

2004 DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program Review

Advanced Manufacturing Technologies for Renewable Energy Applications

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Program 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.

Budget

- Total - \$3,679,040
 - DOE - \$2,943,232
 - In-Kind - \$735,808

- In-Kind will result from the participants in the collaborative projects defined to solve affordable manufacturing issues

Technical Barriers and Targets from the HFCIT Program Multi-year Program Plan

■ Technical Barriers

- Fuel Cell Components
 - a) O. Stack Material and Manufacturing Cost
 - b) P. Durability
- Fuel-Flexible Fuel Processors
 - a) N. Cost
- Hydrogen Storage Systems
 - a) A. Cost
 - b) B. Weight and Volume
 - c) D. Durability
- Other barriers may be addressed by collaborative projects as a result of Task 1.

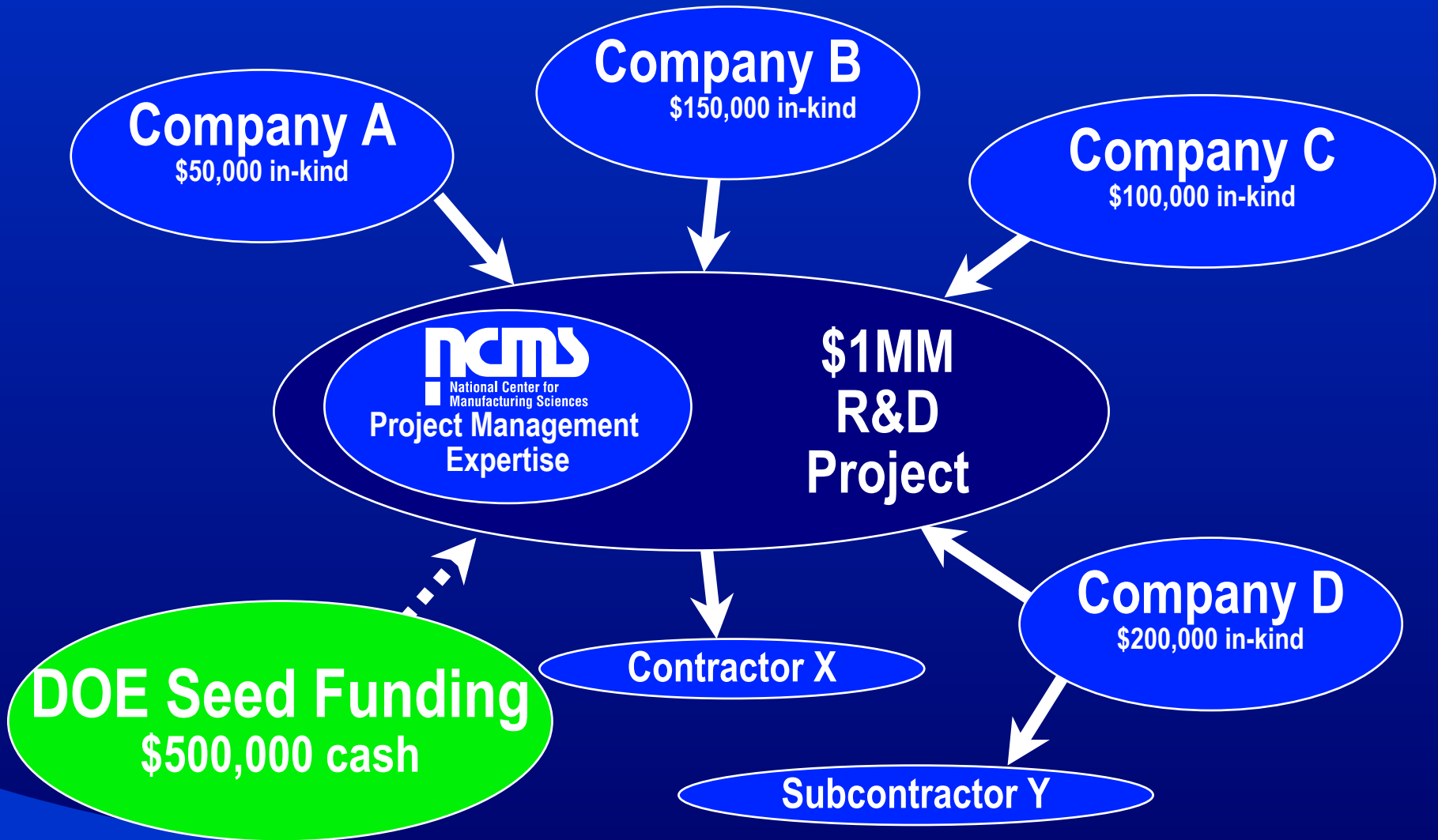
■ Technical Targets

- Costs: Range from \$10/kWe for fuel-flexible systems to \$45/kWe for integrated systems operating on direct hydrogen; Storage system costs of \$2/kWh net.
- Durability: Targets are all 5000 hours or greater. Portable storage systems equivalent to 300,000 miles.
- Weight and Volume: Target is 3 kWh/Kg net useful energy/maximum system mass

Approach

- Identify Manufacturing Hurdles to Hydrogen-Powered and Storage Systems
- Rank as to impact for producing affordable structures
- Develop manufacturing roadmap for addressing key hurdles to affordability
- Institute collaborative development projects that address the manufacturing technology issues deemed of highest impact.
- Provide a clearinghouse of information to promote technology utilization

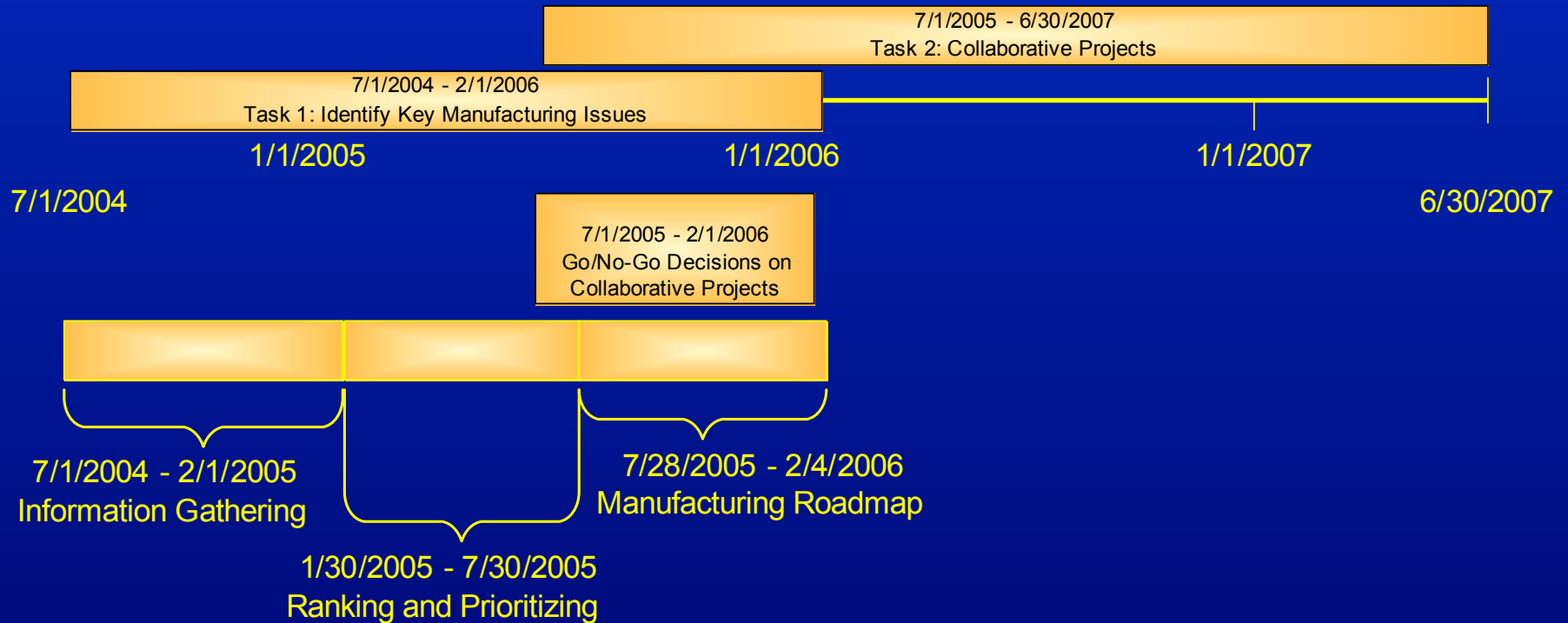
Collaborative Project Approach



Project Safety

- Project proposals by the collaborative team will outline a thorough safety and risk assessment to be undertaken during the project
- 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.

Project Timeline



Technical Accomplishments/Progress

- New program – estimated start July 1

Interactions and Collaboration

- Key to project success
- Interactions with private companies and public facilities to identify key manufacturing drivers for affordable energy systems (Task 1)
- Collaborations between industry, government and universities to solve manufacturing issues with greatest impact to affordability (Task 2: estimate 6 projects)

Future Work: Program Tasks (Year 1)

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

Subtask 1: Working with DOE, federal laboratories, universities, and industry, identify the key manufacturing steps required to produce high volume, affordable hydrogen-powered systems, including storage.

Subtask 2: Rank and prioritize manufacturing areas as to impact on affordable systems. Focus on those manufacturing technology issues that reduces overall production and storage costs tenfold.

Subtask 3: 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.

Future Work: Program Tasks (Year 2, 3)

Task 2: Manufacturing Technology Development and Implementation

Subtask 1: Develop and implement collaborative development projects amongst technology providers, commercializing companies, and end-users that address the manufacturing technology issues deemed of highest impact.

- 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.

Subtask 2: Provide a web-based clearinghouse of information that will promote further development of manufacturing technologies needed to achieve the economic goals required for high volume production

Where you can help

- Identify groups and resources within DOE that have first hand knowledge of manufacturing and storage issues in alternative energy systems
- Identify knowledgeable industry and academic candidates
- Attend Workshops and Roadmapping Sessions