



Advanced Fleet Planning for a Successful Transition to Zero-Emission Vehicles

THE BENEFITS OF UTILIZING ADVANCED
MODELING & ROUTE EMULATION SOFTWARE

The Current State of ZEV Fleet Transition Planning

As fleets work toward ambitious emissions reduction goals, the transition to zero-emission vehicles (ZEV) is at a crucial inflection point while some fleets introduce their first few ZEVs this year and others are **going beyond pilot programs** to deploy large numbers of electric vehicles.

With limited data available in the early years of electric vehicle (EV) and fuel-cell electric vehicle (FCEV) deployments, pilot projects were often done without advanced fleet planning or route modeling.

Small trials and pilots enabled fleet owners and operators to test ZEVs and charging systems in real conditions and gain insights to questions such as, **“What range will EVs get on our routes?”** and “How does this change in different weather conditions?” Initial pilots are critical for establishing foundational insights, but as fleets expand their ZEV deployments the complexities of managing the operational aspects of EVs and FCEVs become increasingly evident and urgent.

Early adopters encountered unforeseen challenges new to fleets, such as high electricity bills from demand charges, less vehicle range than expected, difficulty working with utilities for infrastructure upgrades, longer than expected charge times, and more. While these challenges can be mitigated and overcome for smaller scale pilot projects on a case by case basis, managing larger numbers of electric vehicles without advanced planning and comprehensive analyses can result in **significant cost increases, underutilization of assets and inefficiencies.**





Common Challenges Fleets Encounter with EV Deployments

Several operational challenges can arise during the transition to electric and fuel cell electric vehicles which can impact service delivery, operational costs, and future procurement decisions. Initial challenges may include:

- **Choosing the right vehicles and chargers to meet the fleet's needs**
 - *Determining the right amount of energy storage needed on board each vehicle and the appropriate power levels and system configurations to choose for charging stations*
 - Without advanced planning, fleets risk overspending significantly on charging system hardware, battery capacity, and power consumption.
- **Identifying which vehicles/routes to electrify now vs. down the line**
 - *Knowing which routes the vehicles can cover based on the range requirements, terrain, regional weather conditions, and capabilities of the technology*
 - Electrifying the right vehicles/routes in the best order ensures that the fleet can operate efficiently without range anxiety or uncertainty. Without proper planning, fleets risk having vehicles run out of charge mid-route, which can cause service interruptions, delays, or the need to change schedules.



- **Predicting fleet performance over time**

- *Accurately predicting the performance of EVs and understanding how batteries will degrade over time and impact vehicle range*
- If degradation isn't taken into account, fleets could end up with vehicles that no longer meet their needs before the end of the vehicle life, which can lead to operational challenges and increased costs.

- **Utility costs**

- *Accurately predicting how much power your fleet will need each year and communicating with the utility early in the process*
- Failure to communicate the right power amount needed or not factoring in utility rate changes can result in spending more than needed, delaying the project or getting hit by unexpected costs.
- It is also important to understand how electricity rates may change, consider tariff optimization, and predict what utility bill costs will be when ZEVs are deployed.

Truly solving these problems requires a comprehensive approach to planning the transition that links all the pieces needed to make electric vehicles work efficiently in a fleet.





Challenges Addressed with Advanced Fleet Transition Planning

Advanced fleet transition planning enables fleets to make informed decisions about electrifying their operations and significantly reduce the cost of hardware, installation, and ongoing operational costs.

The transition to an electric fleet is also an opportunity to optimize the fleet and take a comprehensive look at how operations can be tweaked for greater efficiency and cost-effectiveness. With an all-encompassing approach, the result is not only lower costs, but can also lead to a faster path to reduce emissions. When you look at the system as a whole and take the data into account, alternate pathways may be uncovered that do not just rely on buying more vehicles and chargers.

The benefits and functions of advanced fleet planning include informed procurement decisions, a roadmap on which vehicles and/or routes to electrify now and in the future, understanding the power requirements, reducing costs, and more.

- **Provide insights to guide vehicle and charger procurement**
 - Take a data-driven approach to determining the right amount of battery storage needed on board vehicles, based on the range requirements of your fleet.
 - Consider different zero-emission propulsion technologies such as fuel cell electric vehicles to identify the best fit for your fleet's needs.



- Analyze vehicle usage and identify underutilized vehicles that present opportunities for consolidation to achieve more with fewer resources.
 - An advanced fleet transition plan takes into account any existing data to determine how vehicles must perform and how much time they must charge in. This data also guides decisions on whether on-route fast charging infrastructure is needed or if plug-in depot charging is sufficient, or if a combination of the two is the best option for the specific use case.
 - Provide a cost analysis so you can compare the Total Cost of Ownership (TCO) for various zero-emission vehicles and charging stations, in addition to an emissions reduction analysis.
- **Prioritize the best vehicles and/or routes to electrify now and in the future**
 - With proper planning, fleets can identify how electric vehicles will perform in their specific area in the middle of summer heat, the harshest winter conditions, and everything in between.
 - An advanced fleet transition plan takes variable vehicle performance and weather conditions into account to identify the best vehicles/routes for a fleet to electrify first, and the order to successively electrify over time as ZEV technology continues to mature.

Pro tip: Make sure your fleet transition plan takes an agnostic view of the different hardware options for vehicles and charging systems available to find the best possible solution for your specific use case & help you avoid vendor lock-in.



- **Identify the power required at your facility and determine infrastructure upgrades needed**
 - By honing in on the true amount of power needed from a specific location to support EVs, advanced fleet planning helps identify a fleet's energy needs moving forward so they can be communicated to the utility company as early as possible in the planning process to avoid delays and reduce costs.

- **Reduce and predict project costs**
 - Advanced fleet planning incorporates your electricity rates, potential demand charges, and required utility infrastructure upgrades into a managed charging plan. Planning a managed approach to charging an electric fleet can dramatically reduce the costs associated with procuring hardware and utility infrastructure upgrades needed.
 - An advanced fleet transition plan should incorporate an evaluation of current utility tariff rates available to your fleet to see if tariff optimization options are available to further reduce costs.
 - Grant funding opportunities are also taken into account in a comprehensive fleet transition plan, identifying strategies to further reduce overall project costs.

The proper planning can significantly reduce the costs associated with moving to zero emission vehicles, helping avoid potential roadblocks along the way and setting up your fleet for a successful and cost-effective zero-emission fleet implementation.



What Are the Key Components of a Zero-Emission Fleet Transition Plan?

There is a significant difference between a simplified, basic fleet transition plan and a comprehensive, advanced one. An advanced plan dives deeper, addressing the complexities and unique challenges of transitioning to zero emission vehicles with a far greater degree of accuracy.

To help you navigate this process, we've put together a resource with a checklist of the key components needed for an advanced zero emission fleet transition plan.



[Get the Advanced Fleet Transition Plan Checklist](#)



Clarity & value in every step of your zero-emission fleet journey

The BetterFleet platform has been used to help more than 200 fleets with advanced planning for the transition to zero emission vehicles.

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