FRONTIER energy

Planning for the ZEV Transition

FRONTIER energy

20 years experience in green fleet analysis and 40+ years experience with utility programs.

DKS

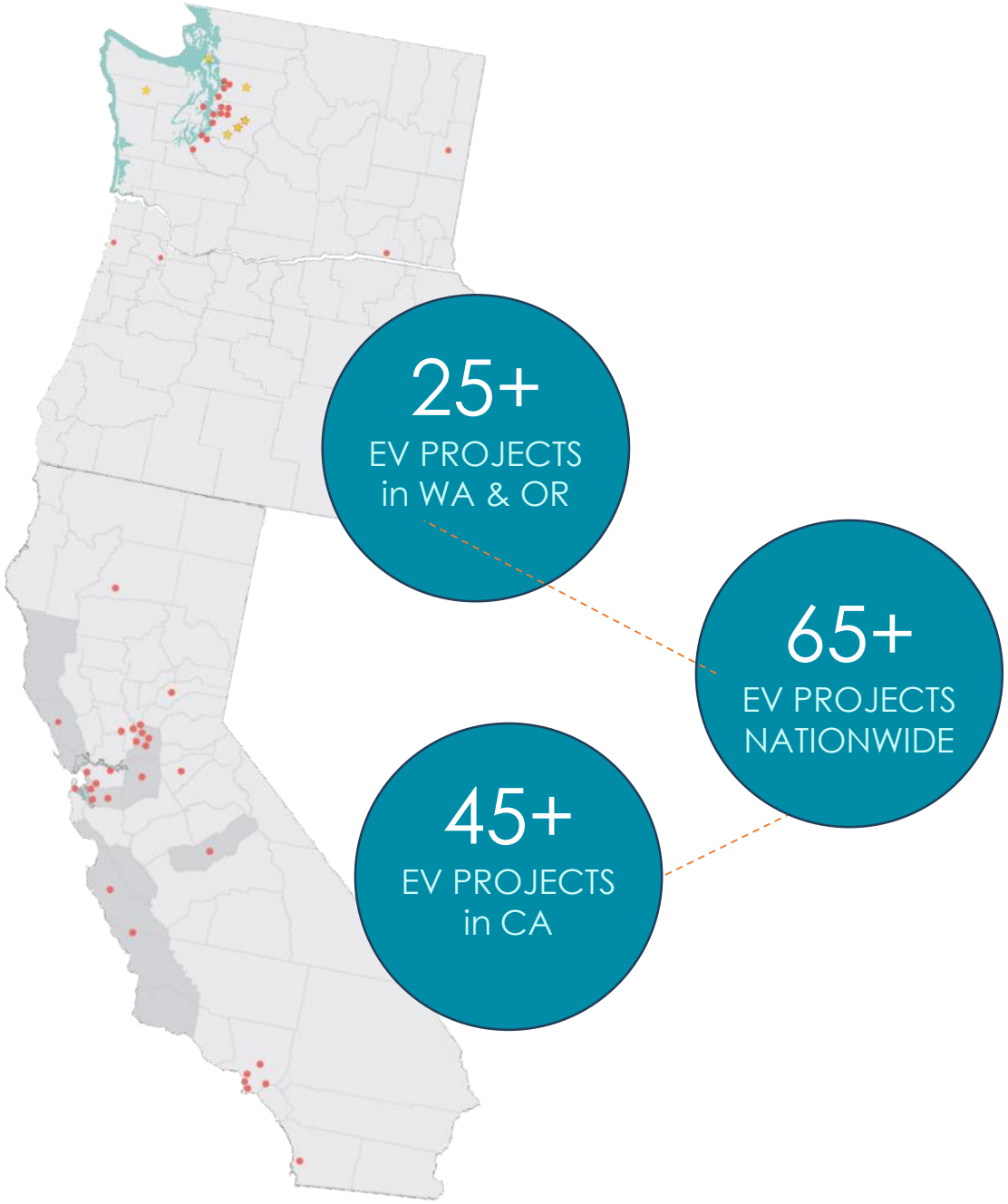
40 years experience designing transportation systems to serve community members and fleets.

MOMENTUM

Experience helping 1500+ clients and institutional partners deploy $10B+ in globally significant innovations.

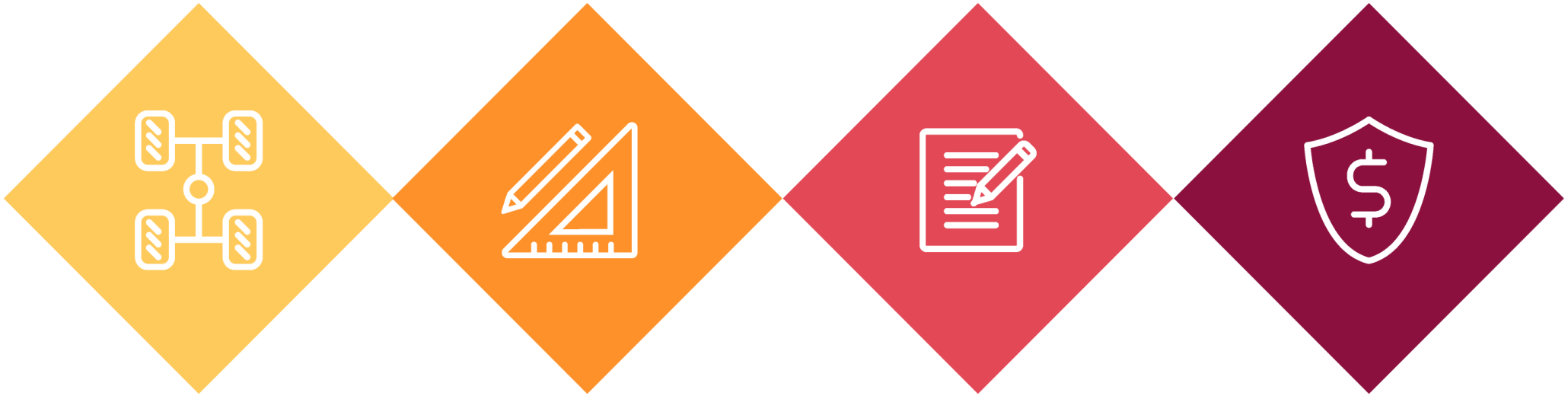
SUGARPINE ENGINEERING

Responsive engineering for real energy savings and true impact.



FRONTIER energy

Nevada County strategies



Right Size

Retire low-mileage vehicles
Match vehicles to use

Shuffle

Delay implementation
Pull forward & push back
Request exemptions

Partner

Coordinate with other agencies on infrastructure

Incentives

Actively seek state and federal grants

2024
ON YOUR MARK

Implement ZEBs & Charging
Complete the electrical upgrades for the planned charging stations.

Install, operate, and collect data to inform operations.

Shuffle Vehicle Purchases
Identify specific vehicles that will need to comply with ACF in 2027-2029 and reallocate budget to replace by December 2026.

Survey Employees
Understand current and future desire for workplace charging, and willingness to pay for electrons.

Increase Electrical Capacity
Complete load analysis with PG&E and evaluate battery energy storage.

2024-2029
GET READY

Procure ZEVs
Purchase ZEVs for Class 8 and Class 2b pickups.

Apply for ACF exemptions

Add LD ZEVS that reach cost parity

Install Charging Stations
Issue bids for charging station vendors and construction.

Dig once; install conduit and wires for future charging stations to reduce construction costs and minimize disruption.

Plan for the Budget Bubble
All new light-duty vehicles, including police, will be ZEVs.

Vehicles replaced early in Phase 1 will need to be replaced again.

Refuse trucks will start to be replaced.

Explore a Grid Resiliency Program
Identify options to ensure that vehicles can charge during a power outage, which may include a microgrid, long-duration energy storage, and hydrogen production.

2030-2034
GET SET

Plan for Capacity
Explore and evaluate advanced technologies and software that can reduce grid load of charging.

Consider behavior and technology changes on electric use.

Install remaining charging stations.

Procure ZEVs
Increase purchases of medium- and heavy-duty ZEVs ZEVs for Class 8 and Class 2b pickups.

All LD vehicles are ZEVs

Assess Hydrogen Potential
Assess the progress of locally available hydrogen.

Coordinate with other fleets about interest in hydrogen and fuel cells.

Reassess the initial recommendations for BEVs and FCEVs for transit and heavy-duty.

Analyze Data and Adapt
Collect and analyze data from vehicles and stations to show trends in use, cost, maintenance, reliability, accessibility, and gaps, Use predictive modeling to identify future impacts to budgets and staffing.

2035+
GO!

Complete the Transition
Except for fire apparatus, all fleet vehicles are ZEVs.

All infrastructure is installed and operating.

Adjust Policies
Based on experience, adjust policies and practices for procurement, maintenance, take-home vehicles, and charge-back fees.

Plan for the Next Change
Follow developing regulations, land use policies, and workforce development to prepare for other decarbonization efforts

Celebrate!
Getting here was a long and unpredictable road. Celebrate your success!

Summary of each phase

Phase	Total Added ZEVs		Total Added Charging Stations		
	Light	*MHD*	*Level 2*	*Slow DC*	*DCFC*
	82	11	50	3	2
	73	55	62	9	5
	23	26	16	12	0
Total	**270 EVs**		**128**	**24**	**7**

EV and EVSE costs through 2050

- EVSE OpEx
- EVSE CapEX
- Registration
- Fuel
- Maintenance
- Vehicle CapEx

Does not include gas vehicle purchases

CapEx Needed Over Baseline	$9.8M
OpEx Savings Compared to Baseline	$7.0M
Max Charging Rate	150 kW
DCFC Ports (While U Wait)	14
DC Slow	24
New L2	256

NEVADA COUNTY CALIFORNIA

Nevada County Fleet Electrification Assessment

EVSE Recommendations | Transition Planner | EV Procurements | ACF Compliance | Fuel Cost Comparison | GHG Emission Reductions | Risks/Challenges

Infrastructure/EVSE Recommendations

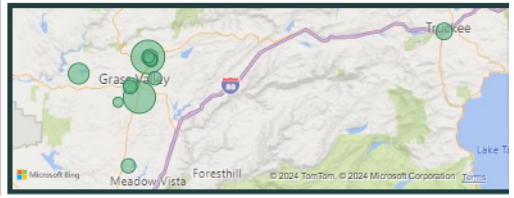
Recommended

Facility	EVs	L2s	Slow DC	DCFC	CapEx	OpEx
Brighton Greens	11	6			$472,600	$344,770
Crown Point	13	7			$224,800	$352,760
District Attorney	7	4			$164,500	$227,390
Facilities SC	8	4			$262,700	$234,300
Joseph Center	10	5			$187,900	$298,500
Lake of the Pines Treatment Plant	5	1	4	2	$494,300	$849,270
Lake Wildwood Treatment plant	15	7	2	2	$682,500	$1,032,830
LEGEND	0					
Madelyn Helling Library	1	1			$70,200	$132,000
McCourtney Rd. Transfer Station	3	1	1		$53,700	$137,790
Total	270	128	24	7	$7,224,000	$9,139,730

NEVADA COUNTY CALIFORNIA

Phase

Phase 1 | Phase 2 | Phase 3



Phase 1: 2024-2029
Phase 2: 2030-2034
Phase 3: 2035-2053

EV = Electric Vehicle
EVSE = Electric Vehicle Supply Equipment
CapEx = Capital Expenditures
OpEx = Operating Expenditures

NEVADA COUNTY CALIFORNIA

Facility

- Select all
- Brighton Greens
- Crown Point
- District Attorney
- Facilities SC
- Joseph Center
- Lake of the Pines Treatment ...
- Lake Wildwood Treatment pl...
- Madelyn Helling Library
- McCourtney Rd. Transfer Sta...
- NCOC
- Nevada City Veterans Hall
- Nevada County Airport
- Rood Center (ERAC)
- Sheriff's Property Unit
- Station 91-McCourtney
- Take Home
- Wayne Brown CF

EV = Electric Vehicle
EVSE = Electric Vehicle Supply Equipment
CapEx = Capital Expenditures

Transition Planner

ID #	Model Year	Make	Model	Veh Pathway	Facility	Replacement Year	EV CapEx
26497	1999	Isuzu	NPR	BEV	NCOC	2025	$161,071
27161	1999	Rampstar	RC3C0	BEV	Nevada County Airport	2035	$87,710
26434	2000	GMC	C6500	BEV	NCOC	2043	$120,038
27458	2004	International	4200 SBA	BEV	Nevada County Airport	2044	$124,839
26543	2006	Ford	F250	BEV	Nevada County Airport	2044	$105,925
26544	2006	Ford	F350	BEV	McCourtney Rd. Transfer Station	2030	$106,424
26541	2006	Ford	Ranger	BEV	NCOC	2027	$57,669
26756	2007	GMC	C7500	BEV	McCourtney Rd. Transfer Station	2048	$146,044
26760	2008	Ford	Escape	BEV	NCOC	2024	$49,445
26648	2008	Ford	Escape	BEV	Rood Center (ERAC)	2034	$56,331
26677	2008	Ford	F250	BEV	Lake Wildwood Treatment plant	2033	$68,807
26659	2008	Ford	F550	BEV	NCOC	2040	$106,713
26786	2008	GMC	C7500	BEV	NCOC	2025	$356,998
26785	2008	GMC	C7500	BEV	NCOC	2043	$120,038
26655	2008	Kenworth	T800	BEV	NCOC	2029	$236,989
26757	2008	Kenworth	T800	BEV	NCOC	2031	$176,984
26653	2008	Peterbilt	367	BEV	NCOC	2028	$266,991
26763	2008	Peterbilt	367	BEV	NCOC	2033	$116,980
26897	2009	Ford	E450	BEV	Sheriff's Property Unit	2049	$138,030
26850	2009	Ford	Escape	BEV	Rood Center (ERAC)	2026	$47,374
26840	2009	Ford	F350	BEV	NCOC	2033	$73,695
26853	2009	Ford	Ranger	BEV	Lake Wildwood Treatment plant	2038	$68,449
26852	2009	Ford	Ranger	BEV	Facilities SC	2039	$71,187
26905	2010	Dodge	Grand C...	BEV	NCOC	2025	$57,600
26974	2011	Ford	Expediti...	BEV	Crown Point	2030	$48,152
26895	2011	Ford	F450	BEV	Station 91-McCourtney	2030	$106,424
26983	2012	Ford	Escape	BEV	NCOC	2025	$48,409
26999	2012	Ford	F250	BEV	NCOC	2028	$57,256
26982	2012	Ford	F450	BEV	NCOC	2042	$104,891
26984	2012	Toyota	Rav4	BEV	Rood Center (ERAC)	2028	$45,303
27002	2012	Toyota	Rav4	BEV	Rood Center (ERAC)	2030	$48,152
27017	2014	Chevrolet	Traverse	BEV	Rood Center (ERAC)	2034	$56,331
Total							$18,505,583

Replacement Year

- Select all
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030

Department

- Select all
- Agricultural Commi...
- Animal Control
- Behavioral Health
- Building Department
- Code Enforcement
- Department of Soci...
- District Attorney
- Environmental Heal...
- Facilities
- HHSA Admin
- Information & Gen...
- Library

Vehicles
270

FRONTIER energy

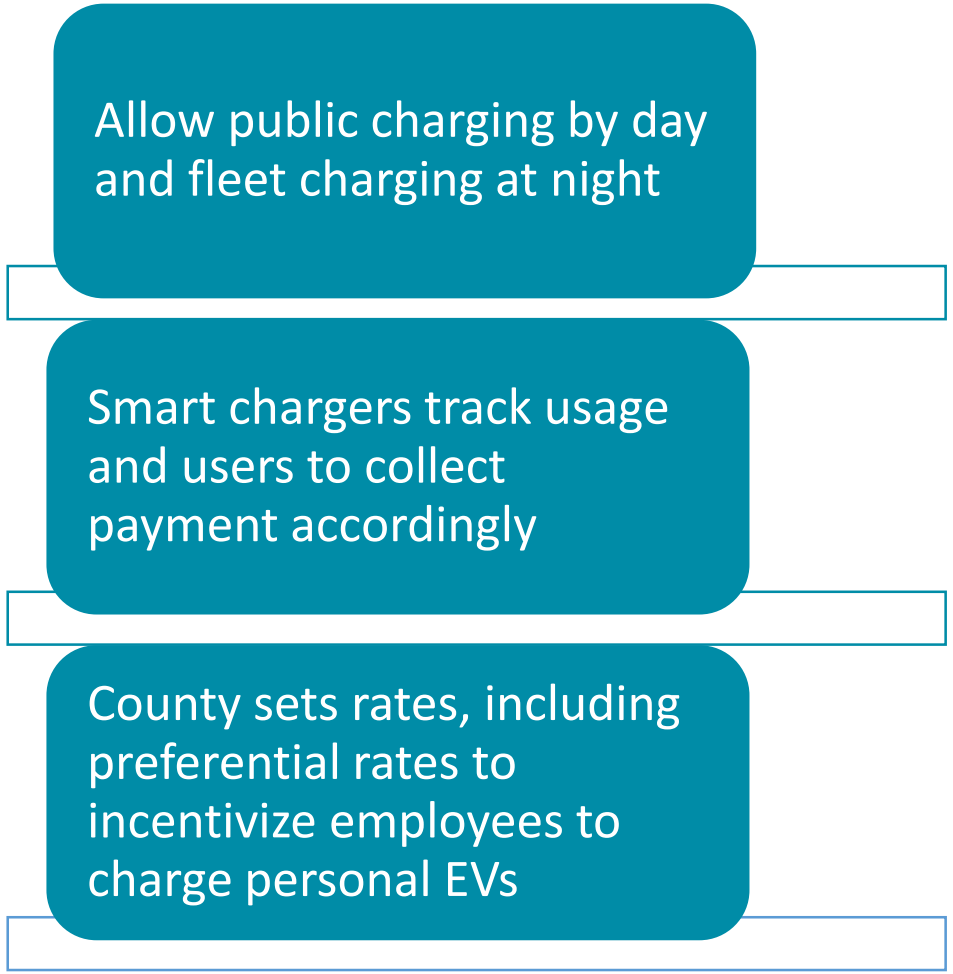
Facility assessments

Nevada City Veterans Hall

- Future EVs: Seven (7) LD
- EV charging load: 49.7 kWh/day
- Electrical upgrades: Yes
- Public/workplace charging: Yes

Potential facilities for shared charging

- Rood Center
  - Three Level 2
  - One DC Fast Charger
- Nevada County Public Health
  - Seven Level 2
- Nevada City Veterans Hall
  - Four Level 2



EVSE Funding and Financing

- Recommend Life Cycle Cost (LCC) accounting method
- Financing Models
  - Pay-as-you-go (PAYGO)
  - Debt financing
  - Public-Private Partnership (P3)

Finance Model	Benefits	Risks	Tools
Pay-as-you-go (PAYGO)	Future funds not tied up and greater budget transparency	Longer wait time and inflation risks	Special financing districts or impact fee
Debt financing	Timely infrastructure delivery and spread costs across useful life	Higher borrowing rates and “Debt Service” payments	Loans, bonds, leasing, or shared savings agreement
Public-Private Partnership (P3)	Risk transfer and lower operating costs	Loss of operational control and potential revenue	Charging or infrastructure as a Service

Funding Option Comparison

	Term	User- based cost	Agreement complexity	Is it CapEx?	Continually maintained	Penalties to cancel	On balance sheet	Required guarantees
As a Service	Monthly	Yes	10 pages	No	Yes	No	No	No
Loan	5-20 Years	No	75 pages	Yes	No	Yes	Yes	Yes
Lease	5-10 Years	No	50 pages	Yes	No	Yes	Yes	Yes
PPP	3-10 Years	No	1,000 pages	Yes	No	Yes	Yes	Yes
Shared Savings Agreement	10+ Years	No	100 pages	Yes	No	Yes	Yes	Yes

Thank you!

Chris White
cwhite@frontierenergy.com
916-371-2899
Director, Zero Emission Transportation
Frontier Energy