

Transitioning to a Hydrogen Future

Art Smith, NiSource

NiSource Inc.- background

Besides NiSource Inc.'s large presence in the natural gas industry, NiSource has significant business involvement with **stationary energy systems**, including systems that produce electricity and thermal products (process steam, heating and cooling). Systems with multiple energy products have promising energy and environmental attributes for society and all customer categories.

Existing focus on the hydrogen economy

Observing the literature and even the attendee list of this meeting, the overwhelming attention and interest has been directed toward the **mobile sector and fuel derived from renewable sources**. This seems to result from the more near term promising business applications in the mobile sector and the elegance of the environmental linkage to renewable fuel sources.

Need for focus on entire energy system

Current national policy urges the expansion of energy supplies, including the investment in the production, delivery and use of clean burning natural gas. Efficiency requires that future energy direction **harmonize various energy programs**. DOE can provide the nation with leadership for a composite and sustainable energy future. Accordingly, there needs to be additional linkage between the mobile and stationary energy systems that transitions the important "bridging" natural gas sector. This efficiency will enhance the likelihood and timing of a hydrogen economy.

A sustainable energy business model

Cost

Capacity

Low emissions

Reliability

Of these characteristics, hydrogen technologies only hold current advantages with its environmental attributes. That advantage would be narrowed if

national policies recognized and facilitated the role that generation efficiency could play in meeting energy and environmental objectives. Thus, the likelihood for the sustainable success of a future hydrogen economy would be better served with more focus on the **transition of the energy infrastructure** that would support hydrogen technologies. A supportive infrastructure would improve the prospect that hydrogen technologies could improve their ability to compete on cost, capacity and reliability.

Transitioning toward a hydrogen economy

A holistic national energy policy should focus on areas of mutual interest that support current energy objectives and a sustainable role for hydrogen technologies. There are areas in which such support could aid an efficient transition, for example:

Hybrid distributed electric grid- A hybrid grid that efficiently allows distributed sources to attach to the existing centralized grid, would support current distributed generation technologies, including those that generate or use hydrogen. A flexible electric grid would support the economics of mobile and stationary hydrogen energy systems. Cost effective protective and control technologies, coupled with fair regulatory treatment for interconnection will facilitate a transition toward a hybrid distribution grid.

Small steam reformation systems- Localized generation of cost competitive hydrogen fuel can help supply fuel for the hydrogen economy. Scaling down hydrogen production processes can potentially minimize the storage/transportation costs from large generation facilitate and provide opportunities to use waste heat from distributed energy systems.

Hydrogen utilization for turbines- The utilization of hydrogen for turbine efficiency and emission control would provide an additional demand for hydrogen and flexibility for energy system economics.

While significant investment dollars are being directed toward the mobile energy sector, there are under-funded areas for supportive infrastructure that would help the sustainable transition toward a larger role for hydrogen in the energy sector.