



# Study of Dispersed Generation Potential

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## Phase 1 Update

**Mike Bull, Deputy Director  
MN Office of Energy Security**

**Path to Community Wind  
Marshall, MN  
April 4, 2008**





# DG Study Phase 1 Update Overview

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- **Introduction**
- **DG Study requirements**
- **DG Study update - Jared Alholinna**
- **Legislative update**
- **Regulatory update**
- **Q&A**



# DG Study Phase 1 Update

## DG Study requirements

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**Analyze transmission impacts of 1200 MW  
of new dispersed generation distributed  
statewide**

### **Two phases**

- **Study Phase I: 600 MW**
  - Report by OES due June 2008
- **Study Phase II: 600 MW**
  - Report by OES due September 2009



# DG Study Phase 1 Update

## DG Study requirements

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- **MN Utilities and MISO are doing the analytical work**
- **A DOC-appointed Technical Review Committee (TRC) review methods and results**



# DG Study Phase 1 Update Technical Review Committee

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- **TRC members:**
  - Individuals with experience & expertise in electric transmission system engineering, renewable energy generation technology, & dispersed generation
- **TRC duties:**
  - Oversee technical analyses & make recommendations regarding proposed methods & assumptions
  - Review drafts and make recommendations



# **DG Study Phase 1 Update Technical Review Committee**

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- **American Wind Energy Association**
- **Community-Based Energy Development Initiative**
- **Great River Energy**
- **Mid-Continent Area Power Pool**
- **Midwest Independent System Operator**
- **Minnesota Chamber of Commerce**
- **Minnesota Department of Commerce**
- **Minnesota Power**
- **Missouri River Energy Services**
- **National Renewable Energy Laboratory**
- **Otter Tail Power Company**
- **Southern Minnesota Municipal Power Agency**
- **Utility Wind Integration Group**
- **Wind on the Wires**
- **Windustry**
- **Xcel Energy**



# Dispersed Renewable Generation Study

Presented by:  
Jared Alholinna  
Great River Energy

Public Meeting  
Marshall, MN

April 4, 2008



# DRG Legislation

## (Next Generation Energy Act of 2007)

### Sec. 17. **STATEWIDE STUDY OF DISPERSED GENERATION POTENTIAL.**

Subdivision 1. **Definition.** "Dispersed generation" means an electric generation project with a generating capacity **between ten and 40** megawatts that utilizes an "**eligible energy technology,**" ....

Subd. 2. **Study participants.** **Each electric utility subject to Minnesota Statutes, section 216B.1691, must participate** collaboratively in conducting a two-phase study of the potential for dispersed generation projects that can be developed in Minnesota.



# DRG Legislation - Continued

Subd. 3. **First phase study content; report.** In the first phase of the study, participants must analyze the impacts of the addition of a total of **600 megawatts** of new dispersed generation projects distributed among the following Minnesota electric transmission planning zones: the Northeast zone, the Northwest zone, the Southeast zone, the Southwest zone, and the West-Central zone.

Study participants must use a **generally accepted 2010 year transmission system model** including all transmission facilities expected to be operating in 2010.

The study must take into consideration regional projected load growth, planned changes in the bulk transmission network, and the long-range transmission conceptual plan being developed under Laws 2007, chapter 3, section 2.





# DRG Legislation - Continued

In determining locations for the installation of dispersed generation projects that consist of [wind energy conversion systems](#), the study should consider, at a minimum, [wind resource availability](#), [existing and contracted wind projects](#), and [current dispersed generation projects](#) in the Midwest

Independent System Operator interconnection queue.

The study must [analyze the impacts of individual projects and all projects in aggregate](#) on the transmission system, and [identify specific modifications](#) to the transmission system necessary to remedy any problems caused by the installation of dispersed generation projects, including [cost estimates for the modifications](#).

The study must analyze the additional dispersed generation projects [connected at the lowest voltage level](#) transmission that exists in the vicinity of the projected generation sites.

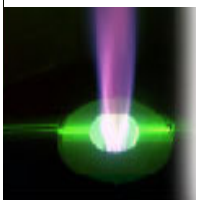
A preliminary analysis to identify transmission system problems must be conducted with the projects installed at initially selected locations.



# DRG Legislation - Continued

The technical review committee may, after reviewing the locations selected for installation, recommend moving the installation sites once to new locations to reduce undesirable transmission system impacts.

The commissioner of commerce must submit a report containing the [findings](#) and [recommendations](#) of the first phase of the study to the commission no later than [June 15, 2008](#).





# DRG Legislation - Continued

Subd. 5. **Technical review committee.** Prior to the start of the first phase of the study, the commissioner of commerce must appoint a technical review committee consisting of between ten and 15 individuals with experience and expertise in electric transmission system engineering, renewable energy generation technology, and dispersed generation project development, including representatives from the federal Department of Energy, the Midwest Independent System Operator, and stakeholder interests.

The technical review committee **must oversee both phases** of the study, and must:

- (1) make recommendations to the utilities regarding the **proposed methods and assumptions** to be used in the technical study;
- (2) in conjunction with the appropriate utilities, **hold public meetings** on each phase of the study in each electricity transmission planning zone prior to the **beginning of each phase** of study, **after the impact analysis is completed**, and **when a draft final report** is available;



# DRG Legislation - Continued

The technical review committee must oversee both phases of the study, and must:

(3) establish procedures for handling **commercially sensitive information**; and

(4) **review** the **initial** and **final drafts** of the study and **make recommendations** for improvement, including problems associated with the interconnections among utility systems that may be amenable to solution through cooperation between the utilities in each zone.

During each phase of the study, the technical review committee may recommend that the installation of dispersed generation projects be moved to new locations that cause fewer undesirable transmission system impacts.



# TRC Meetings

- October 2, 2007
- December 19, 2007
- February 20, 2008

## Future

- April 10, 2008 (Conf. Call)
- April 30, 2006

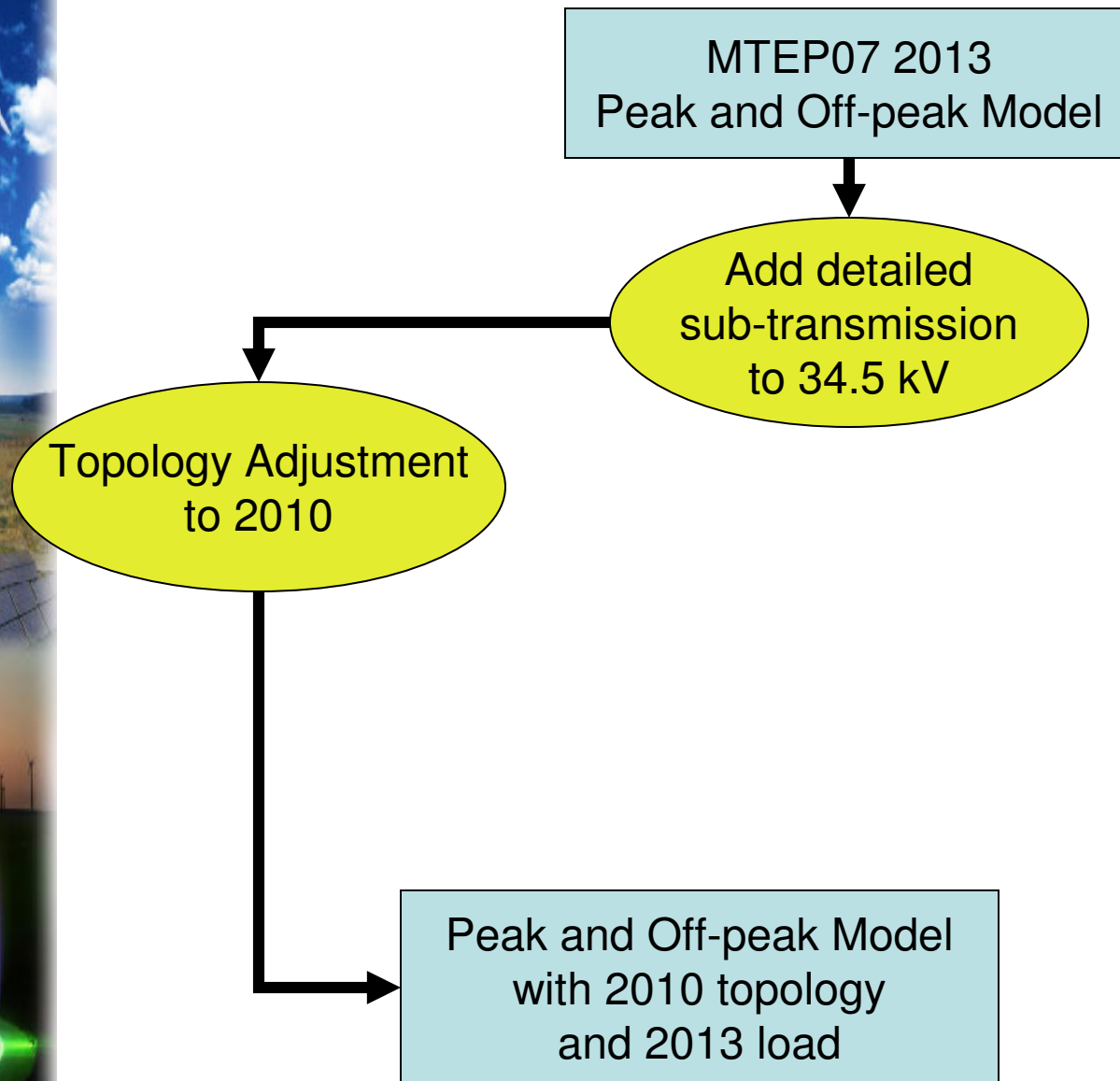


# Transmission Modeling

## MTEP07, 2013 Summer Peak and Off-Peak models

- Integrated GRE-LRP transmission model detail
- Removed Line/Facilities which will not be in-service before or during 2010.
- Gather additional detail from Minnesota utilities
  - Added Lower Voltage Lines (34.5 kV, 41.6 kV, 46 kV)
  - Moved loads from higher voltage to lower voltage buses

# Model Development





# Substation Information

- Wind Profile Information

- Started with existing high level transmission map
- Added sub-transmission detail to map
- Located sub-transmission substations based on known GIS map data and utility one-line diagrams

- Distribution Transformer Information

- Requested data from Minnesota utilities

# Summary of Substation Information

Planning Zone	Buses	Loads	Queued Gen.	Dispersed Gen.
NE	677	2445 1790	1614	30 (1)
NW	457	1093 712	1443	20 (1)
WC	470	2033 1376	8825	337 (16)
SW	265	660 497	5399	367 (15)
SE	400	2003 1564	9617	58 (3)

Presently in MS Excel Spreadsheet format  
and  
MS Access Database format





# Site Screening Approaches

- Analytical
- Engineering Judgment
- Public Input
- TRC Input

# Screening Methodology/Criteria

- The Screening Methodology and the Criteria have been changed several times in response to TRC comments.
  - Utilized DC Analysis to select DRG Short List sites
  - Selected lower-voltage generation study sites
  - Screen promising sites further by wind profile
  - Divided sites equally among planning zones
  - Added Biomass site to Short List



# Analysis

- **Steady-state analysis**

- Individual site
- Planning zone
- State wide

- **Stability analysis**

- Aggregate
- Utilize existing regional stability model
- Need to model new generation on high side buses





# Key Results Will Include:

- Per scenario
  - Limiting element
  - Proposed system improvement
  - Estimated cost
    - Previously identified in a Construction Work Plan
    - New project
- Identify common system upgrades for various combinations of sites
- Qualitative discussion of distribution system issues



# DRG Schedule

## Phase I – First 600 MW

- Report due to MN PUC no later than **June 15, 2008**

## Phase II – Second 600 MW

- Report due to MN PUC no later than **September 15, 2009**



# DG Study Phase 1 Update

## Legislative update

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- **Minimal changes to CBED**
  - OES made a comprehensive proposal to CBED Advisory Task Force
  - Increase incentives for CBED projects, provide for standardized contracts, facilitate distribution interconnection
- **MicroEnergy Loan proposal**
  - \$20 million to help with capital costs of installing small wind, solar thermal & PV, geothermal, biogas and microhydro projects



# DG Study Phase 1 Update Legislative Update, cont.

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- **Solar initiatives**
  - **Sailer/Doll: Allow solar installations as conservation improvements**
  - **Brynaert/Rummel: Provide for small solar carve-out for the RES**
- **Wind turbine purchase aggregation**
  - **Juhnke/Kubly: Provide \$100,000 annually to fund turbine purchase aggregation as part of Rural Wind Development Assistance Project**



# DG Study Phase 1 Update Legislative Update, cont.

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- **Feed-in tariff**
  - Bly: Statutorily set minimum rates for distributed renewable resources
- **Climate initiatives**
  - Knuth/Anderson: Cap & Trade guidelines & studies
  - Hortman/Marty: California automobile emissions regulations
  - Hilty/Prettner-Solon: Greenhouse gas emissions progress report

# DG Study Phase 1 Update

## Regulatory update

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- **Renewable Energy RFP's**
  - **Research & dev't: \$2.2 million**
    - Closed; grants awarded by end of April
  - **On-farm biogas: \$500,000**
    - Open; grants awarded by end of May
  - **NextGen demonstration: \$3 million**
    - Not yet open, but applications will be due by mid-May



# DG Study Phase 1 Update Regulatory update, cont.

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- **MISO queue reform**
  - Tariff filing expected at FERC in April
  - Milestone-based approach
- **PUC wind permitting**
  - January order established general permit standards for siting projects
  - 2007 legislation allowed counties to opt-in to site projects under 25 MW



# DG Study Phase 1 Update

## Regulatory update, cont.

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- **Xcel Renewable Development Plan**
  - Needs 2,600 MW of wind by 2020, in addition to 1,300 expected by end of 2008
  - Of this 3,900 MW: 1/3 Xcel; 1/3 CBED, 1/3 Other
- **Renewable energy zones & transmission corridors**
  - OES is interested in building on the results of the DG study & RES transmission plans
  - Work to develop a least-delivered-cost plan



# **DG Study Phase 1 Update**

## **Thank you!**

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### **Questions & Contact info**

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