2004 DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program Review

Shared Technology Transfer Project (STTP)

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Objectives

The overarching goal of STTP is to establish a collaborative process with domestic industries for the purpose of sharing Navy-developed technology.

The purpose is to educate private business sectors to increase the awareness of these businesses to the vast amount of technologies that are available, with an initial focus on technology applications that are related to the Hydrogen, Fuel Cells and Infrastructure Technologies (Hydrogen) Program of the U.S. Department of Energy (DOE).

Objectives

The STTP target audience will embrace southern domestic industries and university educators.

The key objectives include:

- Catalog NAVSEA-Carderock Unclassified Technologies with a focus on identifying those technologies that relate to the DOE's Hydrogen Program
- Rate the level of readiness for each hydrogen program-related technology
- Develop and implement an Educational Outreach program to increase awareness within hydrogen-related industries
- Identify & match hydrogen-related businesses that might benefit from the technologies
- Launch an Educational Technology Showcase and website, featuring the initial set of technologies identified as being hydrogen related.

Budget

Total funding for the project: $981,077

Technical Barriers and Targets Addressed

From the Education section of the Multi-year Program Plan:

A. Lack of Awareness. Interest in hydrogen and fuel cell technology is increasing, but there remains a general lack of awareness of hydrogen as an energy alternative. Moreover, although world events have drawn new attention to national energy security issues, there is little consensus about the severity of today's environmental problems or linkages to fuel choice. With little awareness, understanding, or recognition of these issues, there is little impetus for change, and target audiences are less inclined to embrace new technology.

B. Lack of Demonstrations or Examples of Real World Use. Hands-on and personal experience greatly enhances understanding and comfort with using any new technology. Although the number of hydrogen and fuel cell demonstration projects is slowly growing, currently there are only a few real-world examples to which educators can point. The absence of installations and demonstrations also results in a lack of success stories and case studies to supplement educational materials and encourage early adopters.

C. Institutional Barriers and Access to Audiences. Audience information needs can be well researched and educational materials or training workshops can be well developed, but they must reach their intended audiences to be effective. Institutional barriers can complicate or inhibit access to target audiences. Moreover, identifying the right organizations, as well as a champion within each organization to embrace hydrogen and fuel cell technologies, can be challenging.

D. Regional Differences. Educational needs will vary by audience, but they may also vary regionally. What applies to one state, county, city, or district, may not apply to another. Serving the education needs of a single target audience may therefore require multiple approaches tailored to serve the needs of various regions. This strains resources and can complicate activities developed at the national level.

Key Barriers Addressed

Technical Barriers and Targets Addressed

From the Education section of the Multi-year Program Plan:

Table 3.8.1 Key Objectives by Target Audience

Target Audience	Key Objectives
Educators and Students (e.g., primary and secondary schools, colleges, universities, and other post-secondary institutions)	• Improve the level and breadth of hydrogen and fuel cell education, using established resources wherever possible and appropriate. • Increase the number of schools teaching hydrogen and fuel cell courses. • Support and promote internships, academic research, and hands-on product demonstrations in these areas.
State and Local Government Representatives (e.g., city, county, state, and regional governments, agencies, and associations)	• Provide objective, accurate information that government representatives can rely on as part of their research to make informed decisions.
Large-Scale End Users (e.g., transit agencies, fleets, building associations and subdivisions, hospitals)	• Provide objective, accurate information that potential end users can use as part of their research to make informed decisions. • Support training for potential end users.
Code Writing Organizations	• Provide objective scientific and technical information to facilitate and expedite the implementation of codes and standards.
National Regulatory Agencies	• Provide objective scientific and technical information to support the timely development of hydrogen and fuel cell policies and regulations.
Professional, Labor, and Trade Organizations	• Support training for potential end-users and the labor force for a hydrogen infrastructure.
Financial Institutions (lenders, investors, and insurers)	• Provide objective, accurate information that these groups can use as part of their research to make informed decisions.
General Public	• Provide timely, objective, consumer-oriented information to support the transition to a hydrogen economy.

Key targets

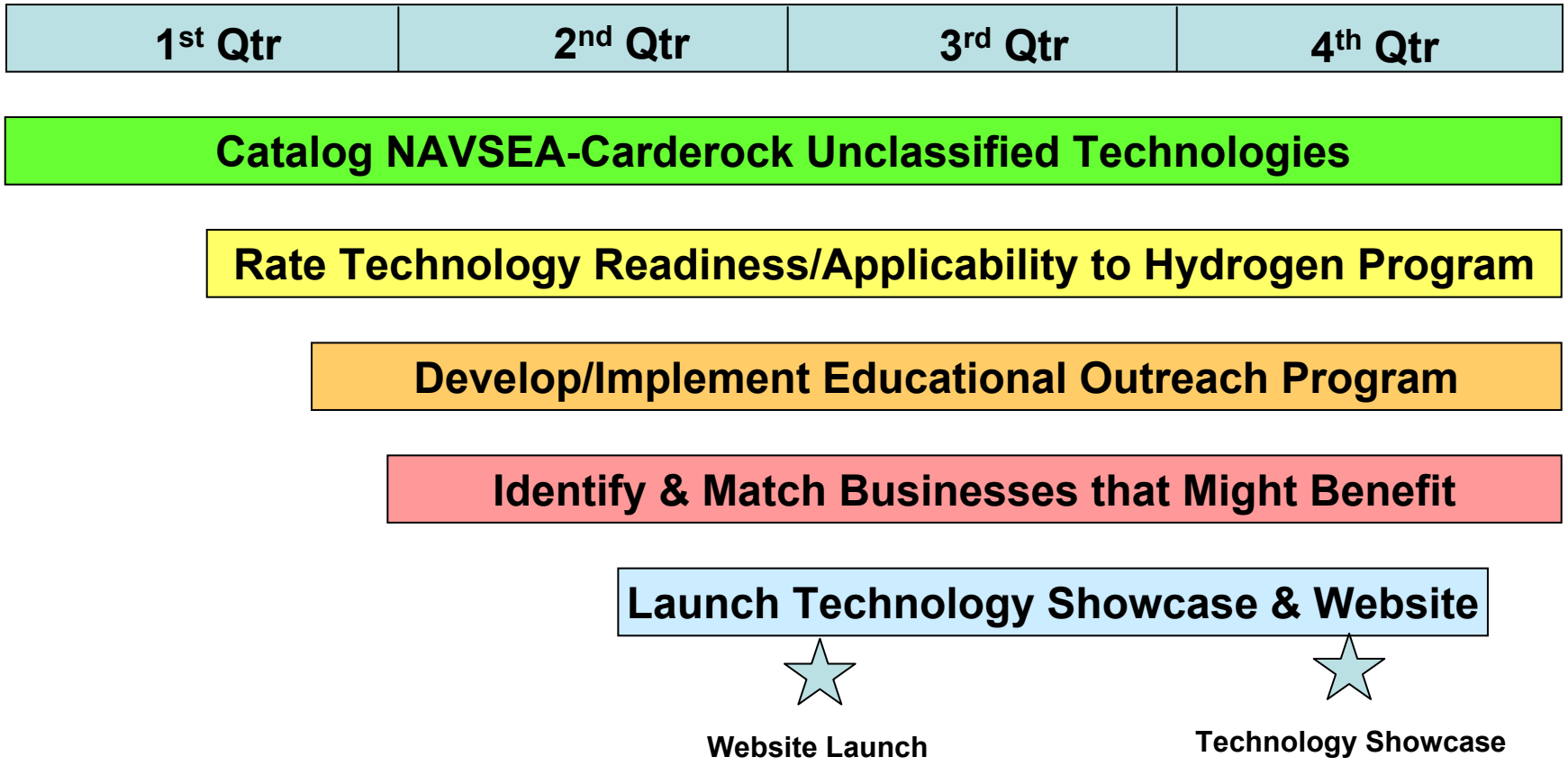
Approach

- Catalog NAVSEA-Carderock Unclassified Technologies with a focus on identifying those technologies that relate to the DOE's Hydrogen Program
  - Maintain liaison with NAVSEA-Carderock
  - Review and catalog NAVSEA-Carderock Unclassified Technologies – prepare briefings of technologies using catalog template
- Rate the level of readiness for each hydrogen program-related technology
  - Review briefings and rate level of technology readiness
  - Decide on applicability to hydrogen program
- Develop and implement an Educational Outreach program to increase awareness within hydrogen-related industries
  - Maintain liaison and coordinate potential industry sponsors
  - Develop and implement plan to inform industry

Approach – Continued

- Identify & match hydrogen-related businesses that might benefit from the technologies
  - Identify and match companies that might benefit – meet with companies
  - Recruit industry sponsors
  - Assist industry with transfer of technologies
  - Prepare plans to develop case studies w/industry for evaluation of transfer
  - Perform case study
- Launch an Educational Technology Showcase and website, featuring the initial set of technologies identified as being hydrogen related.
  - Plan and hold technology showcase at NAVSEA-Carderock facility
  - Complete and maintain webpage for STTP

Project Timeline



Example Technology - Non-Fossil Electrical Power Generation

NAVSEA-Carderock and FHPL will test and refine the FHPL innovative open center turbine unit and mooring assembly.

Carderock brings technical experts and unique facilities for efficient testing and refinement of the new design.

Carderock will use expertise in propeller design and moored systems as well as its unique hydrodynamic test facilities.

Expertise was provided in using the unit's output as a source of hydrogen, in which electrical energy is routed through water, which breaks water into its component parts, hydrogen and oxygen.

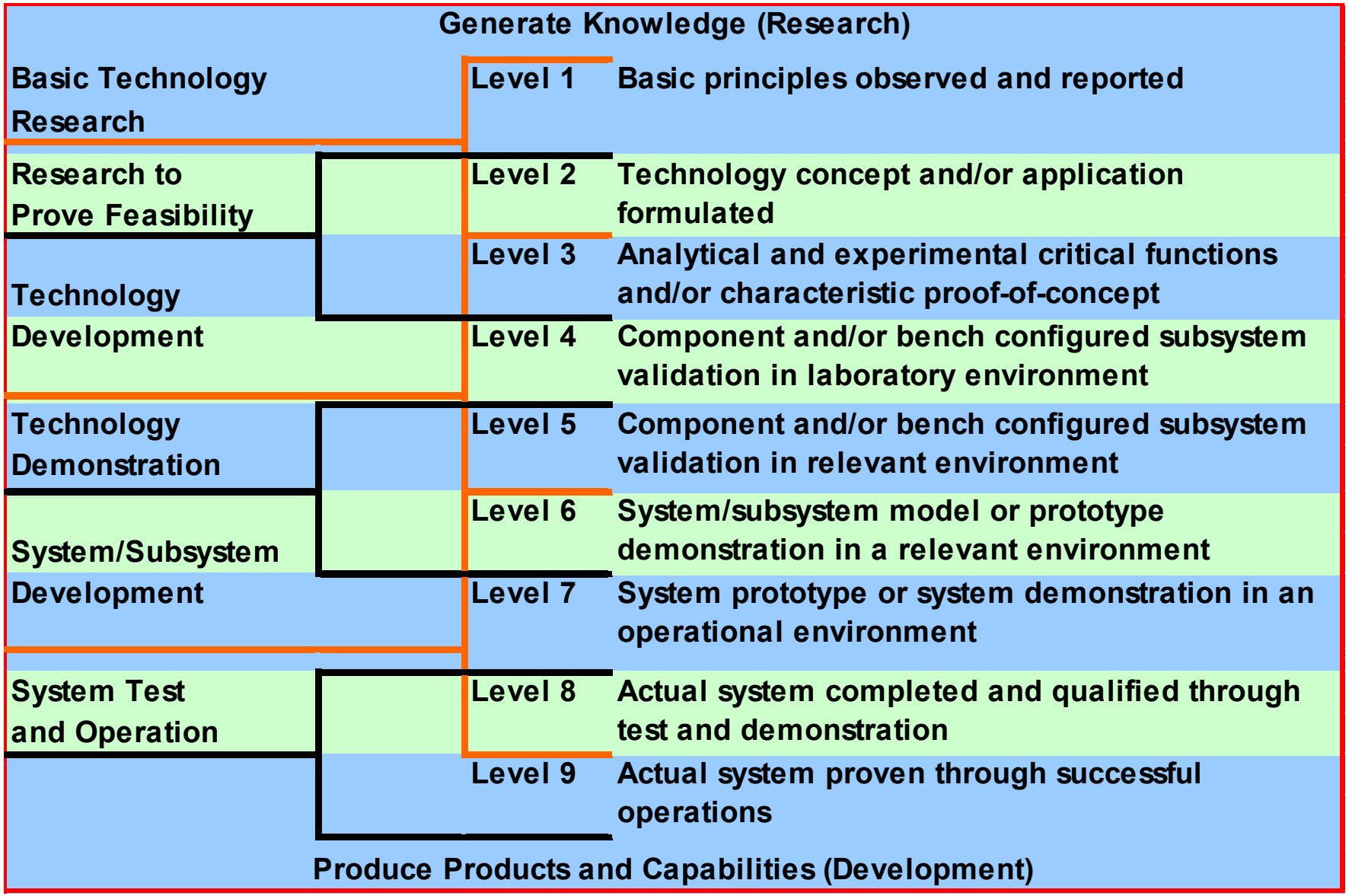
The advantage of using the turbines to produce liquid hydrogen is that they would not be limited to areas that are close to shore, as with electricity, and they could take advantage of tides.

This system is also expected to produce hydrogen at a cost below the Department of Energy goal of $2.00/kilogram.

Accomplishments/Progress

- Catalog Template Developed
- Technology Readiness Methodology Identified

Technology Readiness Levels (TRLs)



Relationship of Programs

National Petroleum Technology Office

Seed Project

Tech. Readiness Level Methodology
Catalog Template

BLUE WATER TECHNOLOGY PROGRAM

Advisory Board
Pilot Web Site Entries

Shared Technology Transfer Project (STTP)

NICHOLLS STATE UNIVERSITY

HARC

NAVSEA CARDEROCK Surface Warfare Center Division

SLEC South Louisiana Economic Council
Assumption • Lafourche • St. Mary • Terrebonne

U.S. Department of Energy
Energy Efficiency and Renewable Energy

2004 Program Key Objectives

Use Catalog Template
Expand Catalog/Hydrogen Outreach