

## VIII.1 Advanced Manufacturing Technologies for Renewable Energy Applications (New Project)\*

*Dr. Charles L. Ryan, Jr. (Primary Contact)*

*National Center for Manufacturing Sciences (NCMS)*

*3025 Boardwalk*

*Ann Arbor, MI 48108*

*Phone: (734) 995-4905; Fax: (734) 995-1150; E-mail: chuckr@ncms.org*

*DOE Technology Development Manager: JoAnn Milliken*

*Phone: (202) 586-2480; Fax: (202) 586-9811; E-mail: JoAnn.Milliken@ee.doe.gov*

*\* Congressionally directed project.*

### Objectives

- Working with DOE and the private sector, identify and develop critical manufacturing technology assessments vital to the affordable manufacturing of hydrogen-powered systems.
- Leverage technologies from other industrial sectors and work with our extensive industrial membership base to do feasibility projects on those manufacturing technologies identified as key to reducing the cost of the targeted hydrogen-powered systems.

### Technical Barriers

This project addresses the following technical barriers from the Hydrogen Storage and Fuel Cell sections of the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan:

- Fuel Cell Components
  - Stack Material and Manufacturing Cost
  - Durability
- Hydrogen Storage Systems
  - Cost
  - Weight and Volume
  - Durability

### Approach

The overall objective of this project is the development of manufacturing technology to address affordability issues in hydrogen storage and in fuel cell systems. The approach is two pronged:

*Task 1. Developing the manufacturing technology roadmap for affordable hydrogen-powered systems*

This project will identify the key manufacturing steps required to produce high volume, affordable hydrogen-powered systems. This will be accomplished through a series of workshops and with consultation with recognized leaders from corporations, national laboratories, universities, and the DOE. Once these steps are identified, they will be ranked and prioritized as to impact on affordable systems. This approach will develop a manufacturing technology roadmap that will provide a detailed pathway to resolving the prioritized manufacturing issues. The roadmap will be used to choose the projects to pursue that provide the most impact for affordable systems.

*Task 2. Manufacturing Technology Development and Implementation*

The project will then develop and implement collaborative development projects amongst technology providers, commercializing companies, and end-users that address the manufacturing technology issues deemed of highest impact. NCMS estimates between 4-6 projects will be initiated and completed. Project ideas will be solicited through the NCMS newsletter, directed e-mailings, publicity at selected conferences, and other mechanisms suggested through the workshops and interactions with the DOE technology development manager. Project ideas will then be developed into specific proposals by the collaborative project team, outlining the nature of the manufacturing problem, the specific approach to be taken, performance metrics and benefits analysis, a thorough safety and risk assessment, hard deliverables (beyond project reports), qualified cost share information, identification of the participants and their specific roles/tasks, and project costing and timelines. To promote technology transfer and implementation of the projects, the manufacturing risk and vulnerability will be evaluated towards the end of each project using the NCMS risk assessment methodology developed in a previous program with the Department of Defense. Each project will primarily follow a pilot project strategy to be used as the management of change process for ensuring technology transfer. In addition, a web-based clearinghouse of information will promote further development of manufacturing technologies needed to achieve the economic goals required for high volume production.