

**ENERGY INNOVATIONS SUMMIT HIGHLIGHTS STURMAN POWER SOLUTIONS**  
**COLORADO RURAL ENERGY ASSOCIATION SUMMIT, October 14, 2011**

State rural and municipal power providers and partners from throughout Colorado gathered at the CREA Energy Innovations Summit in Denver, Colorado. Organizations like Excel Energy, the Governor's Energy Office, Colorado's Public Utilities Commission, and Colorado energy innovators offered presentations and remarks about the state of the industry, its challenges and opportunities. Topics ranged from energy storage, natural gas, and micro-hydro, to transmission and new and enabling technologies in these sectors. The closing general session in the Denver Marriott Ballroom, moderated by Kent Singer, the Executive Director of Colorado Rural Electric Association, was titled "**Colorado Innovators: A Conversation with Carol and Eddie Sturman.**"

The Sturman presentation and conversation with the CREA audience highlighted Sturman's innovative problem solving strategies for the power generation sector. Carol Sturman began the dialogue with the Albert Einstein quote: "We can't solve problems by using the same kind of thinking we used when we created them." The Sturmans answered questions about their company's new power system innovations designed to help address key power sector issues. The system strategies covered in the talk included:

**A. Solutions for power generation that make SENSE**

Carol asserted that the Sturman philosophy of products and strategies, or, SENSE – Simple, Efficient, Needed, Safe, and Economical - will be required for any power strategy or system to be successful and sustainable.

**B. Sturman flexible all-fuel Adaptive Digital Engine Technology™ for stationary power**

An internal combustion engine with modernized controls designed to accommodate ANY liquid or gaseous fuel on demand, in an ultra efficient manner, including alternative fuels, and less refined fuels. The Sturman Adaptive Engine is modernized using micro digital hydraulic valves to replace limiting fixed mechanical parts of conventional engines. This allows for flexible, fast, precise and intelligent control of air as well as fuel, to manage combustion in superior ways never before possible. The modernized engines can be ganged together for a digital central power solution that is fail safe and can connect to the existing community grid. Or, they can be used for new installations in a distributed fashion to reduce transmission requirements, energy losses, and cut costs by reducing the need for new large and expensive central power facilities. Such a distributed system can effectively meet growth demands, or replace outdated and environmentally damaging equipment.

**C. Wind and solar complement and energy storage solution**

The Adaptive Engine can back up intermittent wind or solar instantly with the best fuel available. Additionally, the engine can be used as a tool to facilitate the storage of "stranded" energy generated by wind or solar when demand is low in the form of compressed air in simple storage tanks until there is demand for the stored energy. At that time the engine can facilitate the conversion of the compressed air back to power generation and the supply of electricity.

#### **D. Safe, affordable and practical regional transmission solution**

Distributed power generation using the Adaptive model can enable a new local and regional energy strategy to improve system security and allow for efficiency gains. The energy generated by the engine, or cluster of engines, can be transferred hydraulically, with no requirement for high cost, electro-magnetic emitting high power lines. This can be an ideal solution for new neighborhoods or developments.

#### **E. Enabling carbon free NH<sub>3</sub>**

The Sturman Adaptive engine may be combined with the use of wind or solar to provide a practical method to manufacture carbon free NH<sub>3</sub> from water. Additionally, the engine can reach the high compression ratios required to burn NH<sub>3</sub> as a fuel for stationary or mobile power. Additional revenue from making NH<sub>3</sub> can be realized by selling carbon free NH<sub>3</sub> for fertilizer, which can eliminate the need for import of foreign “brown” NH<sub>3</sub> made with natural gas.

#### **F. Addressing the economy, jobs, national security and the environment**

The Sturman power generation model can be part of a long term practical energy strategy:

- Energy options for suppliers can be fuel flexible.
- Renewable energy and storage can be more practical.
- National security and health issues can be addressed.
- And substantial new job creation and economic development can be fostered.



Pictured from Left to Right: Kent Singer, Executive Director of Colorado Rural Electric Association, Carol Sturman and Eddie Sturman, co-founders of Sturman Industries.