



Wisdom to guide mobility transformations at U.S. ports

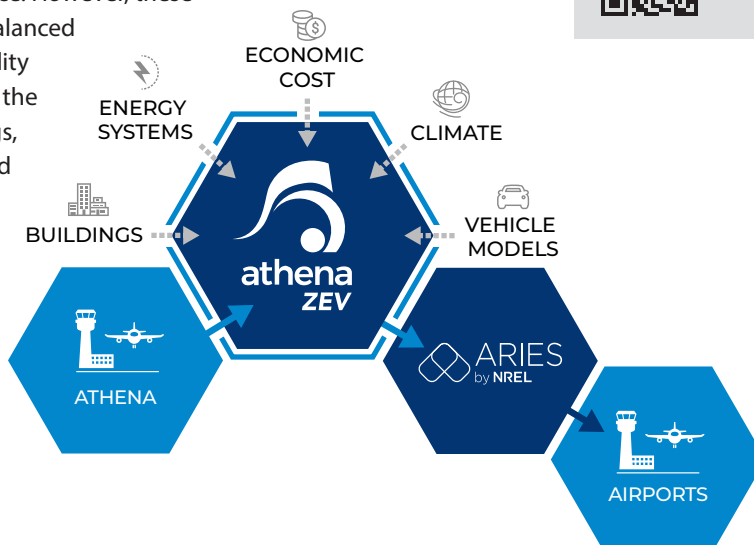


Building Electrification Pathways for Airports: Envisioning the Future of Zero-Emissions Transportation

In Athena ZEV, the next phase of the DOE-funded Athena Project, NREL is working with Dallas-Fort Worth International (DFW) airport and other partners to develop sophisticated strategies that will accelerate the decarbonization of millions of vehicles operating at and around airports. This work has an initial focus on the critical emerging challenge of rapid electrification of rental car operations and evaluating solutions through the NREL ARIES energy system simulation platform.

The Challenge

Airports have complex transportation needs, and electrifying airport transportation requires a sophisticated understanding of systems and energy demands. With urgent energy concerns—grid impacts, resilience, energy demand, electric vehicle adoption—necessitating action, airports must accelerate vehicle electrification by providing efficient, convenient, and affordable charging for many vehicles while also providing planning for grid stability and benefits to travelers. Athena ZEV empowers airports with tools and data that support clean energy solutions. These software tools focus on understanding widespread electrification to lower costs, optimize performance, improve operations, and enhance resilience. However, these goals must be balanced with high reliability and resiliency of the existing buildings, mobility, and grid infrastructure.



The Solution

Building on past insights, mobility and energy system digital twins of the airport will allow NREL researchers to create large-scale, data-driven simulations and conduct megawatt-scale experiments of various controllable loads, managed charging strategies, and energy storage systems that use transformational technologies. NREL's analysis considers electrical system upgrades required to accommodate charging needs, charging strategies aimed at minimizing costs, and rental car turnaround times for customers. Athena ZEV leverages NREL's ARIES platform to perform at-scale testing of proposed solutions. The Athena Project's digital twins for buildings and transportation and NREL's state-of-the-art charging infrastructure analysis tools help airports navigate uncertainty and plan for future needs.

The Impact

The technology solutions and tools developed for Athena ZEV will be widely replicable and transferrable to other airports, seaports, and related operations to accommodate rapid vehicle electrification. With one in 10 new light-duty vehicles sold in the United States going to rental car companies, empowering electrification of rental fleets is critical. More than 850 million passengers go to and from U.S. airports each year, and electrification will make those trips more energy efficient.



For more information, visit athena-mobility.org or contact athena.mobility@nrel.gov.



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