Macro System Model (MSM)
(National Renewable Energy Laboratory)

Objectives

Perform rapid cross-cutting analysis that utilizes and links other models.
Ensure all aspects of hydrogen pathway and cost analysis is included such as hydrogen purity, leakage, etc.

Key Attributes & Strengths

Easily and rapidly links modeling experts with DOE's other models that are included in the MSM.

Platform, Requirements & Availability

MSM is a static, cross-cutting model which links models from various modeling platforms. Each model is left on its own platform, with Java being used to transfer information. The model is not planned to be widely disseminated to the public because of the expertise required from the users.

INPUTS	ASSUMPTIONS & DATA	OUTPUTS
• Scenario information (hydrogen production and delivery technologies, city size, FCEV penetration, FCEV fuel economy, and hydrogen infrastructure and FCEV performance, efficiency, energy use and emissions).	• Technology, fuel economy, energy use, and emissions extracted from models such as H2A and HDSAM, GREET, and other models through MSM's linking system.	• Minimum hydrogen selling price at the pump for entire pathway.
• Energy data from EIA and data from HyARC (hydrogen.pnl.gov/cocoon/morf/hydrogen).	• Resource data based on available demand/cost functions.	• Life-cycle energy use and requirements, with breakdown of energy sources used.
• User-provided data on technology performance, cost, energy use, and emissions; or alternatively, inputs derived from its embedded models (e.g., H2A, HDSAM, GREET).		• Lifecycle GHG and air pollutant emissions (including well-to-wheels fuel cycle and vehicle cycle).