Item No. 9b_supp
Meeting Date: January 8, 2019

Bus Procurement Projects

Rental Car Facility Bus Purchase
Employee Parking Bus Purchase

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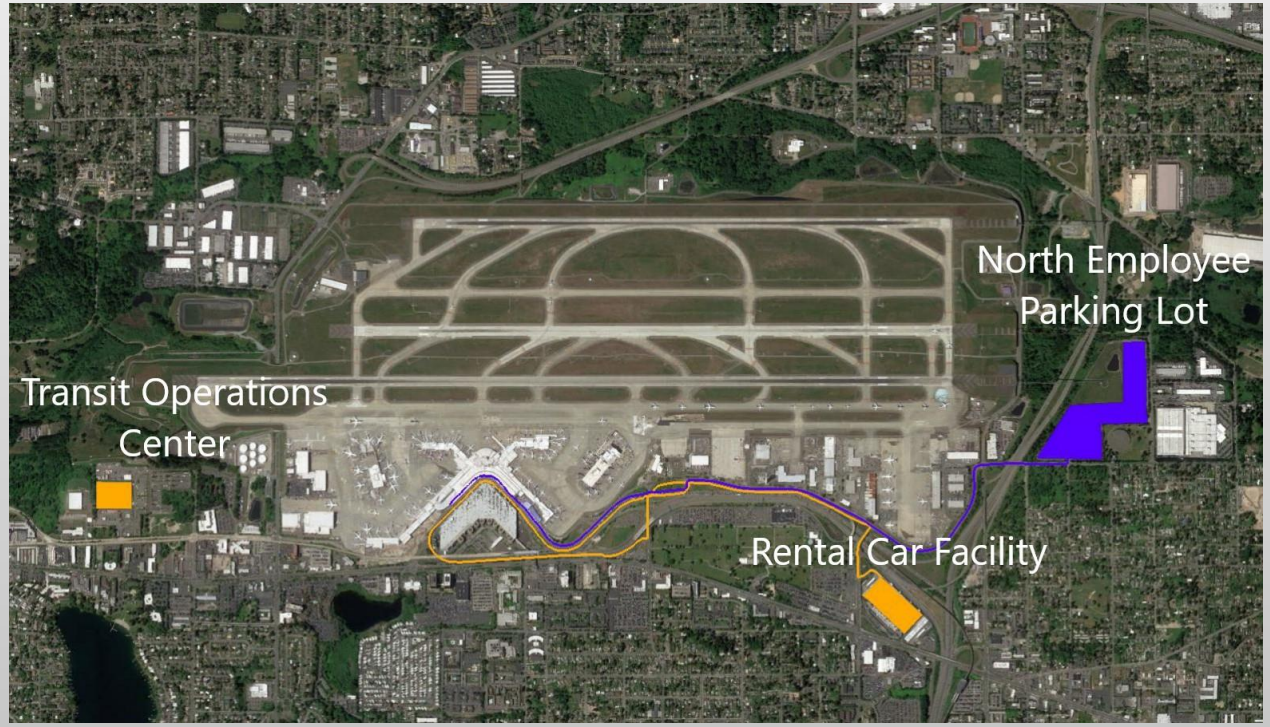
January 8, 2019

Port of Seattle

Briefing Overview

- Project description
  - Current bus operations
  - Future needs
- Goals and objectives
- Alternatives and schedule
- Results
- Recommendation

Bus Operations



Orange route serves rental car passengers, blue route serves tenant employees

Project Description

- Rental Car Facility (RCF), C800810
  - Replace 5 expiring buses and add 1 spare bus
  - Cost recovered through customer facility charge

- Employee Parking (EP), C800956
  - Replace 11 expiring buses and add 7 buses
  - Cost recovered through employee parking rate

Airport must purchase buses to maintain service

Goals and Objectives

- Port goals
  - Reduce carbon emissions
  - Meet growing air transportation needs
  - Financial sustainability of GT operations
- Project objectives
  - Maintain service
  - Minimize cost
  - Reduce carbon emissions
  - Minimize operational impacts

Bus fleet must meet service, financial, and environmental goals

Link to Framework

- Developing a Sustainable Project Framework that incorporates multiple sustainability goals into Port decision-making processes
- Bus procurement project offered an opportunity to test framework assumptions

Bus procurement project was a real-time case study for the Sustainable Project Framework

Project Alternatives

1. Electric buses
   - Requires charging infrastructure and additional buses
   - FAA grant available but uncertain

2. Refurbished CNG buses with Renewable Natural Gas (RNG)
   - New drivetrain, subsystems and interior

3. New CNG buses with RNG
   - RNG is zero net carbon drop-in replacement for CNG
   - Other operators currently use RNG for transportation

Bus technologies differ in price and operational impacts

Schedule

• Commission briefing & authorization	2019 Q1
• FAA grant results	2019 Q2
• Bus/charger purchase (PO)	2019 Q3
• Replacement buses in-use	2021 Q4
• 16 CNG buses retired (EP=11, RCF=5)	2022 Q2

Alternative must be selected by February 2019 to avoid service gaps

Analyzing Alternatives

Step 1: Objectives

- Maintain service
- Minimize cost
- Reduce carbon emissions
- Minimize operational impacts

Step 2: Risks

- Fuel supply
- Maintenance requirements

Analyzed each alternative for its ability to meet objectives and minimize risk

Project Costs

	Electric	Electric w/ grant	Refurbished RNG	RNG
Initial capital cost	$36.6	$25.8	$11.6	$16.8
Average annual operational costs	$0.7	$0.7	$1.0	$1.0
NPV of total cost of ownership (20 years)	$57.4	$46.6	$30.8	$30.0

All costs in million USD 2018

Electric alternative has highest long-term cost

Carbon Emissions

	CNG	Electric	Refurbished RNG	RNG
Carbon emissions (tons CO_2/year)	1,220	20	0	0

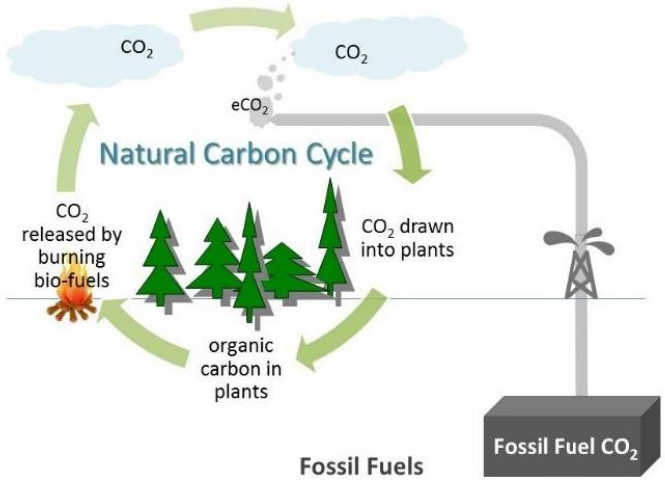
- Expiring buses create 5% of Sea-Tac's Scope 1 and 2 carbon emissions

RNG and electricity have similar carbon reduction benefits

Carbon Emissions

Bio-Fuels

Tailpipe biofuel CO_2 emission do not cause climate change. Although it is the same CO_2 as emitted by fossil fuels, an equivalent amount of CO2 was withdrawn from the air to grow the biomass grew creating a zero sum overall.



Fossil Fuels

do cause climate change. Drilling for fossil carbon and burning it injects CO_2 into the natural biosphere carbon cycle. Since there is no natural way to inject it back into the ground, it builds up in the air, in plants, and in the water causing climate change and other impacts.

RNG does not add carbon to the atmosphere

RNG Availability

- RNG for transportation is available
  - Supported by federal incentive program
  - Bipartisan support; low long-term risk
- Port is developing an RFP for RNG
  - Supplies airport boilers and existing CNG bus fleet
  - Seeking 10- to 20-year term

RNG is currently available and long-term source is likely

Objectives and Risks

Objective	Electric	Refurbished RNG	RNG
Objectives			
Maintain service			
Minimize total cost of ownership			
Reduce carbon emissions			
Minimize operational impacts			
Risks			
Fuel supply and price			
Maintenance requirements			

New CNG buses w/ RNG meet objectives with minimal risk

Recommendation

New CNG buses fueled with RNG

- Meets objectives
  - Reduces maximum amount of carbon
  - Minimizes total cost of ownership
  - Minimizes operational impacts
- Minimizes risk
  - Less maintenance downtime than refurbished buses
  - Allows EV technology to mature and prices to fall
  - Port can revisit electric option prior to 12-year bus replacement

Recommend purchasing new CNG buses and fueling them with RNG

APPENDIX

NPV of Project Costs (20 years)

	Electric	Electric w/ grant	Refurbished RNG	RNG
Total cost of ownership	**$57.4**	**$46.6**	**$30.8**	**$30.0**
Charger capital and installation	$10.4	$5.0	$0	$0
Initial bus capital	$25.2	$19.8	$10.8	$15.2
Bus replacement	$11.4	$11.4	$5.2	$0
Fuel	$2.9	$2.9	$3.2	$3.2
Maintenance	$7.5	$7.5	$11.5	$11.5

All costs in million USD 2018

Electric alternative has highest long-term cost

RNG Cost

- Federal incentives are greater than CNG commodity price
- Other U.S. airports outside of California have procured RNG at similar cost to CNG

RNG price is likely similar to CNG price

Project Cost Summary

	Rental Car Buses – 6 new CNG buses	Employee Parking Buses – 18 new CNG buses	Totals
Current Budget	$1,800,000	$18,081,000	$19,881,000
Budget Increase/(Decrease)	$2,603,000	($5,646,000)	($3,043,000)
Revised Budget	$4,403,000	$12,435,000	$16,838,000

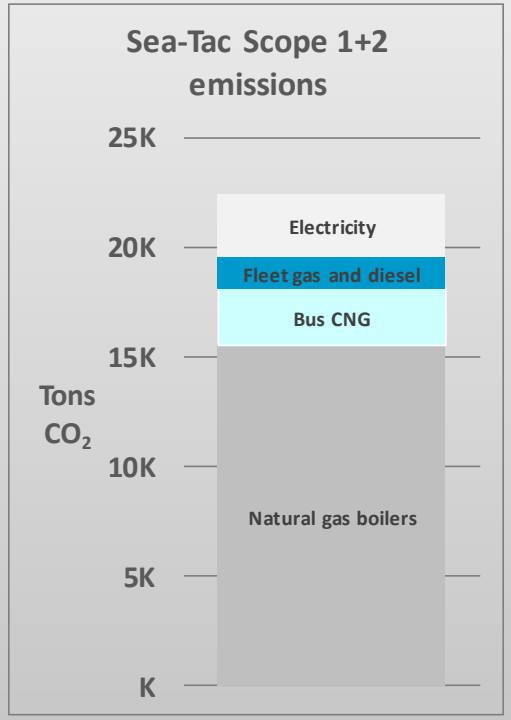
Recommended alternative results in net ~$3 million overall budget reduction

Carbon Reductions Relative to CNG

	RNG	Electric	Refurbished RNG
Emissions reduced relative to CNG (tons CO_2/year)	1,220	1,200	1,220
\$/ton of CO_2 reduced relative to CNG	\$0	\$925	\$0

RNG and electricity have similar carbon reduction benefits

Carbon Reductions from RNG



- Natural gas is 80% of Scope 1+2 emissions
- RNG is zero-carbon drop-in replacement for natural gas

RNG for buses and boilers reduces Sea-Tac's Scope 1+2 emissions by 80%

Comparable Bus Operators

- Pierce Transit: primarily CNG
- Community Transit: diesel
- Microsoft: diesel and gasoline
- Amazon: diesel
- UW: gasoline
- Children's Hospital: gas/propane bi-fuel

With RNG, the Port would remain a regional sustainability leader

Electric Utilities at Sea-Tac