Commonwealth EV/HEV Educational Capacity Methodology Technical Memo
as part of the **Workforce Development** project *for the*
National Renewable Energy Laboratory

February 14, 2025

Introduction

This technical memo details methodology relating to the Workforce Development project, a collaborative effort between the Virginia Department of Rail and Public Transportation (DRPT) and the National Renewable Energy Laboratory (NREL) as a continuation of the Commonwealth of Virginia's transit modernization efforts brought about by HJ 542. This initiative aims to support transit agencies in their workforce development efforts by providing comprehensive guidance, assisting with employee recruitment, retention and reskilling, and addressing skill gaps such as identifying training needs and supporting the development of new programs.

This technical memo details the methodology relating to the following task of the Workforce Development project:

1. **Inventory of Current Educational Capacity**: Develop a comprehensive list of relevant training programs related to electric vehicles (EVs), hydrogen electric vehicles (HEVs) or hydrogen fuel cell electric vehicles (HFCEVs), and infrastructure.

The methodology detailed herein can be replicated by other interested states or organizations. Engagement with stakeholders including educational institutions and the local Clean Cities and Communities Coalition can account for specific nuances.

Methodology

As directed by NREL and VA DRPT, this methodology builds upon the methodology used in *Building an EV Workforce: A Review of Southeast Transportation Electrification Workforce Development Training Programs* authored by Trey M. Gowdy, Duke University Nicholas Institute for Energy, Environment, and Sustainability.

The full text is available here:
https://naseo.org/data/sites/1/documents/publications/Building%20an%20EV%20Workforce_v3.pdf

The methodology used to complete this task also includes Hydrogen Fuel Cell and Transit as two new categories of programs at the request of NREL and VA DRPT so that the output and methodology can support transit agencies with their workforce development efforts.

To generate a list of educational institutions offering a post-secondary credential including colleges, universities, technical and vocational schools, and private companies relevant to electrical vehicles and Hydrogen Fuel Cell technology, the methodology includes the use of the National Center for Education Statistics (NCES) College Navigator tool, desk research, and interviews.

Steps taken to develop this inventory include the following:

1. Generated an initial list of higher education institutions by downloading NCES data[1] on January 16, 2025, using the following criteria:
    i. States: Virginia

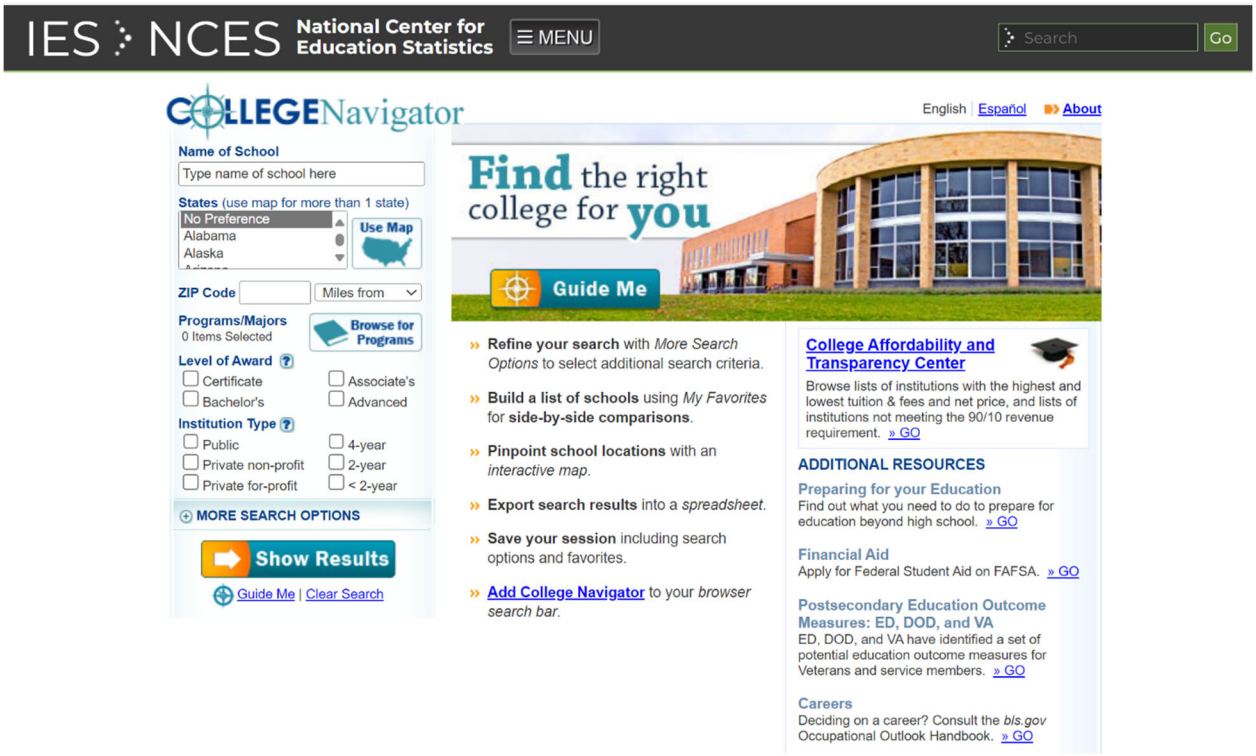

Image: College Navigator

2. Returned results with 163 institutions in Virginia from the NCES database.

3. Refined the initial list of institutions by filtering criteria based on institution 'Name' to screen likely non-applicable institutions (removing institutions with the following or similar directly in the name: massage, cosmetology, nursing, medicine, medical, esthetics, beauty, barber, health, seminary, law, culinary, pharmacy, arts, cutz, paul mitchell, hair). The initial list of institutions was narrowed down to a list of 116 institutions.

4. Further refined the list of institutions and validate relevancy using an online search engine (Google Advanced Search) with the following criteria: electric vehicle training OR

[1] https://nces.ed.gov/collegenavigator/

program OR workforce OR education OR assembly OR maintenance OR manufacturing OR battery "Institution Name."[2]

5. The list of institutions was further validated by reviewing the curriculum offerings listed on their website and program descriptions were drafted for each institution.

6. Institutions that have programs related to the following Workforce Groups[3] were categorized as 'Yes' if the programs were specifically related to EVs, HEVs, or related infrastructure (i.e., charging station or electrical vehicle maintenance and repair).

   Institutions that have programs related to the following Workforce Groups were categorized as 'Potential' if the programs were not specifically related to EVs, HEVs, or related infrastructure and have the potential for a transition to include EVs, HEVs, or related infrastructure in curriculum.

Workforce Groups	**Example Programs**
EV Workforce Development Consortium and Special Programs	• EV Workforce Development Consortium • Special Programs
Manufacturing	• Industrial Maintenance • Manufacturing • Mechanical Engineering • Mechatronic • Welding • And Related Programs
Automotive Maintenance and Service	• Automotive Technology • Hybrid and Electric Vehicle Technician • Diesel Mechanics • And Related Programs
Electrician and EV Charging Infrastructure	• Electrical Engineering • Electronics Engineering • And Related Programs
Hydrogen Fuel Cell	• Chemistry • Chemical Engineering

[2] Several different search keywords were tested by the author of *Building an EV Workforce: A Review of Southeast Transportation Electrification Workforce Development Training Programs*, including 'e-mobility' and 'transportation electrification'. After testing pre-identified training programs, it seemed the final search engine criteria noted herein most effectively returned results for the types of programs being inventoried.

[3] These Workforce Groups were developed in collaboration with NREL and VA DRPT and determined to be relevant to EVs, HEVs, and related infrastructure.

	• And Related Programs[4]
Transit and Facility Management	• Facility Management • Commercial Driver's License and Vehicle Operations • Transportation Planning • Training and Development • And Related Programs[5]

7. Broadened search to additional sources to include additional institutions and associated information by researching EV Workforce Development Consortiums and Special Programs and other relevant programs in Virginia. Such examples include:
    i. The Electric Vehicle Infrastructure Training Program, National Institute for Automotive Service Excellence, and SkillFusion
    ii. Relevant Related Technical Instruction which is part of Registered Apprenticeships sourced from the Virginia Department of Labor and Industry[6]
    iii. OEM training programs including Toyota Technical Training and Education Network (T-TEN)

8. The inventory was further validated by conducting interviews with 5 educational institutions (Virginia Polytechnic Institute and State University, Norfolk State University, Northern Virginia Community College, Southwest Virginia Community College, and James Madison University) to collect current state information on program offerings and collect information on relevant programs at other institutions. This was to account for specific nuances of Virginia.

Assumptions and Limitations

While this inventory seeks to be substantive, it is likely not exhaustive of every individual program in Virginia.

There may also be additional offerings or adult education programs from specific, or other organizations in Virginia (or nationally), and secondary school programs (i.e., high school career technical education programs) not captured in this inventory.

[4] Related programs could include hydrogen delivery, storage, and management, and hydrogen safety, codes, and standards.
[5] Related programs could include health and safety. This analysis identified health and safety as a core competency in a majority of programs for Manufacturing, Automotive Maintenance and Service, and Electrician and EV Charging Infrastructure Workforce Groups. Occupational Health & Safety (OSHA) and other related safety standards trainings are also related programs.
[6] https://doli.virginia.gov/registered-apprenticeship/

The categorization of programs as 'Yes' is based on whether descriptions indicated the presence of EV-related curricula. It is possible that additional programs may cover EV-related material that were not part of the target Workforce Groups. The additional links/notes aim to provide additional information on institutions with EV, HEV, or related-infrastructure programs or faculty research projects, or workforce development/ customized training solutions for local employers (i.e., a local transit agency).

The metrics provided are the number of institutions, and not reflective of student numbers in each program.

These results represent institutions and programs as of February 2025.

Notes

This inventory was built in Microsoft Excel using the foundation of the inventory of EV workforce training programs in *Building an EV Workforce: A Review of Southeast Transportation Electrification Workforce Development Training Programs:* https://doi.org/10.6084/m9.figshare.24714711.v1.