

## **Annex 34: Fuel Cells for Transportation**

Annex 34 is an application oriented Annex with the overall objective to provide a forum for the exchange of non-proprietary information on the rapidly developing automotive fuel cell technology. The specific objectives of this task include improving the understanding of the state-of-the-art fuel cell systems, on-board fuel storage systems, directions of recent technology development activities, approaches for cost reduction, and field data from large-scale demonstration projects. Annex 34 consists of four subtasks.

Subtask 1 focuses on the fuel cell system and hydrogen storage technology. It covers all aspects of the components and systems for propulsion of fuel cell light-duty vehicles, electric buses, and off-road specialty applications, such as fork-lift trucks and heavy-duty construction machines. The scope of this subtask includes the theoretical and experimental understanding of performance and durability of fuel cell stack components (membrane, ionomer, catalysts, support, gas diffusion layers, and bipolar plates) and balance-of-plant components for air management, fuel subsystem, water management, and stack waste heat rejection.

Subtask 2 evaluates the fuel infrastructure for distributed and central production of hydrogen using renewable sources (biogas, solar, wind) and non-renewable fuels (natural gas), and different production methods (reforming, electrolysis). This subtask also compiles and discusses results from major well-to-wheel studies on process efficiencies and emissions of greenhouse gases and criterion pollutants during hydrogen production.

Subtask 3 focuses on technology validation. It covers data from laboratory tests to large-scale field demonstration programs on passenger vehicles and fleet buses, and the associated hydrogen infrastructure, in Asia, Europe, and North America. All data related to performance, reliability, and cost are included in the discussions and evaluations that extend to identifying and quantifying potential improvements needed to match the targets.

Subtask 4 is concerned with the economics of automotive fuel cell systems and hydrogen production. It covers cost models, underlying model assumptions and cost projections. This subtask regularly updates results from cost studies on high-volume manufacturing of automotive fuel cell systems and large-scale hydrogen production technologies.