2021 DOE Vehicle Technologies Office Annual Merit Review Presentation

East Zion National Park Electric Vehicle Shuttle System

P. I. Name & Presenter: Tammie Bostick, Utah Clean Cities Coalition

Utah Clean Cities Coalition

Date: 6/23/2021 5:50:00 PM EDT

Project ID #
ti116

Overview

Timeline

- Start Date: October 2019
- Completion Date: December 31, 2022
- Percent complete: ~50%

Budget

- Total project funding $1,436,569
  - DOE share $655,000
  - Contractor share $781,569
- Funding for FY 2020 $280,869
- Funding for FY 2021 $925,198
- Funding for FY 2022 $230,502

Barriers and Technical Targets

- Barriers addressed

(1) identify barriers to EV

infrastructure and EV deployment, with a particular focus on gateway rural townships in Kane, County

(2) develop and demonstrate modern, electrified and advanced EVSE infrastructure as a clean, reliable, time-efficient fueling source

(3) test, demonstrate, and deploy available advanced vehicles technologies

(4) develop a complementary project that supports ZNP's current

master plan. As a final deliverable, the National Park EV Development Concept Plan will provide a full case study on this three-year project with the intention to assist with similar EV shuttle deployment projects.

Partners

- Kane County, Utah
- National Renewable Energy Labs
- Utah Department of Transportation
- Zion National Park
- Zion Forever Visitor Center

Relevance

Abstract

EVZion will demonstrate a small-scale environmentally sound, zero-emission, electric vehicle (EV) shuttle system through the east entrance of Zion National Park (ZNP). The project has been designed for universal scalability, with deployment in other high-traffic, environmentally sensitive National and State Parks throughout the United State

OBJECTIVES

The primary goal of this project is to connect ZNP and Kane County through the development, deployment, and management of an electric shuttle system. To accomplish the project goal, a successful electric shuttle system will be developed, including a Shuttle Hub, shuttle stops, EVSE and EV shuttle deployment. We will demonstrate the viability of an electric shuttle system as a scalable transportation solution connecting ZNP and the rural region of Kane County

PROJECT IMPACT

- EV development and deployment pilot study
- Regional transportation system
- Scale-able & replicate-able
- Increase regional resiliency and connectivity
- Mitigate environmental impacts
- Reduce energy consumption, vehicle traffic and pollutant emissions, and ambient noise
- Improve visitor experience, safety and service

PROOF OF CONCEPT

- ❑Pilot EV
- ❑Scale
- ❑Replicate
- ❑Regional
- ❑National

Milestones

Milestone – Budget Period 1 -2020	Type	Description
Best Strategies Compiled	Technical	Completed Best Practices Strategy Plan
Mapped EV Shuttle System	Technical	EV shuttle system route, shuttle stops, and affiliated infrastructure mapped and all sites required for the project have received government approval in accordance with the National Energy Policy Act for Environmental Compliance.
RFP Sent to Vendors & Received Back	Technical	Response to RFP from EV shuttle and EVSE vendors received.
Preliminary EV Shuttle Route Designed	Go/No Go	The EV shuttle route design has been completed.

Milestone - Budget Period 2 -2021	Type	Description
Kanab Infrastructure Developed	Technical	Kanab Shuttle Hub developed and EVSE developed
ZNP Infrastructure Developed	Technical	ZNP west entrance shuttle stop developed, EVSE developed
Apple Cross/Carmel Junction Infrastructure Developed	Technical	Apple Cross/Carmel Junction shuttle stop developed, EVSE developed
Two EV Shuttles Acquired	Go/No Go	Vendor proposals reviewed and EV Shuttles fleet acquired for the Kanab fleet

Milestone - Budget Period 3 -2022	Type	Description
Kanab Infrastructure Developed	Technical	Kanab Shuttle Hub developed and EVSE developed
ZNP Infrastructure Developed	Technical	ZNP west entrance shuttle stop developed, EVSE developed
Apple Cross/Carmel Junction Infrastructure Developed	Technical	Apple Cross/Carmel Junction shuttle stop developed, EVSE developed
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Approach

Assessment & EV Shuttle System Planning

- **Needs and Barrier Assessment**
  - Collection of input from stakeholders as identified from the Needs and Barrier Assessment
  - Identification of key transportation strategies
- **Best Strategies Plan Compiled**
  - Stemming from key issues addressed by the Needs and Barrier Assessment
- **Map EV Shuttle System Route & Infrastructure**
  - Working closely with Utah Rural Transit Authority to strategically plan stops, and route for best efficiency
- **Request for Proposal published to potential EV Shuttle and EVSE vendors**
  - Selection of vendors

EVSE & Shuttle Stop Development

- **Kanab Shuttle Hub & Infrastructure Development**
  - Purchase and installation of infrastructure
- **Zion Area Shuttle Stop & Infrastructure Development**
  - Purchase and installation of infrastructure
- **Apple Cross Shuttle Stop & Infrastructure Development**
  - Purchase and installation of infrastructure
- **EV Shuttle Purchase & Deployment**

Following infrastructure development, Request for Proposal (RFP) process. The distributed RFP will consider technical specifications (range, battery size, etc.) and will be developed in consultation with technical experts on the team, including NREL and local stakeholders.

EV Shuttle Demonstration

- **Data Collection Demonstration Test**
- **Temporary Limited Service Pilot Test**
- **Full Service Pilot Test & Outreach**
- **Full Project Aggregation & Analysis**
- **Final Project Webinar**

The EV shuttles will complete a year long incremental data collection demonstration pilot period where the vehicle will be loaded to capacity with test weight and tracked to record the vehicle's reaction to the performance environment - including the Zion-Mount Carmel Tunnel, narrow roads, and steep grades.

Each 4 month demonstration period will increasingly test and prove success at the targeted performance level. Concluding the test period, solutions will be distributed through the developed National Park EV Development Concept Plan document to provide recommended deviations for large alternative fuel EV shuttle systems to increase smart and secure growth throughout the nation.

Technical Accomplishments and Progress

EVZion Shuttle

UTAH CLEAN CITIES

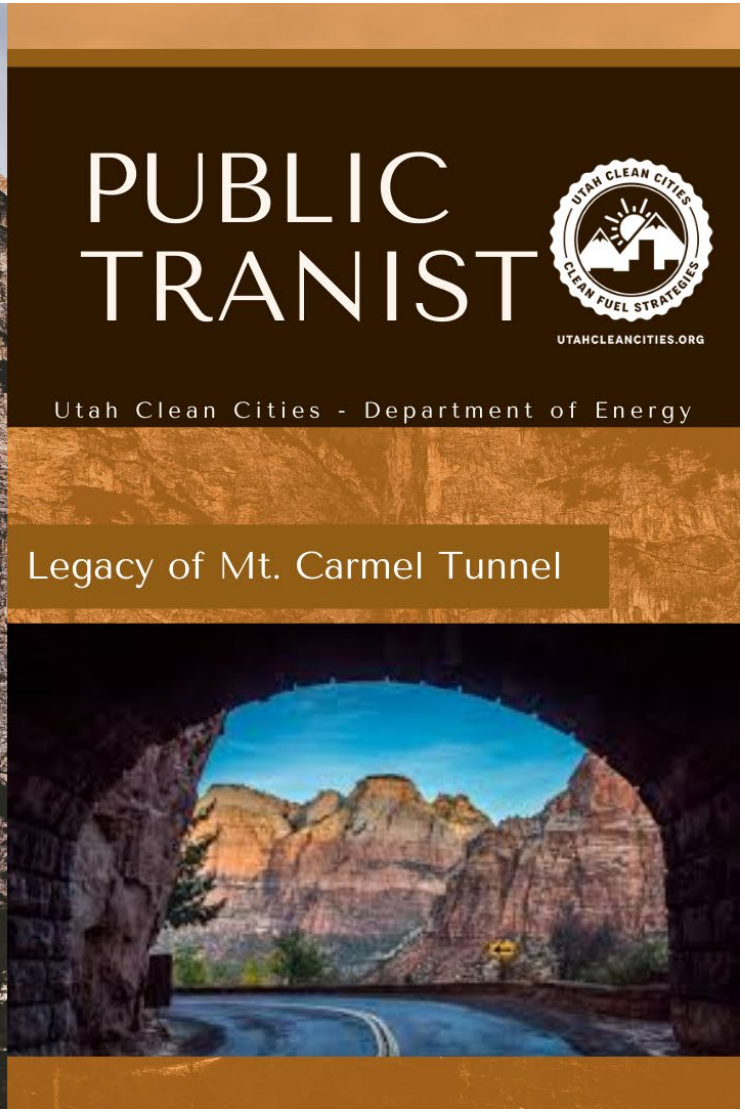
Department of Energy Pilot Project

- Demonstration of Electric Shuttles
  - Accommodate Tunnel
  - Steep Grades
  - Hair-Pin Turns
  - Extreme Environment, Four-Season
- Scale, Replicate and Duplicate Nationally

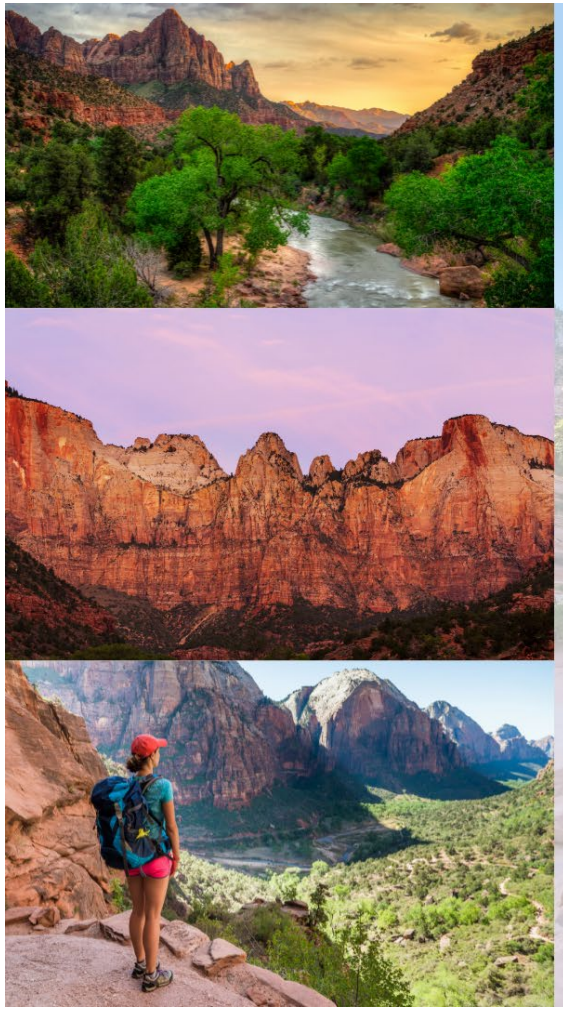
VISITOR EXPERIENCE

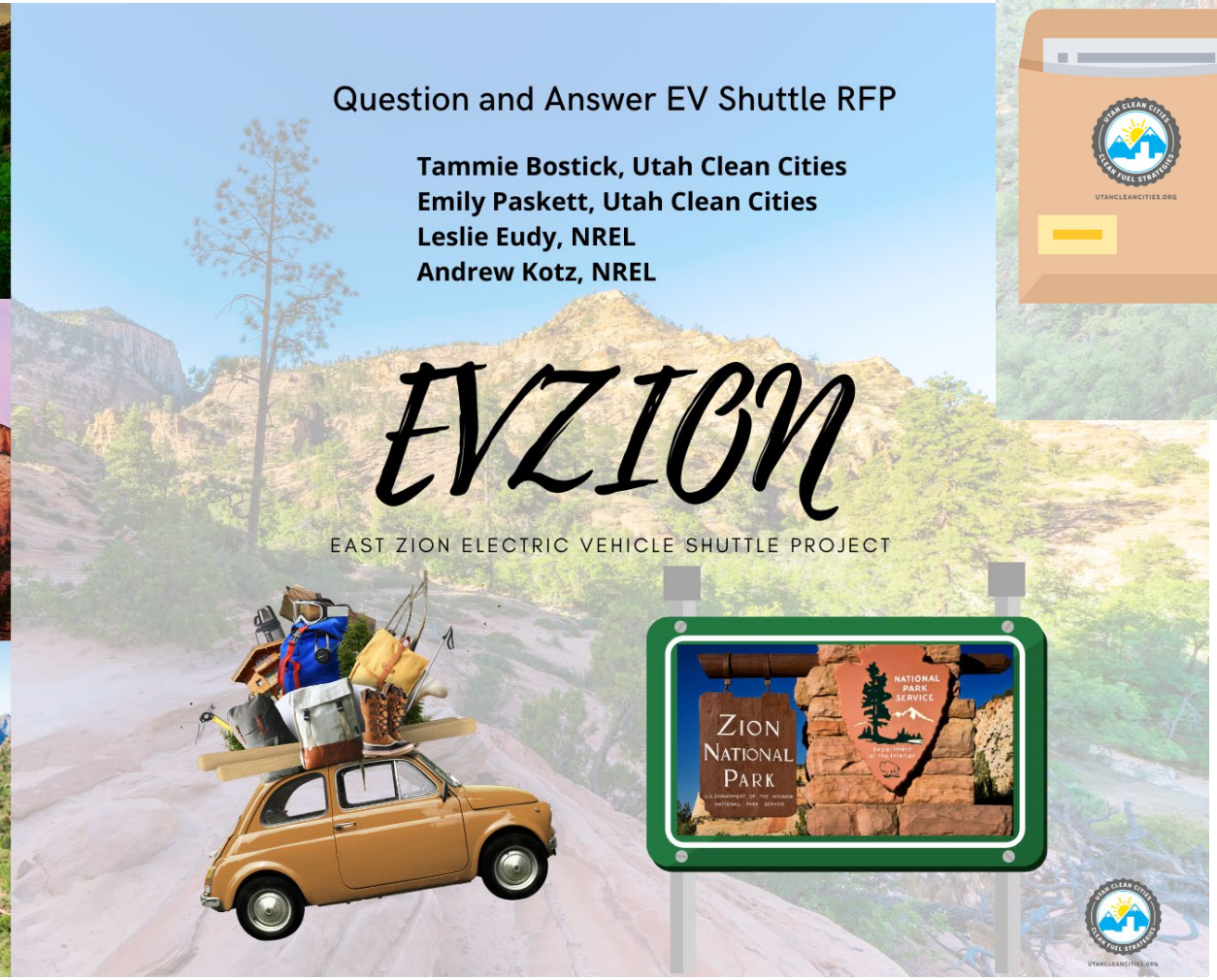
Connecting East Zion Area & East Zion Visitor Center

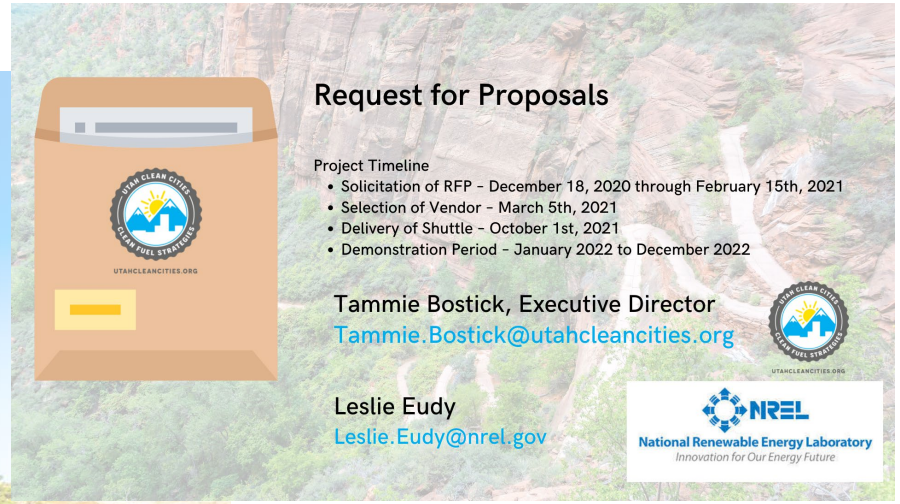
- Theater View Touring- Becomes the Experience
- Zero Emissions - Sustainable Fueling
- All-electric Shuttles



Technical Accomplishments and Progress







EVZion Shuttle

Responses to Previous Year Reviewers' Comments

This is the first Annual Merit Review

Thank you.

If your project was not reviewed last year, please indicate as such on the slide.

Collaboration and Coordination with Other Institutions

Utah Clean Cities
Project Prime, Clean Cities Coalition

National Association of State Energy Officials
Project Prime, Clean Cities Coalition

Denver Metro Clean Cities Coalition
Sub Recipient, Clean Cities Coalition

Kane County
Sub Recipient, Local Government
EV Shuttle Owner & Operator

Northern Colorado Clean Cities Coalition
Sub Recipient,
Clean Cities Coalition

Zion Forever
Sub Recipient, Federal Government
Shuttle EVSE Owner & Operator

Columbia Willamette Clean Cities
Sub Recipient,
Clean Cities Coalition

Kanab City Center
Sub Recipient, Local Government
Shuttle EVSE Owner & Operator

Treasure Valley Clean Cities Coalition
Sub Recipient, Clean Cities Coalition

Valley of the Sun Clean Cities Coalition
Sub Recipient, Clean Cities Coalition

Yellowstone-Teton Clean Cities Coalition
Sub Recipient,
Clean Cities Coalition

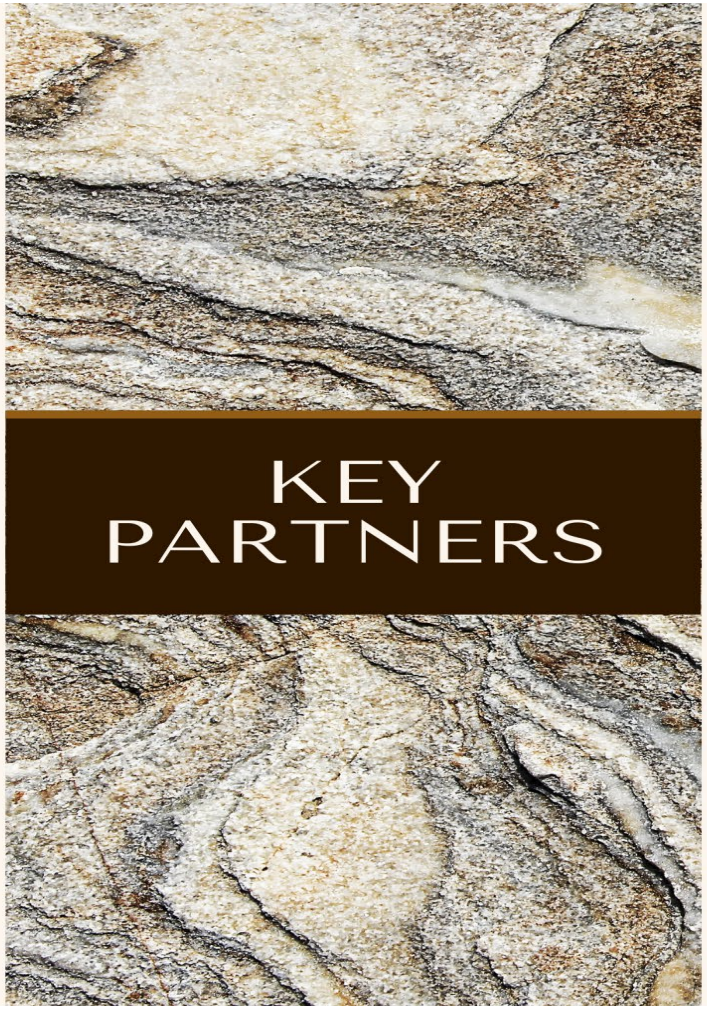
EVZion Shuttle

Primary Investigator

Steering Committee

Community Partners

Collaboration and Coordination with Other Institutions



- Kane County Private Land Owners
- Zion National Park
- Zion National Park Forever Project
- Kanab BLM Field Office
- Utah Department of Transportation
- Utah Governor's Office of Economic Development
- Five County Association of Governments
- Utah Office of Tourism
- Utah Clean Cities

Remaining Challenges and Barriers

- Vehicle Related
  - Finding Chassis that are not standard width and height
    - Can two shuttle really pass each other in the tunnel?
  - Demonstrating long-term the efficacy of battery vehicle in the four season environment of Zion Park with steep, winding roads; averaging a consistent 11% grade climb and decent.
  - Will an OEM be able to create the promoted Vista View experience – Theater View Shuttle configuration desired by the park and Kane County.
- Public Transit Contingency
  - Will a shared ridership work with post covid tourism
  - Will the shuttle be able to provide enough ride space with social distancing and proper spacing

- Continue To Support And Consult On A Southwestern Regional Transportation Plan
- Secure Operating Costs For A Multi-modal Smart Transportation Collective
- Further Develop The M.O.V.E Smart Mobility Plan For Gateway Communities
- Develop Relationships With Municipalities, Rural Towns And Gateway Communities, To Secure And Effectively Use State And Federal Government Funding.
- Continue To Work With Local, State And Regional Governments To Ensure Bi-partisan Collaboration
- Continue To Develop Rural Community Workforce Mobility In Underserved Communities With Range Challenges Related To Transportation: Traditional And Advanced Alternative.
- Training High Quality Bus And Shuttle Driver Programs And Logistic Routing For Highly Effective Transit Programs
- Support The Ongoing Development Of Zion National Park's Transit Program; Focusing On The New Forever Zion Visitor Center.
- Support And Mentor Regional And National Clean Cities Program Coalitions To Replicate And Scale Similar Smart Mobily Project In Rural Gateway Communities.

Any proposed future work is subject to change based on funding levels.

Summary Slide

- Relationship building with stakeholders is paramount to the success of DOE VTO Clean Cities projects.
- Actively involving and engaging with local and state leadership effectively combines state and federal resources in a multiplier effect– this is unique to high functioning Clean Cities programs
- Rural transportation infrastructure development and vehicle deployment is essential to ensure equity in underserved communities.
- Developing tools and strategies to support stakeholders, public and private partnerships in advancing transportation and smart mobility goals is a core value of a successful Clean Cities project.