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Hydrogen Transportation and Distributed Energy Systems Risk and Feasibility Assessment for Airport Facilities (CRADA 555)

Abstract

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Abstract

This CRADA presents the strategy that Pacific Northwest National Laboratory (PNNL) and Sandia National Laboratories (SNL) will take to support PDX in performing a risk assessment for several hydrogen deployment scenarios. It is intended that the deployment of hydrogen at PDX could serve several roles building out a distributed energy system which could also be used to facilitate emergency operations.

PDX's initial plans concern replacing their current fleet of 28 busses with FCEBs. To do so, PDX will need to deploy the hydrogen systems needed to support the buses. This includes hydrogen storage, production, delivery, filling, compression, and maintenance. PDX also has long range plans to build a distributed energy system to support normal and resilient operations. This study will investigate the risks of each plan individually, and a combined plan which serves both. Additionally, PDX is in an area with the potential for high seismic activity, as such this work will also include a seismic risk assessment.

A detailed risk assessment using PDX as a test case is necessary to ensure the deployment of large-scale hydrogen is successful and to understand the benefits or drawbacks. Many technologies have been proposed that claim to utilize hydrogen for both transportation and distributed energy systems; however, these technologies need to be analyzed as they apply to an actual site. The physical infrastructure and hydrogen use cases for PDX will be analyzed, a risk assessment will be performed on the hydrogen infrastructure and distributed energy system. These assessments will be useful for understanding how each of these technologies would perform as applied to a large public facility and public safety.

The results of this CRADA, and an impact of the DOE funding, will evaluate hydrogen as a key fuel for PDX and will accelerate by several years availability of hydrogen, fuel cells, and other low-carbon technologies.