Presentation by

Don Martin

Dakota Wind Transmission Study Meeting

Jan 19, 2005

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1/17/2005

Dakota Wind Transmission Study – Task 1

- Analyze non-firm transmission potential for new wind generation
  - Develop wind generation estimates
  - Transmission constraint evaluation
  - Sensitivities to hydro generation and load

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Dakota Wind Transmission Study – Task 1

- **Develop wind generation estimates**

  (See Handout on AWS Truewind proposed method)

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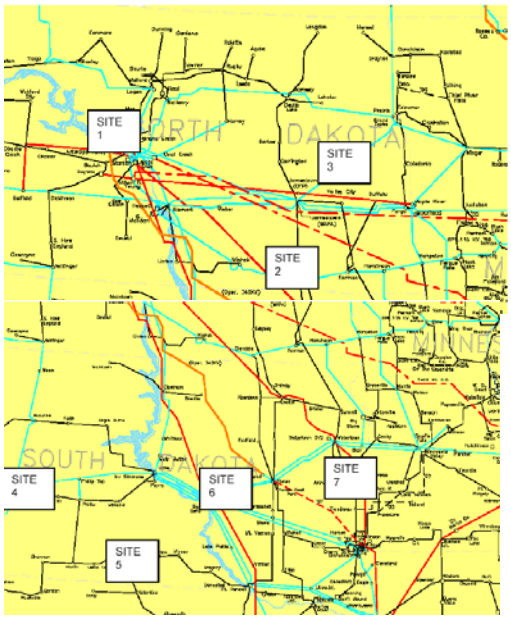
Dakota Wind Transmission Study – Task 1



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Dakota Wind Transmission Study – Task 1

- **Transmission constraint evaluation**
  - **Benchmark Gridview with 2003 system data**
  - **Add wind generation at each site**
    - Each site individually at 500 MW
    - 50 MW at each site simultaneously
  - **Evaluate transmission constraints with new wind generation**
  - **Rerun with higher hydro generation and higher loads for sensitivity analysis**

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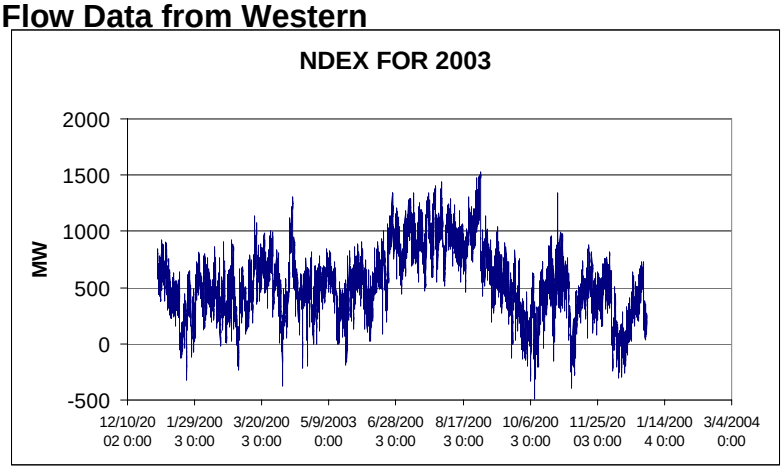
Dakota Wind Transmission Study – Task 1

- **Flow Data from Western**



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Dakota Wind Transmission Study – Task 1

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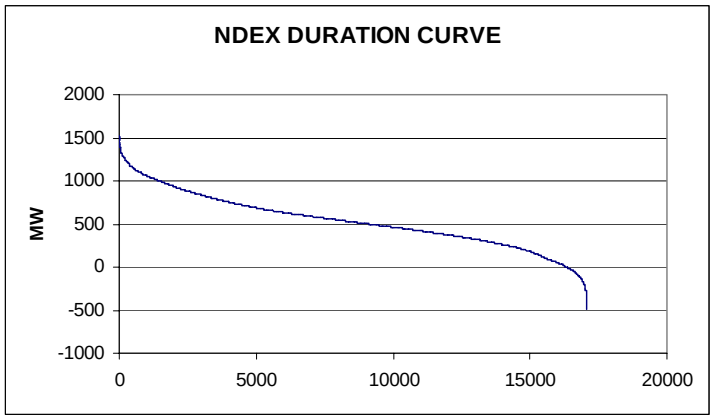

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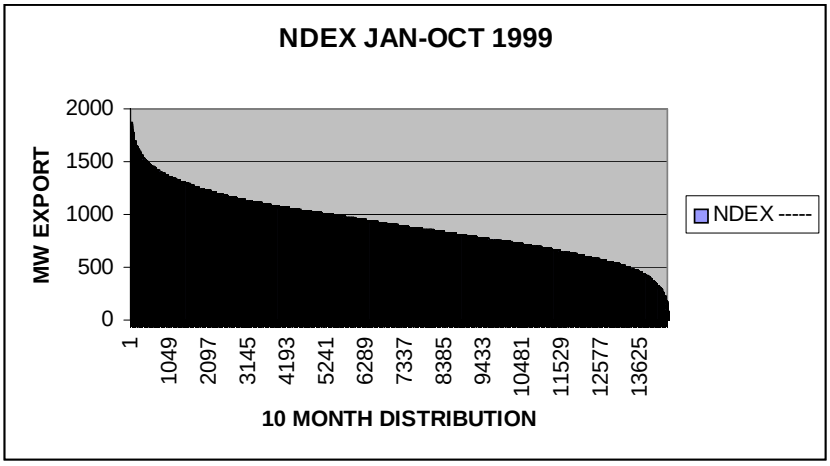
Dakota Wind Transmission Study – Task 1

- **Comparison to previous year**



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Dakota Wind Transmission Study – Task 1

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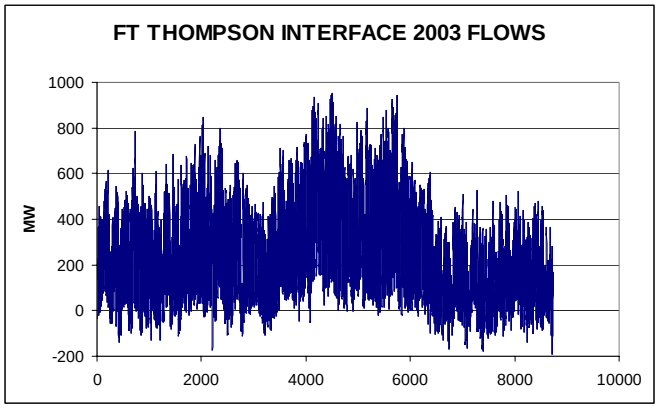

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Dakota Wind Transmission Study – Task 1

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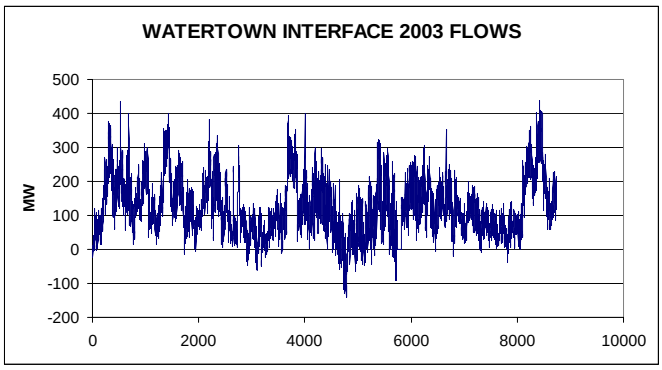

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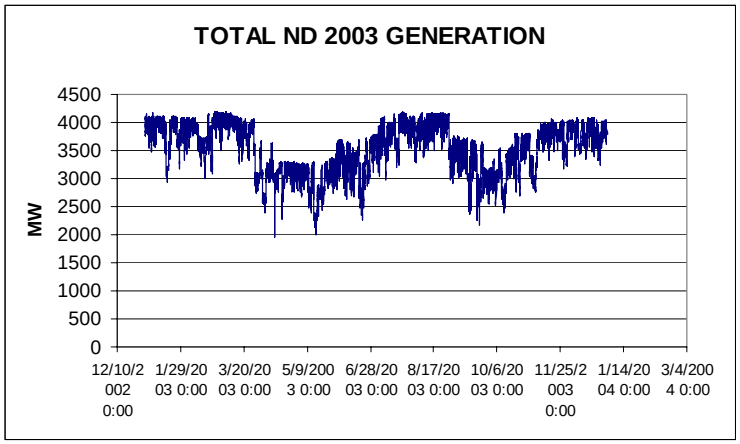
Dakota Wind Transmission Study – Task 1

- **Generator Data from Western**



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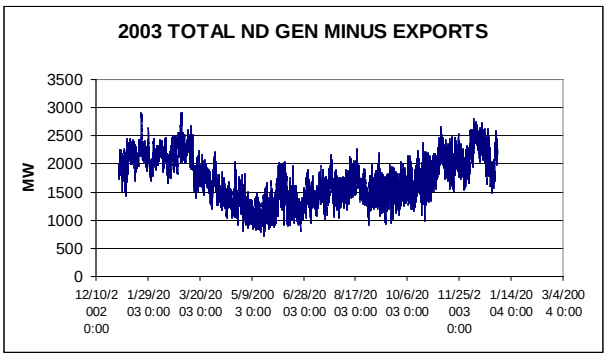
Dakota Wind Transmission Study – Task 1

- **ND Generation minus Transfers of NDEX, CU, & Sq Butte**



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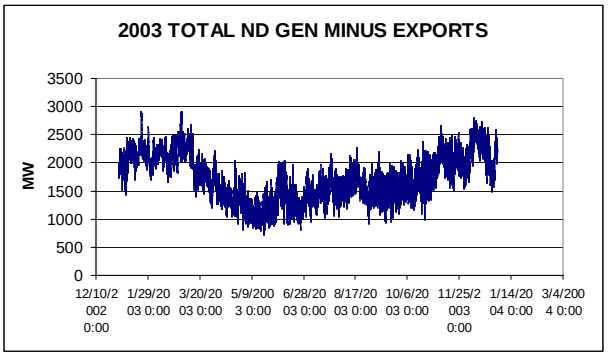
Dakota Wind Transmission Study – Task 1

- **ND Generation minus Transfers of NDEX, CU, & Sq Butte**



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Dakota Wind Transmission Study – Task 2

Transmission Enhancements For Steady-State Improvements

- **Add conventional series capacitors**
- **Add phase shifting transformers**
- **Re-conductor transmission lines**
- **Dynamic transmission line ratings**

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Dakota Wind Transmission Study – Task 2

Transmission Enhancements For Steady-State Improvements

- **Add conventional series capacitors**
- **Add controllable series capacitors**
- **Add SVCs or STATCOMs (They provide the same benefits)**
- **Add phase shifting transformers**

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Dakota Wind Transmission Study – Task 3

- **Interconnection Studies**
  - **7 Sites**
  - **Start at 500 MW (except Site 5)**
  - **Studies will include:**

    Powerflow

    Short Circuit

    Local Stability

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Dakota Wind Transmission Study – Task 4

- Analyze Transfer Capability with New Wind
  - Use PTI's MUST
  - Determine Constraints
  - Evaluate stability transfer limits

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Dakota Wind Transmission Study

- DATA REQUIREMENTS
  - Powerflow base case for Interconnection Studies
  - Powerflow base case for Transfer Capability Studies
  - Stability data for each powerflow case
  - Hydro hourly generation for wet years

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Dakota Wind Transmission Study

- **SCHEDULE**
  - **Received line power transfers for 2003 on December 13, 2004**
  - **Assumptions, methods, & models identified by January 6, 2005**
  - **Task 1.2 complete December 31, 2004**
  - **First Meeting on Assumptions and Methods, January 19, 2005**
  - **Task 1.1 data available February 15, 2005**
  - **Complete simulations for Task 1.3 March 15, 2005**
  - **Complete Task 2 initial analysis February 20, 2005**
  - **Tasks 1 – 2 Results -- due date -- March 15,2005**
  - **Complete Task 3, May 1, 2005**
  - **Complete Task 4, May 10, 2005**
  - **Tasks 3 – 4 Results -- due date -- May 17, 2005**
  - **Draft Report Tasks 1-2 -- due date -- July 15, 2005**
  - **Draft Report Tasks 3-4 -- due date -- August 12, 2005**
  - **Final Report – due date – September 23, 2005**

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