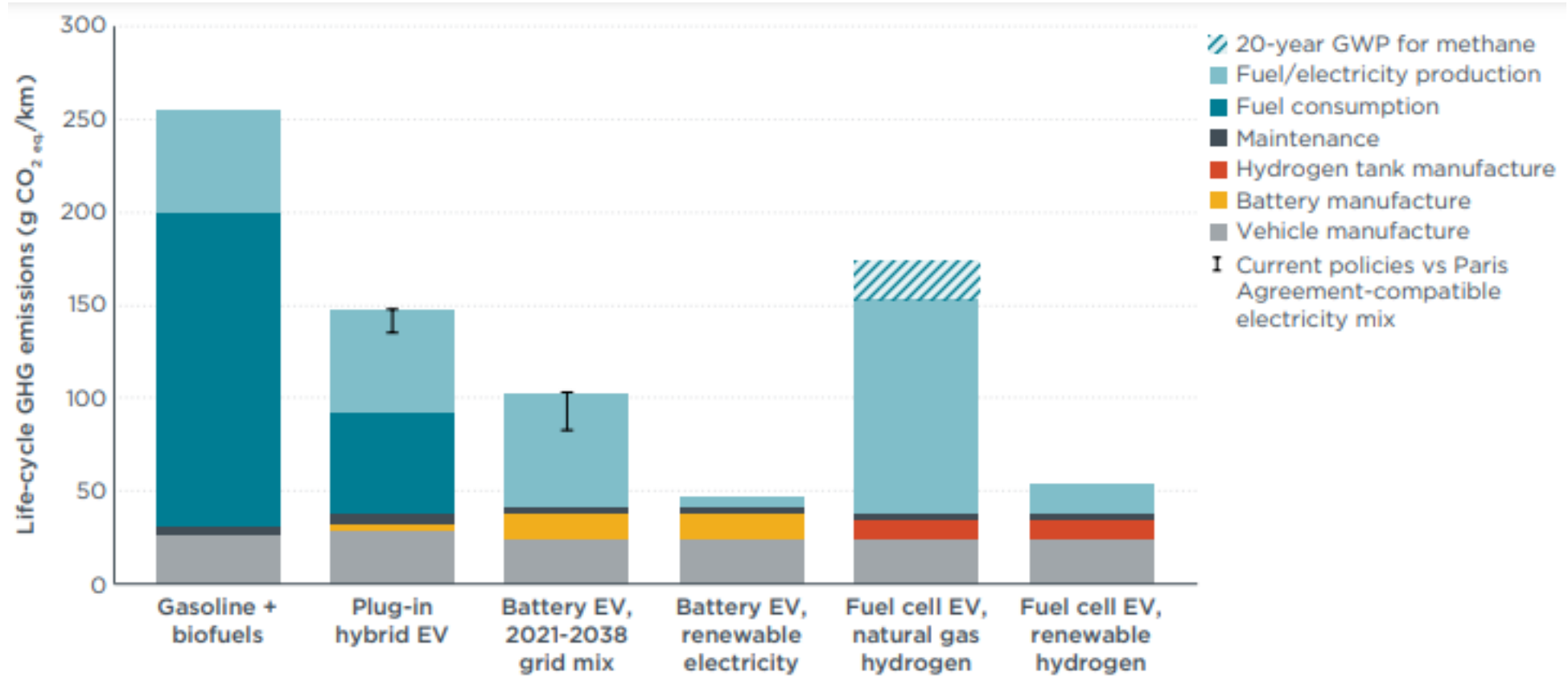


Figure 4.1. Life-cycle GHG emissions of passenger car segment gasoline ICEVs, PHEVs, BEVs, and FCEVs registered in the United States in 2021.

Lifecycle GHG

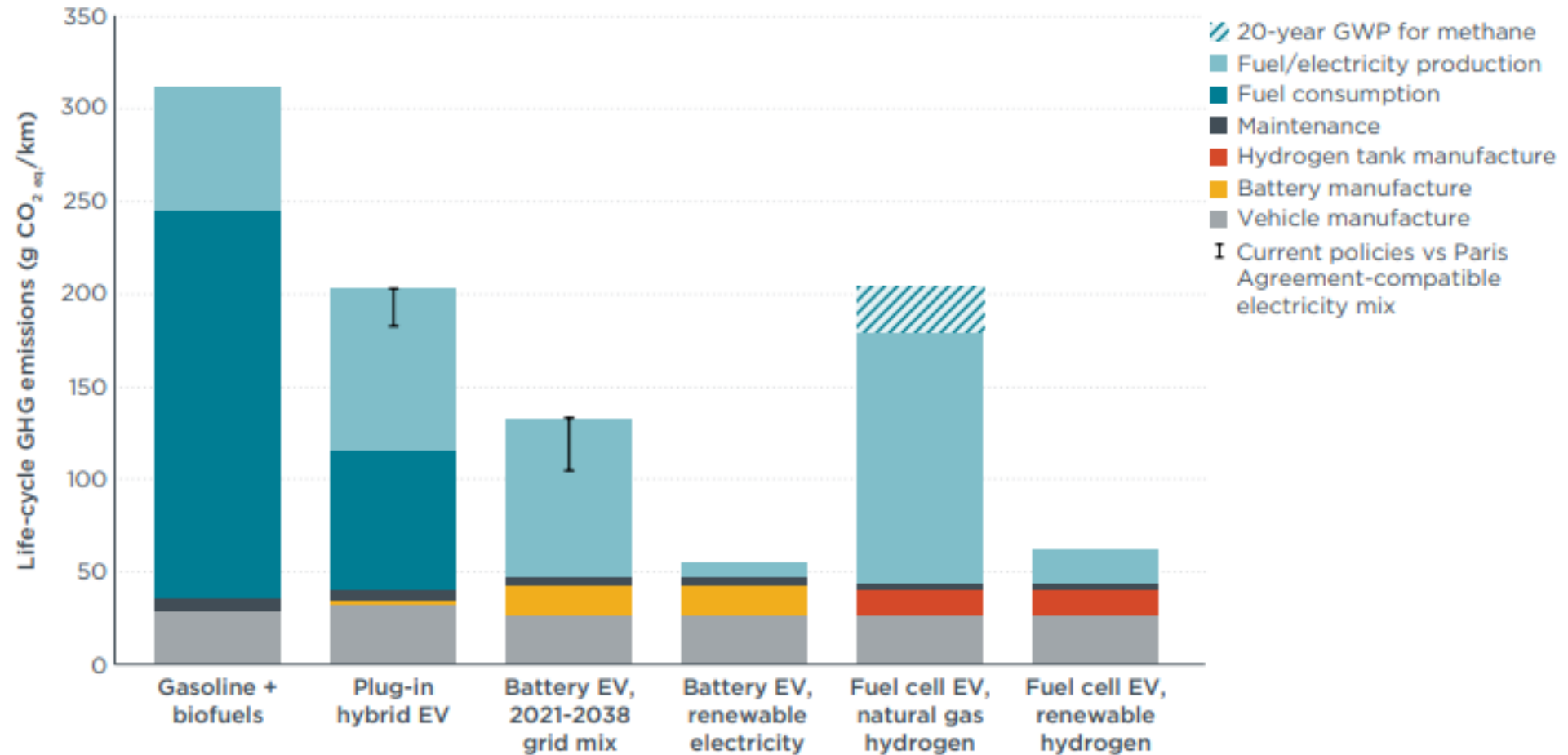
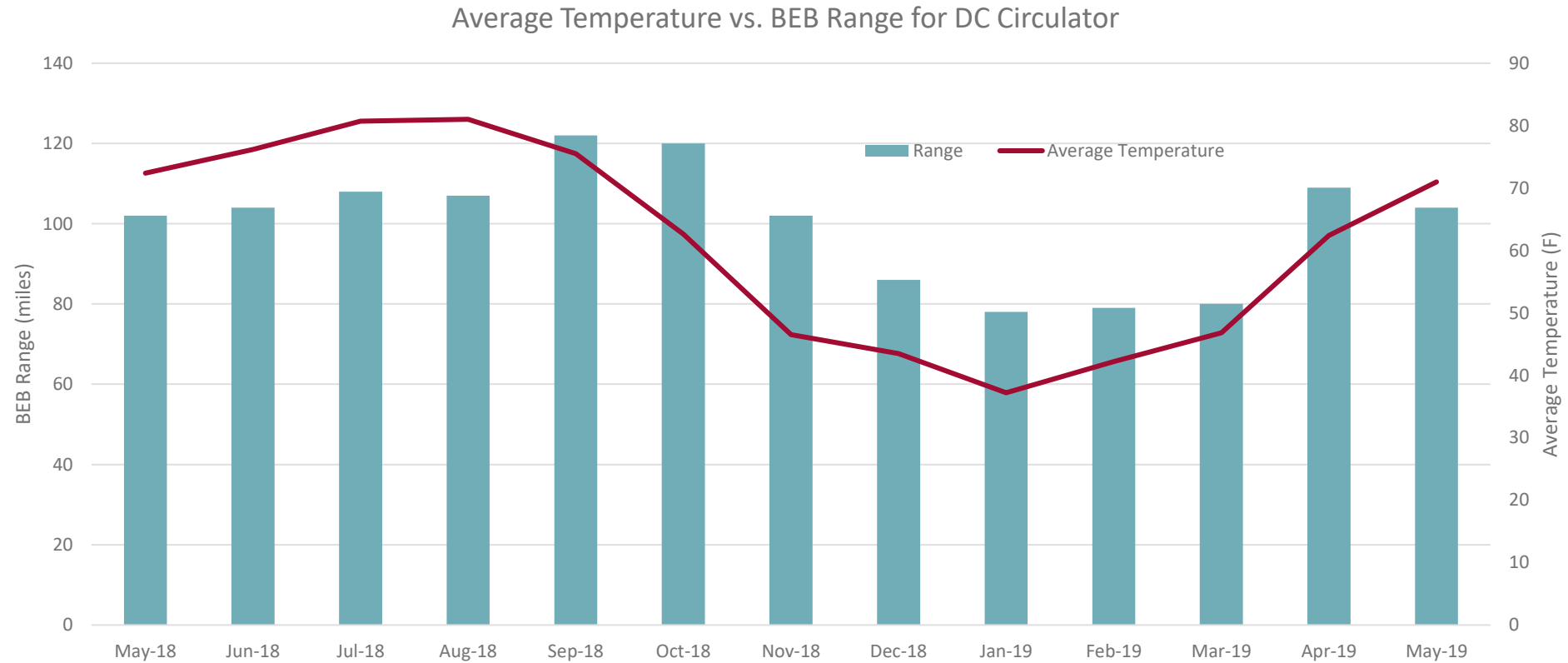


Figure 4.2. Life-cycle GHG emissions of SUV segment gasoline ICEVs, PHEVs, BEVs, and FCEVs registered in the United States in 2021.

Vehicle Range vs. Temperature (DDOT)



*DDOT Pilot Study Average Operating Range (By Month) Vs. Average Washington, DC, Temperatures
(District Department of Transportation, 2021)
(National Centers for Environmental Information (NCEI), 2021)*