

THE IOWA
STORED
ENERGY
PARK



CAPTURING
THE POWER
OF NATURE

Iowa Stored Energy Park (ISEP) Update

**Institute for Regulatory Policy
Studies Conference**

Linking Supply with
Changing Demand

October 14, 2010



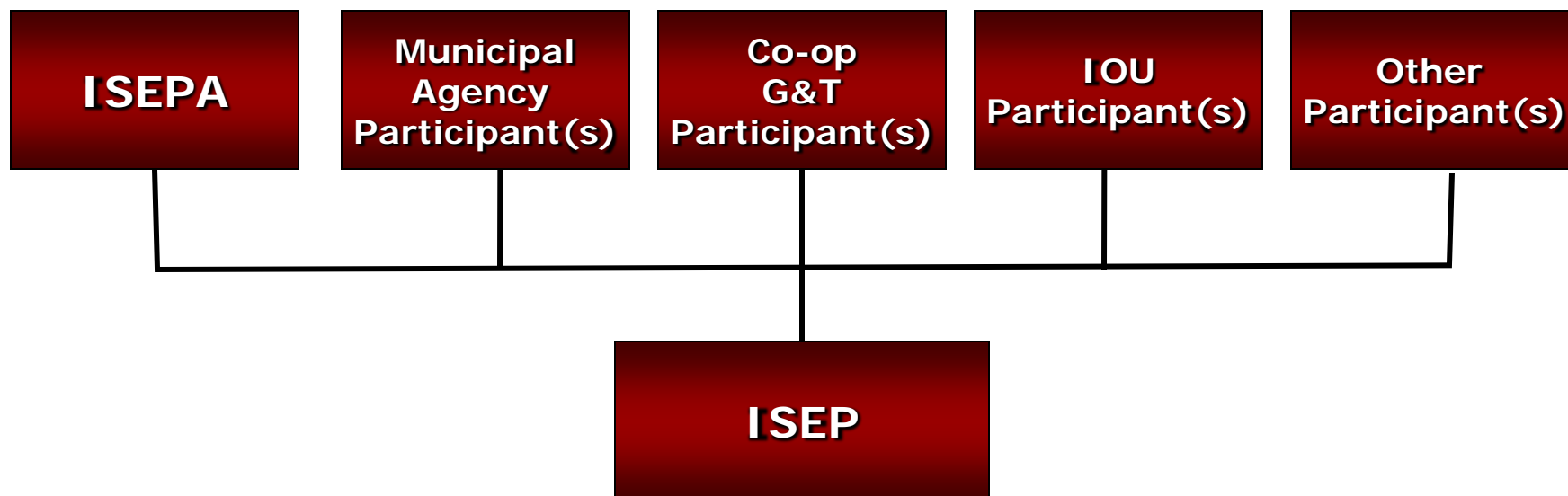
Overview

- About ISEPA and ISEP
- Current Actions and Schedule
- Transition to Project Participation
- Next Steps

About ISEPA

- Iowa Stored Energy Plant Agency
 - Started by the Iowa Association of Municipal Utilities (IAMU)
 - Now an Iowa Chapter 28e organization
 - Ten individual Iowa municipal utilities
 - Three municipal power agencies
 - South Iowa Municipal Electric Cooperative Association (SIMECA)
 - Missouri River Energy Services (MRES)
 - Central Minnesota Municipal Power Agency (CMMPA)
 - Total of 95 municipal utilities represented
 - Investment to-date in ISEP (all sources): ~\$10.5 M

Future Project Organization



Project participants will be tenants in common, with undivided shares.

About ISEP

- Proposed 270 MW compressed air energy storage (CAES) project, 2015 in-service
- Capital cost: ~\$400 million
- Site: Dallas Center, Iowa
 - Transmission interconnection at Grimes substation, nine miles east of ISEP site.
- Unique: Fully dispatchable load
 - Compress (200 MW): 12 to 16 hours on weeknights and weekends
 - Generate (270 MW): 12 to 16 hours per day on weekdays.
- In daily operation, generation will look like an intermediate-duty, combined-cycle unit.
 - But heat rate only ~4400 Btu/kWh*

*Excluding energy content of compressed air input to generator.

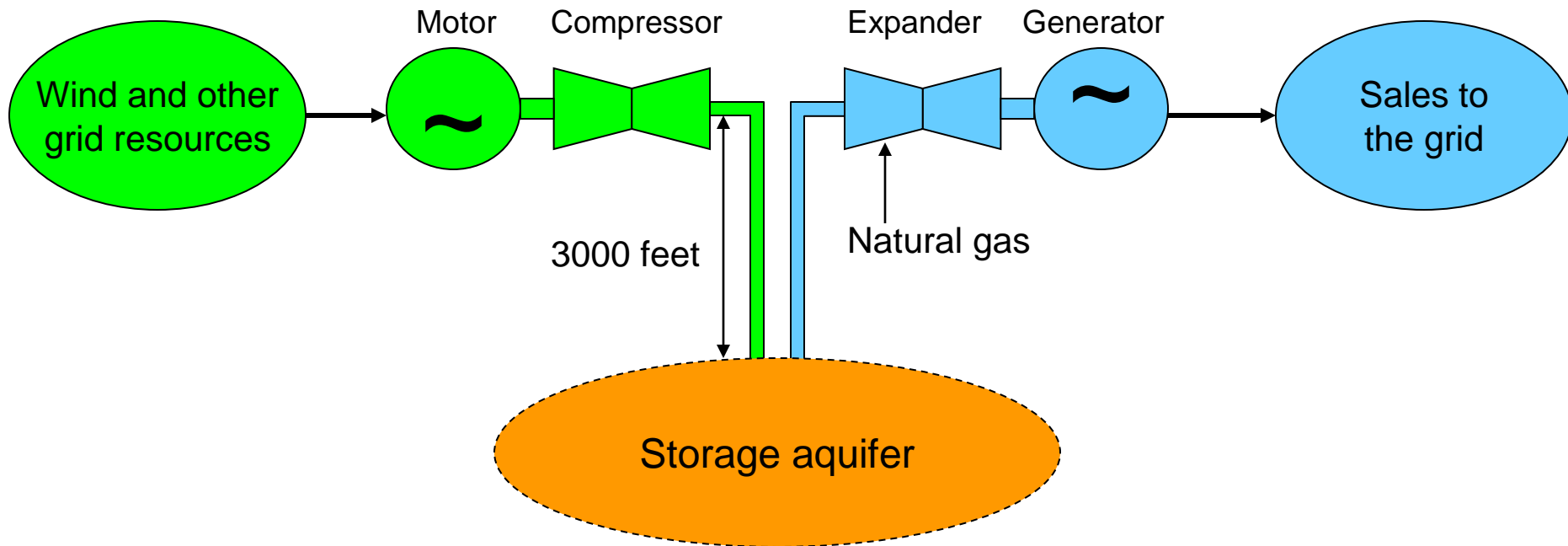
CAES Operation

“Off-peak” demand periods;
particularly when wind is blowing

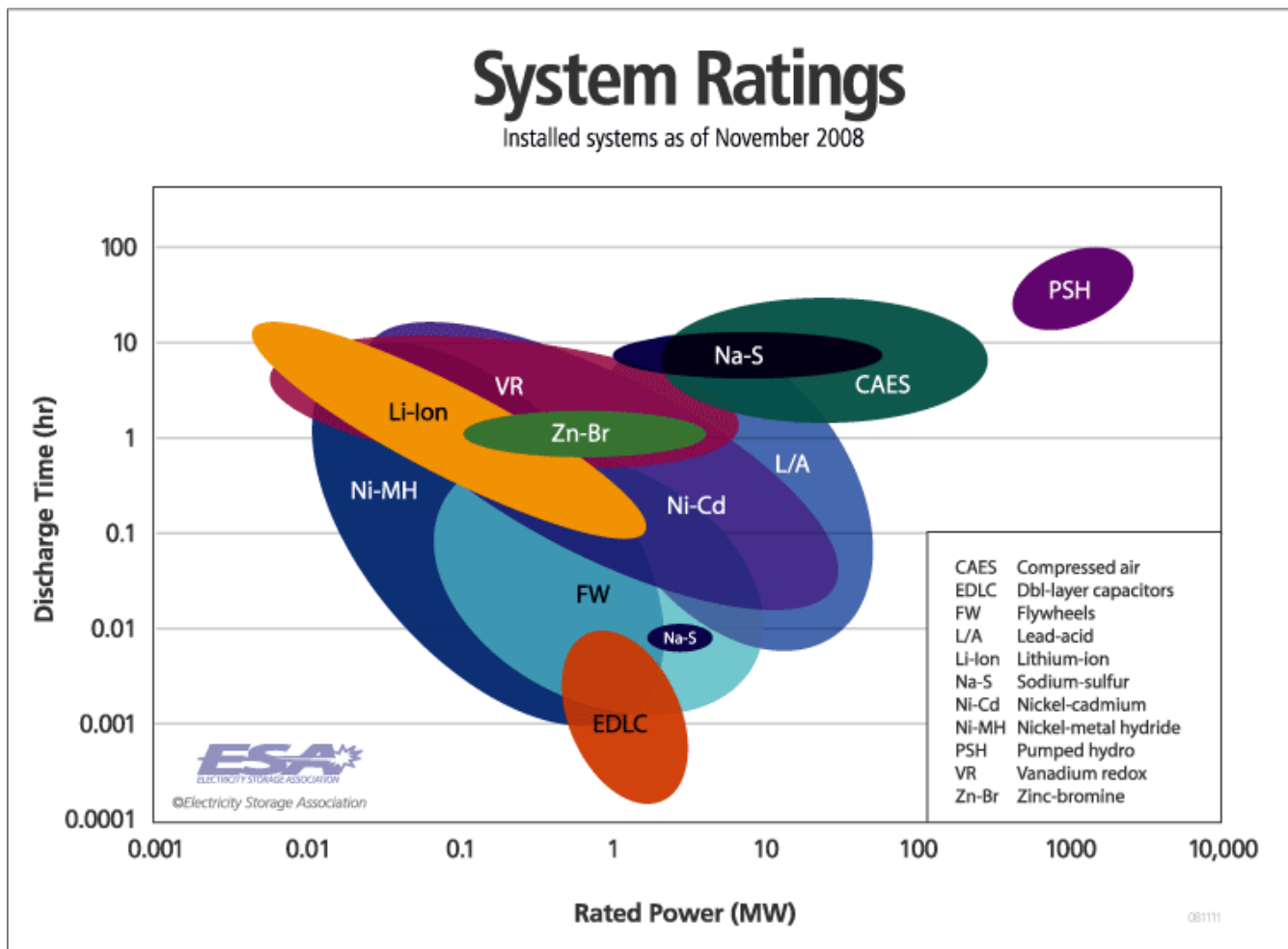
“On-peak demand periods;
particularly when wind is not blowing.

Low electric prices

Higher electric prices



Storage Technologies: Available Sizes

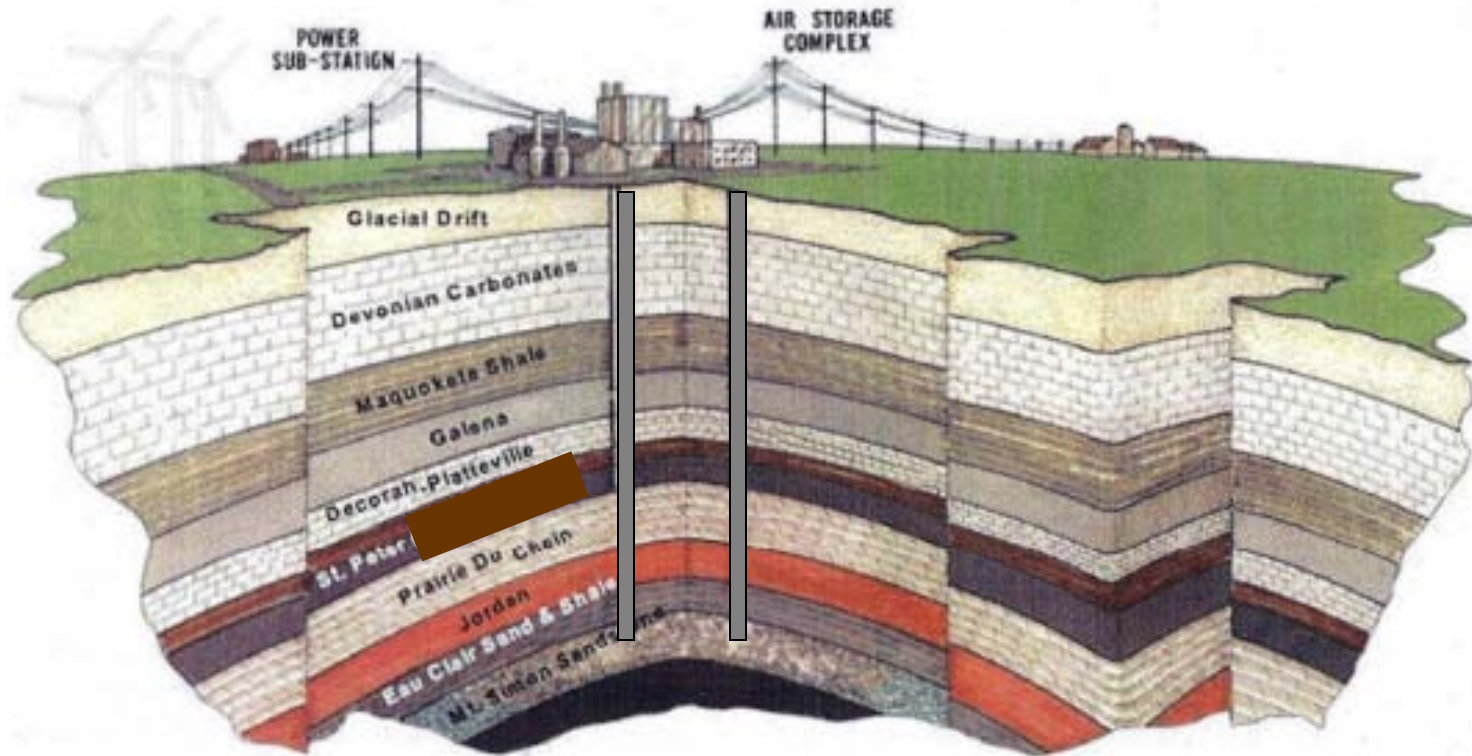


Source: Energy Storage Association, website, www.electricitystorage.com.

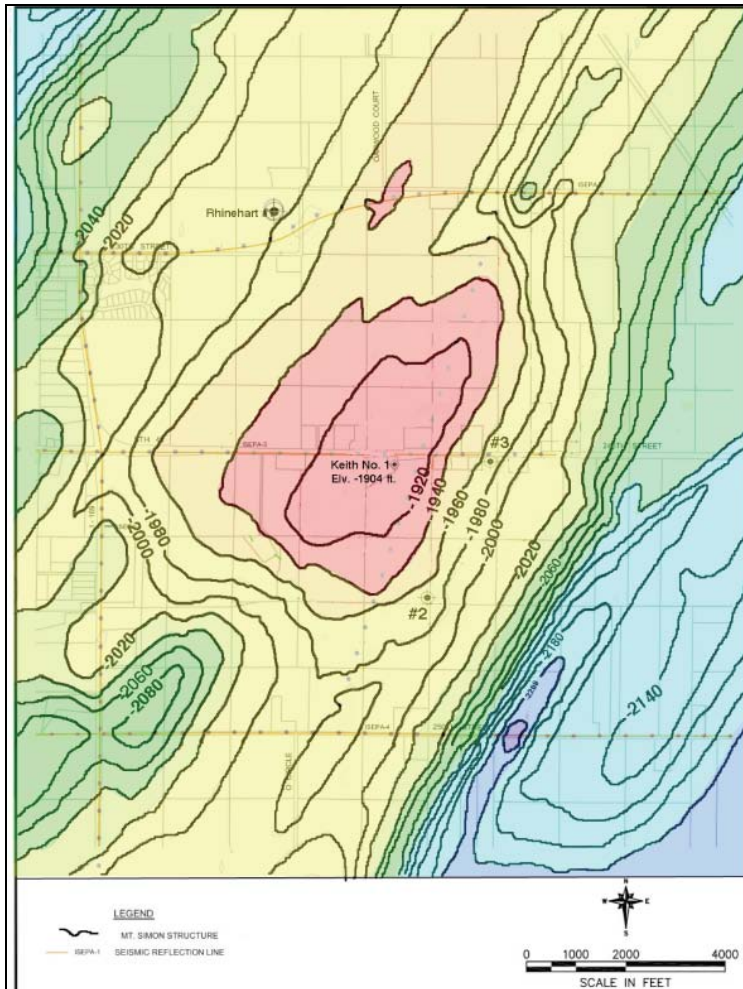
Dallas Center, Iowa



Tapping the Mt. Simon Sandstone



A Unique Underground Structure



- Not a cavern.
- Porous sandstone structure
 - ~ 1 square mile x 100 feet thick
- 3000 feet underground.
- Originally discovered by Northern Natural Gas in the 1960s as a potential natural gas storage site.
- Northern stores natural gas in a similar structure 10 miles away.

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Test Drilling Program at Site is Underway



Well #1 Drill Rig, April 2010



Test Drilling Program at Site is Underway (continued)

Well #2 Drill Rig, July-August 2010



Talk Like a Geologist

“**Mt. Simon:** Sandstone, gray, primarily quartz with minor glauconite, moderately well cemented, rounded to subrounded, well sorted, fine. Fossils locally abundant, mostly inarticulate brachiopods w/phosphatic shells, occasionally intact, locally comprise bedding partings. SS is crossbedded on scales of ~5', dips to ~20°, rare lenses and beds of thin grayish green shale.”

Source: Keith Well #1 geolog,
Depth = 2927.8 feet
March 11-12, 2010

Cost & Economics Studies: Timeline

- ISEPA Board approved RFP April 29
- RFP Issued May 10
- Responses from vendors June 1
- Selection of vendor(s) June 8
- Vendor report(s) due October

Now and the Future

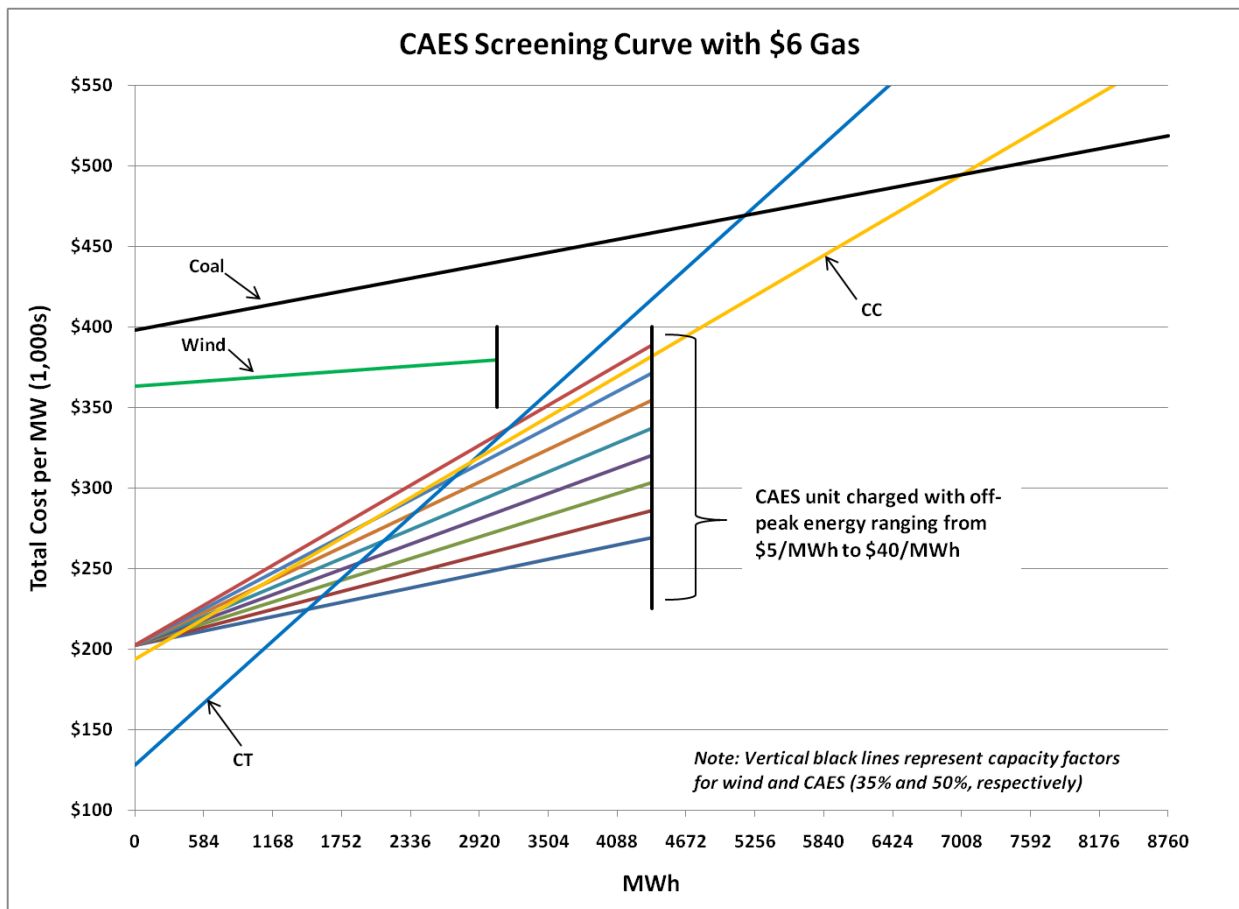
- Current Conditions
 - The economy and customer electric loads are down
 - Natural gas prices are relatively low
- But, something important is happening regardless of these current conditions:

Very large amounts of intermittent, non-dispatchable wind resources are being installed in the region.

Benefits

- Off-peak to on-peak price arbitrage
- Optionality to hedge future generation costs
 - Large amounts of installed and intermittent wind capacity
 - Increases in natural gas prices
 - Retirement of older, intermediate coal capacity
- Ancillary Services
 - Regulation service
 - Ramp-up and ramp-down, in both compression and generation modes
 - Quick-start reserves
 - Reactive power
 - In both compression and generation modes

CAES Economics: Example Screening Study



Source: Midwest Independent System Operator (MISO)
draft MTEP 2010 Plan, Sept 2010

Legislative Activities

- **Congress**
 - 20% investment tax credit for bulk storage (SB 3617: “Storage 2010 Act”, Senators Bingaman, Shaheen, Wyden)
- **Possible state initiatives (Iowa, Minnesota, Dakotas)**
 - Storage to count toward state RES/RPS goals. (Example: California AB 2514)
 - Automatic cost recovery via rate rider, without need for rate case. (Example: Renewables in Minnesota)
 - Exemption from state Certificate of Public Use, Convenience and Necessity processes. (Example: Wind projects in MN and Iowa)
 - Property tax/sales tax relief. (Example: Big Stone II project in SD)
 - Incentive return on equity. (Example: Energy conservation investments in MN)

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ISEPA Transition Goals

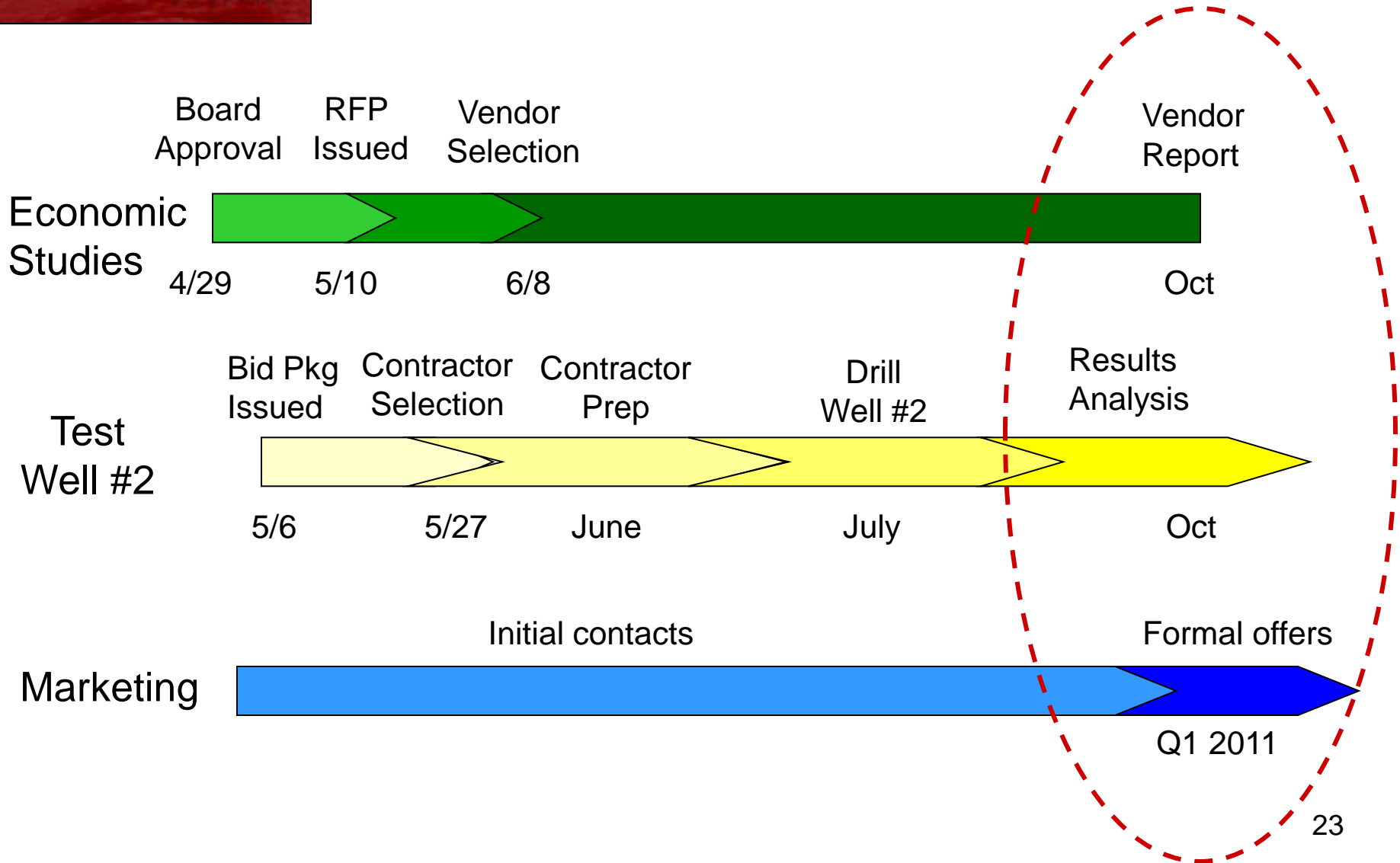
- Establish a process by which current ISEPA members will determine their respective shares of the project going forward.
 - And thereby establish ISEPA's share of project.
- Establish a process by which additional participants can be added.

Opportunities for New Project Participants

- Become a project participant/owner
- Provide compression energy
 - Weeknights
 - Weekends

Goal: The ultimate wind/gas combo resource.

Timelines



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What's Next

- ISEPA members' transition agreement (October)
- Results of test drilling (October)
- Results of economics studies (October)
- MISO Interconnection Request (completed in September)
- ISEPA members declare their MW participation (Early 2011)
- Offer to New Participants (Early 2011)
- Project Participation Agreement (Early 2011)
 - Development
 - Construction
 - Operations

Questions?

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