

## Energy plant of the future

In the United States, the Department of Energy (DOE) plans to develop a revolutionary pollution-free energy system that could be commercially available by the year 2015. Under DOE's Vision 21 programme, industry-led design and engineering projects would provide the critical building blocks required to turn vision into reality. Four of the projects will focus on key technologies that might eventually become building blocks for the Vision 21 plant. These projects are:

- FuelCell Energy Inc. is to develop a hybrid power system that would combine a fuel cell and gas turbine to generate electricity at ultra-high efficiencies.
- Siemens Westinghouse Power Corp. will develop a membrane for separating oxygen from air and use it to convert the depleted fuel from a specially modified solid oxide fuel cell into carbon dioxide (CO<sub>2</sub>) and steam. The CO<sub>2</sub> could then be easily separated for eventual sequestration.
- Eltron Research Inc. will develop a ceramic membrane to separate valuable hydrogen from the flue gas stream of a coal gasifier, which is to be later used in a fuel cell.
- Clean Energy Systems Inc. will adapt a rocket engine design to burn a clean fuel gas and mix the combustion products with water to produce a hot, high-pressure, steam-saturated gas stream that could power an advanced turbine.

Two other projects will develop advanced techniques for designing Vision 21 plants and integrating the key modules using new computer processes. National Fuel Cell Research Centre will look after engineering issues associated with integrating key components and subsystems into Vision 21 plants. Fluent Inc. is to build a "virtual demonstration" system that would provide future plant designers a tool to model a fully functional Vision 21 plant on a computer. The Vision 21 plants would also be equipped with technologies to convert many pollutant-forming impurities into commercially valuable commodities.

*Website: [http://www.fe.doe.gov/techline/tl\\_vis21sel1.html](http://www.fe.doe.gov/techline/tl_vis21sel1.html)*