Delivery of a Nebraska Commodity to the US Market.

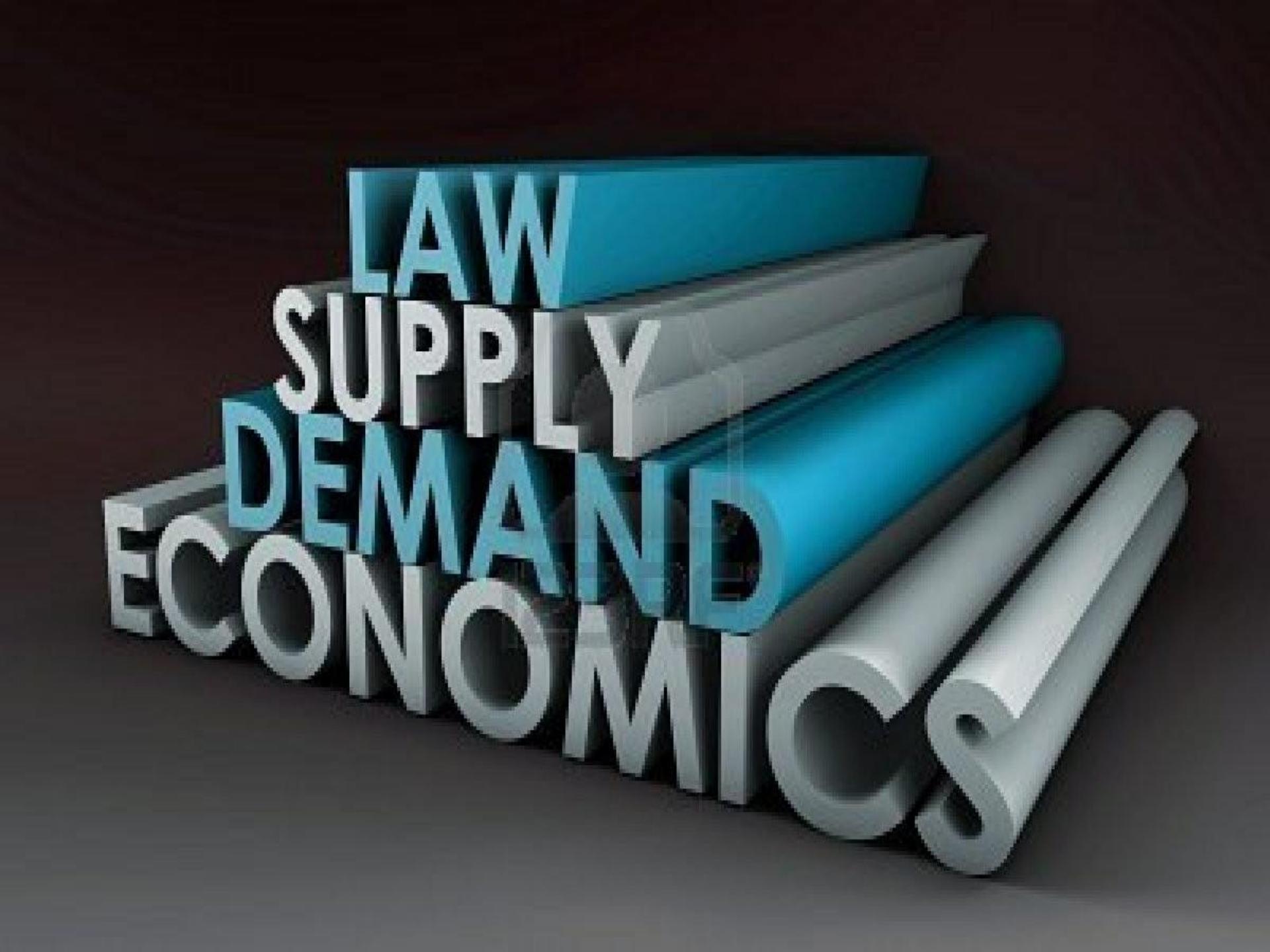
Roads, Rails and Transmission

Steve Gaw
The Wind Coalition

The Wind Coalition

The Wind Coalition

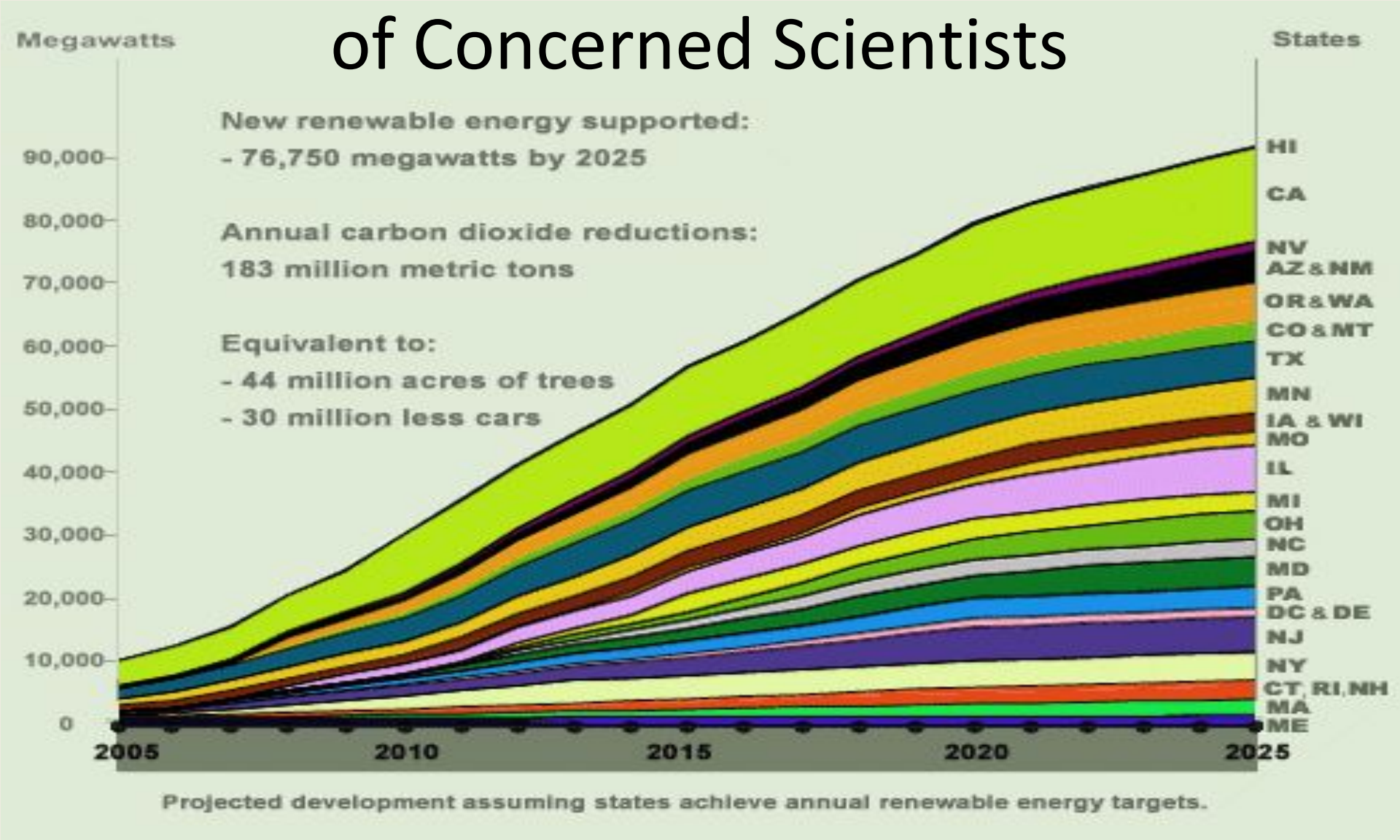
- Acciona; Apex Wind; ENEL; EnXco(EDF-R);
- Infinity Wind; Pattern Energy; TradeWind
- Energy;
- AES Wind; Blattner Energy (Blattner); BP;
  Clean Line Energy; Clipper (CPV; Duke)
- E.On (Airtricity); Edison Mission;
- EDPR (Horizon); Exelon; Gamesa; GE Wind Energy;
- Iberdrola (PPM); Invenergy; Novus (Great Plains)
- RES (Renewable Energy Systems); Third Planet;
- Vestas; Zephyr Wind Power (MAP Royalty);
- Stahl, Bernal & Davies LLP; Electric Power Engineers;
- TREIA; Environmental Defense Fund; AWEA; Public Citizen.


LAW
SUPPLY
DEMAND
ECONOMICS

Demand

Majority of States Have Established Long-Term Renewable Electricity Standards

STATE RES Estimated DEMAND-Union of Concerned Scientists



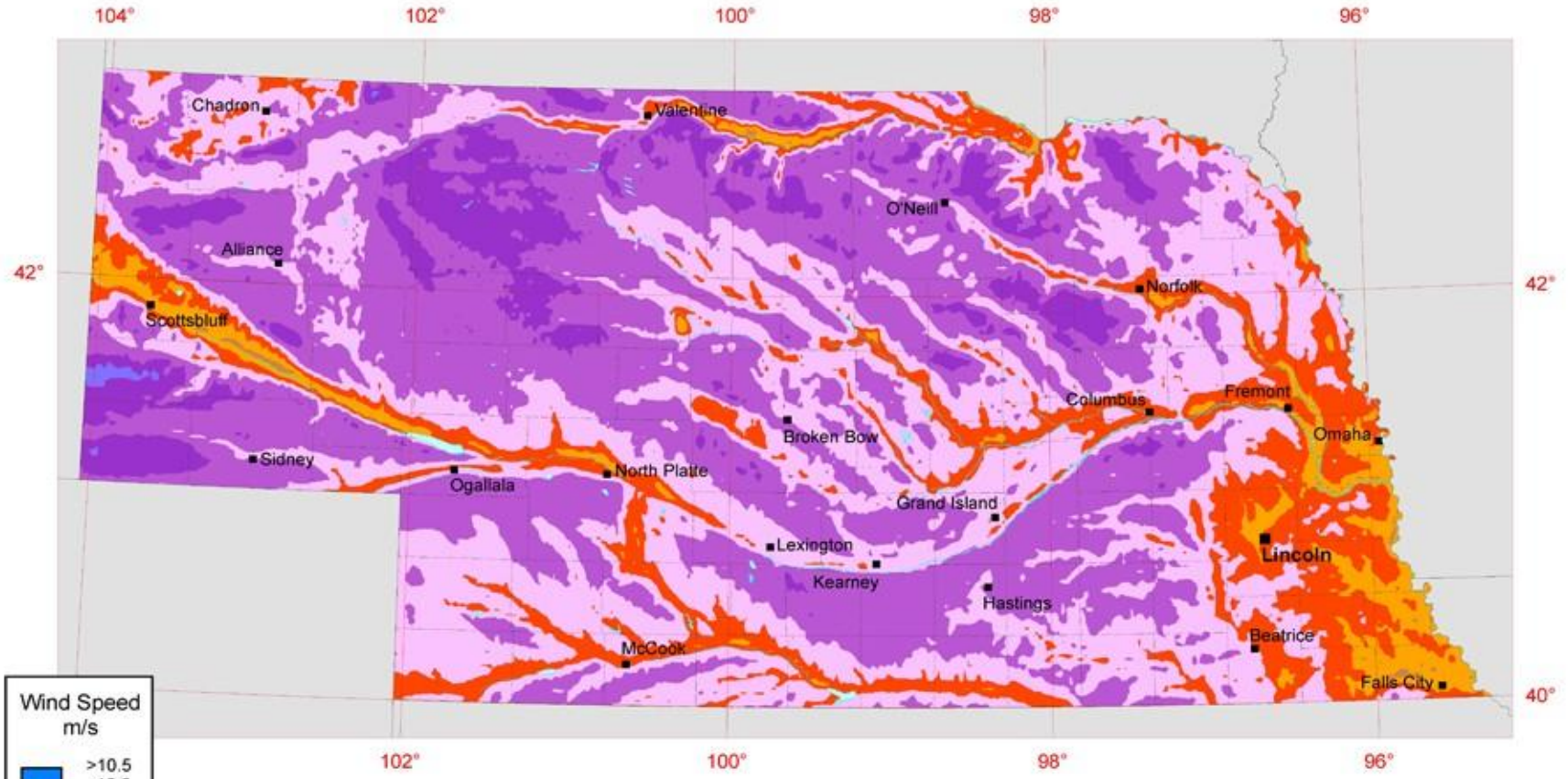
Projected development assuming states achieve annual renewable energy targets.

Additional Demand

- Hedging Uncertainty
  - Fuel Prices
  - Fuel Transportation Cost
  - Diversity
- Environmental Issues
  - Cross State Air Pollution Rule
  - Mercury and Air Toxics Standards
  - Water Use

Supply

Nebraska - Annual Average Wind Speed at 80 m



Wind Speed m/s

>10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
< 4.0

Source: Wind resource estimates developed by AWS Truepower, LLC for windNavigator®. Web: http://www.windnavigator.com | http://www.awstruepower.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 14 WGS84.

50 0 50 100 150 200 Kilometers

50 0 50 100 Miles

AWS Truepower™
Where science delivers performance.

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

30-SEP-2010 1.1.1

Wind Status in Nebraska

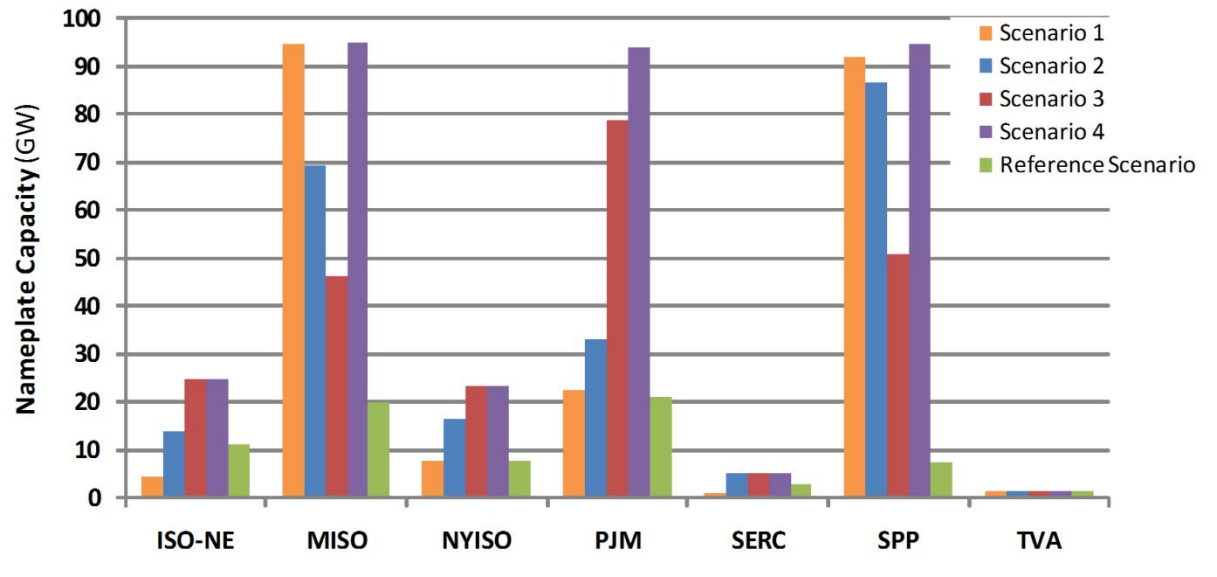
- Currently online: 457 megawatts (MW)
- Added in 2012: 120 MW
- Added in 2011: 125 MW
- Added in 2010: 60 MW

Nebraska Wind Resources

- State potential wind resource:
  - Capacity: 917,998.7 MW
  - Energy:3,540,370 GWh annually at 80 meters hub heights (NREL/AWS Truepower Study)
- Nebraska's wind resource is ranked **3rd** in the
- US. According to a resource assessment from the National Renewable Energy Lab, Nebraska's wind resource could provide over a hundred times the state's current electricity needs.

Regional Wind Penetration by Scenario

- Very high penetrations in SPP and MISO for all scenarios
- Atlantic off-shore amount increases substantially in S3 & S4.
- Installed wind generation capacity
  - 20% ≈ 230 GW
  - 30% ≈ 330 GW



Capacity Factor Comparisons:

Scenarios

	East	West
Scenario 1	33%	40%
Scenario 2	34%	40%
Scenario 3	36%	39%
Scenario 4	36%	40%

Entire Database

	Land Only	W/offshore
West	38%	
East	31%	36%
East + PJM	30%	36%

West = MISO + SPP
East = ISO-NE + NYISO

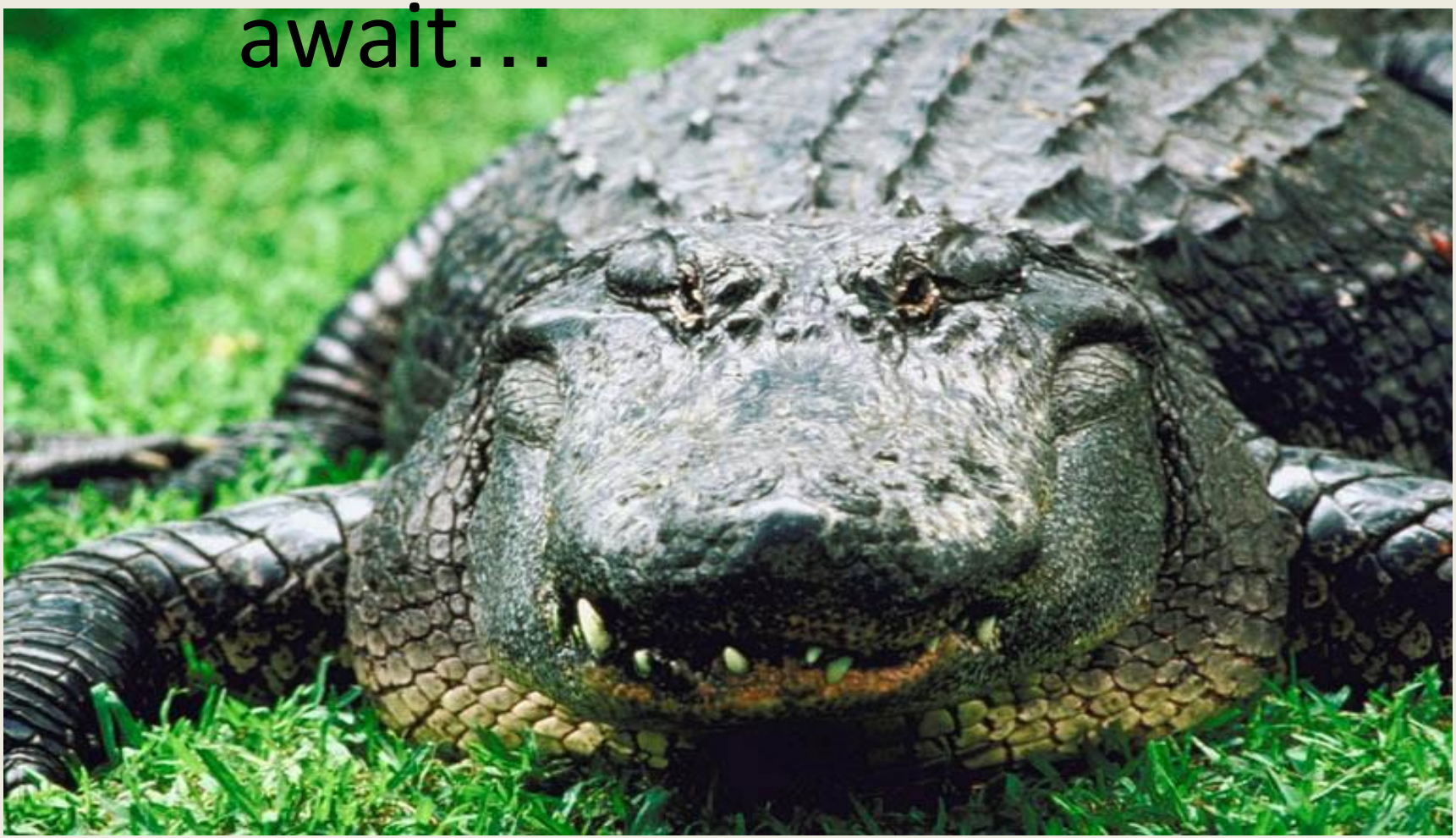
Obstacles to wind development in Nebraska

Challenges for Nebraska Wind Development

- Risk for private development
- Demand for homegrown renewable energy in Nebraska
- Tax issues
- Transmission

Through the efforts of a few working together

Other challenges await…



Transportation is critical to market success

Roads to Market: Transmission

Transmission Barriers

- COST ALLOCATION
  - No mechanism for dividing costs up fairly among those who benefit
  - No cost allocation for economic or policy driven projects
- PLANNING
  - Planning was piecemeal and inefficient
  - Good projects were not being built

Highways and Markets

Building Transmission

TRANSMISSION CHALLENGES

THE SPP SOLUTION

INTEGRATED TRANSMISSION PLANNING

Highway/Byway Cost Allocation

Voltage	Paid for by Region	Paid for by Local Zone
300 kV and above	100%	0%
above 100 kV and below 300 kV	33%	67%
100 kV and below	0%	100%

24

SPP: After Passage of ITP and Highway/Byway

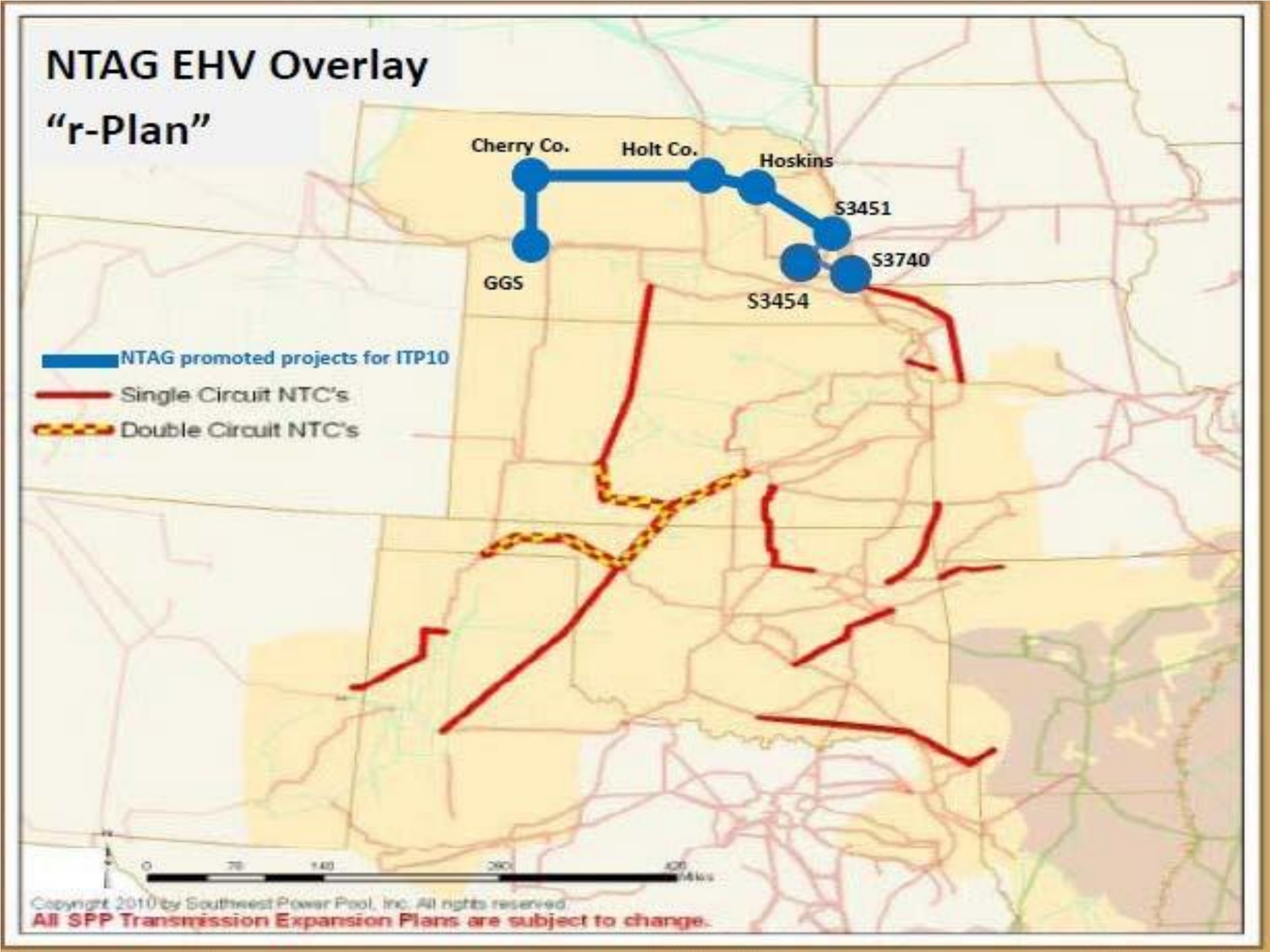
- $7 Billion in new notices to construct transmission have been issued
- New market startup in 2014
- New Wind Resources are being modeled in every future within the Integrated Transmission Planning process

SPP

NEBRASKA TRANSMISSION NEEDS

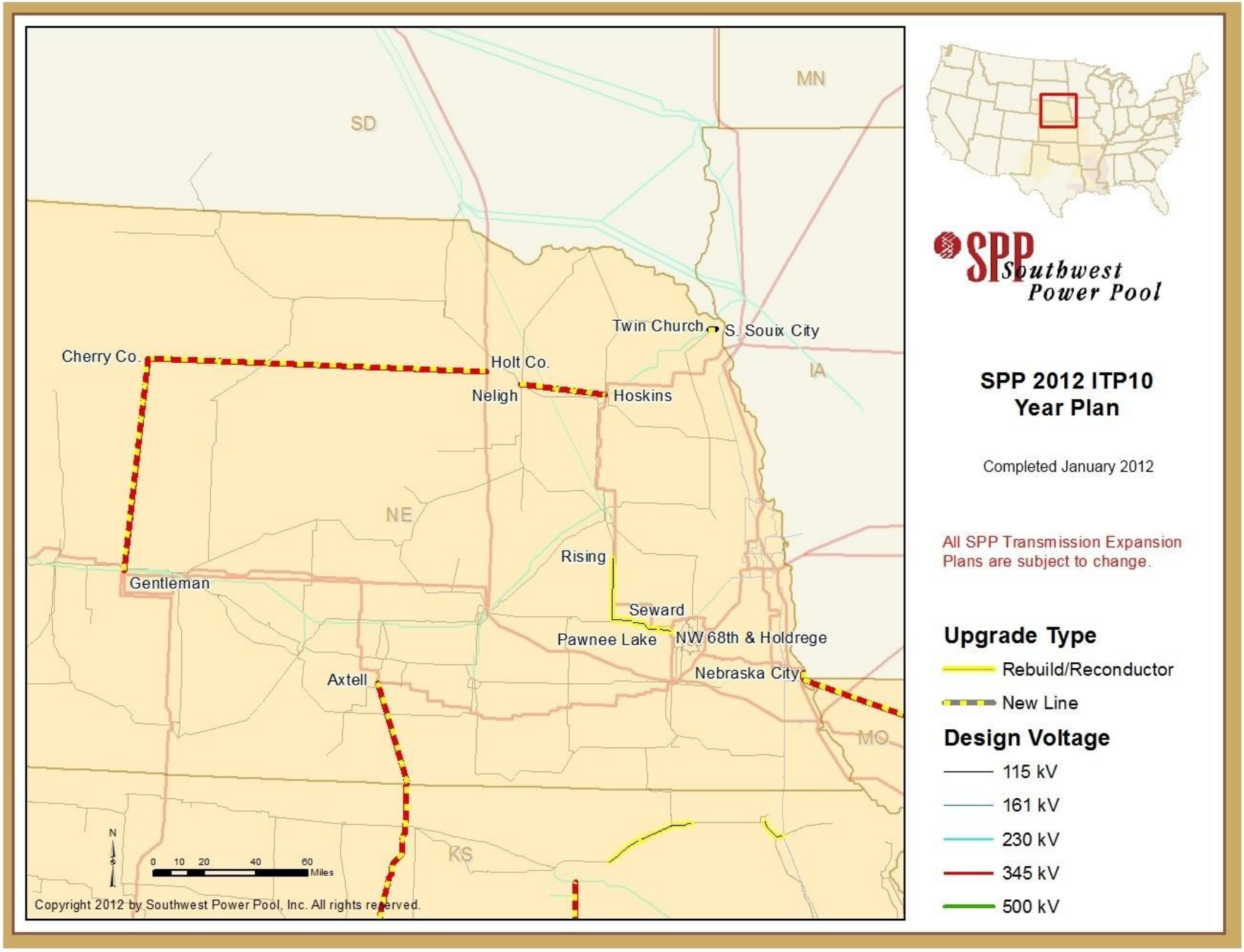
NTAG EHV Overlay

"r-Plan"

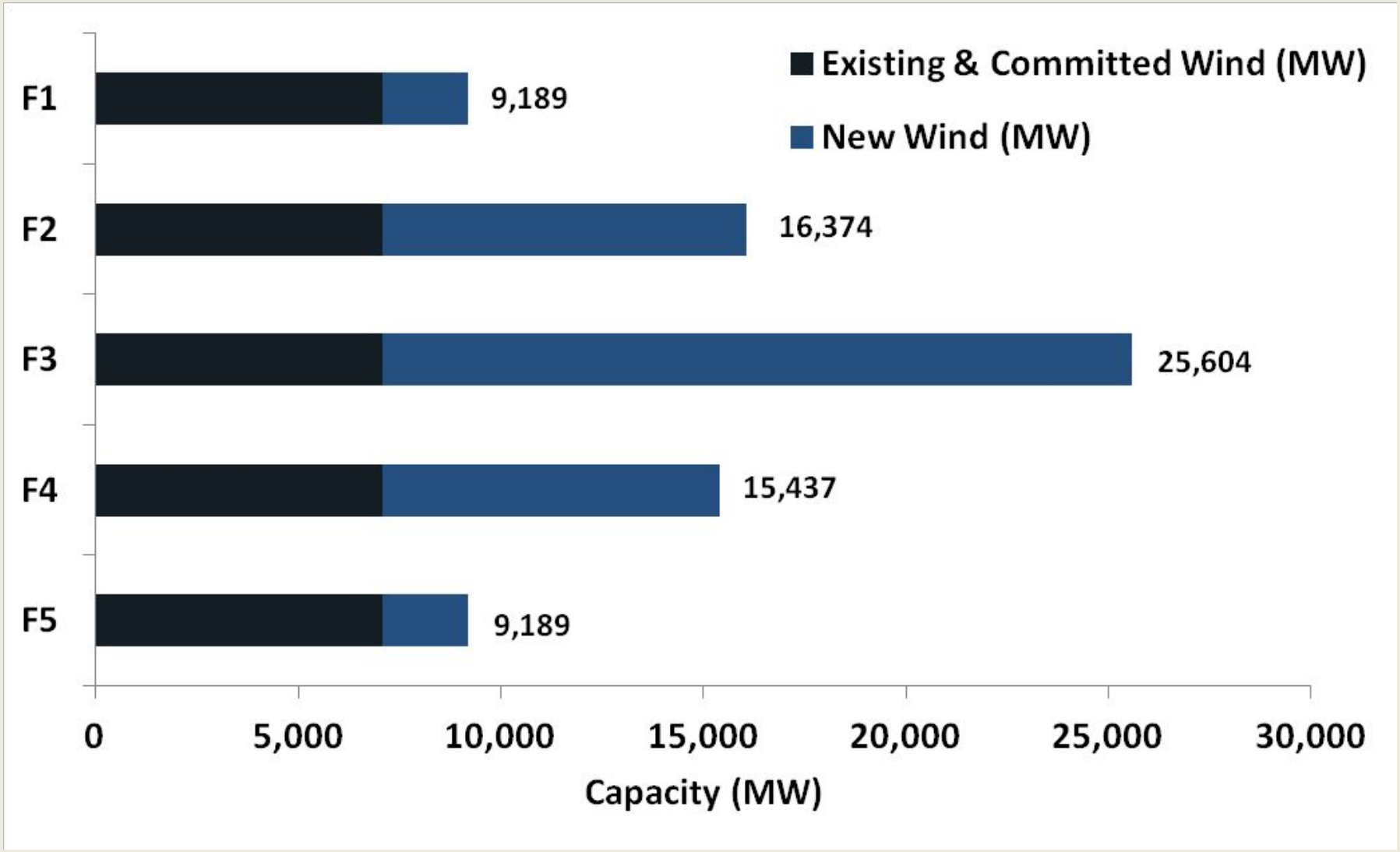


All SPP Transmission Expansion Plans are subject to change.

Nebraska Transmission Advocacy Group (NTAG)


MN
SD
Twin Church
S. Souix City
Cherry Co.
Holt Co.
IA
Neligh
Hoskins
NE
Rising
Gentleman
Seward
Pawnee Lake
NW 68th & Holdrege
Nebraska City
Axtell
MO
KS
N
0 10 20 40 60
Miles
Copyright 2012 by Southwest Power Pool, Inc. All rights reserved.
SPP Southwest Power Pool
SPP 2012 ITP10 Year Plan
Completed January 2012
All SPP Transmission Expansion Plans are subject to change.
Upgrade Type
Rebuild/Reconductor
New Line
Design Voltage
115 kV
161 kV
230 kV
345 kV
500 kV

Wind Summary



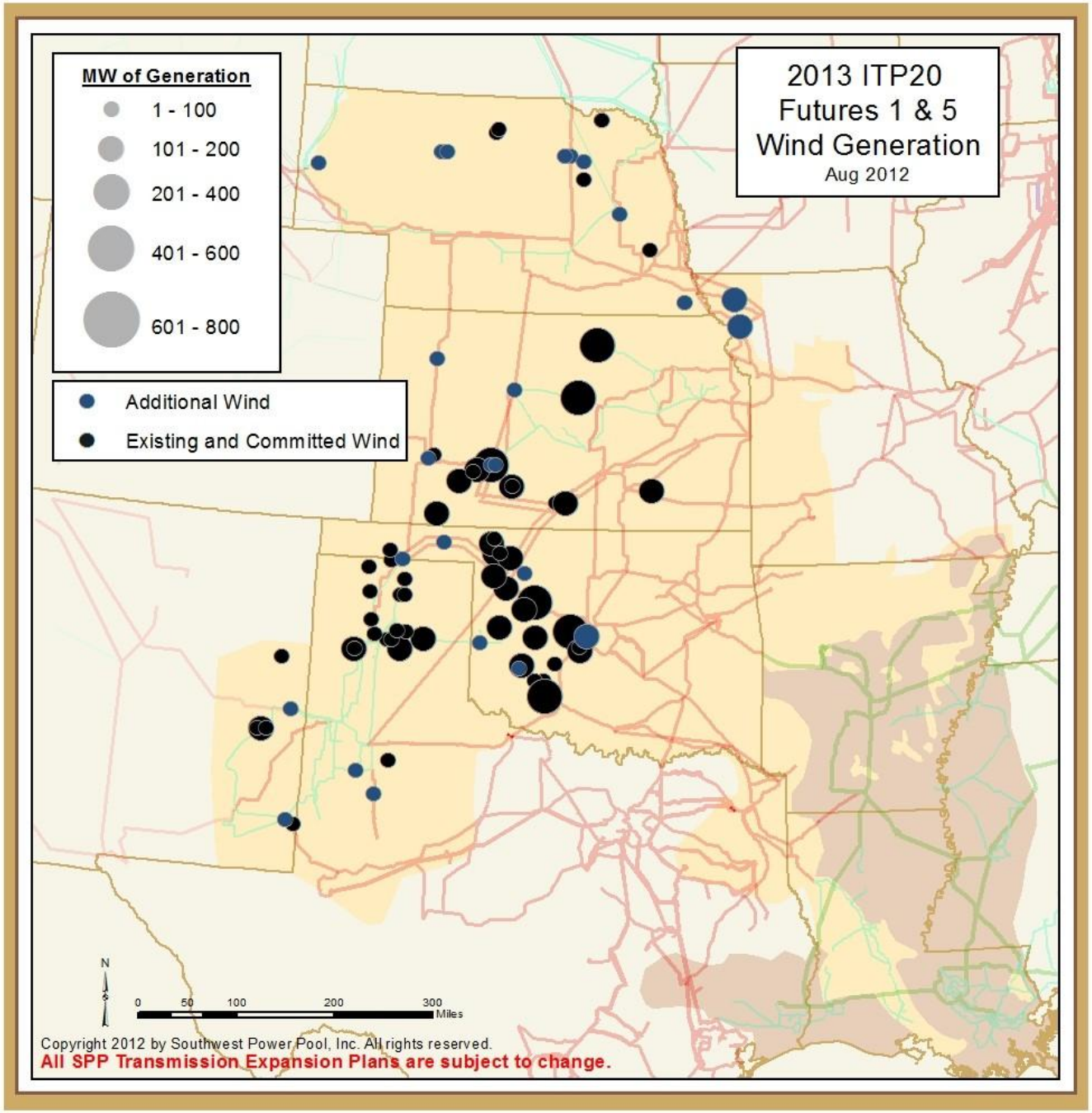
2033

Wind Sites

71 existing
25 new

Wind Capacity (GW)

7.1 existing/committed
2.1 new
9.2 total



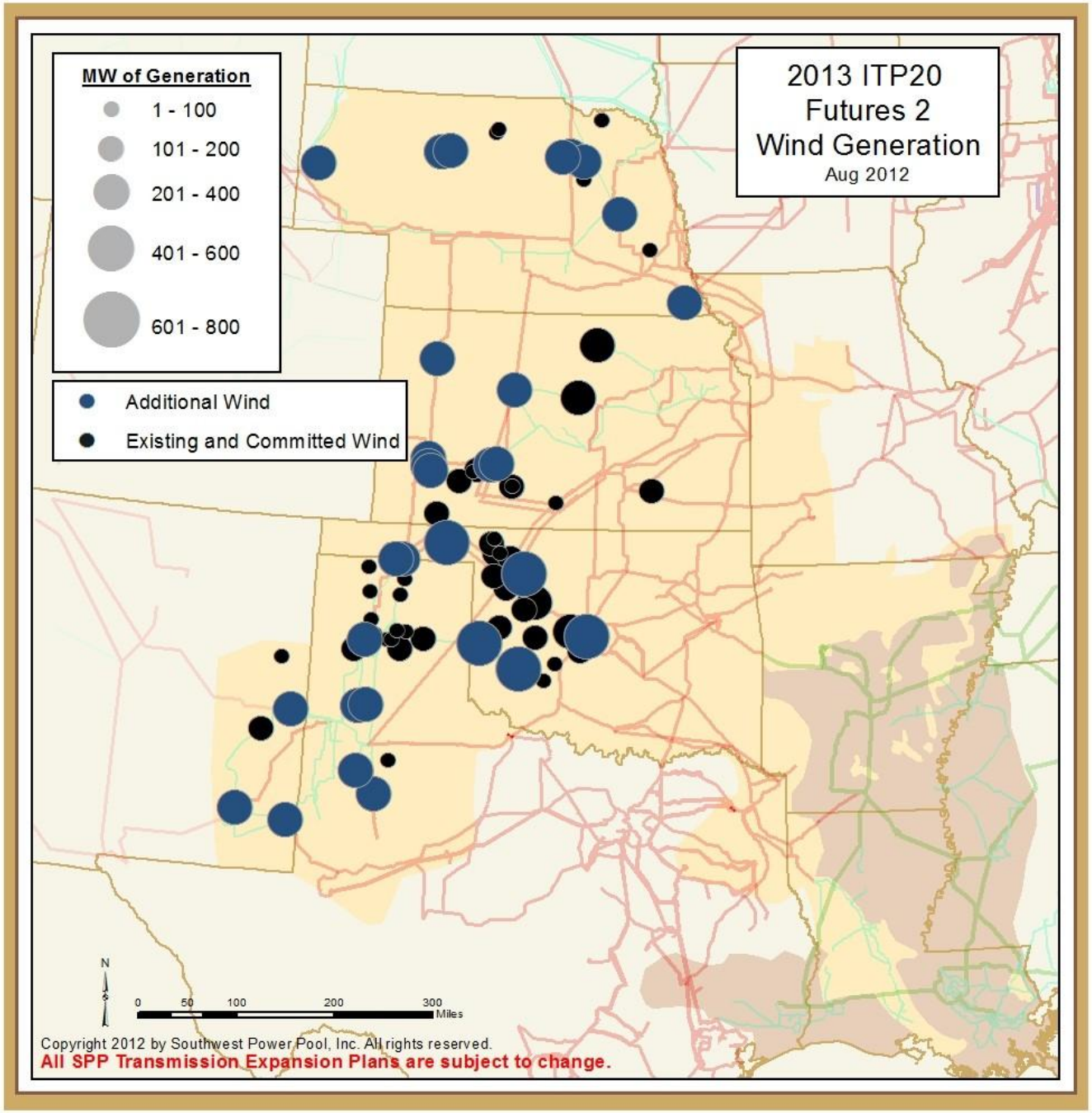
2033

Wind Sites

71 existing
30 new

Wind Capacity (GW)

7.1 existing/committed
9.0 new
16.1 total



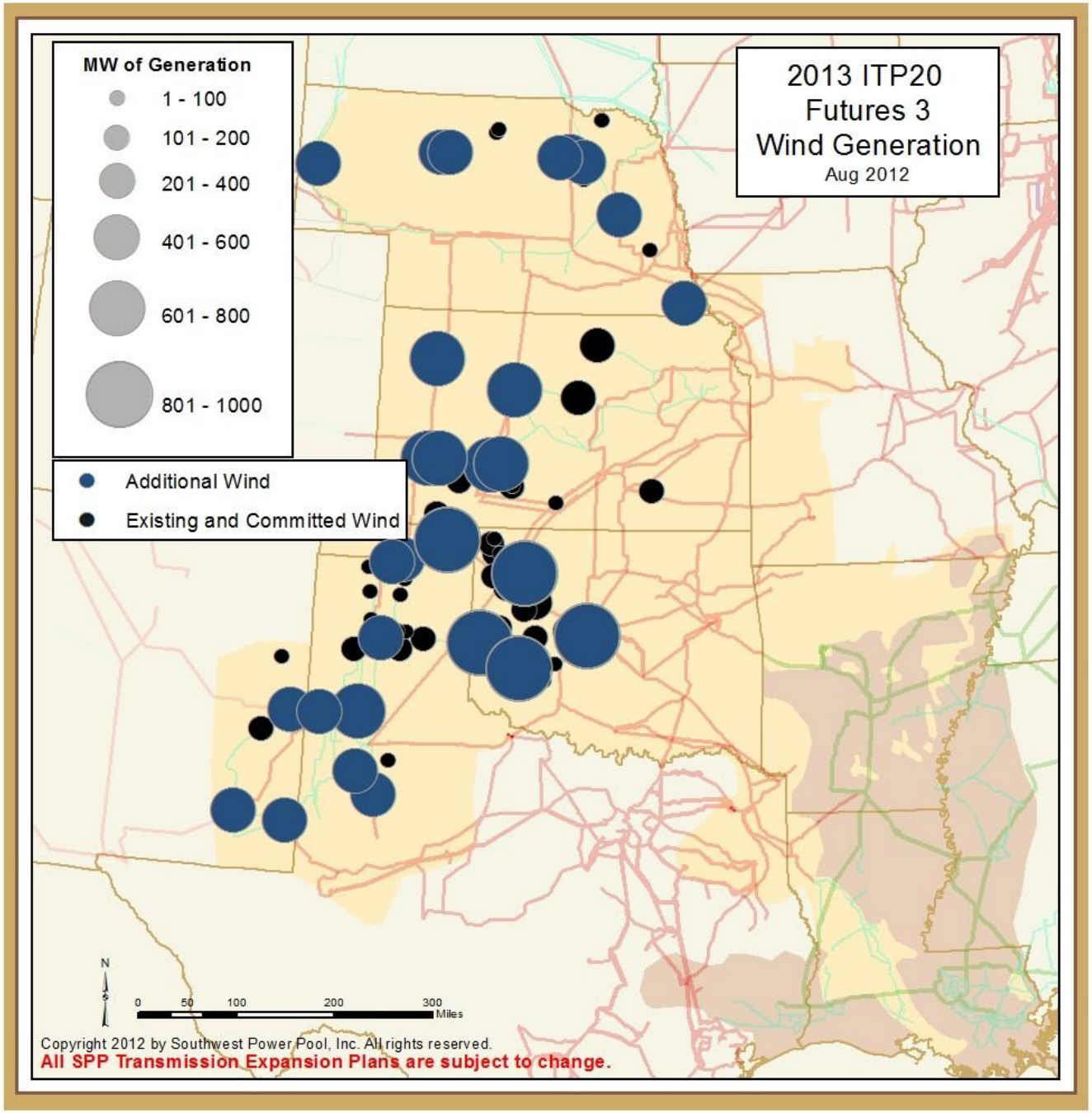
2033

Wind Sites

71 existing
30 new

Wind Capacity (GW)

7.1 existing/committed
18.5 new
25.1 total



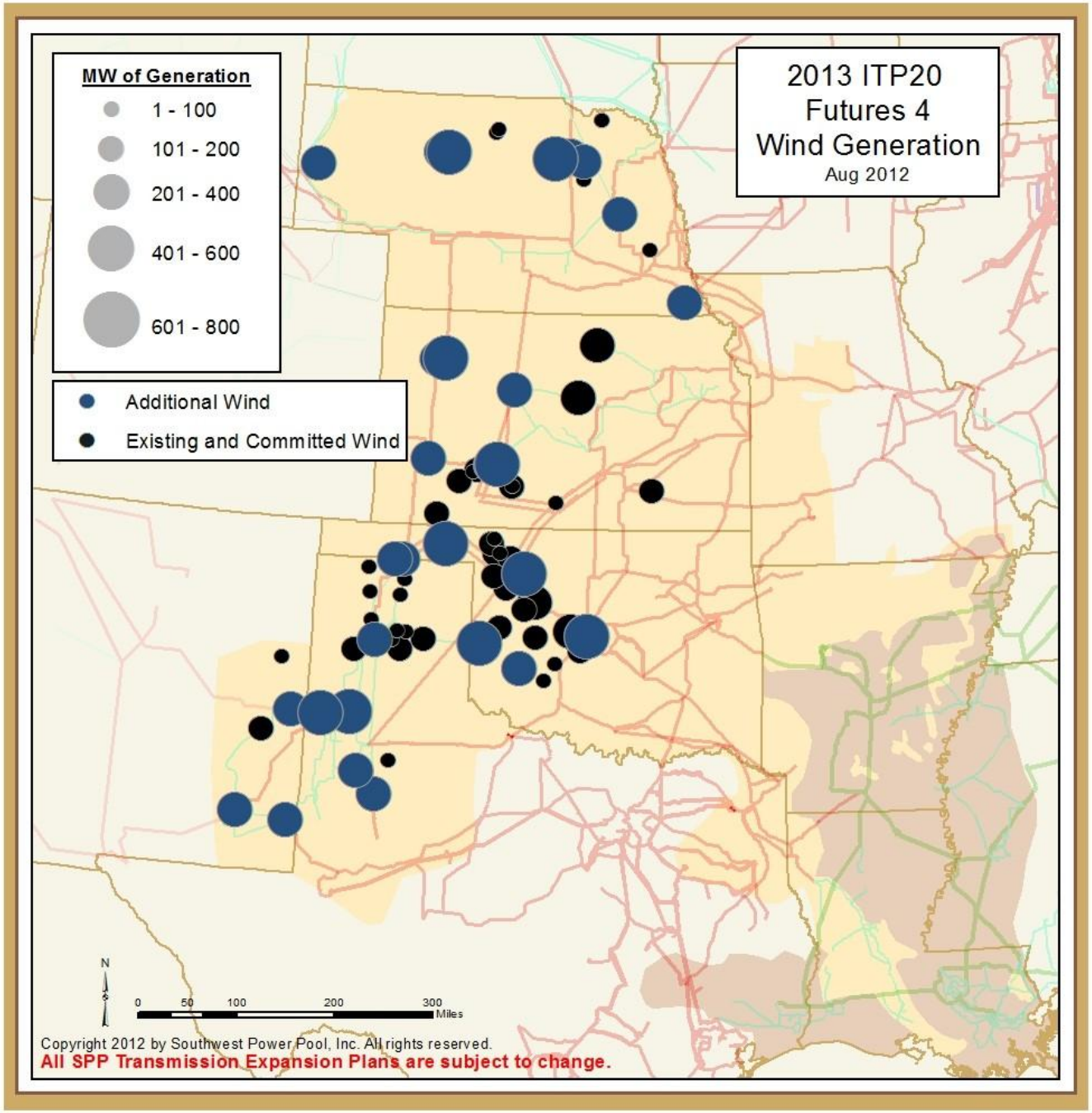
2033

Wind Sites

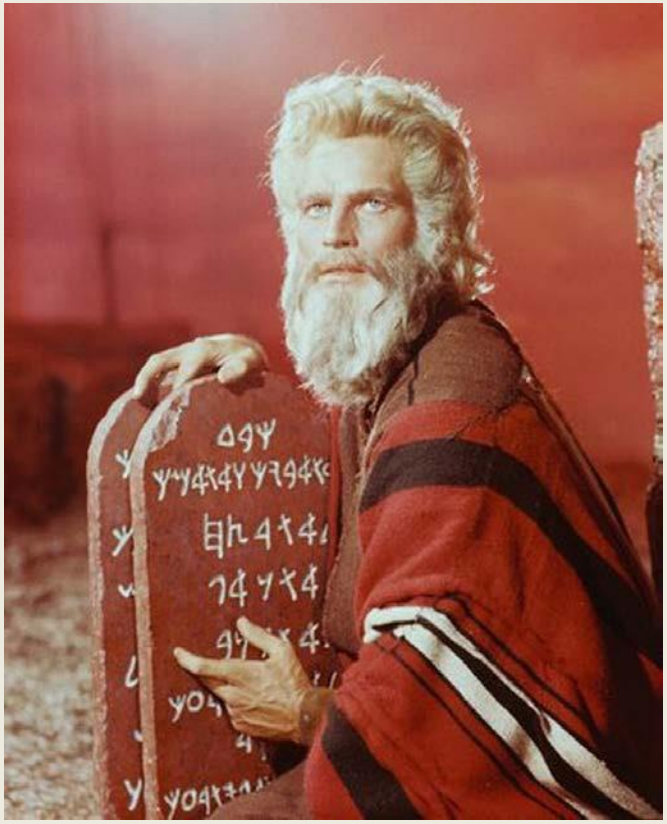
71 existing
30 new

Wind Capacity (GW)

7.1 existing/committed
8.3 new
15.4 total



“I have spoken, so shall it be!”



ORDER 1000

- Regional Requirements
  - Cost Allocation: Highway/Byway
  - Planning: Integrated Resource Planning process
  - ROFR
- Interregional Requirements
  - Cost Allocation
  - Planning
  - Dialogue ongoing with seams neighbors

FERC Order 1000

- "On balance, the Commission concludes that the reforms adopted herein are necessary for more **efficient and cost-effective regional transmission planning**. As discussed further below, the electric industry is currently facing the possibility of substantial investment in future transmission facilities to meet the challenge of **maintaining reliable service at a reasonable cost**. The Commission concludes that it is appropriate to act now to ensure that its transmission planning processes and cost allocation requirements are adequate to allow public utility transmission providers to address these challenges more efficiently and cost-effectively." P.8

Objectives Order 1000

- "…the specific reforms adopted in this Final Rule
  are intended to achieve two primary objectives: (1) ensure that transmission planning processes at the regional level consider and evaluate, on a non-discriminatory basis, possible transmission alternatives and produce a transmission plan that can meet transmission needs more efficiently and cost-effectively; and (2) ensure that the costs of transmission solutions chosen to meet regional transmission needs are allocated fairly to those who receive benefits from them." P 10

SPP and FERC Order 1000

- Benefits of Transmission must exceed the costs.
- Traditional measures undervalue the benefits of transmission.
- Transmission costs are generally a small part of the consumers bill.

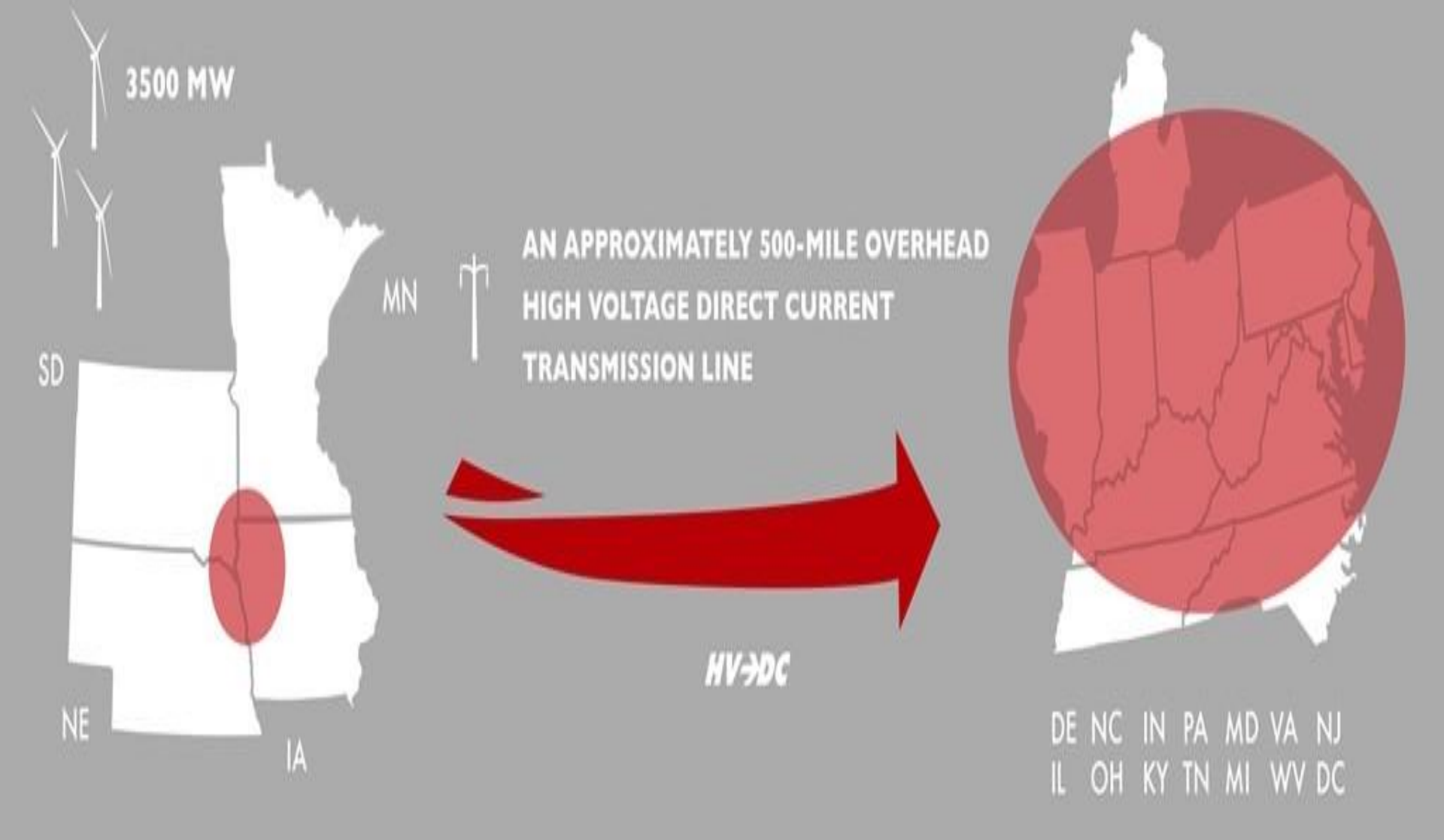
Planning Requirements Overview

- Transmission Planning
  - Each public utility transmission provider must participate in a regional transmission planning process.
  - Each region must produce a single transmission plan under the principles of Order 890
  - Each region must consider the transmission needs driven by policies set by Federal, State and political subdivision requirements
  - Each region must have an agreement to plan with each adjoining region to address interregional transmission solutions

Interregional Planning

- “In light of the comments received on this issue, the Commission in the Proposed Rule expressed concern that the lack of coordinated transmission planning processes across the seams of neighboring transmission planning regions could be needlessly increasing costs for customers of transmission providers, which may result in rates that are unjust and unreasonable and unduly discriminatory or preferential.” P. 272

Clean Line HVDC



THANK YOU!

STEVE GAW

Wind Coalition

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