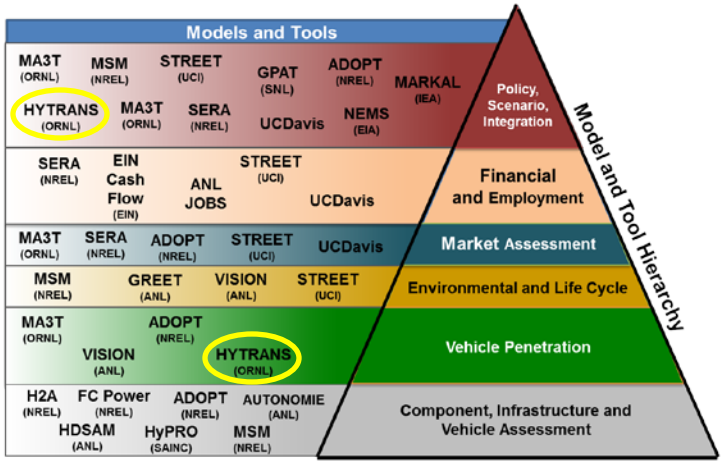
Hydrogen Transition (HyTRANS) Model

(Oak Ridge National Laboratory)

Objectives

Dynamically simulate the transition to hydrogen powered light-duty vehicles in the U.S. to 2050, representing the simultaneous interaction of (1) hydrogen production and delivery, (2) hydrogen fuel cell vehicle production, and (3) consumers' choices among alternative vehicle technologies. Determine a market equilibrium solution by multi-period optimization of an objective function that reflects private costs and benefits.



Key Attributes & Strengths

Integrates all major factors, including pathway components, vehicle attributes, consumer choice, and manufacturer decisions. Incorporates learning curves and scale economies for cost analysis. Can be used to analyze the impacts of various policies on the transition, including vehicle and fuel subsidies and mandates.

Platform, Requirements & Availability

HyTRANS is a dynamic, non-linear optimization, market and policy model programmed in GAMS (Generalized Algebraic Modeling System) language. It is not available to the public.

INPUTS

- Technology information from the H2A suite of models.
- Data from U.S. EIA's Annual Energy Outlook projections and the Hydrogen Analysis Resource Center (//hydrogen.pnl.gov/cocoon/morf/hydrogen).
- Vehicle attributes.

ASSUMPTIONS & DATA

- Manufacturing "learning" algorithm and economies of scale are built into the model.
- Vehicle attributes based on Autonomie model and values from the U.S. DOE Vehicle Technologies and Fuel Cell Technologies offices.
- Hydrogen production information from the H2A Production and HDSAM models.
- Energy costs and projections from the U.S. EIA.

OUTPUTS

- New vehicle sales and stock.
- Fuel use.
- GHG emissions.
- Hydrogen produced.
- Costs of various policies to stimulate market introduction of hydrogen vehicles.
- Private and social costs and benefits of transition.