THE IOWA STORED ENERGY PLANT

DOE Energy Storage Systems
Annual Peer Review
November 2-3, 2006

Progress Report

Presented by

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Iowa Association of Municipal Utilities

for

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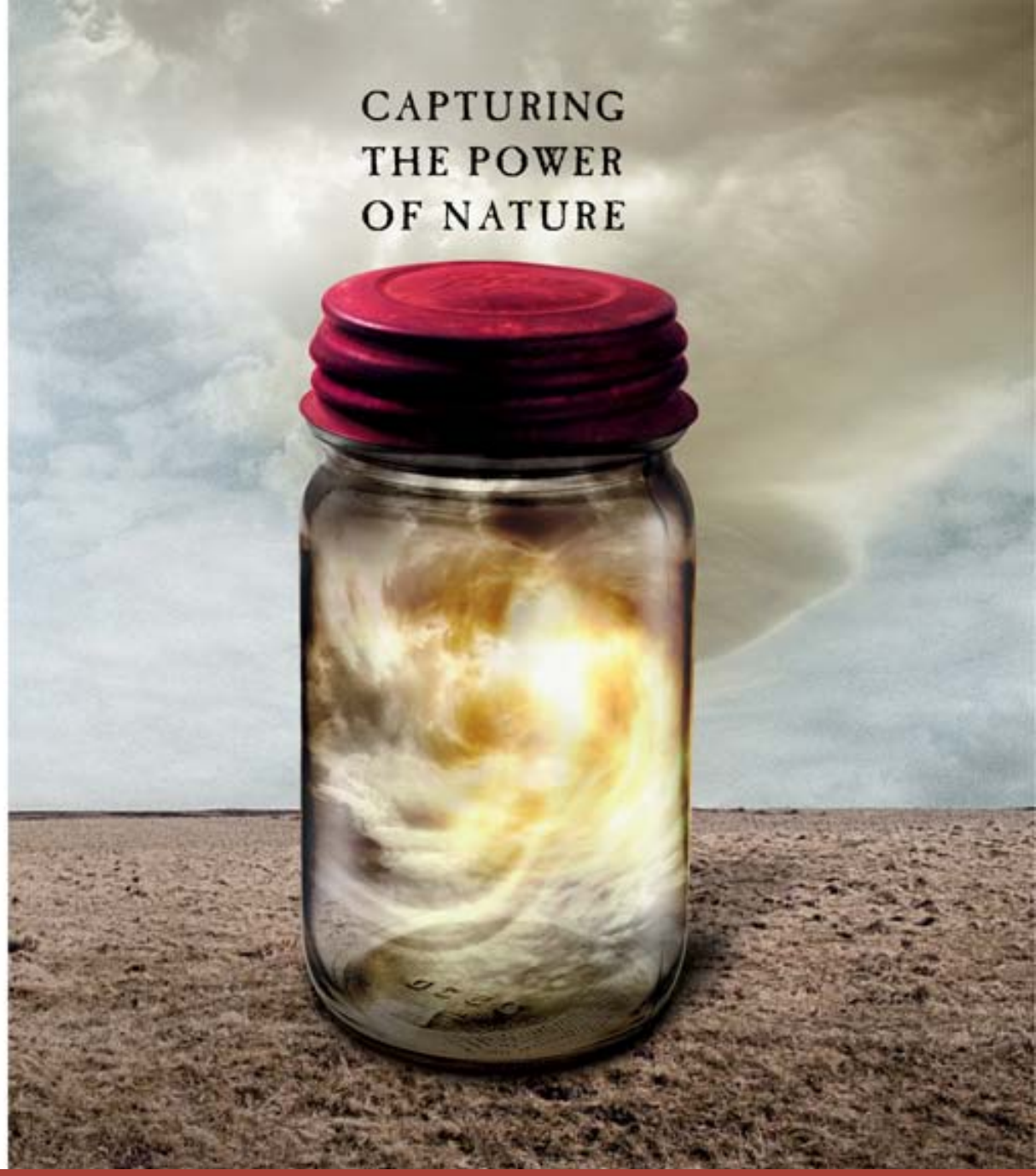


What is ISEP?

- ISEP is a DOE-supported effort of municipal utilities in Iowa, Minnesota, and the Dakotas for development of 200 (now 268) MW of compressed air energy storage (CAES) and 75 MW of wind capacity.

What is the ISEP Agency?

- The ISEP Agency is an intergovernmental entity formed under Iowa law in 2005 and governed by a board of directors composed of representatives of participating local governments.

Board of Directors:
- Dennis Fannin, Osage
- John Bilsten, Algona
- Sheila Boeckman, Waverly
- Scott Tonderum, Graettinger
- Niel Ruddy, Carlisle
- Kent Holst, Development Dir.
- Nick Critelli, Counsel

Principle investigators:
- Tom Wind, Wind Utility Consulting
- Sam Sheppard, EASE
- Michael McGill, EASE

What problems does ISEP address?

- Demonstrates transferable processes and technology
  - Evaluation of aquifer storage and identification of sites
  - CAES design and operation for grid integration of wind
- Supports development of wind energy
  - Increases value of wind; makes it dispatchable
  - Produces ancillary services to support transmission grid, allowing further development of wind resources
- Satisfies need for intermediate generation

What's been accomplished? 1 of 2

- Introduced to CAES - power supply study 2001
- Burns & McDonnell concept design & cost estimate 2003
- DOE's NREL contracts for studies 2004
- Fairchild and Wells report on Fort Dodge site 2004
- Black & Veatch financial feasibility study 2005
- Current DOE-funded projects began in 4th Qtr. FY05

What's been accomplished? 2 of 2

- Original site abandoned; 2 alternate sites identified 2005
- Charlie site analyzed; geology proves unacceptable 2005
- Agency formed to manage project 2005
- Report on public preference for energy supply 7/06
- Alpha site analyzed; report is highly positive 9/06
- ISEP Web site 8/06
- 3 sites identified for +/- 75 MW wind generation

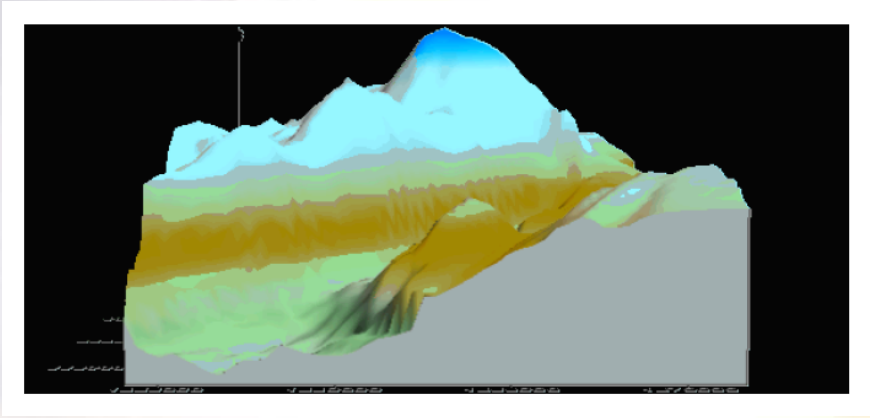
What have we learned? 1 of 2

- Wind adds substantial value to CAES and visa versa
- Additional compression costs for deeper aquifer are offset by gains in efficiency
- Wind does not need direct inter-tie with CAES
- CAES delivers substantial efficiencies to grid operation
- Market research confirms public demand for environmentally friendly alternative energy sources
- Suitable aquifer storage sites are difficult to find

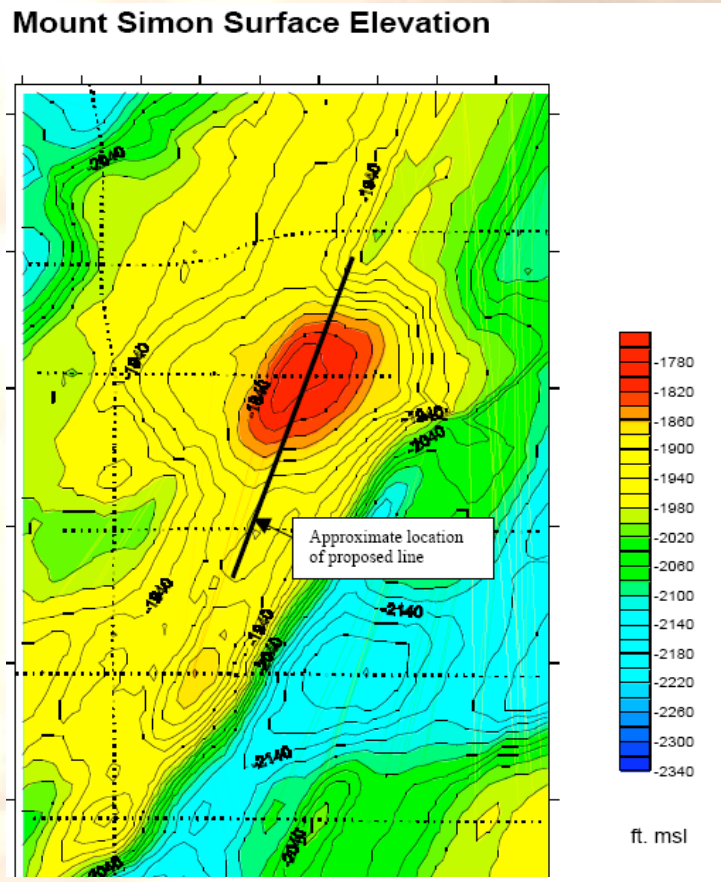
……..but not impossible

What have we learned? 2 of 2

- In September, ISEP learned – at last – that we have found a good storage aquifer and site [Hydrodynamics LLC 9-26-06]



Mt. Simon – Perspective View



What is next?

- Complete site analyses for +/- 75 MW of wind turbines and confirm participation (11/06)
- Additional seismic survey over dome (12/16)
- Confirm utility participation in next phase of CAES (1/07)
- Schedule to completion:

Task	Duration	Completion	Est. Cost
Test well	10 mo.	January 2008	$1.5 million
Prelim. design	3 mo.	May 2008	$.5 million
Permitting	12 mo.	September 2008	$2 million
Final design	6 mo.	April 2009	$3 million
Construction	24 mo.	May 2011	$214 million

How have municipal utilities supported ISEP?

- 75 municipals had contributed $857,500 through 2005
- Additional $300,000 expected by end of 2006
- $10 million will be needed from utilities in 2007 for tasks through final design
- Construction (not including wind) at $800/kW will total $214 million for 268 MW.

How has DOE supported ISEP? 1 of 2

DOE's funding has been critical to progress on ISEP

- $136,000 contracts administered by NREL in 2004
- Distribution of FY05/FY06 Congressional Directed Funds totaling **$2.1 million** through a series of contracts managed by Sandia National Laboratories
- Providing technical expertise through Sandia National Laboratories

How has DOE supported ISEP? 2 of 2

Technical work DOE funding has supported

- Reservoir Investigation
- Market Research
- Subsurface Technology
- Wind Farm Project
- Alternate Fuel Study
- Power Project

Special Thanks

- Imre Gyuk – DOE Energy Storage Program
- Georgianne Peek – Sandia National Laboratories
  - Steve Bauer, Geo-tech expert
  - Blake Simmons, Biomass combustion expert
- John Boyes – Sandia National Laboratories

Additional Information

www.isepa.com

Appendix 1: CAES Animation

The hyperlink below links this presentation to a separate executable animation file in Adobe Flash format. You may also view the animation from the ISEP web site www.isepa.com. You may need the latest version of Adobe Flash Player, which can be downloaded free to your Windows machine from the following site:

http://www.adobe.com/shockwave/download/download.cgi?P1_Prod_Version=ShockwaveFlash&promoid=BIOW

Click here for hyperlink to animation file