

# '07 Farm Bill: Hydrogen from Large, Stranded, Renewable Resources

National Hydrogen Association annual meeting  
Sacramento, 30 March – 4 April, 2008

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## Two Farm Bill Research Initiatives Promise New Markets, Transmission, and Annual-scale Firming Storage for Diverse, Large-Scale, Stranded Renewables as Hydrogen and Ammonia

- GW-scale\* renewables generation, transmission, “firming” storage
  - GW-scale\* electrolyzers make hydrogen from renewable-source electricity
  - Potential: all USA energy from renewables -- requires new markets
  - Potential: supply all USA energy from renewables -- requires new markets
    - Only a third of 15 million tons / year ammonia fertilizer = 3 million tons hydrogen = 40,000 MW nameplate wind
    - Only a third of 120 billion gal / year gasoline = 40 million tons hydrogen = 500,000 MW nameplate wind
- \*GW=1,000 MW Nameplate

## Farm Bill status

As of March 27, only the Senate Conference Committee members have been named:

Debbie Stabenow (D-MI)  
Tom Harkin (D-IA)  
Max Baucus (D-MT)

Kent Conrad (D-MT)  
Patrick Leahy (D-VT)  
Blanche Lincoln (D-AR)

Saxby Chambliss (R-GA)  
Richard Lugar (R-IN)  
Charles Grassley (R-IA)

Thad Cochran (R-MS)  
Pat Roberts (R-KS)

## Section 9019: RURAL NITROGEN FERTILIZER STUDY

- Anhydrous ammonia ( $\text{NH}_3$ ) made from renewable-source hydrogen + atmospheric nitrogen
- USA consumes ~15 million tons of  $\text{NH}_3$  per year; <60% imported, from offshore natural gas
- Potential:  $\text{H}_2$  demand for  $\text{NH}_3$  synthesis = 3 million tons / year
- $\text{NH}_3$  is a high-density hydrogen carrier, storage medium, and fuel
- Internal combustion engines and combustion turbines run well on  $\text{NH}_3$
- “Assess feasibility... identify alternative processes... program recommendations”
- “... report to Congress... no later than 18 months from the first meeting of the Task Force”
- “... identify the key technical and economic barriers to producing commercial-scale quantities of nitrogen fertilizer from renewable energy sources”
- Appropriation: Senate Farm Bill recommends authorization \$1 M

## Section 9022: RESEARCH AND DEVELOPMENT OF ALTERNATIVE ENERGY

- Directs program and funds to Colorado Renewable Energy Collaboratory: NREL, UC Boulder, Colorado State University, Colorado School of Mines
- Energy crops, biofuels, storage and conversion, fuel cell technologies
- “Develop storage and conversion technologies for wind- and solar-generated power for small-scale and utility-scale generation facilities...”
- “Research fuel cell technologies for use on farm, ranch, and rural applications...”
- Could include hydrogen pipeline transmission and firming storage in solution-mined salt caverns
- Appropriation: Senate Farm Bill recommends authorization of \$225 M

