
IX.4 Hydrogen Futures Park at The University of Montana*

R. Paul Williamson
The University of Montana
32 Campus Drive
Missoula, MT 59812
Phone: (406) 243-2932; Fax: (406) 243-2181
E-mail: paul.williamson@umontana.edu

DOE Technology Development Manager:
Christy Cooper

Phone: (202) 586-1885; Fax: (202) 586-9811
E-mail: Christy.Cooper@ee.doe.gov

DOE Project Officer: Paul Bakke
Phone: (303) 275-4916; Fax: (303) 275-4753
E-mail: Paul.Bakke@go.doe.gov

Contract Number: DE-FC36-04GO14244

Start Date: October, 2005
End Date: October, 2007

*Congressionally directed project

Accomplishments

- www.H2education.com K-12 web site completed
- One and two year Energy Technicians Program nearing completion
- H2 Futures Park Plan completed
- H2 Safety Program collaboration progressing

Introduction

The University of Montana seeks to play a key role in the establishment of a knowledge base and workforce infrastructure that will benefit Montana in the transition into the hydrogen economy. The project seeks to collaborate and coordinate with a broad range of partners throughout the state and nation to maximize its work and the progress of energy independence for the United States.

Montana and the nation are on the precipice of an energy paradigm shift and educational challenge that will dramatically affect every facet of our economic, sociologic, educational, business, environmental and industrial infrastructure. Yet preparation for this great change has been minimal and our ability to cope with tomorrow's unknowns is seriously in question.

The University of Montana-College of Technology is taking deliberate steps in its planning to ensure that it is in a position to play a key role in meeting the present and future needs of students, workers and businesses. In 2004, Senator Conrad Burns secured a grant for the College through the U.S. Department Energy to help move the College's planning process forward. The grant funded Phase I of the planning process and propelled the College forward into national prominence with the development of a vision for the future. The vision is centered on meeting expanding enrollment and workforce training demands while creating a new consolidated college campus in Fort Missoula that addresses the inadequate status of the College's facilities, equipment, technology, teaching and learning resources. Also central to the vision is the infusion of the latest sustainability technologies and concepts into all infrastructure and programs at the new campus. This emphasis will create an atmosphere that will serve as a working/living demonstration of how we may persist into the future without compromising the health of our planet or the quality of life of our descendants. The name of this innovative campus is "*The Montana Futures Park @UM*" and will position the College to fulfill its vision to be "a preeminent leader and catalyst for progress in education".

Objectives

- To develop a college curriculum for energy technicians and energy engineers.
- To establish a hydrogen safety training center at the University of Montana that provides cutting edge training and education for existing and emerging hydrogen businesses and industries on a national basis.
- To develop a Hydrogen Futures information and education web site supporting the growth and development of a hydrogen economy.
- To develop a plan for the programs and facilities needed in the H2 Futures Park.

Technical Barriers

This project addresses the following technical barriers from the Education section (3.8.4.1) of the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan:

- (A) Lack of Awareness
- (B) Lack of Demonstration or Experience of Real World Use
- (C) Institutional Barriers and Access of Audiences
- (D) Regional Differences

The Futures Park promises to benefit all by being the first green, alternative energy-powered, platinum LEED-certified (national sustainable architecture standard), sustainable college campus and will be a critical part of the Fort Missoula “super park”. The facility will demonstrate leading-edge technologies and will be a true learning and working environment by using transparent infrastructure that reveals the inner workings of all campus systems to students, supporter, researchers, and visitors. Extensive, long-term research, planning documentation, and work regarding the Futures Park have been compiled herein and in supporting materials.

Approach

The University has sought to identify current and cutting edge energy technology in ways that positively affect the implementation and applications level of alternative energy development and support growth of a new workforce and energy paradigms.

Support for the creation of the Futures Park has been overwhelming, including that received from: the Governor, the Montana State Legislature, Montana’s Congressional Delegation, the U.S. Congress, Missoula County Commissioners, Missoula City Council, the U.S. Department of Energy, the U.S. Department of Transportation, the University of Montana Long Range Planning, and the Montana Board of Regents Long Range Planning. The Futures Park has also gained support from thousands of grassroots Montanans, community leaders, business professionals, and non-profit leaders in communities across Montana.

In 2003, the Montana State Legislature passed a resolution in support of the Futures Park and its business plan and in 2005, authorized the raising of \$24M for the next phase of the campus. In addition to the 2004 grant from the DOE, the U.S. Congress appropriated \$750K a year for four years from the Department of Transportation to support further development of the Future Park.

The vision for the Futures Park is one that addresses both present and future workforce, technological, economic, college, sustainable and alternative energy development needs. To address these needs, this report includes the planning process which traces the steps, time, and energy that have been invested to bring the vision to this point. Additionally, the over-arching Futures Park concept that has guided planners and architects is included.

Based on the high level of support and the work of hundreds of professionals, the Futures Park Master Plan was developed by OZ Architects, Miller-Hull Partnership, and PAE Consulting Engineers. This significant investment of time and resources has

produced a plan for the College that will create a national laboratory of excellence and learning, providing an unparalleled workforce, technological, economic, college, sustainable and alternative energy learning base for future generations. This project involved the master planning and schematic design of a new campus for the College. Based on evaluation of potential sites, a location was selected at historic Fort Missoula along the Bitterroot River between the JTL gravel pit and the National Guard properties.

The College’s user groups, in the Fall of 2005, consisted of over 190,000 persons in the regional community, over 6,000 regional businesses, 45 full-time faculty, 60 part-time faculty, 30 staff, and 950 full-time equivalent students. The students are enrolled in a combination of one-year Certificate Degree and two-year Associate Degree programs in university prep, health, business, computing and electronics, and professional trades areas. A majority of the College’s programs are fully subscribed with waiting lists of students.

The objectives for the Futures Park are to:

1. provide leading-edge technological demonstration, education and training;
2. consolidate the College’s central operations for all present and future workforce, university prep, allied health, technological and trades education;
3. be the focal point for the outreach management of off-site regional, state, community, and business learning centers;
4. be a key distribution point for web-based workforce education, and community on-line distance learning;
5. stimulate a love of learning and discovery in students of all ages;
6. form seamless secondary-to-higher education career academies;
7. build a preeminent, real-world educational hub with satellite business and community learning centers that promotes academic quality and institutional superiority through pedagogical excellence; and
8. create a model sustainable living, working and learning environment/laboratory; and be the gateway for alternative energy and sustainability education, business and industry development in Montana.

The Futures Park is still in the beginning stages with many phases yet to follow. This document is the major component of Phase I and is the plan for the initial blueprint of the Futures Park, comprising of 84,124 square foot (s.f.) at an estimated cost of \$16M. Subsequent phases of the project include:

Phase II

In this phase, the campus will expand to 156,500 s.f. by the addition of 72,376 s.f. To include expanded classroom space, offices, laboratories and other support space. This will be accomplished through a combination of activities of additions to previous structures and construction of new “modules.”

Phase III

In this phase, the campus will expand to 232,500 s.f. by the addition of 76,000 s.f. To include major expanded spaces for Arts & Sciences, Culinary Programs, and Industrial Programs, but will also include moderate expansion for all the program areas.

Phase IV and Beyond

Future phases would expand the COT/Futures Park through decentralization. Satellite campuses could potentially develop along the North Reserve Business Corridor, near the airport, and southward in the Bitterroot Valley. These and the Riverbend Campus/Futures Park could also be interconnected with the proposed Rapid Transit System, which would also serve as a broadband communications network.

Results

Thus far, the results of the project have included excellent outcomes that include:

1. www.H2education.com K-12 web site completed, updates are under way (see Figure 1).
2. H2 Safety Program Collaboration progressing through nationwide coordination.
3. One and two year Energy Technicians Program nearing completion. The curriculum has been developed and will be available on the web for students to enroll. Successful completion of this



FIGURE 1. www.H2education.com K-12 Web Site

coursework will be recognized and initial work toward engineer degree work.

4. H2 Futures Park Plan completed as project match.

Conclusions and Future Directions

The Hydrogen Futures Project @UM has been successful accomplishing $\frac{3}{4}$ of the goals set for the project and at the same point surpassed in many respects the goal and objectives of the DOE Hydrogen Program Education Technical Plan.

The final part of the project to finalize the energy technicians curriculum along with the work on the national hydrogen safety program will move the project and the goal of the DOE Hydrogen Program Education Technical Plan forward in a positive way.

FY 2006 Publications/Presentations

1. Approximately 50 presentations have been made regarding the Hydrogen Economy in Montana and at national conferences.