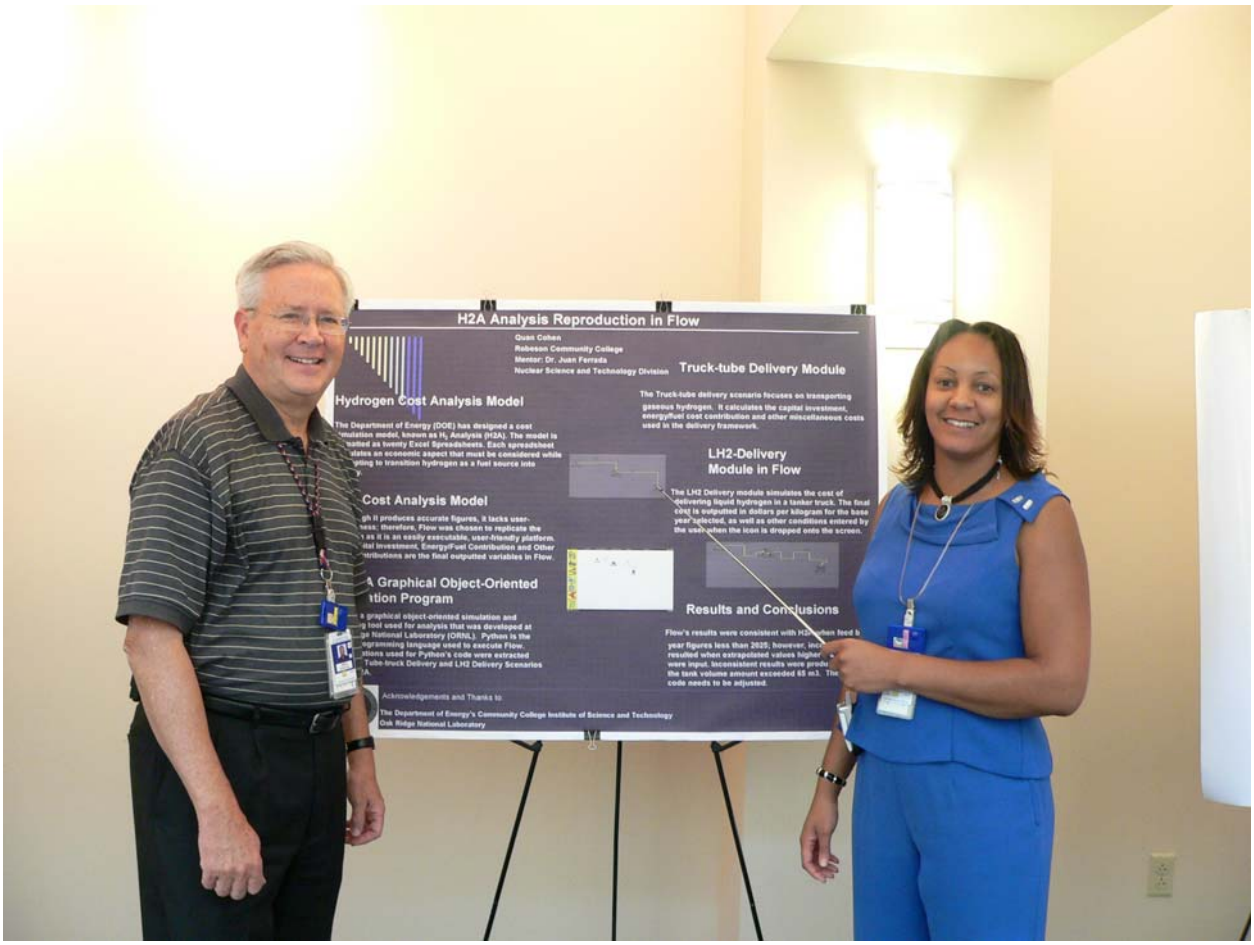
Hydrogen Cost Analysis Simulation in Flow



Quan explains her poster to Jim Rushton

The Department of Energy (DOE) has designed a model, known as H_2 Analysis (H2A), which addresses several of the economic aspects that must be considered while attempting to transition hydrogen as a fuel source into society. H2A has estimated all costs of production, storage, and modes of delivery from the storage facility to the distribution site in its "scenarios." The scenarios contain data that represent the implementation of a hydrogen economy such as projected feedstock and utility prices and labor costs. Delivery methods such as pipeline, truck tube-trailer equipment operation, and maintenance are included in the simulation. This module, however, will focus on the associated delivery costs of gaseous and liquid hydrogen from its storage facility to its distribution site in a truck tube-trailer. The project objective is to create a user-friendly interface that will display the main variables associated with hydrogen transportation. The user has the option of using H2A Projections in the code's database or entering other values if there is a variance. Flow is the simulation process and modeling tool used for analysis, developed by Oak Ridge National Laboratory (ORNL) that will be used to

produce the module. Python is the modeling programming language embedded in Flow. The data used for Flow's code was extracted from two of DOE's twenty spreadsheets. The sequence of calculation steps were coded in Flow by using the reverse engineering method, which determined how the variables on the DOE spreadsheet were calculated. DOE spreadsheets had to be examined to determine the various forms of data compiled and differentiate the user-inputs from the calculated variables. This module produced results consistent with those produced by DOE's H2A spreadsheets. It allows for flexible and friendlier interaction with the user. In conclusion, this is a significantly small portion of the DOE hydrogen economy project.

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