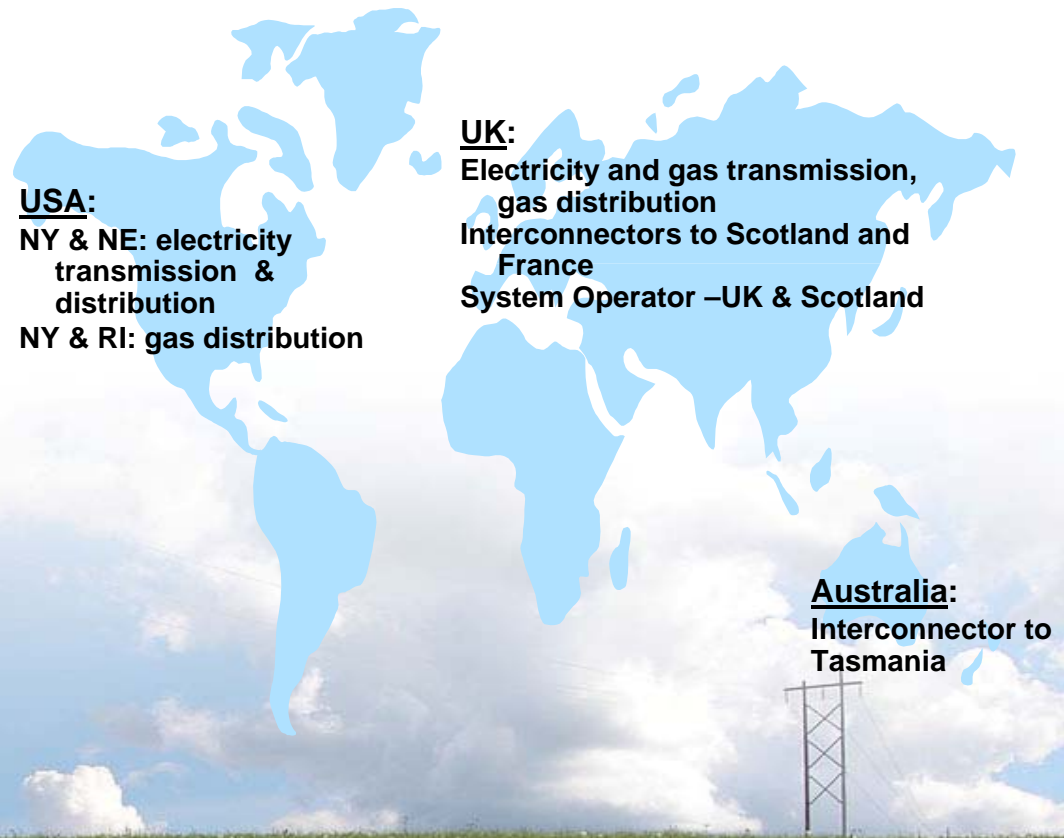




# Introduction to National Grid

- ◆ One of the world's largest investor owned utilities
  - ◆ Market cap of \$30 billion
  - ◆ Internationally recognized for outstanding corporate performance
- ◆ One of the 10 largest utilities in the US
  - ◆ 3.7 million electric and gas customers in New England and New York
- ◆ Clear business focus:
  - ◆ Develop, own, and operate premier energy delivery networks



# Transmission and Wind Energy

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- ◆ Objective of the wind white paper:

***To recognize the increasing public and regulatory attention on new cleaner sources of energy, such as wind energy, and to explain how transmission system changes will be required to accommodate these new technologies***



# Presentation Agenda

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## Driving Trends for Renewable / Wind Energy

### 1. Challenges of Wind Power

1. Reliable and Sustainable Wind Operation
2. Getting Interconnected

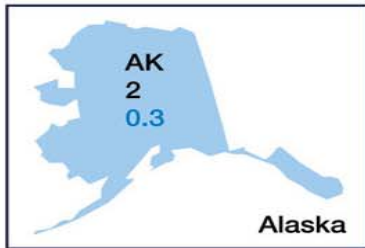
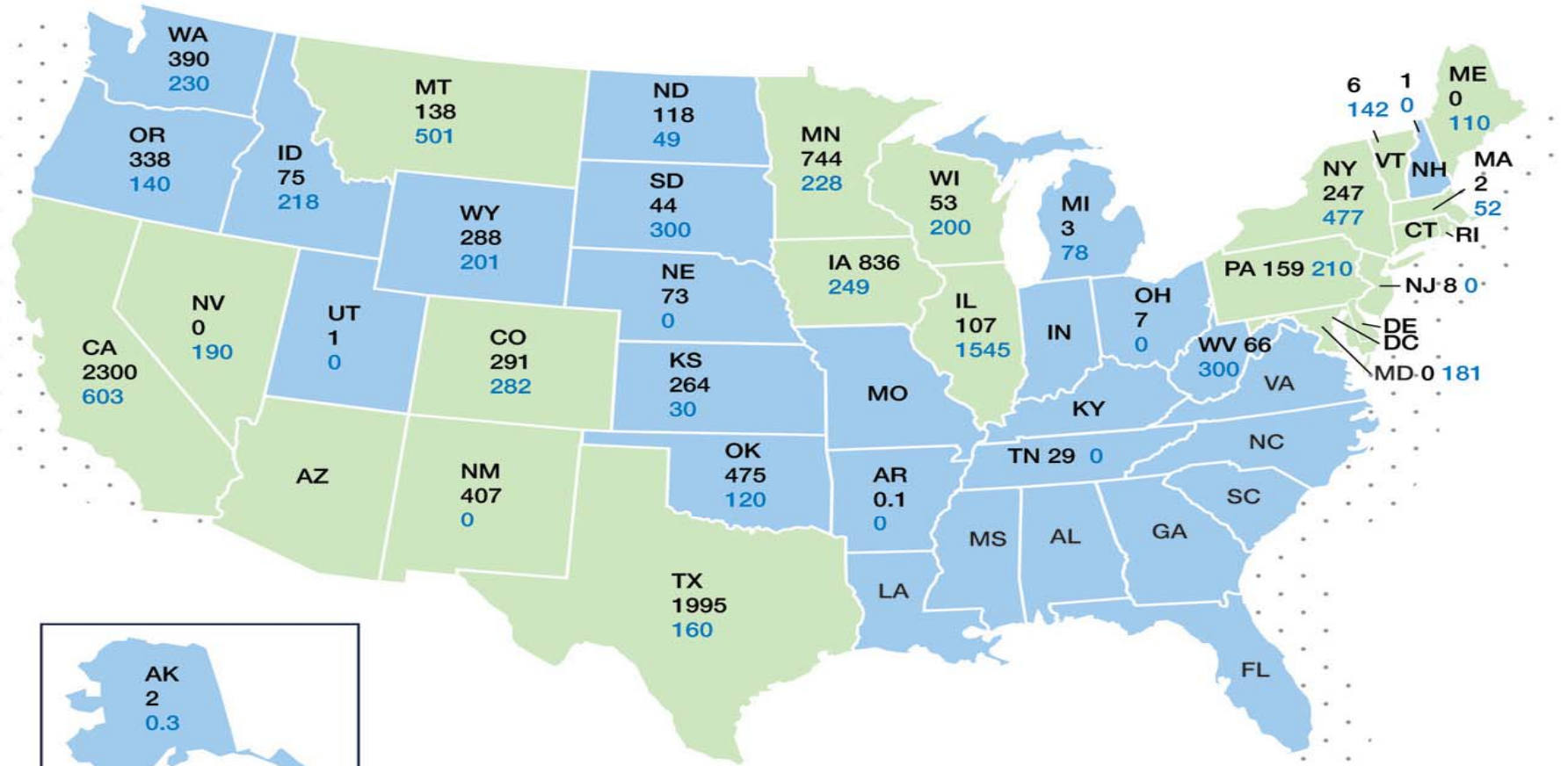
### 2. Need for Effective Regional Planning and Effective Transmission Policies

1. Problems with Existing US Transmission Planning
2. Achieving Effective Regional Planning
3. Key Considerations for Renewable
4. Incentives for Transmission Investment and Independence

### 3. National Grid Wind Interconnection Studies by Region

### 4. Q & A – Link to paper

# US Wind Energy - May 2006



Alaska



Hawaii

- States with Renewable Portfolio Standards (RPS)
- States without RPS
- Offshore Wind Areas
- Wind Energy Capacity Installed (MW)
- Planned Wind Capacity (MW)

Note: Wind data not available for some states



# Wind Penetration – High Level Examples

## Penetration of Wind Resources 2005

	Peak Load	Installed Wind	Penetration
Denmark (West)	4 GW	2.4 GW	60%
Germany	81 GW	18.5 GW	23%
Spain	41 GW	10.0 GW	24%
USA	760 GW	9.5 GW	1.25%
California	45 GW	2.3 GW	5.1%
Texas	60 GW	2.0 GW	3.3%

# Driving Trends

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## ◆ Regulatory and Policy

- ◆ Desire for cleaner, diversified sources of energy
  - ◆ Reliability and Economic consequences of over-relying on fossil fuel types of energy
  - ◆ State Renewable Portfolio Standards (RPS)
  - ◆ Federal PTC of 1.9 cent/KWh for first 10 years

## ◆ Industry

- ◆ Advances in Technology
  - ◆ Costs dropped by more than 80% in the last two decades. (i.e., from 15-20 cents to 4-6 cents)

## ◆ Consumer Interests

- ◆ Cost competitiveness is shifting interest to wind power

# Operational / Market Concerns

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## ◆ Intermittency

- ◆ Wind needs to be backed with dispatchable generation
- ◆ However, cost of back-up power is low with 10-20% penetration

## ◆ Wind Forecasting

- ◆ Forecasting has not been accurate
- ◆ However, improved forecasting methods able to reduce overall system reserve costs

## ◆ Imbalance Charges

- ◆ Current imbalance charges seen as punitive for wind
- ◆ Should be based on actual costs



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# So What is Stopping Wind Development???



# Major Challenge

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- ◆ **Transmission Interconnection Issues**
  - ◆ Inadequate Transmission Infrastructure
  - ◆ Wind Source Remoteness
  - ◆ Micrositing
  - ◆ Issues with Interconnection Process & Queue
    - ◆ Project-by-Project Approach
  - ◆ Deliverability



# Major Challenge Cont'd

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- ◆ **Transmission Planning Issues**
  - ◆ Transmission needs to be recognized as a market enabler, not a market product
  - ◆ Not geared to comprehensive regional needs
    - ◆ Too narrowly focused on minimum reliability requirements
    - ◆ Does not address economic needs, or locations of future generation
    - ◆ Not facilitate long transmission lead times
- ◆ **Lessons from Abroad (Denmark & UK)**
  - ◆ Closer to home (Texas & Alberta)

# Need for Effective Regional Planning

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- ◆ **Critical Components of effective planning**
  - ◆ Sufficient geographic scope
  - ◆ Open and transparent process
  - ◆ Independent entity
  - ◆ Comprehensive planning criteria, addressing both reliability and economic needs
  - ◆ Authorization for construction
  - ◆ Clear up-front repeatable cost allocation that recognize broad benefits of transmission

# Key Considerations for Renewables

(And other remote sources of energy)

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- ◆ Renewable Trunk Lines
- ◆ Taking into account state RPS programs in comprehensive transmission planning
- ◆ Cooperation Among States





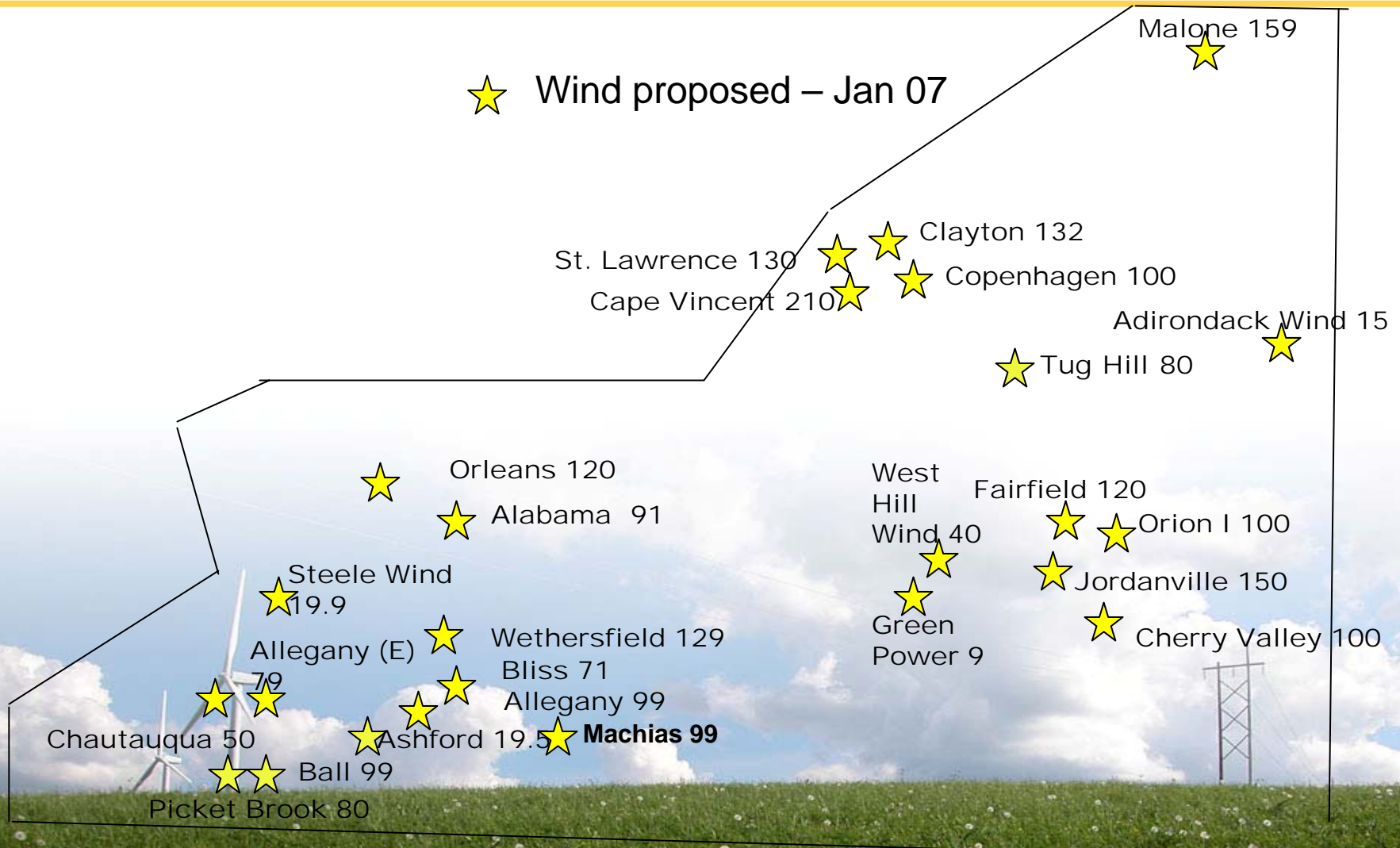
# National Grid Interconnection Studies by Region

*Jan 2007*

- ◆ **New England – 2 Projects (75MW)**
  - ◆ MA – Hoosac Wind, Florida
  - ◆ VT – Deerfield Wind, Searsburg
  
- ◆ **New York**
  - ◆ Already existing: 400+ MW
  - ◆ Planned: 24 Projects (2,300MW) – Map Attached



# National Grid Location of NY Wind Projects



Date 02/10/06

# Questions?

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- ◆ **National Grid white paper can be found at:**  
**[http://www.nationalgridus.com/non\\_html/c3-3\\_NG\\_wind\\_policy.pdf](http://www.nationalgridus.com/non_html/c3-3_NG_wind_policy.pdf)**

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