

2009 Innovations Awards Program APPLICATION

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ID # (assigned by CSG): 09-S-43WV

Please provide the following information, adding space as necessary:

State: West Virginia

Assign Program Category (applicant): Natural Resources: Energy (Use list at end of application)

1. Program Name: West Virginia Hydrogen Working Group
2. Administering Agency: West Virginia Division of Energy
3. Contact Person (Name and Title): John F. "Jeff" Herholdt Jr., director
4. Address: Capitol Complex, 1900 Kanawha Blvd. E., Building 6, Room 645, Charleston WV 25305
5. Telephone Number: (304) 558-2234 or (800) 982-3386
6. FAX Number: (304) 558-0362
7. E-mail Address: jherholdt@energywv.org
8. Web site Address: www.energywv.org
9. Please provide a two-sentence description of the program:
The West Virginia Hydrogen Working Group (WVHWG) is developing hydrogen fuel production and dispensing facilities at Yeager Airport in Charleston, W.Va., and at West Virginia University in Morgantown, W.Va. The facilities will promote the use of coal-based electricity in the production of a pollution-free fuel.
10. How long has this program been operational (month and year)? Note: the program must be between 9 months and 5 years old on March 2, 2009 to be considered.
The program began in September 2007.
11. Why was the program created? What problem[s] or issue[s] was it designed to address?
West Virginia's energy goal, outlined in the state's energy plan at www.energywv.org, is to displace 1.3 billion gallons of oil by 2030. That figure represents 60% of the state's oil use, and 60 percent is the nation's current level of oil imports. Diversifying the state's fuel supply through the production and use of hydrogen will contribute to that goal.
Dependence upon foreign sources of petroleum puts West Virginia and the U.S. at risk because oil originates – in many cases – from regimes that have not proven friendly to the U.S. or its allies. As an energy-producing state, West Virginia and West Virginia coal offer real solutions to energy independence. The proposed hydrogen facilities will use coal-based electricity to produce hydrogen from water through electrolysis. Concurrently, fueling the state's transportation infrastructure with hydrogen, a clean, renewable fuel, will also provide environmental benefits. Hydrogen energy offers the potential of a stable, economic fuel supply produced nationally and, it is hoped, in West Virginia.
12. Describe the specific activities and operations of the program in chronological order.
September 2007: Representatives from the U.S. Department of Energy's National Energy Technology Laboratory, located in Morgantown, W.Va., presented an opportunity to West Virginia to organize a team of state government, academic and private-sector representatives to

advance hydrogen fueling locations. Using grid electricity provided by coal to split water would also make use of a domestic energy resource.

November 2007: NETL presented information about the program at an initial meeting with a broad group of stakeholders including WVDOE, Yeager Airport, WVU and the National Alternative Fuel Training Consortium located at WVU.

January 2008: An increasing number of stakeholders, including the West Virginia Air National Guard 130th Air Wing, met at WVDOE and at Yeager Airport. The hydrogen facility customers will include Yeager Airport ground support vehicles as well as vehicles from the air guard.

March 2008: NETL presented an overview of hydrogen, its environmental benefits, its safety as a fuel, its flexibility both in how it can be manufactured as well as in its uses, commercial production and distribution.

May 2008: WVHWG participants inspected the proposed site for the fueling facility at Yeager Airport as well as discussed plans for promoting the fuel and developing signage for the station. The West Virginia Chamber of Commerce pledged to survey its members for their suitability and willingness to participate in the Charleston station's development.

June 2008: WVHWG met on the campus of WVU. University representatives, including the campus facilities director, participated. A site plan and design were presented to the group and survey questions were developed.

December 2008: More detailed site drawings were presented. Plans were announced to hold the Mountain States' 5th Annual Hydrogen Implementation Conference in Charleston Aug. 17-20, 2009, in Charleston. Gov. Joe Manchin III agreed to chair this initiative. The Charleston facility will be commissioned as part of the conference's opening.

February 2009: WVHWG members reviewed proposed designs for two signs at the Yeager Airport facility and a news release on the facility. The group also reviewed plans for the Charleston hydrogen conference.

13. Why is the program a new and creative approach or method?

The program's creativity is fueled through the desire to produce hydrogen from coal-based electricity at a comparable price point with conventional gasoline. West Virginia has the nation's lowest overall electricity cost at 5.54 cents a kilowatt-hour (kWh). As 44 kWh are needed to produce 1 kilogram of hydrogen (the energy in 1 kilogram of hydrogen is about the same as the energy in 1 gallon of gasoline), the price (\$2.43/kg) would be comparable with that of gasoline.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

Start-up costs incurred by the WVDOE have been minimal. The principal hardware cost of the project will be met via a donated dispensing facility and hydrolysis unit. Yeager Airport is providing a site for the facility and NETL partner engineering firm Parsons has provided site design.

15. What are the program's annual operational costs?

Estimated annual costs are \$18,000.

16. How is the program funded?

NETL is the sole funding source and this program is incorporated into NETL's hydrogen program budget.

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.

No.

18. What equipment, technology and software are used to operate and administer this program?

Hydrogen production, dispensers and storage equipment will be maintained at the facility.

19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address. Yes. Contacts include:

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20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?

Yes. Other hydrogen fueling stations exist. This program is a product of a state-based collaboration advancing energy security in partnership with a federal agency. Unique to this hydrogen activity is a focus on providing a cost-competitive transportation fuel using grid electricity from coal.

21. Has the program been fully implemented? If NO, what actions remain to be taken?

No. Plans are progressing for the development of the first hydrogen refueling facility at Yeager Airport. A site has been selected. Design has been completed. Vehicles with internal combustion engines for use by the airport ground support will be converted to operate on hydrogen. Facility construction and vehicle conversion remain to be completed.

22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

Hydrogen produced and used in West Virginia will be an important element of a diversified transportation energy strategy. Many different West Virginia resources, such as natural gas, coal, solar energy, wind and biomass, can be used to produce hydrogen. The only emission from hydrogen-powered fuel cell vehicles is water, so the fuel's environmental benefits are vast.

A widespread hydrogen infrastructure does not exist, though. Vehicles that can use the fuel are expensive. The WVHWG project will provide two more pins in the map of the hydrogen refueling infrastructure.

23. How has the program grown and/or changed since its inception?

At each meeting of the WVHWG, the number of groups represented increases, showing a diversity of support for the planned fueling facilities.

24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?

States with higher electricity costs might find that hydrogen production through electrolysis yields a fuel that is not cost-competitive with gasoline.

2009 Innovations Awards Program Program Categories and Subcategories

Use these as guidelines to determine the appropriate Program Category for your state's submission and list that program category on page one of this application. Choose only one.

Infrastructure and Economic Development

- Business/Commerce
- Economic Development
- Transportation

Government Operations

- Administration
- Elections
- Public Information
- Revenue

Health & Human Services

- Aging
- Children & Families
- Health Services
- Housing
- Human Services

Human Resources/Education

- Education
- Labor
- Management
- Personnel
- Training and Development
- Workforce Development

Natural Resources

- Agriculture
- Energy
- Environment
- Environmental Protection
- Natural Resources
- Parks & Recreation
- Water Resources

Public Safety/Corrections

- Corrections
- Courts
- Criminal Justice
- Drugs
- Emergency Management
- Public Safety

Save in .doc or rtf. Return completed application electronically to innovations@csg.org or mail to:

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This application is also available at www.csg.org, in the Programs section.

Deadline: March 2, 2009