

Pathways to Commercial Success: Technologies and Products Supported by the HFCIT Program

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Overview

Timeline

- ▶ Project start date 08/2007
- ▶ Ongoing

Budget

- ▶ Funding in FY08: \$250K
- ▶ Funding in FY09: \$100K
- ▶ Funding in FY10: \$200K
(100% DOE funded)

Barriers Addressed

- ▶ Inconsistent data, assumptions, and guidelines

Partners

- ▶ HFCIT personnel and lab/contractor researchers to identify potential technologies and contacts
- ▶ Various private sector vendors and other technology providers to obtain data on technologies

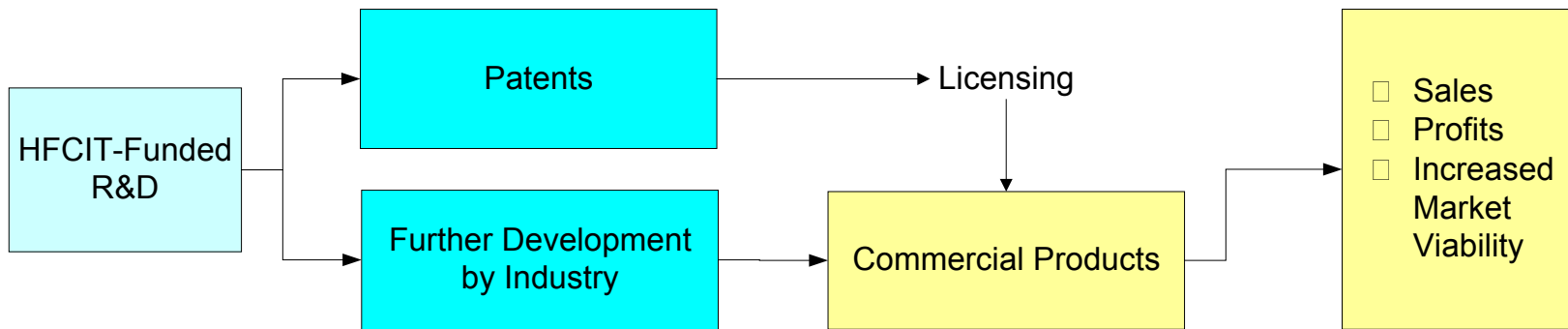


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Objective/Relevance

Assess HFCIT program benefits by tracking the commercial success of technologies developed by HFCIT and HFCIT predecessor programs and by estimating their impacts and benefits.



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Milestones and Deliverables

Month/Year

Milestone/Deliverable

September 2009

Deliverable: Update the HFCIT technology tracking database containing information on commercial and emerging technologies. **(Completed)**

October 2009

Deliverable: Prepare the HFCIT report on the status of commercialized and emerging technologies and patents. **(Completed)**

September 2010

Deliverable: Update the HFCIT technology tracking database containing information on commercial and emerging technologies. **(On track to complete)**

October 2010

Deliverable: Update the HFCIT report on the status of commercialized and emerging technologies and patents. **(On track to complete)**



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Approach

► Task 1: Conduct initial patent search and continue to update it (ongoing)

Continue updating the patent list for technologies linked to HFCIT program efforts.

► Task 2: Develop initial list of potential commercial and emerging technologies and update annually (ongoing)

Interview HFCIT staff and patent holders to create the initial list of commercial and emerging technologies. Contact lab/contract researchers annually to update status.



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Approach

► Task 3: Create, Populate, and Update HFCIT Technology Tracking Database (ongoing)

Gather data on newly and previously identified commercial and emerging technologies and update the tracking database by category (fuel cell, production/delivery, and storage).

► Task 4: Produce and Update HFCIT Report (ongoing)

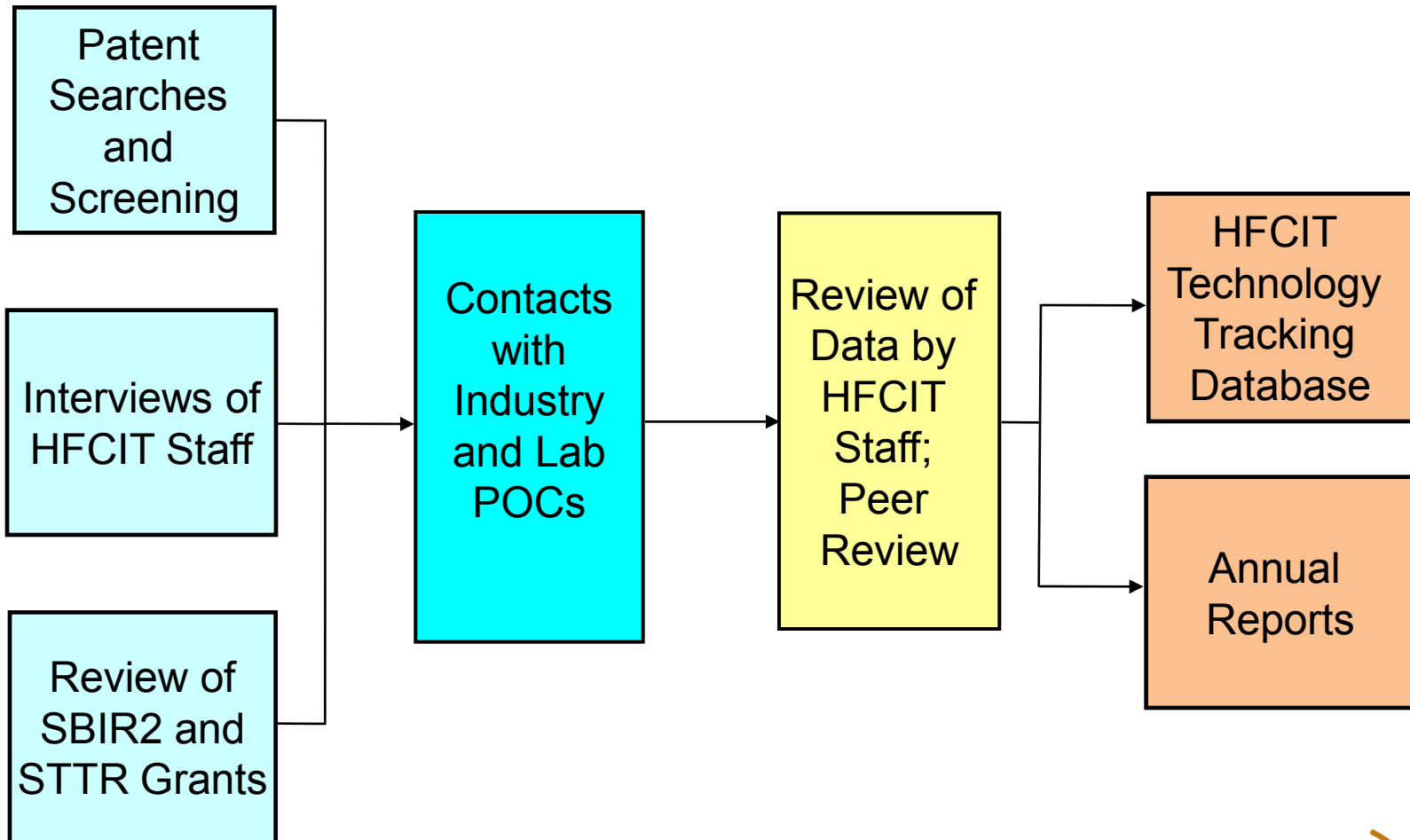
Create technology pages for newly identified commercial and emerging technologies and update pages for previously identified technologies; obtain reviews by researchers/industry contacts. Complete and continue to update the HFCIT report.



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Technology Tracking Project: Process



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Accomplishments:

Task 1 – Patent Search

- ▶ Conducted a fuel cell patent search. Results reviewed by PNNL and HFCIT staff and narrowed to
 - 73 fuel cell patents
 - 49 hydrogen production/delivery patents
 - 21 storage patents.

- ▶ Contacted patent holders to determine patent status.



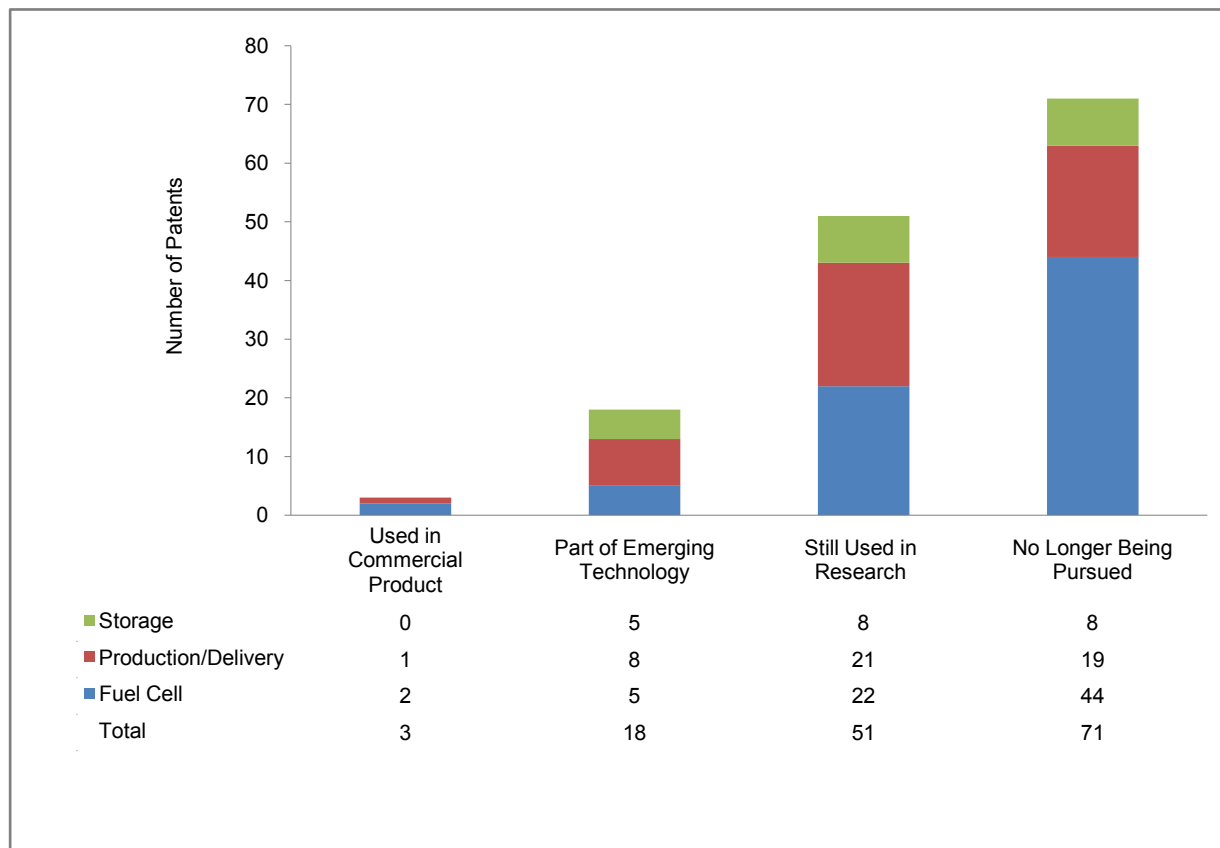
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Accomplishments:

Task 1 – Patent Search

Of the 143 patents reviewed, 50% are being used in commercial products, are part of emerging technology development, or are still being used in research.



Accomplishments:

Task 2 – List of Commercial and Emerging Technologies

- ▶ Using 2002-2009 annual reports, interviewed HFCIT staff to create list of potential commercial and emerging technologies.
- ▶ Contacted patent holders to determine whether their patents were being – or had been – used to develop any technologies.
- ▶ Reviewed 2002-2009 SBIR2 and STTR grants to identify potential emerging and commercial technologies.
- ▶ Contacted private sector vendors and other technology providers to determine each technology's status.

Accomplishments:

Task 2 – List of Commercial and Emerging Technologies

- ▶ As of 03/31/10, the list included
 - Fuel Cells: 17 commercial, 28 emerging
 - Production/Delivery: 9 commercial, 19 emerging
 - Storage: 2 commercial, 6 emerging.

- ▶ The list is a living document, with information updated continually in the database and annually in the report.



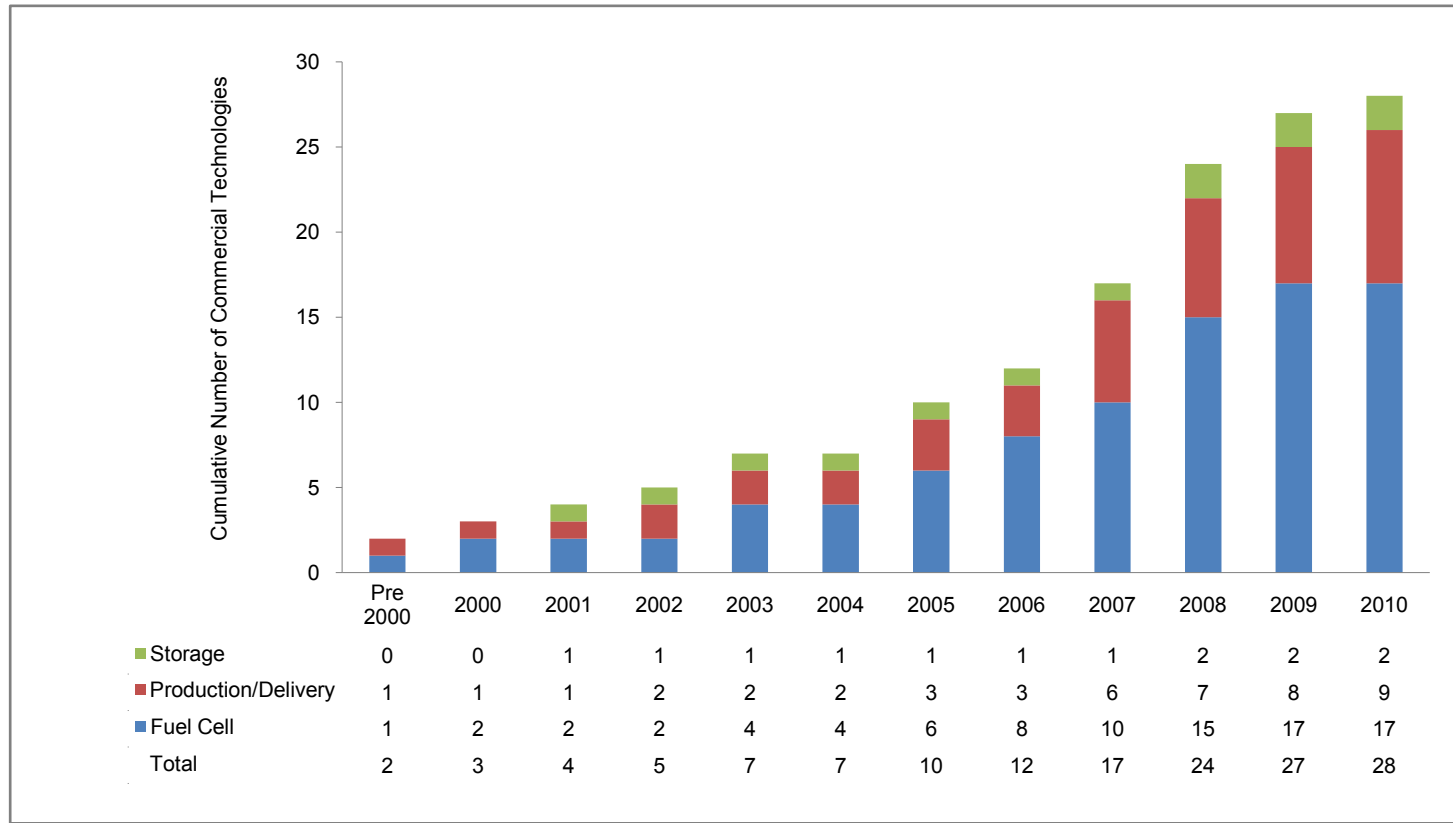
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Accomplishments:

Task 2 – List of Commercial Technologies

Since 2006, an increasing number of HFCIT-funded technologies have been entering the market.



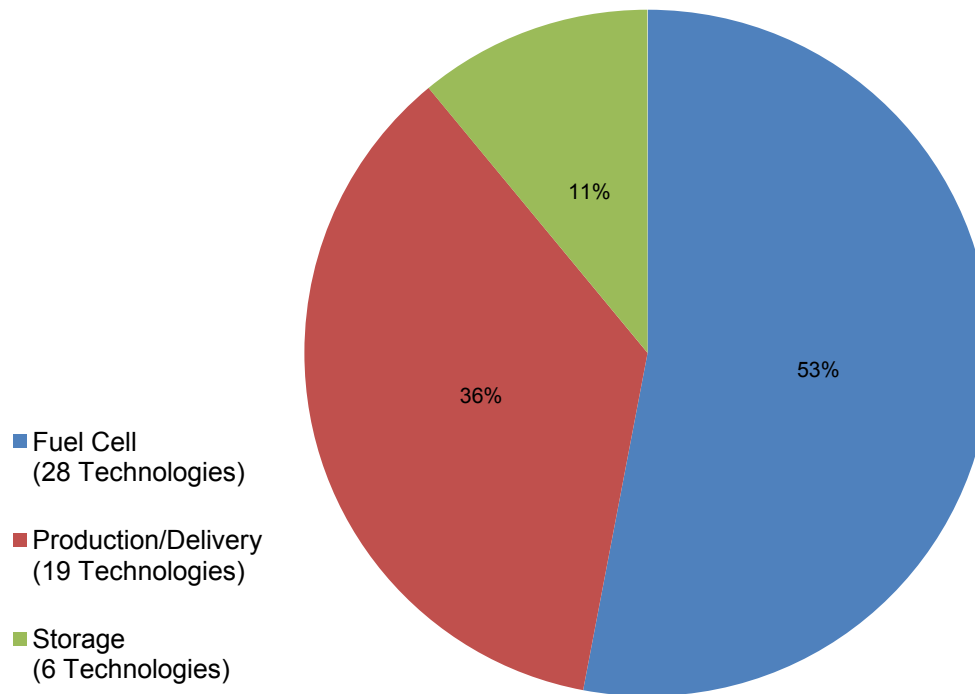
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Accomplishments:

Task 2 – List of Emerging Technologies

These 53 emerging technologies form the potential pool from which future technologies could be commercialized.



Accomplishments:

Task 2 – Examples of Commercial Technologies

XX25™: Portable Reformed Methanol Fuel Cell



- Developed and sold by UltraCell Corporation
- Commercialized in 2007 with **200+ units sold**
- Lightweight, rugged fuel cell unit for mobile power
- Supplies up to 25 watts of continuous power for radios, laptops, etc.

Hydrogen Composite Tanks



- Developed and sold by Quantum Fuel System Technologies Worldwide, Inc.
- Commercialized in 2001 with **2000+ tanks sold**
- Lightweight, all-composite tanks for high-pressure storage
- High capacity improves the range of hydrogen-powered fuel cell vehicles



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Accomplishments:

Task 3 – Technology Tracking Database

- ▶ Interviewed private sector vendors and other technology providers and entered data into the database.
- ▶ Divided database into commercial and emerging technologies and into fuel cell, production/delivery, and storage.
- ▶ Maintained database at PNNL and DOE-HQ on an internal server that is available to HFCIT staff.



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Accomplishments:

Task 3 – Technology Tracking Database

For each technology, collected the specific types of data from the private sector vendor and other technology provider for the database.

Technology Title

- ▶ **Overview:** Industry partner or research organization, year commercialized, and number of operating units.
- ▶ **Applications:** Areas where technology can be applied.
- ▶ **Description:** Summary of the technology, research development activities, and benefits.
- ▶ **Benefits:** Qualitative description of technology improvements, including environmental, quality, productivity, and safety.
- ▶ **Graphic:** Depiction of technology.
- ▶ **Capabilities:** Operational characteristics displaying improvement over the baseline technology.
- ▶ **Contacts:** DOE and industry partner name, address, and phone number.
- ▶ **Status:** Annual update on technology activities and commercialization efforts.
- ▶ **History:** Summary of prior years' efforts.

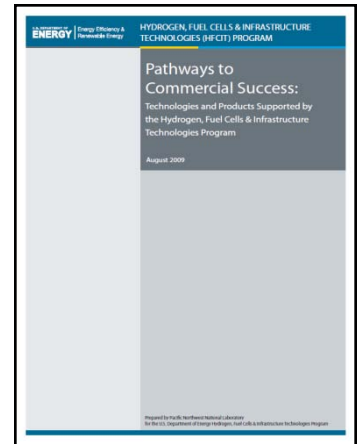


Accomplishments:

Task 4 – HFCIT Report

► The report's technology pages include the following:

- Description (2-3 paragraphs)
- Graphic/photo
- Overview (developer/manufacturer and units sold)
- Applications (uses for the technology)
- Capabilities (technical information highlighting improvements)
- Impacts/Benefits (e.g., sales, safety, and environmental benefits)
- Contact information (company and POC).



- Technology pages are approved by private sector vendors, other technology providers, and HFCIT staff.
- HFCIT report is peer reviewed, finalized, and being updated to detail the impacts/benefits of commercial technologies and the potential impacts/benefits of emerging technologies.



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Collaborations

- ▶ Contacted private sector vendors and other technology providers for data on commercial and emerging technologies:
 - Fuel Cells – 45
 - Production/Delivery – 28
 - Storage – 8.
- ▶ Worked with HFCIT staff to obtain technology tracking list and contact and background information on research projects from the list.
- ▶ Worked with HFCIT staff to obtain patent information.



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Future Work

- ▶ Update the HFCIT report.
- ▶ Meet with HFCIT staff to review FY10 results and update the FY11 technologies' list.
- ▶ Update status of all technologies by annually contacting each company/organization.
- ▶ Enter information into the database and produce technology pages (for all new technologies).
- ▶ Update patent listings using information from technology patent POCs and patent searches.



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Summary

- ▶ Technology tracking provides
 - Effective management of R&D programs
 - Budget defense
 - Strategic planning
 - Portfolio management
 - Institutional memory.
- ▶ Report and database help highlight HFCIT-sponsored commercial products' impacts and benefits, potentially expanding their markets.
- ▶ Report and database help publicize emerging technologies to interested commercialization partners.