

USC, Siemens, XRD_i announce partnership for developing hydrogen-powered engines

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The University of South Carolina announced on Friday, October 14th a partnership to develop hydrogen-powered engines for currently diesel-powered vehicles. The project discussed would modify existing diesel engines to run on hydrogen fuel, allowing an increase in efficiency of roughly 30%.

This endeavor would bring together researchers from the Mechanical Engineering Department with engineers from Siemens of Columbia and XRD_i of Beaufort to design, test, and manufacture engines which run on hydrogen instead of diesel. The project would be headed by Dr. Abdel Bayoumi, professor of mechanical engineering in the College of Engineering and Information Technology.

“The diesel engine has a long history of use in industrial, automotive and marine applications and is considered the work-horse in many industries,” said Bayoumi. As prices and demand for fuels increase, the need for alternative sources of energy becomes more important, he commented.

“Bringing diesel engines and hydrogen together would solve many of society’s current energy problems,” said Andrew Sorensen, president of the University of South Carolina. “Doing this in South Carolina will have a positive and immediate impact on our state’s economic development.”

USC would provide expertise from faculty in the Mechanical and Electrical Engineering Departments to design the fuel injectors which will use hydrogen instead of diesel. Siemens, a leader in the fuel injector industry, would also give expertise in their area and manufacture the fuel injectors for the project. XRD_i, a research and development company based out of Beaufort, SC, would provide the engine, pistons, and cylinders as well as their expertise in the realm of engine performance.



Fuel injector designed for the envisioned hydrogen-powered engine.

The group is discussing the first phase of design, which involves researching hydrogen fuel injectors and design. Although the idea for this engine was initiated by Dr. Bayoumi only one year ago, progress has already been made in the design phase. A fuel injector has been modeled and rendered using computer aided design software (left).

When the partnership has been finalized the group will enter the next two phases. A prototype of the injector will be manufactured and tested, after which the final injectors will be produced. Engines designed by XRD_i will then be manufactured and tested using the hydrogen fuel injectors. The timeline for final production is projected to be five to ten years.

Siemens and XRD_i have expressed interest in the project and are in the process of discussing details with USC. Both President Andrew Sorensen and VP for Research Harris Pastides from the University of South Carolina have expressed their strong commitment to see the project is funded.

“Hydrogen is the fuel of tomorrow,” Harris Pastides, USC’s vice president for research stated. The Horizon Center, part of the Innovista[®] project, will be home to research involving hydrogen storage and fuel cells and was listed as a potential location to house the project.



President Andrew Sorensen (left) and VP for Research Harris Pastides(right) inspect a model of the fuel injector for the hydrogen-powered engine.

Questions and/or requests for more information about the hydrogen-powered engine project can be directed to Dr. Abdel Bayoumi, (803) 777-1845 or bayoumi@enr.sc.edu.