Utah Electrification Initiative: 2026 Annual Report

Executive Summary

The Utah Electrification Initiative entered a new phase in Year 3. While Years 1 and 2 focused on establishing foundational understanding, defining scope, building partnerships, and exploring a broad range of electrification concepts, Year 3 reflects a deliberate shift toward standardized, evidence-based reporting suitable for legislative oversight and future scalable and replicable decision making. As early pilot efforts moved from concept to implementation, the need for consistent documentation with comparable outcomes and clearly stated limitations became essential.

To address priority knowledge and technology gaps identified through earlier phases of the Initiative, Year 3 included 10 focused case studies examining real-world transportation electrification applications across Utah. Representing multiple transportation sectors, geographic contexts, and infrastructure configurations, these case studies were documented using a common reporting framework to generate consistent, comparable evidence. Together, they provide practical insights to inform future planning, infrastructure investment, policy development, and technology deployment.

The case studies were not intended to provide a comprehensive assessment of every available technology or prescribe statewide deployment strategies. Rather, they were designed to evaluate specific questions under Utah conditions, identify where evidence is strongest, and highlight areas requiring additional research, validation, or coordination before broader implementation can be considered.

Findings from the case studies identify clear patterns related to infrastructure readiness, grid interaction, operational reliability, and workforce considerations. They also reveal important remaining gaps, including where additional data, longer observation periods, or expanded collaboration will be necessary to support informed investment and policy decisions.

Year 3 should therefore be understood as a transition from exploratory groundwork toward a disciplined technical record that systematically addresses Utah's most significant electrification questions. The reporting framework established here provides a stronger foundation for future analysis while equipping legislators and decisionmakers with increasingly reliable evidence to guide long-term transportation electrification strategy.

Our Story

An Entrepreneurial Legacy

Figure 1. Champagne Photograph by Andrew J. Russell, taken May 10, 1869, at Promontory Summit, Utah, to commemorate the completion of the transcontinental railroad.

Utah's identity as a transportation and innovation hub predates statehood itself. Long before modern highways, the region served as a critical crossroads for trade, migration, and economic opportunity across the American West. Early trail networks, the transcontinental railroad, and later electric streetcar systems created patterns of mobility, laying the foundation for many of today's major freight and logistics corridors. And as transportation evolved, so did Utah's infrastructure. Towns grew around transportation access, reinforcing Utah's role as the Crossroads of the West.

These systems demonstrated an early commitment to electrified mobility, regional connectivity, and efficient movement of people and goods that continue to influence Utah's development today — improving access, reliability, and economic opportunity through ongoing investments in roads, freight networks, intelligent transportation systems, and electrified transportation infrastructure. Today, nearly all freight that enters the U.S. from western ports flows through Utah.

Building on a history of innovation and entrepreneurship, the state is advancing next-generation mobility solutions that strengthen economic growth, improve quality of life, and position Utah as a leader in the future of transportation.

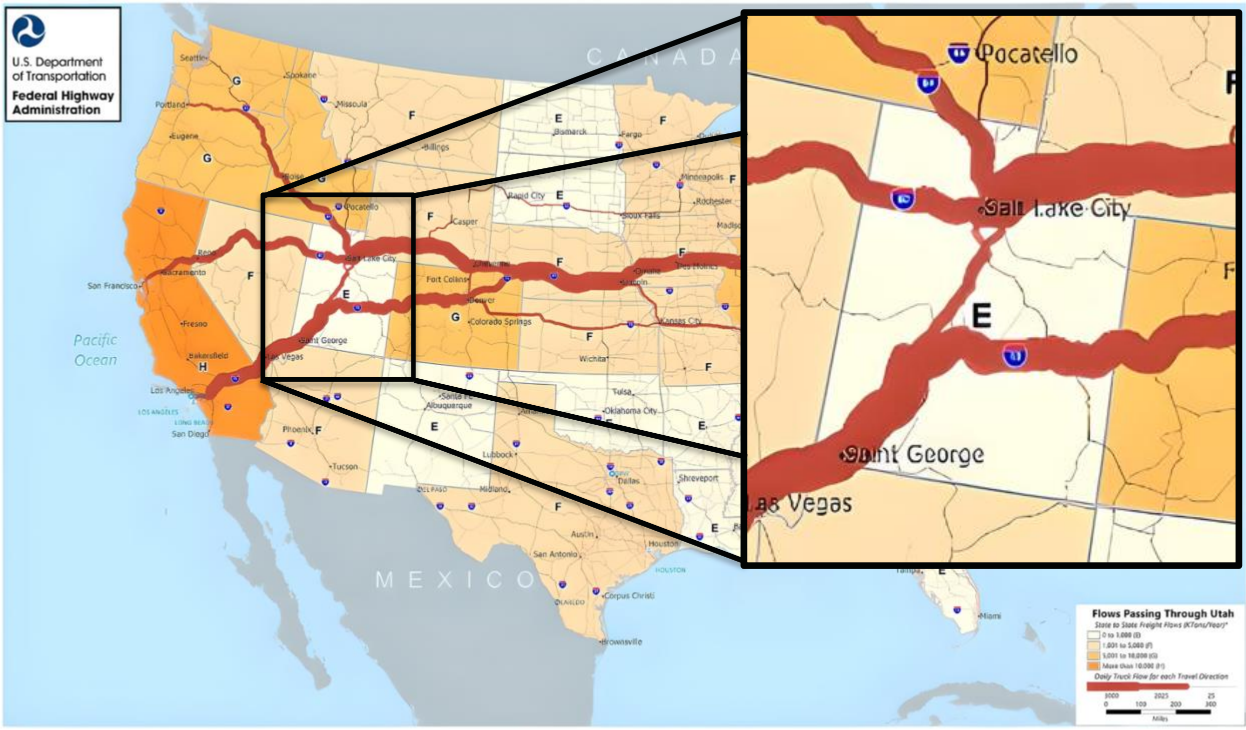

Figure 2. U.S. Department of Transportation's Federal Highway Administration estimate of Freight Analysis Framework (FAF) flow for trucks passing through Utah on U.S. National Highway System by 2050. State to state flows represent annual KTons of freight transported by trucks passing through Utah.

A New Chapter in Transportation Innovation

The Utah Electrification Initiative grew out of this same tradition. In 2023, the ASPIRE Engineering Research Center headquartered at Utah State University was designated the lead institution of the Initiative. This timely effort was meant to examine how emerging electrification technologies might interact with Utah's transportation system, what risks and benefits they present under local conditions, and how the state could prepare for change without undermining reliability, affordability, or community trust.

Years 1 and 2 were exploratory by design. During that period, the Initiative focused on building the foundational knowledge needed for responsible planning. This included developing statewide inventories of transportation energy use and emissions, establishing governance and advisory structures, engaging industry and community partners, and furthering early pilot efforts. The purpose of this work was not to accelerate adoption, but to understand where electrification might offer genuine benefits, where limitations were likely to arise, and what kinds of coordination would be required across agencies and sectors.

As that foundational work progressed, a consistent picture began to emerge. Transportation, particularly medium and heavy-duty freight, was confirmed as a major contributor to air pollutants in Utah. At the same time, early demonstrations revealed that electrification is less constrained by vehicle availability than by infrastructure readiness, grid interaction, workforce preparedness, and operational integration. These insights reoriented the Initiative away from broad conceptual analysis toward focused documentation of real-world conditions.

Vision & Impact

The vision guiding the Utah Electrification Initiative has remained consistent since its inception, even as its methods and understanding have matured. At its core is the pursuit of an ideal electrification system — one where transportation and electricity meet at the grid edge in an intelligently coordinated balance that strengthens, rather than strains, Utah's broader infrastructure systems.

Utah's future depends on continued growth, economic development, and mobility. Transportation electrification is an integral part of that future. The challenge is therefore not whether growth should occur, but how it can be managed responsibly through coordinated planning, shared data, and collaboration across agencies, utilities, industry, and communities. When approached intentionally, electrified transportation can work alongside other forms of load growth to improve air quality, support economic competitiveness, strengthen grid resilience, and integrate more effectively with Utah's evolving energy infrastructure. Achieving that outcome will require long-term coordination, disciplined planning, and a willingness to develop solutions that work together rather than in isolation.

From Vision to Practice

Year 3 marks an important transition for the Utah Electrification Initiative. While earlier phases focused on establishing context, testing assumptions, and building partnerships, this year centers on observing how electrification performs under real operating conditions across Utah.

Spanning multiple transportation sectors, infrastructure configurations, and geographic contexts, each case study was documented using a common reporting framework to support clear comparison across projects. Together, they provide insight into demonstrations, consistent outcomes, and where important limitations remain. We acknowledge there is not a one-size-fits-all plan, which is why our case studies reflect the varying needs and availability of resources throughout the state.

The findings reinforce a central principle of the Initiative: progress must be incremental, coordinated, intentional, and informed by operational experience. In many cases, the most significant challenges were not technological, but related to infrastructure readiness, permitting, workforce capacity, grid interaction, and interagency coordination. These realities underscore the need for long-term collaboration across transportation, energy, industry, and public sector partners.

The case studies establish a growing technical record to support more informed policy discussions and future decision-making. By prioritizing documented outcomes over projections alone, the Initiative is creating a clearer foundation for how Utah can thoughtfully advance electrified transportation over time.

State of the State

Before identifying future opportunities and strategic priorities, it is important to understand Utah's current transportation electrification landscape. Over the past several years, the state has experienced steady growth in electric vehicle adoption, charging infrastructure, public-private partnerships, and technology demonstrations. Together, these efforts have established a strong foundation for continued statewide deployment while providing valuable real-world data to guide future investments.

The following snapshot highlights Utah's current progress and illustrates how research, infrastructure development, and industry collaboration are moving transportation electrification from concept to implementation.

Quick Facts & Stats

Electric Vehicle Adoption

Utah continues to see steady growth in passenger electric vehicle adoption, with increasing market penetration across both passenger cars and light trucks. While EVs currently represent a relatively small percentage of the statewide fleet, new vehicle sales indicate continued momentum as consumer adoption expands. Though there was a slight dip in new sales in 2025, this was expected due to expiring national incentives in late 2024. Adoption is still increasing since we first started tracking this data in 2023.

Utah EV Snapshot (Early 2026)

- ~84,000 registered electric vehicles (battery electric and plug-in hybrid)
- 2.9% of Utah's passenger car and light-duty truck fleet is electrified
- 9% of new passenger vehicle sales in 2025 were electric
- 3.4% of used passenger vehicle sales in 2025 were electric
- Per capita share: 18.7 EVs per 1,000 residents (up from roughly 1.2 in 2018)

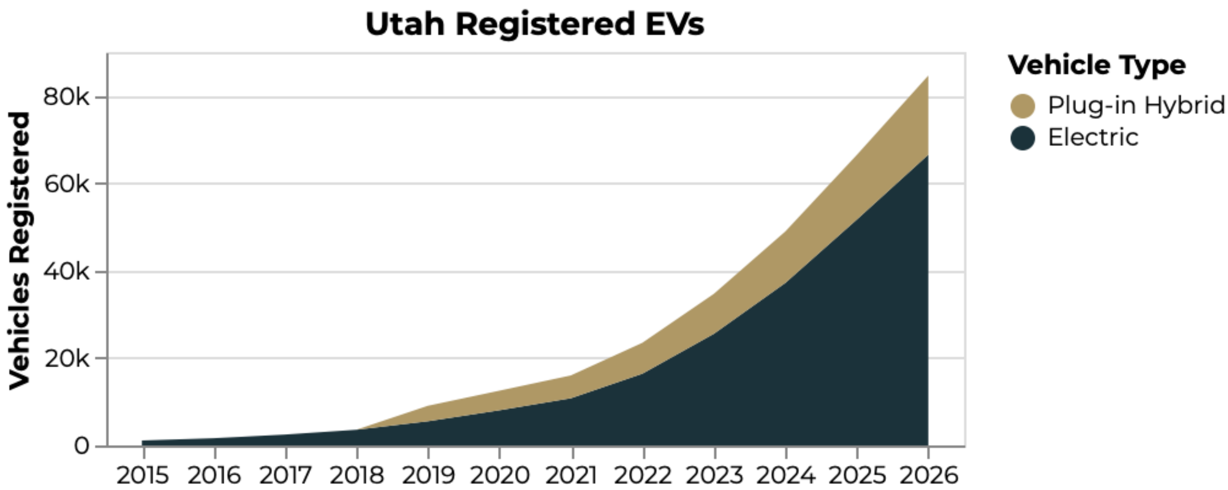

Figure 3. Utah registered plug-in vehicles, 2015–2026. Annual early-year snapshots of on-highway vehicle registrations classified by the Utah State Tax Commission as electric or plug-in hybrid. Reported electric registrations grew from 1,100 in 2015 to 67,000 in 2026. Plug-in hybrids were not reported as a separate category until 2019; since then, registrations grew from 3,500 to 18,000. Source: Utah State Tax Commission, Economic & Statistical Unit, Vehicle Registrations—Recent Data.

Long-Term Adoption Outlook

Statewide modeling projects continued growth in electric vehicle adoption through 2050 under a range of market conditions. The pace of adoption will depend on several factors, including vehicle affordability, charging infrastructure deployment, fuel prices, and federal incentives.

2050 Statewide Projections

Scenario	Estimated EV Population	Annual Electricity Demand
Low	~1.47 million	11.4 TWh
Medium	~2.75 million	21.4 TWh
High	~3.22 million	26.0 TWh

Key assumptions include:

- EV purchase price parity with conventional vehicles
- Growth in public DC fast charging infrastructure
- Future fuel prices
- Availability of federal EV incentives

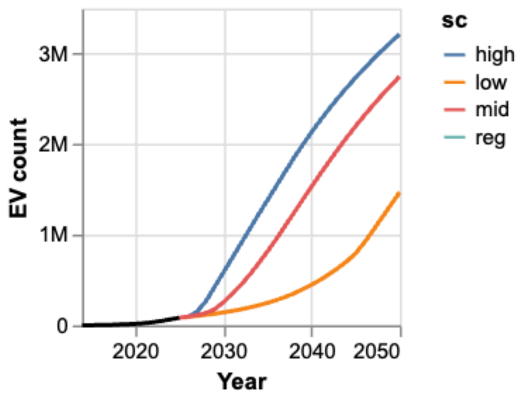

Figure 4. Three scenarios of light-duty EV population for Utah through 2050, projected using a vehicle-market model. The scenarios (low, mid, and high) cover a range of uncertainty in the favorability of circumstances surrounding EV economics and feasibility. The low scenario represents a future wherein EVs continue to require a purchase price premium relative to comparable ICEV models. The high scenario assumes increasingly favorable economics for EVs, including reductions in purchase price, improved access to charging infrastructure, and continued total-cost-of-ownership benefits from low-cost electricity.

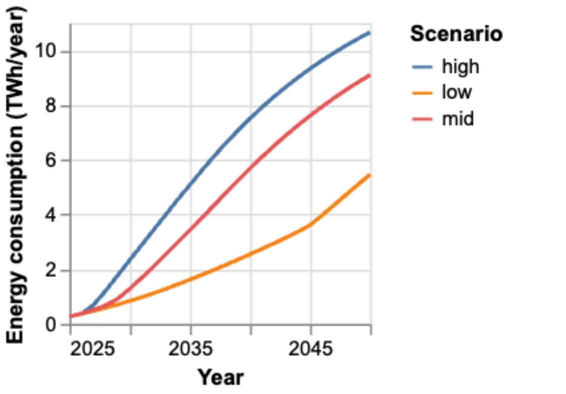

Figure 5. Three scenarios of projected annual electricity demand from light-duty EVs in Utah, expressed as total energy in terawatt-hours (TWh). The scenarios correspond to those shown in Figure 4. Energy totals are estimated from projected EV populations based on typical light-duty EV energy consumption rates ([NLR]) and annual travel distributions from travel surveys ([WFRC], [NHTS]).

Public Charging Infrastructure

Utah's charging network continues to expand through investments by federal, state, utility, and private-sector partners. Public charging stations are becoming increasingly available along major transportation corridors and within urban centers, improving access for passenger vehicles while laying the groundwork for commercial fleet electrification. However, EV adoption is growing at nearly twice the rate of public charging infrastructure in the state.

Some quick facts:

- 1,083 public charging stations, with 3,403 ports.
- 890 Level 2 charging ports
- 202 DC Fast Charging ports
- Public charging available in 27 counties

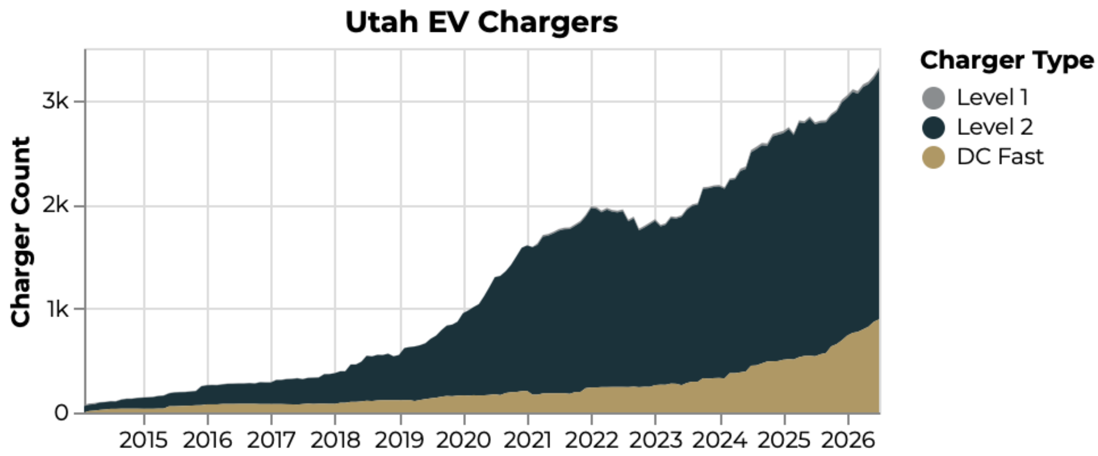

Figure 6. Operational EV charging ports in Utah, February 2014–July 2026, by charging level. Monthly first-of-month snapshots include Level 1, Level 2, and DC fast charging ports at publicly and privately accessible stations reported as operational. [Source: U.S. Department of Energy, Alternative Fuels Data Center (AFDC), Alternative Fueling Station Locator historical data; Utah electric stations.]

Charging Infrastructure Snapshot

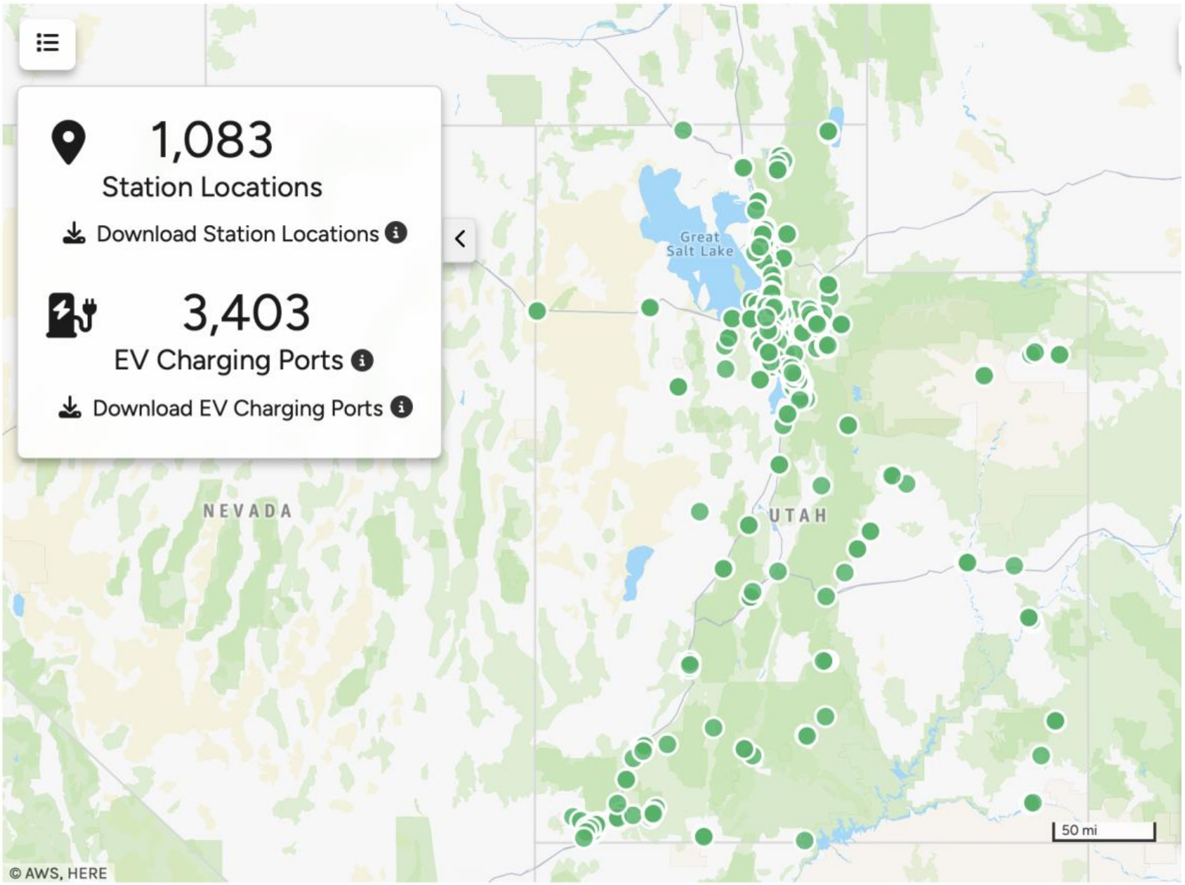

Figure 7. A snapshot from [a tool created by the U.S. Department of Energy's Office of Critical Minerals and Energy Innovation] includes information on alternative fuels, such as charging locations and port numbers across the U.S. and Canada.

Research to Real-World Deployments

Utah's transportation electrification ecosystem extends beyond planning efforts to include active demonstrations, pilot deployments, and commercial implementations. These projects allow researchers, industry partners, utilities, and public agencies to evaluate technologies under real-world operating conditions while accelerating commercialization.

Electric Vehicle & Roadway (EVR) Research Facility

The Electric Vehicle & Roadway (EVR) Research Facility at Utah State University serves as one of the nation's leading testbeds for wireless power transfer, megawatt charging, battery systems, grid integration, and connected transportation technologies. The facility enables researchers and industry partners to validate emerging technologies before deployment in operational environments, helping reduce technical risk while accelerating commercialization.

Capabilities include:

- **Intelligent Energy & Microgrid Management**
  - 1.5 MW utility grid connection
  - 100 kW on-site photovoltaic (PV) solar array
  - 1.2 MWh battery energy storage system
  - Microgrid capability for grid-connected and islanded operation
  - Intelligent Energy Management System (EMS) for optimizing generation, storage, and charging
  - +1 MW DC power supply supporting high-power charging research
- **Wireless Charging Infrastructure**
  - World's first 1 MW wireless charging system
  - Dynamic wireless charging roadway infrastructure
    - Three dynamic charging systems:
      - 1 × 75 kW
      - 2 × 200 kW
  - Evaluation of passenger, commercial, and heavy-duty vehicle applications
- **High-Power Charging & Vehicle Testing**
  - 350+ kW conductive (plug-in) DC fast charger
  - Vehicle instrumentation and performance monitoring
  - Charging efficiency and system performance evaluation

ASPIRE PowerPort

Located at the Northwest quadrant of the Utah Inland Port, ASPIRE's PowerPort has evolved from a research demonstration into a scalable model for real-world deployment. Originally designed as an integrated charging and energy management testbed, the platform now serves as the foundation for public-private partnership (P3) deployments that combine high-power charging, battery energy storage, intelligent energy management, and utility coordination.

These deployments demonstrate how advanced charging infrastructure can reduce grid impacts, improve resiliency, and support commercial fleet electrification while providing practical models that can be replicated throughout Utah and beyond.

Capabilities include:

- **Intelligent Energy Management**
    - 2MWh Battery storage
- **MW-Scale Static Wireless Charging**
    - 2MWh on-site battery storage
    - 0.5C Sonnen battery packs each deliver 500kW (1 MW total) to receiver
    - Fully charges electric Class 8 semi in 30 minutes
- **High Powered Dynamic Wireless Charging**
    - ¼ mile in-motion charging infrastructure installed in the Public Right-of-Way
        - First of its kind in Utah
    - 30-35 kW delivered to each receiver
    - ASPIRE Class 6 truck outfitted with 2 receivers
        - Available for lease for drayage fleet operators to experience advanced technology like wireless charging and electrified freight.
    - High-power charging validation for commercial and heavy-duty vehicles

Meeting Utahns Where They Are

This year offered many opportunities for ASPIRE to learn and engage with partners across Utah and the country. ASPIRE participated in conferences, workshops, summits, and community events that spanned academic, industry, government, and community sectors. Collectively, these engagements strengthened regional economic development and cross-sector collaboration and amplified the initiative’s visibility and impact.

Participation in these professional and community forums served as a critical feedback loop for the Utah Intelligent Electrified Transportation Initiative, enabling team members to integrate real-world perspectives, emerging best practices, and stakeholder insights into ongoing project planning and implementation. Grounded in ongoing, direct involvement and continuous stakeholder interaction, these activities not only advanced project goals but also reinforced ASPIRE's role as a convener and thought leader in intelligent and electrified transportation across Utah and beyond.

Scope of Participation & Outreach Scale

ASPIRE participated in 84 events, spanning local campus engagements, statewide and regional convenings, and national and international conferences. These included participation in major industry and research forums such as the Transportation Research Board (TRB) Annual Meeting, the American Association of State Highway and Transportation Officials (AASHTO) Annual Meeting & Expo, Advanced Clean Transportation (ACT) Expo, Electric Vehicle (EV) Charging Summit & Expo, and Intelligent Transportation Systems (ITS) America Conference and Expo, and 47G's Project Alta Summit, as well as Utah-focused events including the Utah Department of Transportation (UDOT) Utah Transportation Conference, Utah Association of County events, Utah Energy Week, and One Utah Summit.

In all, the estimated audience exposure is conservatively between 180,000 and 260,000 individuals during this year. This accounts for smaller community and campus events, midscale state and regional conferences, and national or international exhibitions and conferences. From a participant's perspective, this level of engagement created continual visibility and learning opportunities for project activities across multiple stakeholder sectors.

Collaborative Planning & Engagement

Outreach efforts operated as a practical integration layer alongside formal project processes, extending insight beyond what structured reporting alone could capture. Consistent participation in recurring international, national, regional, and community events surfaced critical considerations related to regulatory environments, workforce capacity, infrastructure readiness, and stakeholder perceptions. These elements remain essential to effective implementation but are not always visible within formal planning channels.

Overall, the strong participation and thematic consistency across outreach efforts suggest that structured engagement played an important role in supporting successful implementation discussion, future scalability, and long-term impact across Utah, while also providing valuable insight into community needs, shared challenges, and opportunities for continued collaboration and growth.

These engagement efforts also helped inform and strengthen the work of the Initiative's Industry Advisory Teams, which provide ongoing guidance across key focus areas including transportation systems, utilities and grid integration, freight and logistics, workforce development, policy, and community impact. Insights gathered through conferences, stakeholder meetings, and community interactions created valuable opportunities to identify emerging challenges, validate research priorities, and align technical efforts with real-world operational needs. In turn, the Industry Advisory Board teams helped translate those perspectives into actionable feedback that supports more coordinated planning, cross-sector collaboration, and practical implementation pathways for Utah's evolving transportation and electrification ecosystem.

Over the past year, the following focus areas were targeted:

Transportation Electrification & Advanced Mobility Systems

A significant portion of outreach activity centered on vehicle electrification, charging infrastructure, and advanced mobility systems. Team participation at events such as the ACT Expo, the EV Charging Summit & Expo, Society of Automotive Engineers (SAE) Electric Vehicle Charging Infrastructure Conferences, National Association of State Energy Officials (NASEO) Freight Electrification, Electric Power Research Institute (EPRI) Electrification International Conference & Exposition, Work Truck Week, GeoTab Connect, and CoMotion LA provided repeated opportunities to engage directly with fleet operators, utilities, OEMs, technology providers, and solution integrators.

These engagements functioned as feedback and learning mechanisms rather than one-way information distribution.

Conversations at these events informed action around fleet readiness, grid integration challenges, charging interoperability, and operational timelines. Exposure to real-world deployment experiences shared by practitioners helped contextualize research outputs and reinforced the importance of implementation-focused framing within the state initiative.

Infrastructure & Intelligent Transportation Systems

Outreach related to infrastructure and freight systems was supported through engagement at longstanding transportation planning and engineering events. Participation in the TRB Annual Meeting, AASHTO Annual Meeting & Expo, Association of Metropolitan Planning Organizations (AMPO) Annual Conference, UDOT Utah Transportation Conference, ITS America Conference & Expo, and Smart Ports Seminar and Expo connected project efforts with agencies and organizations responsible for asset planning, freight movement, and system operations.

Involvement in these activities clarified how project-level innovation intersects with established planning cycles, standards, and capital investment frameworks. Insights gained at these events informed how project outputs were described and positioned for adoption within public sector environments.

Governance & Public Sector Engagement

Policy oriented outreach included participation in events such as the National Conference of State Legislatures (NCSL) Summit, Utah Association of Counties conferences and meetings, legislative committee briefings related to transportation and infrastructure, Public Policy Colloquium activities in Washington, D.C., and statewide convenings such as the One Utah Summit.

These interactions highlight the importance of policy context in shaping implementation pathways. Engagement with policymakers and public administrators reinforced the need for technically accurate and economically grounded framing of project activities that support economic development and transportation needs across the state. These interactions fostered mutual understanding between technical contributors and decisionmakers without overstating project maturity or outcomes.

Research & Advanced Technology Engagement

Research focused engagement extended to national and international venues, including the Institute of Electrical and Electronics Engineers (IEEE) Forum for Innovative Sustainable Transportation Systems, IEEE PELS COMPEL Conference, CharIN Testival and Conference, International Conference on Production Technologies and Systems for EMobility, Consumer Electronics Show (CES), and materials and manufacturing expos such as the Wasatch Front Materials Expo.

Participation in these events exposed project contributors to emerging standards and manufacturing considerations, as well as global innovation trends relevant to electrified and intelligent transportation systems. The primary value of these engagements lies in information exchange and benchmarking, supporting internal technical awareness rather than serving as formal dissemination milestones.

Workforce Development & Educational Engagement

Workforce and education-oriented outreach formed a complementary layer of engagement through events such as Utah STEM Fest, the Society of Hispanic Professional Engineers (SHPE) National Convention, ASPIRE annual meeting and open house, American Society for Engineering Education (ASEE) Annual Conference, National Conference on Undergraduate Research, Utah State University (USU) Student Research Symposium, and student leadership activities.

Involvement in these events reinforced the relationship between technical research and workforce readiness. Observations from these forums informed how educational components and student involvement were positioned within broader project narratives, supporting longer term workforce self-sufficiency rather than short-term deliverables alone.

Community & Regionally Focused Engagement

Regionally focused engagement occurred through localized events, including the USU Day on the Quad, USU Sustainability Festival, Cache Summit, R6 Regional Council, Eastern Utah Economic Summit, Southeastern Utah Association of Local Governments and Economic Development District (SERDA) regional tours, Utah Urban Rural Specialized Transit Association (URSTA) and community-focused engagement conferences. These activities provided opportunities to contextualize project efforts within local economic and workforce priorities.

Each of these sessions contributed to trust-building and helped ensure that project activities remained sensitive to local conditions and stakeholder expectations, particularly where pilot or demonstration activities were being discussed.

Integrating Industry Insights

Evolution of IAB Structure

During the reporting period from August 2025 through April 2026, the Industry Advisory Board underwent a significant transformation in both structure and function. Early in the reporting period, meetings were largely focused on updates, coordination, and information sharing. However, as the broader initiative matured and projects moved from concept to execution, the board evolved into a more active and collaborative working body.

This transformation reflects the broader transition of the initiative from strategic planning to implementation. The IAB's role expanded accordingly, positioning it as an integral contributor to the development of actionable solutions and ensuring that industry perspectives are embedded within the state's electrification strategy.

Major Activities & Accomplishments

During this year, the Industry Advisory Board contributed to a wide range of activities that advanced Utah's electrification goals across multiple sectors. One of the most significant areas of involvement was oversight and input into major funding programs and infrastructure deployments. The board engaged with large-scale initiatives such as the EPA Clean Ports Grant and the Beehive Emissions Reduction program, which together represent substantial investments in electrified transportation infrastructure, emissions reduction, and economic development within the state. These programs are notable not only for their scale but also for their multimodal approaches, integrating freight, transit, and infrastructure solutions into a cohesive strategy.

The board also supported and monitored the deployment of advanced infrastructure projects, including charging hubs at the Utah Inland Port, the installation of wireless charging systems, and the development of real-time analytics platforms for monitoring fleet performance and charger utilization. These efforts reflect Utah's position at the forefront of emerging electrification technologies and highlight the importance of industry input in navigating the technical and operational complexities associated with these deployments.

A defining accomplishment of the IAB during this period was the adoption of a case study driven approach to analysis and reporting. Recognizing the need for practical, data-driven insights, the board identified a portfolio of case studies spanning key sectors such as rural charging infrastructure, public transit systems, heavy-duty trucking, aviation, and off-road applications including mining and agriculture. These case studies are designed to move beyond high-level planning by providing detailed technical, economic, and operational analyses that can inform both policy decisions and future investments.

The rural charging case study provides a clear example of the value of this approach. Faced with significant grid constraints and high projected infrastructure costs, the analysis explored alternatives involving energy storage and flexible system design. The results demonstrated that integrating on-site storage solutions could dramatically reduce capital costs while still meeting performance requirements for charging infrastructure. This finding has broader implications for rural electrification strategies across the state and illustrates how targeted technical analysis can identify cost-effective solutions to complex challenges.

Building on these efforts, aviation electrification emerged as a complementary highlight alongside the Bluff case study, illustrating both the promise and constraints of advanced transportation technologies. The IAB supported analysis of electric and hybrid aircraft applications, including modeling of eVTOL systems under Utah-specific conditions such as high elevation and cold temperatures. Findings indicated that environmental conditions can significantly reduce performance, particularly range, yet still support targeted, high-value use cases such as regional cargo delivery and time-sensitive passenger transport. Ongoing partnerships with manufacturers, logistics providers, and federal programs position Utah to test and validate these technologies in real-world conditions. Together with infrastructure-focused analyses like Bluff, the aviation work reinforces the importance of data-driven, scenario-specific planning to guide scalable deployment across varied transportation modes.

In addition to case study development, the IAB played a key role in fostering collaboration and data integration across stakeholders. Members contributed operational data, supported the development of modeling and simulation tools, and participated in interoperability testing efforts aimed at advancing industry standards. These activities help ensure that Utah's electrification strategy is grounded in real-world conditions and informed by accurate, high-quality data.

The board also supported extensive outreach and engagement efforts. Through participation in conferences, regional meetings, and public events such as the ASPIRE Open House, the IAB helped increase awareness of electrification technologies and their benefits. Feedback from these engagements indicated growing public interest and improved understanding, while also reinforcing the need for continued education and communication, particularly in sectors such as freight and rural communities.

Key Insights & Challenges

Through its discussions and activities, the Industry Advisory Board identified several recurring challenges that have implications for the successful deployment of electrified transportation systems in Utah. One of the most prominent challenges is the complexity of permitting and regulatory processes, particularly for innovative technologies such as wireless charging. Delays often arise from a lack of familiarity among permitting authorities and the absence of standardized processes, resulting in extended timelines and increased project uncertainty.

Grid capacity constraints were another major issue highlighted during the reporting period. The deployment of high-capacity charging infrastructure frequently requires significant upgrades to existing electrical systems, which can be costly and time-consuming. The board emphasized the importance of integrating energy storage solutions, such as batteries and flywheels, to mitigate these constraints by reducing peak demand and enabling more flexible system operation. These discussions underscore the need for coordinated planning among utilities, infrastructure developers, and policymakers to ensure that grid limitations do not become a barrier to progress.

The IAB also identified supply chain vulnerabilities and the availability of critical minerals as areas requiring focused attention. Consistent with statutory requirements, the board initiated efforts to evaluate risks associated with the supply of materials needed for batteries and other key technologies. Addressing these risks is essential for ensuring the long-term self-sufficiency and resilience of the state’s electrification strategy.

In addition to technical challenges, the board highlighted the importance of aligning policy with operational realities. Discussions around proposed legislation emphasized the potential unintended consequences of overly prescriptive requirements, particularly in cases where flexibility is needed to accommodate different use cases and technological solutions. At the same time, the board noted that while awareness of electrification is growing within industry, public understanding and workforce readiness continue to lag, indicating a need for expanded outreach and training initiatives.

Direction & Recommendations

As Utah moves from research toward implementation, the Industry Advisory Board recommends focusing on strategies that accelerate deployment while maintaining the flexibility to adapt to rapidly evolving transportation technologies.

Across these recommendations, the Board emphasized that future projects should be purpose-driven. Demonstration projects should not be undertaken solely to showcase technology, but rather to answer specific planning questions, validate modeling assumptions, address identified knowledge gaps, or inform future policy and investment decisions. This disciplined, data-driven approach will ensure that each focus area strengthens Utah's statewide transportation electrification strategy.

Expand the Use of Real-World Demonstration Projects

The Board reaffirmed that pilot deployments and case studies remain among the Initiative's most valuable planning tools. Demonstrations such as Utah's rural and freight electrification projects provide measurable data on infrastructure performance, grid impacts, operational costs, and user behavior that can inform future policy and investment decisions. Members encouraged identifying additional deployment opportunities that address diverse operating environments and replicate successful models across the state.

Prepare for Emerging Mobility Connectivity

Industry leaders and planners recommend continuing to evaluate emerging transportation technologies — including autonomous vehicles, automated transit, advanced air mobility, micromobility, and wireless charging — to better understand how they will influence future infrastructure needs. Members noted that these technologies are rapidly converging, creating opportunities to rethink charging strategies, transportation access, and multimodal system design. Continued monitoring of battery advancements and vehicle capabilities will help ensure Utah's planning remains adaptable as markets evolve.

Strengthen Grid Integration Through Smart Energy Management & Multimodal Planning

The Board continues to support greater coordination between transportation planning and electric utilities to reduce deployment barriers and improve system efficiency. Members highlighted opportunities to integrate battery energy storage, managed charging, and utility planning into future infrastructure deployments to lower demand charges, reduce costly grid upgrades, and improve overall system resilience. Future planning should consider how passenger vehicles, freight, transit, micromobility, and emerging transportation modes can share infrastructure where appropriate, improving utilization while maximizing public investment.

Expand Industry Collaboration & Technology Partnerships

As transportation technologies continue to evolve, the Board recommends expanding engagement with emerging industries, technology providers, and private-sector partners. Continued collaboration with utilities, freight operators, advanced air mobility organizations, vehicle manufacturers, and economic development partners will help identify new deployment opportunities while ensuring Utah remains responsive to changing market conditions.

Position Utah as a National Transportation Innovation Hub

The Board recognized several upcoming opportunities to showcase Utah's leadership in transportation innovation. National conferences such as ITS America and IEEE, along with preparations for the 2034 Olympic and Paralympic Winter Games, provide opportunities to demonstrate Utah's electrification infrastructure, wireless charging technologies, and integrated transportation solutions to a national and international audience. Coordinated demonstrations and strategic partnerships can help attract investment, strengthen industry relationships, and reinforce Utah's position as a leader in next-generation mobility.

Continue Building a Collaborative Innovation Ecosystem

The Board emphasized that transportation electrification will require ongoing coordination among government agencies, industry, utilities, research institutions, and community partners. Maintaining an active Industry Advisory Board, expanding knowledge sharing, and identifying new funding and demonstration opportunities will help ensure the Initiative remains responsive to emerging technologies while supporting Utah's long-term economic competitiveness.

Strategic Objectives & Planning

Overview

Utah is uniquely positioned to lead in the electrification of transportation due to its central freight corridor status, expanding energy ecosystem, and growing need for air quality improvements. This plan outlines a coordinated strategy to align data modeling, infrastructure development, and smart charging deployment with existing statewide planning efforts — most notably the Utah Unified Transportation Plan and related energy goals. We prioritize collaborative action with local and regional planners, utility providers, and industry partners to ensure that Utah’s transition is efficient, economically sound, and responsive to community needs. Our strategic objectives are continued from Year 2, as they remain crucial to collaborative planning efforts.

Strategic Objectives

Align Statewide Planning Efforts

Coordinate with statewide planners — like the Utah Energy Strike Team, Salt Lake City Olympics committee, UDOT, UTA, and other government offices — and local planners like MPOs and AOGs to ensure transportation electrification strategies are fully integrated into existing infrastructure, and land use, as well as transportation, energy and economic development plans.

Integrate Utility Partnerships & Grid Modeling

Leverage utility-provider collaboration and modeling to forecast energy demands and guide strategic siting of charging infrastructure, reducing costly upgrades and enabling grid-responsive deployments.

Deploy Interoperable & Coordinated Charging Infrastructure

Implement smart charging and demand response systems at high-priority multimodal hubs (usable by personal vehicles, public transit, and even freight) to maximize grid efficiency and minimize peak energy impacts.

Accelerate Industry & Freight Sector Engagement

Partner with major freight operators, industrial park developers, and Utah Inland Port Authority to coordinate shared infrastructure that serves multiple fleets and logistic networks.

Inform Policy Through Data & Pilots

Use data-driven models and pilot deployments to identify actionable regulatory and investment recommendations for cost-effective, scalable transportation electrification.

Key Findings & Implications

Case Studies Demonstrate the Value of Integrated Planning

Pilot deployments across Utah and partner states continue to demonstrate that transportation electrification is most successful when infrastructure planning, utility coordination, and operational data are developed together. These projects validate the

Initiative's modeling tools while providing real-world insights that can inform statewide policy, infrastructure investment, and future deployments.

More on Case Studies found below (see pg. 31).

Freight Is a High-Impact Opportunity

With over 10,000 trucks moving through Utah daily, freight electrification offers immediate benefits for public health and air quality. Strategic partnerships with logistics firms and regional freight hubs can amplify infrastructure impact.

Coordinated Charging Reduces Infrastructure Costs

Data shows that smart charging coordination can reduce projected energy upgrade costs by up to $1.5B compared to unmanaged charging — presenting a clear ROI case for early investment in grid-integrated EV infrastructure.

Energy Demand & Grid Constraints Vary by Location

Site-specific modeling reveals that not all locations require the same level of investment. Coordinated planning with utilities enables cost optimization and resilience planning.

Economic Impact Is Tied to Utilization

Higher utilization of charging networks reduces per-user costs and improves the ROI of infrastructure projects — especially for fast-charging deployments serving freight corridors and regional hubs.

Policy & Funding Must Reflect Mode-Specific Needs

Light-duty, freight, transit, and off-road electrification each have different energy and infrastructure needs. Unified modeling enables efficient multimodal planning and prioritization.

Guiding Strategies

Convening Cross-Sector Electrification Experts

Our initiative’s Industry Advisory Board includes representatives from UDOT, UTA, MPOs, utilities, economic development offices, and industry partners. This structure brings real-world expertise into the planning process and ensures infrastructure and policy strategies are grounded in practical application — without duplicating efforts already underway.

Aligning with Statewide Initiatives & Planning Frameworks

Ensure strategic coordination with Utah's existing efforts such as Operation Gigawatt, the Salt Lake City Olympic planning process, the Unified Transportation Plan, and the goals of the Governor's Offices of Energy Development and Economic Opportunity. This alignment ensures the Action Plan reinforces, rather than competes with, the state's broader economic and sustainability priorities.

Developing A Statewide Charging Infrastructure Blueprint

We will develop a dynamic, data-informed plan for where and when to deploy different charging types (L2-L4, MCS), tied to freight routes, incorporating rural needs, and grid availability.

Incentivizing Smart Charging Through Policy & Programs

Work with policymakers and utilities to implement rate structures, demand response incentives, and managed charging protocols that reduce peak loads and accelerate adoption.

Integrating Modeling Tools with Planning Agencies

Deploy decision-support tools to MPOs and local governments that combine grid modeling, transportation demand forecasting, and siting analytics to inform project prioritization.

Demonstrating Multimodal Electrified Hubs in Key Corridors

Identify 2–3 high-volume nodes (e.g., Utah Inland Port, Central I-15) to test shared-use electrified freight and passenger facilities, coordinating across agencies.

Opportunities, Knowledge Gaps & Future Planning

As Utah advances toward a coordinated statewide transportation electrification strategy, several knowledge and technology gaps remain. Some require additional research and statewide analysis, while others can be explored through targeted pilot projects and case studies. Rather than attempting to answer every question at once, the Utah Electrification Initiative identified priority focus areas where research, demonstration projects, and stakeholder collaboration can generate the data needed to inform future policy and investment decisions.

The Year 3 case studies presented in the following section represent this next phase of work, examining real-world applications across freight, infrastructure, grid integration, and emerging transportation technologies to help guide Utah's long-term electrification roadmap. Additionally, they serve as replicable areas of interest to impart lessons learned for other states exploring electrification planning.

Priority Knowledge Gaps for Year 4

Critical Materials & Minerals

Transportation electrification depends on reliable access to critical minerals such as lithium, nickel, graphite, and rare earth elements that are essential for batteries, electric motors, and power electronics. Strengthening domestic supply chains, expanding recycling capabilities, and supporting next-generation battery chemistries will improve long-term resilience while reducing dependence on foreign sources. Utah is well positioned to contribute through its mineral resources, research institutions, and advanced manufacturing ecosystem.

A comprehensive mineral and material gap analysis is planned as a future phase of the Utah Electrification Initiative to better understand Utah's role in supporting resilient transportation electrification supply chains. Leveraging university ties and deep knowledge, it's planned that Utah State University's Janet Quinney Lawson Institute of Land, Water, and Air will lead these efforts.

Supply Chain Constraints

Although vehicle availability and charging technologies continue to improve, supply chain constraints remain a challenge for large-scale deployment. Long lead times for transformers, switchgear, charging equipment, semiconductors, and specialized electrical components can delay infrastructure projects and increase costs. Continued coordination among utilities, manufacturers, public agencies, and private industries will be essential to anticipate demand, improve procurement strategies, and accelerate deployment timelines.

Future Opportunities

Autonomous Vehicles

The convergence of autonomous driving technologies with vehicle electrification presents new opportunities for optimizing transportation systems. Autonomous fleets can coordinate charging schedules, improve vehicle utilization, reduce congestion, and enable shared mobility services that maximize infrastructure investments. Planning today for connected, automated, and electrified transportation systems will help ensure Utah's infrastructure remains adaptable as these technologies mature.

Olympics Preparedness

Preparation for the 2034 Olympic and Paralympic Winter Games in Salt Lake City presents a unique opportunity to accelerate transportation electrification while showcasing Utah's innovation leadership on a global stage. Investments made to support increased passenger movement, freight logistics, transit operations, and visitor charging infrastructure can provide lasting benefits beyond the Games. Coordinated planning among state agencies, utilities, local governments, and private industries will help ensure these investments strengthen long-term mobility, economic development, and grid resilience.

Battery Improvements

Rapid advances in battery technology continue to improve vehicle performance while lowering costs. Higher energy densities, faster charging capabilities, longer lifespans, and emerging chemistries such as solid-state batteries are expected to reduce vehicle weight, increase driving range, and decrease total cost of ownership. These improvements will expand electrification opportunities across passenger, commercial, transit, and heavy-duty transportation sectors.

Vehicle-to-Grid & Bidirectional Charging

Bidirectional charging technologies have the potential to transform electric vehicles into distributed energy resources that support grid reliability during periods of high demand or emergencies. As standards mature and utility programs expand, vehicle-to-grid capabilities may provide additional economic value for fleet operators while improving statewide energy resilience.

Statewide Community & Industry Insights

Continue to expand and incorporate findings from community and stakeholder engagement efforts to ensure rural and urban areas are part of the strategic deployment roadmap — including fleet deployment opportunities.

Leverage Federal & Private Sector Funding

With the creation of the Utah State University ASPIRE Foundation, more opportunities are open to raise funds and collaborate with partners in electrification fields. Continue to coordinate grant applications and public-private partnerships to align federal infrastructure investments with Utah’s electrification roadmap.

Monitor & Adapt Strategy Based on Real-World Data

Continue using real-time utilization and grid load data from pilot sites to refine planning assumptions, expand successful models, and inform statewide policy.

Case Study Modeling, Analysis & Evidence Base

To begin addressing several of these priority knowledge and technology gaps, the Utah Electrification Initiative selected a series of targeted case studies focused on high-impact opportunities for Utah. Together, these projects evaluate technologies, operational strategies, infrastructure needs, and implementation pathways that can help inform future statewide planning and investment decisions.

Purpose & Evolution

Modeling and analysis in Year 3 serve a fundamentally different role than in earlier phases of the Utah Electrification Initiative. Rather than projecting future adoption or optimizing statewide outcomes, analytical tools are used to interpret observed performance, identify patterns across deployments, and clarify where variability emerges under real operating conditions.

This shift reflects the maturation of the Initiative from exploratory planning to evidence-based documentation. The objective is therefore descriptive and comparative: to support disciplined interpretation of real-world case studies rather than to extend findings beyond what is directly observed.

Case Study Framework

The 10 case studies presented in this report form the primary evidence base for Year 3. Each represents a distinct operating environment, technology configuration, and institutional context across Utah's transportation system. To enable meaningful comparison, all case studies are documented using a standardized reporting framework.

This structure ensures that each case is evaluated through consistent criteria, including operating context, implementation conditions, observed performance, and documented limitations. The intent is not to rank or optimize technologies, but to enable cross-case understanding of shared constraints and recurring patterns.

Analytical Methods & Inputs

Analysis is grounded primarily in observed deployment data, supplemented by statewide context developed in prior years. Inputs include operational logs, duty cycles, route characteristics, environmental conditions, and qualitative feedback from operators, maintenance personnel, and project partners.

Methods emphasize transparency and interpretability over complexity. These include normalization of operating profiles to enable cross-case comparison, scenario bounding to test sensitivity to key variables, and thematic aggregation to identify recurring conditions associated with similar outcomes. Where data were incomplete or non-comparable, limitations are explicitly acknowledged rather than inferred.

Key Findings from Integrated Analysis

Across the case studies, several consistent patterns emerge:

- Operational outcomes are more sensitive to context (duty cycle, infrastructure readiness, and environment) than to technology category alone.
- Infrastructure integration and grid coordination often determine performance outcomes earlier than vehicle selection.
- Small differences in operational stability or charging access can produce disproportionate effects on system performance.
- The most significant constraints are frequently institutional rather than technical, particularly in permitting, coordination, and workforce readiness.

Where analytical outputs aligned with observed case study results, confidence in findings increased. Where discrepancies occurred, those instances were flagged for further review rather than reconciled through assumption.

Limitations & Scope Boundaries

Year 3 analysis is intentionally constrained to avoid extending conclusions beyond the evidence base. It does not:

- Predict statewide adoption rates or system-wide outcomes
- Establish cost effectiveness under future market conditions
- Quantify statewide grid impacts beyond localized observations
- Replace long-term planning or optimization studies

The purpose of this analytical framework is to support interpretation of demonstrated performance, not to prescribe future deployment pathways.

Implications for Implementation & Risks

From Observation to Readiness

Findings from the 10 case studies indicate that successful electrification is determined less by individual technologies and more by coordinated system readiness. As deployments moved from concept to operation, consistent constraints emerged across infrastructure, institutional coordination, workforce capacity, and grid integration.

Accordingly, Year 3 implementation framing focuses not on deployment planning, but on readiness conditions required for responsible future action.

Implementation Readiness Themes

1. *Infrastructure & Grid Coordination*

Case studies consistently show that siting, utility coordination, and permitting timelines have a greater influence on outcomes than equipment performance alone. Effective implementation therefore depends on early utility engagement, alignment between transportation and energy planning cycles, and identification of site constraints prior to procurement decisions.

2. *Interagency & Institutional Coordination*

Projects with structured coordination across transportation agencies, utilities, and local governments demonstrated fewer delays and smoother operations. This highlights the importance of clearly defined roles, formal coordination protocols, and standardized documentation practices across participating entities.

3. *Workforce & Operational Capacity*

Workforce readiness emerged as a critical implementation constraint. Successful deployment depends on aligning technical training, certification pathways, and operator engagement with system design and commissioning processes to ensure operational capability matches infrastructure investment.

4. *Data, Documentation & Performance Tracking*

The standardized case study framework developed in Year 3 establishes a foundation for consistent reporting. Continued implementation will depend on maintaining comparable metrics, transparent documentation of limitations, and clear recording of deviations from expected performance.

Risk Insights from Observed Deployments

Risk assessment in Year 3 is grounded in observed conditions rather than theoretical scenarios. Across deployments, four primary risk categories were consistently identified:

- **Infrastructure & grid integration risk:** driven by utility upgrade timelines, local capacity constraints, and coordination gaps between energy and transportation planning

- **Operational variability risk:** arising from duty cycle instability, environmental conditions, and mismatches between expected and actual operating profiles
- **Workforce & institutional risk:** including training gaps, procedural unfamiliarity, and permitting or inspection delays
- **Financial & schedule risk:** primarily linked to late-stage design changes, integration complexity, and permitting timelines

These risks are not unique to electrification technologies but reflect system-level implementation conditions.

Risk Posture & Boundaries

The findings suggest that these risks are manageable but not avoidable. Effective mitigation depends on early visibility, phased implementation, and alignment across institutions rather than reliance on technology selection alone.

This section does not quantify risk probabilities, establish cost impacts, or prescribe mitigation investments. Those analyses will become appropriate as the evidence base expands and deployment conditions become more defined.

Overall Interpretation

Together, the implementation and risk findings reinforce a central conclusion of Year 3: electrification outcomes are determined as much by system readiness and coordination as by technological capability. The primary constraint is not feasibility, but integration.

This reinforces the Initiative's broader approach of disciplined, incremental advancement grounded in observed experience. The case studies do not prescribe deployment pathways, but they do define the conditions under which future deployment can be evaluated, supported, and sustained with greater confidence.

Conclusion

Advancing with Readiness, Coordination & Operational Evidence

The case studies presented throughout this report collectively demonstrate that electrification is not a single technology transition, but a broader systems-integration challenge that intersects transportation, energy, infrastructure planning, workforce readiness, economic development, and public policy. Across rural charging deployments, school and transit fleets, freight systems, grid-aware infrastructure planning, electric aviation, and air-quality modeling, a consistent pattern emerged: successful implementation depends less on any individual technology than on the ability of systems, institutions, and stakeholders to operate in coordination.

Several themes appeared repeatedly across the Year 3 findings. Infrastructure readiness and utility coordination often influenced outcomes earlier than vehicle capability itself. Operational performance was highly dependent on local context, including terrain, duty cycles, weather conditions, rate structures, and permitting environments. Workforce readiness, data integration, and institutional coordination frequently proved just as important as technical specifications. In many cases, the greatest constraints were not technological limitations, but the practical realities of implementation.

Importantly, the findings also demonstrate that Utah is entering a more operational phase of transportation electrification. Many of the discussions reflected in earlier planning years are now being tested through deployed infrastructure, active fleets, corridor analysis, integrated charging systems, and real-world operational data. The Initiative's standardized case-study framework provides an increasingly valuable mechanism for documenting those experiences consistently, enabling future analysis to build cumulatively over time rather than through isolated pilot observations.

At the same time, the report reinforces the importance of maintaining disciplined expectations around scale, timing, and deployment readiness. The presence of promising pilot results or successful deployments does not eliminate uncertainty surrounding long-term adoption patterns, infrastructure costs, grid impacts, supply chains, or operational scalability. Rather than treating uncertainty as a barrier, Year 3 approaches it as a necessary planning condition — one that should be documented transparently and incorporated directly into implementation discussions.

The engagement and outreach efforts described throughout this report further strengthened that process. Participation across industry, government, research, utility, workforce, and community forums provided continuous opportunities to validate findings against operational realities and emerging stakeholder needs. These interactions helped ensure that technical work remained grounded in practical implementation conditions while also strengthening the role of the Industry Advisory Teams in shaping coordinated cross-sector feedback and strategic alignment.

As additional sections are incorporated into future reporting — including statewide conditions, materials and minerals analysis, and expanded deployment observations — the Initiative's evidence base will continue to mature. Over time, this growing body of operational data, comparative analysis, and stakeholder engagement will improve Utah's ability to distinguish isolated outcomes from repeatable patterns and to evaluate future investments with greater confidence.

Ultimately, the most significant outcome of Year 3 may not be any single technology result or deployment milestone, but the establishment of a disciplined statewide process for learning, evaluating, and coordinating across complex systems. The Initiative continues to reinforce a practical principle that emerged consistently throughout the report: electrification readiness is determined not simply by technology availability, but by the ability of infrastructure, institutions, workforce systems, utilities, industry, and communities to move forward together in an informed and coordinated manner.

That foundation positions Utah to continue evaluating transportation electrification deliberately, responsibly, and with increasing operational clarity as technologies, infrastructure systems, and statewide priorities continue to evolve.

Thank You

The Utah Electrification Initiative is built on collaboration. The progress highlighted throughout this report reflects the dedication and expertise of researchers, public agencies, industry partners, utilities, and community stakeholders working together to thoughtfully advance transportation electrification across Utah.

We extend our sincere appreciation to the many individuals and organizations whose leadership, technical expertise, and ongoing collaboration continue to shape this initiative.

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Case Studies & Summaries

The following summaries distill key findings from the full case studies, providing a concise view of observed outcomes and cross-cutting insights. Detailed case studies remain available for full technical reference and are linked in each summary.

Scan the code to see all Case Studies, or continue to explore individually.

Grid-Constrained Rural DC Fast Charging with Storage

Executive Summary

Small rural communities are critical to the deployment of comprehensive electric vehicle fast charging, enabling convenient EV travel across the western United States and to its recreation destinations. Such locations can present significant and unique challenges from a power access perspective. Often rural communities have limited grid capacity, capped by substation or transmission capacity. Unlike a larger community in a more densely populated region, there may only be one substation in town, and no nearby town for many miles. Such constraints challenge regional and national deployment efforts such as the National Electric Vehicle Infrastructure program (NEVI). This study evaluates supplemental grid-supporting storage technologies and control strategies to offer high-performance charging while minimizing cost and grid impact.

Using a rural community near several recreational parks, this is a useful test case because its charging demand is shaped by regional tourism and long-distance travel as much as local population. The site must be ready for short periods of high-power service, including NEVI-required four-port 150 kW operation, even though average utilization is low, and a large conventional grid upgrade is difficult to justify on-site revenue alone.

The study evaluates whether a rural community can meet that service need through a constrained-grid design rather than a major utility upgrade. Projected charging sessions were translated into site power requirements for a two-cabinet, four-plug station. The financial model compared grid upgrades, battery storage, and flywheel-supported configurations under Rocky Mountain Power rate structures, and the sensitivity analysis tested fixed storage configurations across alternative arrival scenarios with and without limited curtailment.

Key takeaways

- The lowest-cost storage pathway is dramatically cheaper than a conventional grid upgrade. The base grid-upgrade case requires roughly $3.7 million in power-infrastructure CAPEX. The one-flywheel case is about $300,000 before incentives or negotiated discounts, a more than 10x reduction.
- Storage addresses the real constraint: short, coincident peak demand. The area's difficult periods are not driven by high average energy use. They occur when multiple vehicles need high-power service at the same time. Storage holds the grid interconnect at 500 kW and covers the most demanding intervals.
- Schedule 6A lowers site operating cost but weakens the storage signal. Schedule 6A is generally cheaper for a low-utilization site because it makes lightly used grid capacity less

expensive to operate. A lower-power version of Schedule 8 that rewards moving demand outside peak demand periods could better align customer and grid benefits.

- Curtailment changes the robustness picture. Without curtailment, flywheel-only configurations are too sensitive to arrival timing, and the two-battery configuration is strongest. With limited curtailment, every evaluated storage configuration remains NEVI compliant through 2035.
- The practical upgrade path is modular. Limited curtailment can act as a compliance buffer for lower-CAPEX designs. The site can install enough storage to deliver 600 kW during short peak periods, monitor actual demand and curtailment events, and reserve space for later storage additions.

Click here to access the full case study on Grid-Constrained Rural DC Fast Charging.

Considering Feasibility of Electric Aircraft at a Regional Scale

Executive Summary

Electric aviation presents an emerging opportunity to reduce emissions, expand regional mobility options, and improve operating economics for certain aviation applications. As electric aircraft transition from prototype development toward commercial deployment, regional airports and aviation training programs may serve as some of the earliest and most practical environments for adoption. However, the feasibility of electric aviation depends not only on aircraft capability, but also on the readiness of airport electrical infrastructure and operational alignment with flight patterns.

This study evaluates the readiness of Utah's regional airports to support electrified aviation using infrastructure data provided by Rocky Mountain Power. Two key metrics were analyzed: peak electrical capacity, representing the maximum instantaneous power available at an airport, and daily energy throughput, representing sustained energy availability over time. Together, these metrics provide a foundational understanding of how existing airport infrastructure aligns with the operational requirements of emerging electric aircraft.

The analysis focused on several potential use cases, including flight training, air taxi operations, light cargo service, and recreational aviation. Among these, flight training emerged as the most immediately feasible application. Existing aircraft platforms, including the Bye Aerospace eFlyer 2 and Diamond eDA40, appear capable of supporting a large share of recorded training flights, particularly where flights begin and end at the same airport. Because these operations require charging infrastructure at only one location, implementation complexity and cost are significantly reduced.

Other use cases, including regional air taxi and light cargo services, show longer-term potential but depend more heavily on coordinated infrastructure availability at both origin and destination airports, as well as continued improvements in battery energy density and aircraft range. Mid-scale cargo and broader recreational aviation applications remain more constrained under current infrastructure and technology conditions.

Key Takeaways

- Flight training is the most practical near-term application for electric aviation. Existing electric aircraft platforms can support a large portion of observed training operations using currently available airport infrastructure.
- Peak power availability and sustained energy throughput differ considerably between regional airports, influencing where early deployment is most feasible.

- Infrastructure coordination is as important as aircraft capability. Feasibility depends not only on vehicle technology, but also on charging availability, utility coordination, and operational alignment with airport activity patterns.
- Point-to-point services face additional infrastructure constraints. Air taxi and cargo applications require reliable charging access at both ends of a route, increasing deployment complexity and infrastructure costs.
- Electric aviation deployment is likely to occur incrementally. Early adoption is expected in highly predictable operational environments before expansion into broader regional transportation applications.

Click here to access the full case study on Feasibility of Electrified Aviation at Regional Scale.

Cold-Weather eVTOL Fleet Operations for Large-Scale Sporting Events

Executive Summary

Electric vertical takeoff and landing (eVTOL) aircraft represent a transformative mode of urban air mobility (UAM), yet their operational viability in high-altitude, cold-weather environments remains an open question for large-scale deployment. This paper examines eVTOL fleet management for the anticipated 2034 Salt Lake City Winter Olympics — a scenario uniquely challenging due to sub-zero temperatures, terrain elevation spanning **1288m** to **2438m** above sea level, and sharply peaked transport demand driven by Olympic event schedules.

We develop a discrete-event simulation modeling a heterogeneous fleet of Archer Midnight, Joby S4, Beta Alia A250 (eVTOL), and Beta CX300 (eCTOL) aircraft serving twelve official and anticipated Olympic venues over a representative 24-hour operational day. The model incorporates lithium-ion battery cold weather efficiency degradation, air-density power corrections at altitude, mountain wave turbulence penalties, and passenger weight distributions across athlete, spectator, staff, and media categories. Critically, we incorporate the 2024 FAA Powered-Lift SFAR mandate for 20 min energy reserves and evaluate battery State of Health (SoH) degradation under aggressive Olympic duty cycles. Results demonstrate that a twelve-aircraft mixed fleet (three of each type) can move approximately **303 passengers** while managing energy constraints and regulatory compliance. We identify cold-weather lithium plating risk and mountain-induced power increases of 7% to 25% as the principal fleet management challenges, and discuss infrastructure recommendations for high-power thermal management.

Metric	Archer Midnight	Joby S4	Beta A250	Beta CX300
Flights completed	7	6	75	26
Passengers moved	22	18	184	79
Energy consumed (kWh)	152	277	1,859	458
Avg. energy/flight (kWh)	21.7	46.2	24.8	17.6
Mean SoC at dispatch (%)	38.2	32.5	22.0	28.4
Fleet utilization			7.3%	
Total energy (MWh)			2.7	
Avg. temperature (°C)			−4.9	

Figure 3 Simulation Results (3 aircraft per type, 24 hour cycle)

Key Takeaways

- Cold-weather battery penalties (24-38% effective range reduction across the anticipated Olympic temperature range) constitute the dominant energy-model correction factor, exceeding altitude effects by a factor of three.
- Correct battery capacity specification is prerequisite to valid fleet planning: a factor-of-three error in the initial Archer Midnight battery capacity estimate produced a factor-of-four overestimate of daily flight capacity.
- A 12-aircraft heterogeneous fleet serving both eVTOL and eCTOL routes provides approximately 303 passenger sorties per day under Olympic operating conditions, with

Beta Alia A250 platforms performing the majority of mountain missions due to superior energy density

- Battery State of Health (SoH) degrades at an accelerated rate (1000–1500 cycles) under Olympic duty cycles due to high-power hover phases and cold-weather charging, impacting long-term fleet commercial viability.
- Mountain vertiport electrical infrastructure must be sized to accommodate concurrent altitude power derating, mountain wave turbulence penalties, and cold-weather charge rate derating.

Click here for the full case study on Cold-Weather eVTOL Fleet Operations for Large-Scale Sporting Events.

eVTOL for Regional Travel in Utah Feasibility

Executive Summary

Electric vertical takeoff and landing (eVTOL) aircraft present a potential future pathway for regional air mobility, particularly for short- to medium-range travel where roadway congestion, terrain, or travel time create transportation challenges. In Utah, however, mountainous terrain, high elevations, and rapidly changing weather conditions introduce operational constraints that may significantly affect the feasibility of eVTOL deployment. Understanding how these conditions influence flight performance is critical for future route planning, infrastructure coordination, and evaluation of viable use cases.

This study evaluates the feasibility of regional eVTOL travel in northern Utah through large-scale simulation modeling using an extended version of Laminar Research's X-Plane flight simulation platform. The simulation environment incorporated autonomous flight operations, terrain-aware navigation, and enhanced battery modeling to better represent real-world eVTOL operating conditions. Using the BETA ALIA 250 platform, 157 simulated flights were conducted across multiple route combinations and weather scenarios, including clear, cloudy, rainy, foggy, and severe weather conditions.

The analysis focused on potential regional mobility applications, including air taxi-style transportation between major population centers and recreation destinations. One motivating use case examined travel between Salt Lake City and ski destinations in Little Cottonwood Canyon, where roadway congestion can create significant travel delays during peak recreation periods.

Simulation results indicate that eVTOL feasibility in Utah is highly dependent on terrain, route geometry, and battery limitations. Of the 157 simulated flights, 107 were completed successfully, while 40 resulted in failure due to insufficient battery capacity or terrain adaptation limitations. An additional 10 simulations were manually terminated or exceeded the maximum simulation duration. Routes across flatter terrain, including connections between Brigham City and Salt Lake City, demonstrated consistently higher success rates across weather conditions due to the aircraft's ability to maintain efficient cruise altitudes.

Key Takeaways

- Terrain is a primary operational constraint for eVTOL deployment in Utah. Mountainous routes often require significant altitude changes or extended rerouting around terrain features, increasing battery demand and reducing operational feasibility.
- Battery energy density remains a limiting factor. Current battery capabilities constrain route flexibility, particularly in high-elevation environments and during longer regional flights.

- Flat-terrain regional corridors show the greatest near-term feasibility. Simulations indicate stronger performance and reliability on routes where aircraft can maintain stable cruise altitudes without major terrain avoidance.
- Weather and operating conditions materially affect performance. Variable weather conditions influence route completion rates, energy consumption, and overall operational reliability.
- eVTOL deployment is likely to emerge first in specialized use cases. Early adoption may be most practical for high-value regional mobility applications where time savings justify operational complexity, such as airport connections or recreation access corridors.

The findings suggest that while eVTOL aircraft may support future regional mobility applications in Utah, widespread deployment will depend on continued improvements in battery technology, terrain-aware flight operations, and supporting infrastructure coordination.

Click here to access the full case study on eVTOL Regional Travel in Utah.

Rural School Bus Electrification: Feasible Routes, Coordinated Charging, & Near-Term Bill Savings

Executive Summary

A case study of Uintah School District's fleet shows that school-bus electrification potential varies substantially by bus and itinerary. Some buses fit current electric-bus range, depot-charging windows, and cost conditions much better than others. The analysis is best read as decision support: which service patterns are technically feasible, where electrification appears economically attractive, and what operating conditions would be needed if the district considers expanding beyond its current electric-bus fleet.

What the Analysis Shows

- **Feasibility is route-specific.** Under baseline depot-only assumptions, 30 of 60 buses can be electrified with the modeled battery configuration. Several additional buses are near the feasibility threshold, while the most constrained vehicles appear to be higher-demand and less regular duty cycles, such as athletics or field-trip-style service. Figure 1 shows the vehicle level screening results.
- **Winter heating load is a major planning consideration.** Cold-weather heating can account for a large share of daily energy use, especially when buses move slowly, wait, or operate short route segments over long service windows. A simple average kWh-per-mile assumption can miss the days when range risk is highest.
- **Economics are selective.** High-use feasible buses are better candidates because they recover more value from lower fuel and maintenance costs. Purchase incentives are often needed for those savings to overcome higher electric-bus purchase costs.
- **Existing depot chargers can go farther than one charger per bus, but only if they are reliable.** The analysis does not suggest a need for additional depot chargers in the modeled low-, medium-, or high-electrification pathways. That result depends on shared charger use, charger uptime, queue management, peak-demand control, and practical operating discipline.
- **Rate selection is an immediate savings opportunity.** Observed electric-bus charging is about 160 MWh per year and is concentrated after morning and afternoon routes. Moving that load from Schedule 6 to Schedule 6A reduces the modeled annual bill from about $55,200 to $36,700, saving $18,500, or 34%, with no operating change. Smart charging on Schedule 6A reduces the modeled bill to about $26,000, saving $29,200, or 53%, relative to

Schedule 6. Schedule 8 could save more than Schedule 6A, but it depends on safely and economically meeting eligibility requirements. Figure 2 summarizes the rate opportunity.

What It Means

- **Prioritize feasible, high-use buses if additional electrification is pursued.** These vehicles are more likely to fit current range limits and recover value from lower operating costs.
- **Treat charger reliability as part of the infrastructure plan**. Shared-use procedures, charger uptime, queue management, and peak-demand control are central to making a low-infrastructure depot strategy practical.
- **Pursue Schedule 6A as the clearest near-term rate action.** The modeled savings are large and do not require changing bus operations, although billing and utility details should still be verified before switching.
- **Test smart energy management during lower-risk periods.** Summer or other low-service windows can be used to confirm delayed charging, route readiness, charger response, and operational monitoring.
- **Evaluate Schedule 8 as a larger but more conditional opportunity.** The modeled savings are larger, but the district would need to safely and economically meet eligibility requirements.

Click here for the full case study on Rural School Bus Electrification.

Energy Storage-Supported Electric Bus Charging

Executive Summary

Utah Transit Authority's electric bus charging sites include overnight depot charging and on-route pantograph charging. These operations can create short, high-power demand peaks even when total energy use is moderate, which raises a practical planning question: can stationary storage reduce utility bills enough to justify its installed cost?

This study evaluates that question for five existing UTA charging locations: Mount Ogden Depot Chargers, Ogden FrontRunner Pantographs, SLC Depot District, SLC FrontRunner Central Station, and SLC Orange Street. The analysis focuses on current operations and measured charging behavior, asking whether storage makes financial sense for the load UTA is already serving today.

The analysis used January through March 2026 charging records to build 15-minute site load profiles aligned with Rocky Mountain Power billing demand intervals. For each site, the model optimized storage sizing and dispatch across tariff, storage-cost, and battery-performance assumptions. The scenarios compared UTA's current Schedule 6A treatment with Schedule 6 and tested whether storage value depends on lower installed cost or higher battery power capability.

Key Takeaways

- Storage is not financially compelling under the quoted 2026 assumptions. At the quoted storage prices and supplier-specified battery performance, no evaluated UTA site reduces net present cost by installing stationary storage. The modeled peak-reduction value is real, but not large enough under current cost and tariff assumptions to justify procurement.
- The practical recommendation is to avoid near-term storage procurement. UTA should not advance stationary storage deployment for these sites on the basis of the evaluated 2026 quotes. A project would need to overcome the modeled financial gap plus procurement, installation, controls integration, maintenance, and operational oversight.
- Battery economics improve only under more favorable assumptions. Storage becomes attractive in selected cases when battery pricing is materially lower or batteries can deliver more peak power per installed kWh. The strongest modeled opportunity is SLC Depot District, but even there the result depends on pricing substantially below the quoted high-cost case.
- Schedule 6A limits the payoff from dedicated storage. Schedule 6 creates a stronger demand-reduction signal and therefore makes storage dispatch more valuable in some

cases. Schedule 6A, UTA's current schedule, is often cheaper overall but provides a weaker financial reward for reducing short-duration charging peaks with dedicated storage hardware.

- The sites still have peak-management opportunity. Several locations show brief high-demand intervals and relatively low energy utilization. The analysis does not imply that peak reduction has no value; it means that under current assumptions, dedicated stationary storage is not the most practical path to capturing that value; the first step should be optimizing smart charging control strategies.

Click here to access the full case study on Storage-Supported Electric Bus Charging.

Integrated Charger & Vehicle Monitoring Platform

Executive Summary

As transit agencies expand battery-electric bus fleets, operational visibility and charging reliability become increasingly important to maintaining service continuity and controlling operating costs. The Utah Transit Authority (UTA), in partnership with ASPIRE's software team at Utah State University, developed and deployed an integrated monitoring platform designed to improve management of electric bus charging infrastructure and vehicle operations through centralized, real-time data integration.

The platform has operated continuously in production for more than a year, supporting high-power DC fast chargers ranging from 150–300 kW across depot and on-route charging locations. The system integrates charger data using the Open Charge Point Protocol (OCPP 1.6) alongside real-time vehicle telematics from battery-electric buses, allowing charging events to be reconstructed and analyzed within a single operational interface.

Prior to deployment, charger information, vehicle telemetry, and energy usage data existed across separate vendor systems with limited interoperability. Diagnosing failed charging events often required manually comparing records from multiple platforms, increasing troubleshooting time and reducing confidence in the reliability of charging infrastructure. The integrated platform addresses these challenges by correlating vehicle and charger data into unified charging session records that connect a specific vehicle, charger, charging period, and operational outcome.

The resulting system provides real-time infrastructure monitoring, anomaly detection, charge scheduling support, and facility-level energy demand visualization through a centralized web-based interface used by operations and maintenance personnel. The platform has since evolved from a monitoring tool into an operational management system supporting daily fleet scheduling, maintenance coordination, and energy management activities.

Key Takeaways

- Integrated operational visibility improves troubleshooting and reliability. By correlating charger and vehicle data into unified charging sessions, staff can more quickly distinguish between charger faults, vehicle issues, and communication interruptions.
- Data integration supports more efficient fleet operations. Centralized monitoring enables improved maintenance workflows, clearer operational oversight, and more accurate warranty documentation for charging equipment and vehicles.
- Energy management capabilities reduce operational costs. Facility-level demand visualization and power curtailment strategies provide greater control over peak demand charges and support ongoing electricity cost management.

- Real-world deployments require flexible data handling approaches. Variability in charger implementation of OCPP 1.6 protocols required the platform to accommodate inconsistent behaviors and intermittent communication gaps while maintaining operational usability.
- Centralized charge management supports future scalability. Ongoing development of server-side charging controls is expected to improve scheduling reliability, automate charge management functions, and support future microgrid optimization strategies.
- The platform architecture is transferable beyond a single deployment. The system demonstrates how integrated monitoring and contextualized operational data can support broader adoption of electric transit systems across other transit agencies and fleet operators.

Overall, the deployment demonstrates that operational integration and data interoperability are critical components of electric fleet reliability. As electrified transit systems scale, centralized monitoring and coordinated charge management may become as important as the charging hardware itself in supporting dependable daily operations.

Click here to access the full case study on the Integrated Charger and Vehicle Monitoring Platform.

Utah Class 8 Truck Electrification: System Costs, Charging Strategy, and Grid Planning Needs

Executive Summary

Class 8 truck electrification in Utah can be cost-competitive for a meaningful share of modeled activity, but it is fundamentally a system-planning problem. Heavy-duty long-haul and regional-haul trucks have high daily energy demand, long-distance and cross-border movement, concentrated corridor activity, and limited charging windows. A successful system depends on coordinated decisions about vehicle batteries, stationary chargers, on-route charging, dynamic wireless power transfer (DWPT), electricity costs, and grid upgrades.

What the Analysis Shows

- **This is a scenario comparison, not a forecast.** The study uses observed Class 8 truck telematics to compare strategies. The low pathway models **3,514 electric trucks**, or about **4.5%** of Utah combination-truck VMT; the high pathway models **8,785 electric trucks**, or about **22.7%**. The high pathway is a conservative stress case because it electrifies all eligible trucks in the modeled sample, including harder-to-serve itineraries that may not be targeted first.
- **All-in system costs are competitive relative to conventional fuel-only benchmarks in some scenarios and challenging in others.** Modeled battery-electric system cost ranges from **$0.44-$0.67/mi** in the low pathway and **$0.86-$1.37/mi** in the high pathway. These values include vehicle batteries, charging infrastructure, electricity, grid upgrades, infrastructure replacements, operating penalties or credits, and supporting infrastructure for out-of-state itineraries.
- **Operating-cost comparisons are more favorable than all-in comparisons.** After removing vehicle battery and out of-scope infrastructure components, modeled BEV energy and charging-system operating cost is about **$0.36-$0.52/mi** in the low pathway and **$0.68-$1.04/mi** in the high pathway. At **$4.50/gal** and **5.7 mpg**, diesel fuel cost is about **$0.79/mi**.
- **Battery cost is one of the strongest cost drivers.** Lower battery costs make larger onboard batteries more attractive; higher battery costs push the system toward smaller batteries and greater reliance on charging opportunities.
- **Stationary charging anchors the modeled system.** It supplies most charging energy and appears consistently across scenarios. DWPT is scenario-sensitive and complementary,

supplying between **0%** and about **11%** of modeled charging energy across Utah zones. These scenarios do not rule out broader roadway electrification; they only evaluate selective truck focused DWPT deployment.

- **Grid impacts rise sharply with adoption.** Based on a coarse and scope-limited grid capacity model, upgrade capacity ranges from about **77-213 MW** in the low pathway and **372 MW-1.66 GW** in the high pathway. These are planning signals, not statewide engineering estimates.

What It Means

- **Plan for a mixed charging system whose balance depends on costs and adoption.** Stationary charging supplies most modeled energy in these scenarios, so freight-stop coordination, site access, utilization, and interconnection screening remain central. DWPT becomes more attractive under favorable cost and high-adoption assumptions, especially where in-motion charging can reduce battery or stationary-charging burden, but it does not displace the need for substantial stationary charging in this scenario set.
- **Use the high-electrification results as a stress test.** The high pathway includes harder-to-serve eligible trucks and should inform planning for difficult cases, not be read as a typical early-adoption cost estimate.
- **Move grid coordination earlier.** Grid impacts rise sharply with adoption, so transportation planning, utility planning, and freight-sector engagement need to be coordinated before large charging commitments are made.
- **Treat the cost results as optimized benchmarks.** Practical deployment will still face land, permitting, interconnection, carrier coordination, financing, and information constraints.

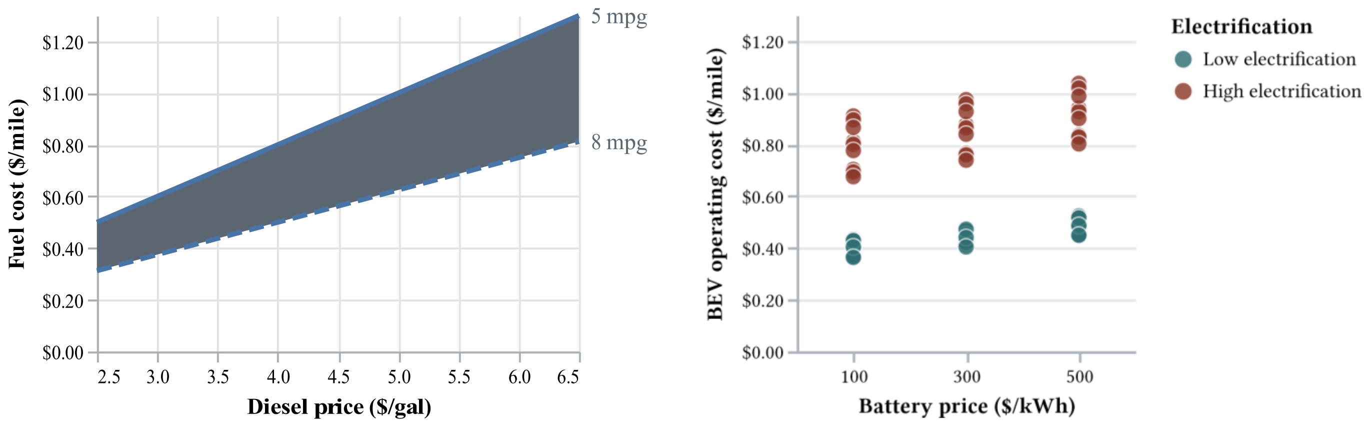

Figure 1: Diesel fuel cost per mile compared with modeled BEV energy and charging-system operating cost per mile. Both panels exclude vehicle capital costs and out-of-scope infrastructure costs.

Click [here] to access the full case study on Electrifying Heavy-Duty Trucking in Utah.

Grid-Aware EV Corridor Planning: Utah's Wasatch Front Transportation Corridor

Executive Summary

Utah's freight, transit, and passenger-rail electrification needs create a planning problem that is both a transportation problem and a grid problem. Heavy-duty truck charging, UTA bus charging, electrified roadway demand, and short high-power FrontRunner charging events can produce large, fast-changing loads even when total energy use is manageable.

The corridor analysis evaluates those transportation needs together with utility tariffs, local interconnection, upstream grid upgrades, available grid capacity, and on-site storage. It compares grid-aware planning, where grid information is used while the system is being designed, with grid-unaware planning, where charging and site decisions are made first and grid consequences are evaluated afterward. The companion municipal results provide specific cost, grid-upgrade, storage, demand, utility-bill, and unit-cost breakouts for municipalities across the state.

The planning message is practical: high-power charging infrastructure should be planned with the grid from the beginning, not handed to the grid after transportation decisions are fixed. Including grid capacity during planning helps align charging demand with available capacity, giving the corridor system more options to serve vehicles while reducing avoidable upgrades and costs.

Key Takeaways

- Grid-aware planning reduces costly grid upgrades. Including grid information during optimization lowers modeled net present cost from about $1.3 billion to about $920 million and reduces upstream grid upgrades from about 110 MW to about 79 MW.
- The scale is large enough to justify integrated planning. By 2045, the modeled grid-aware buildout reaches more than $1.5 billion in net present cost and more than 150 MW of upstream grid upgrades. Small improvements in siting, timing, interconnection, storage, and tariff response therefore translate into material system impacts.
- Load shape matters as much as energy. Charging demand can be shifted in time, buffered with storage, or connected at locations with more available capacity. Those options are only visible when the planning model sees grid constraints while it chooses how charging is served.
- Ramp-rate limits can sharply reduce grid impact with limited cost increase. At a multimodal site, a short FrontRunner pulse can make grid demand swing from less than 250 kW to more than 2 MW in seconds. Moving from near-instant response to a one-hour ramp time

raises modeled net present cost only modestly, from about $7.6 million to just under $8.0 million, while making the event appear as an essentially flat grid load near 1 MW.

- Ramp-rate-aware tariffs are a promising policy tool. Existing tariffs often focus on monthly peak demand, but high-power transportation loads also stress the grid through rapid changes in power. A ramp-rate charge, interconnection requirement, operating constraint, or related tariff mechanism could reward smoother grid behavior without disrupting the transportation service.

Click here to access the full case study on Grid-Aware EV Corridor Planning. Supplemental analysis that incorporates municipal-level insights is available here.

Air Quality & Health Impacts of Vehicle Electrification: Projected PM2.5, NO2 & Health Outcomes Under Transportation and Power-Sector Scenarios

Executive Summary

Transportation electrification has the potential to improve air quality and reduce adverse health outcomes associated with vehicle emissions. However, the magnitude of those benefits depends on several factors, including the pace of vehicle electrification, future population growth, and how additional electricity demand is supplied by the power sector. This study evaluates how different transportation electrification and electricity-generation scenarios could affect concentrations of fine particulate matter (PM2.5), nitrogen dioxide (NO2), and associated public health outcomes in Utah over time.

The analysis modeled 18 future emissions scenarios representing combinations of 0%, 60%, and 100% vehicle electrification paired with electricity generation mixes containing 0%, 40%, and 80% renewable energy for the years 2025, 2035, and 2045. These scenarios were evaluated using the InMAP reduced-complexity air quality model to estimate changes in PM2.5 and NO2 concentrations relative to a baseline emissions scenario.

Across all modeled scenarios, transportation electrification resulted in net reductions in both PM2.5 and NO2 concentrations. Larger reductions were observed under 100% electrification scenarios compared to 60% adoption scenarios and benefits generally increased in future decades due to projected growth in population and transportation activity. Differences in renewable energy assumptions within the modeled power sector scenarios produced relatively small changes in projected air pollution concentrations under the assumptions used in this analysis.

The study also evaluated how projected changes in air pollution concentrations could influence health outcomes. A health impact assessment estimated changes in all-cause mortality and multiple disease categories associated with long-term exposure to PM2.5 and NO2, including asthma, chronic obstructive pulmonary disease (COPD), ischemic heart disease, stroke, type 2 diabetes, dementia, autism, lung cancer, and acute lower respiratory infection.

Key Takeaways

- All modeled electrification scenarios resulted in net improvements in PM2.5 and NO2 concentrations. No scenario produced statewide increases in modeled air pollution exposure under the assumptions evaluated.

- Higher levels of vehicle electrification produced greater air quality benefits. The 100% electrification scenarios consistently resulted in larger reductions in pollutant concentrations and associated health impacts than 60% electrification scenarios.
- Projected benefits increased over time. Air quality and health improvements were larger in 2035 and 2045 scenarios due to expected growth in population and transportation emissions under baseline conditions.
- Modeled health outcomes indicate substantial potential public health benefits. By 2045, modeled scenarios projected avoided cases of COPD, dementia, childhood asthma onset, and other pollution-related health conditions, alongside reductions in premature mortality associated with PM2.5 and NO2 exposure.
- Power sector assumptions materially influence results. Although renewable energy assumptions had limited effects within the modeled scenarios, outcomes remain sensitive to the future electricity generation mix, including the role of natural gas, coal generation, and the geographic location of power production.
- Transportation electrification alone does not eliminate uncertainty. Results depend on future adoption patterns, energy generation pathways, and the underlying assumptions incorporated into the modeling framework.

Overall, the findings suggest that transportation electrification could provide meaningful air quality and public health benefits in Utah under a wide range of future conditions, while also reinforcing the importance of coordinated transportation and energy planning as electrification expands.

Click here to access the full case study on Air Quality and Health Impacts of Vehicle Electrification.