Americans for a
Clean Energy Grid

Regional Transmission Webinar Series

HEARTLAND

Who we are and what we do:

We support policies that modernize the nation's electric power network and unlock clean energy and economic opportunities across the country. The backbone of a clean electricity system and a strong economy is a resilient and reliable transmission grid. Smart state and federal policies that improve the way the grid is developed, planned, and paid for will help it become a more robust, reliable, and secure network that supports expansion of renewable energy, competitive power markets, energy efficiency, and lower costs for consumers.

Regional Transmission Summits

- Minnesota (Great Plains)
- Oregon (Pacific Northwest)
- Iowa (Midwest)
- Kansas (Heartland)
- Massachusetts (New England)
- Ohio (PJM-Interconnection)
- Nashville (Southeast)
- Denver (Rocky Mountain)

Regional Transmission Webinar Series

- Pacific Northwest *(Concluded)*
- Midwest *(Concluded)*
- Heartland – October 29th
- New England – November 13th
- PJM - Week of November 25th
- Southeast - Week of December 2nd
- Rocky Mountain - Week of December 9th
- National - *(To Be Determined)*

SPP Slides for Heartland Webinar

October 29, 2013

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Director – Research, Development & Special Studies

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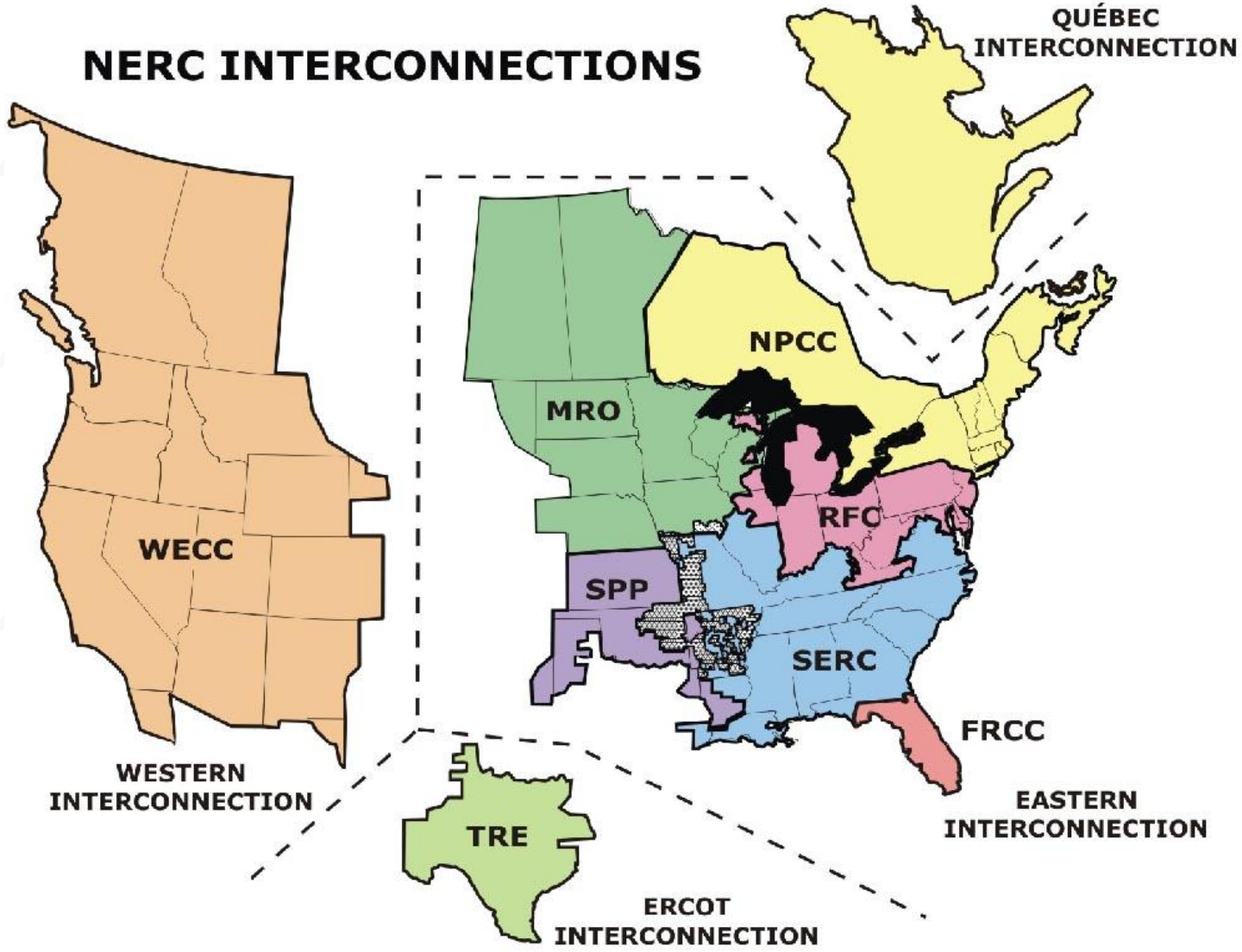
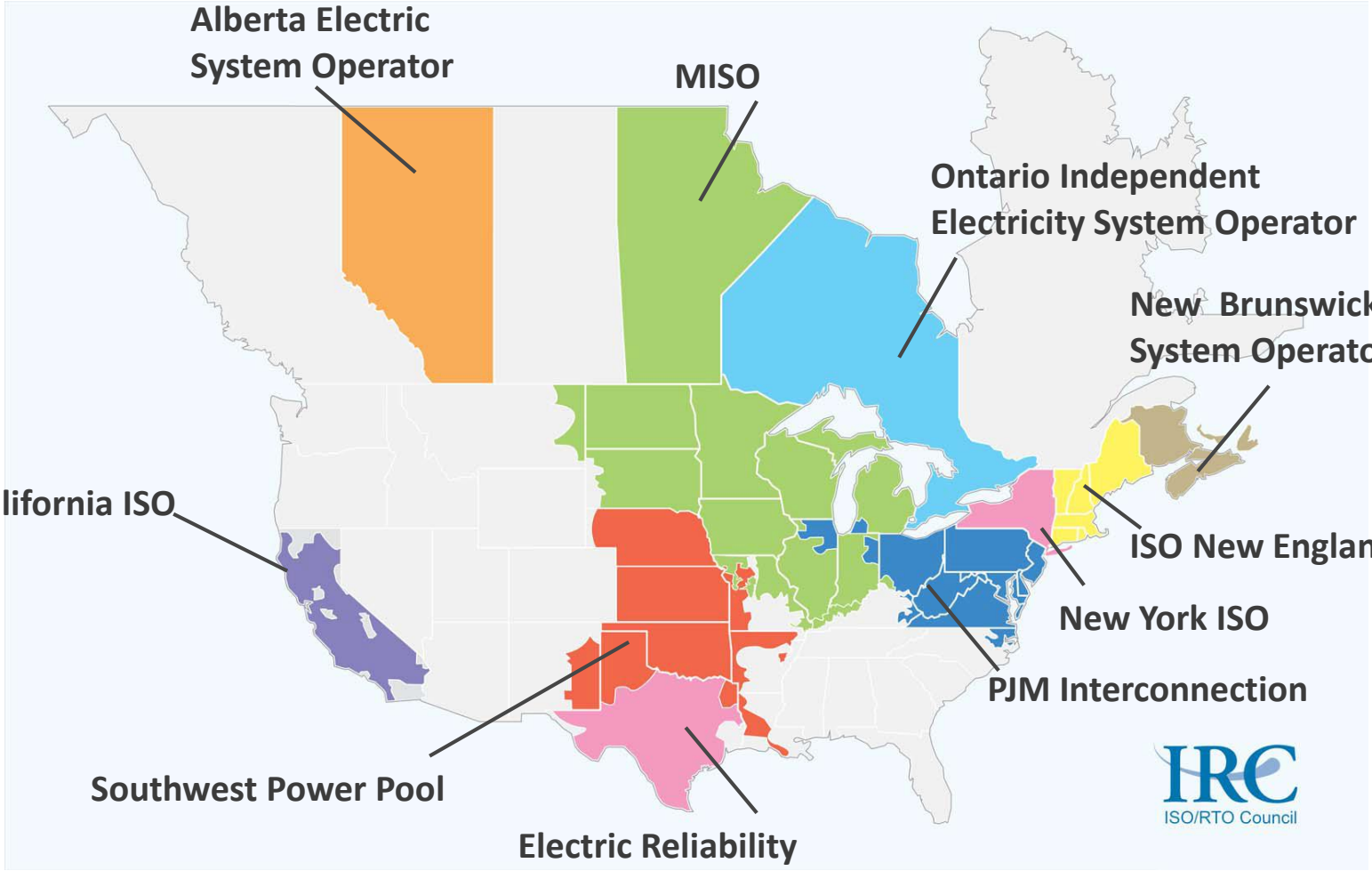
SPP Southwest Power Pool

Electric Interconnections / 8 NERC Regions

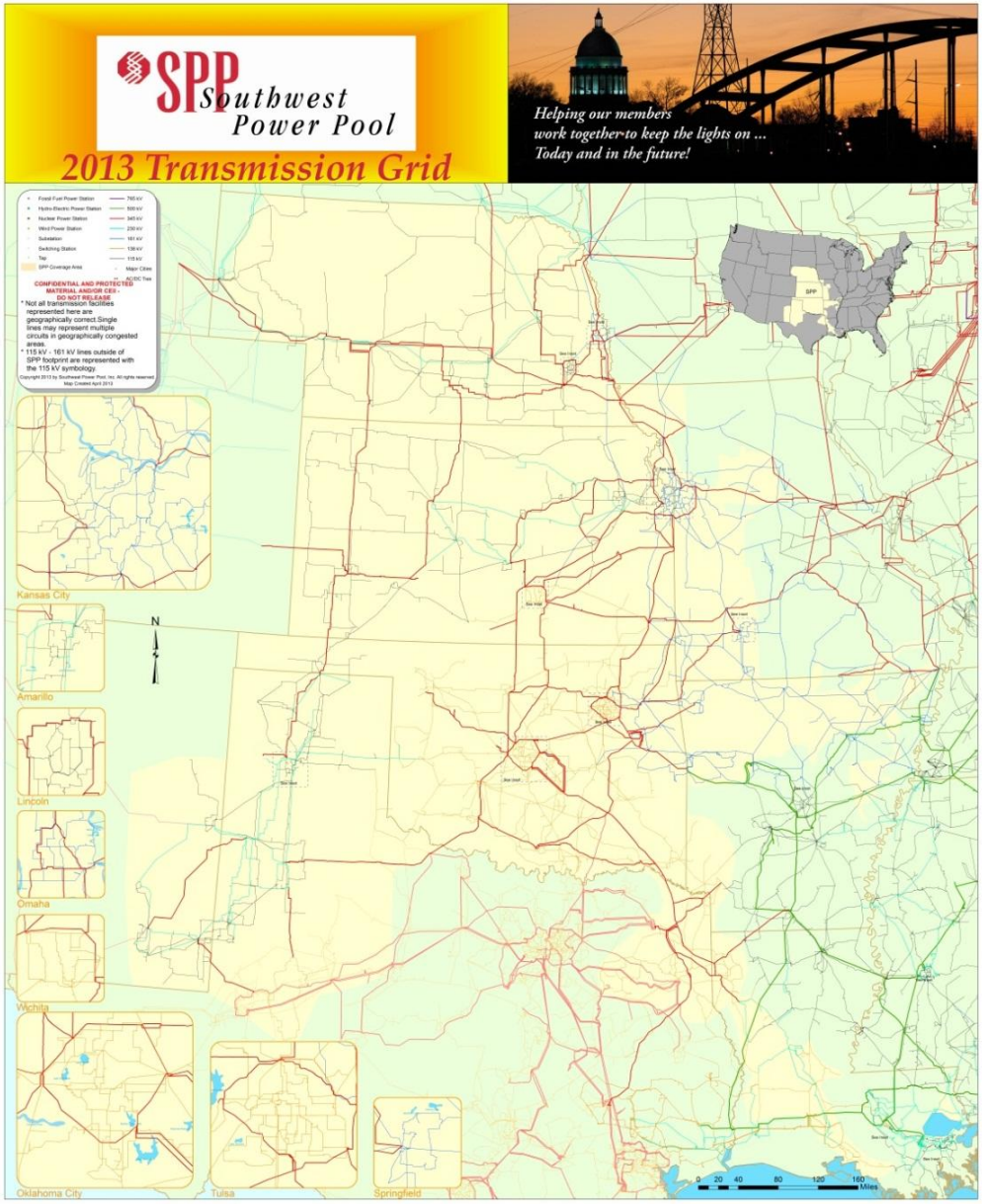


Independent System Operator (ISO) / Regional Transmission Organization (RTO) Map

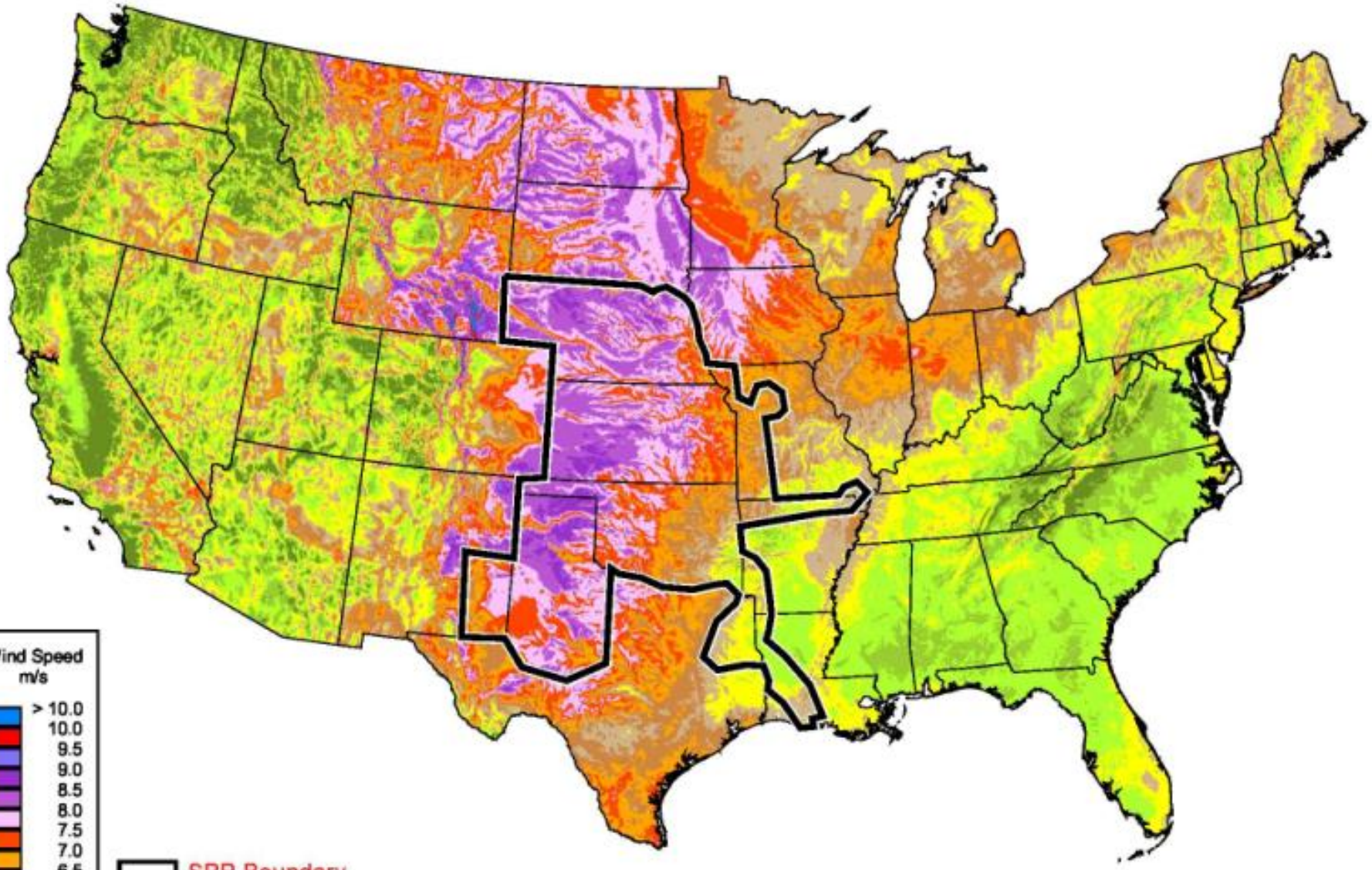


Operating Region

- 370,000 square miles service territory
- 915 generating plants
- 3,921 substations
- 48,638 miles transmission:
  - 69 kV – 11,966 miles
  - 115 kV – 10,302 miles
  - 138 kV – 10,129 miles
  - 161 kV – 5,066 miles
  - 230 kV – 3,787 miles
  - 345 kV – 7,023 miles
  - 500 kV – 93 miles



United States - Annual Average Wind Speed at 80 m



Source: Wind resource estimates developed by AWS Truewind, LLC for windNavigator® Web: http://navigator.awstruewind.com | www.awstruewind.com. Spatial resolution of wind resource data: 2.5 km. Projection: Albers Equal Area WGS84.

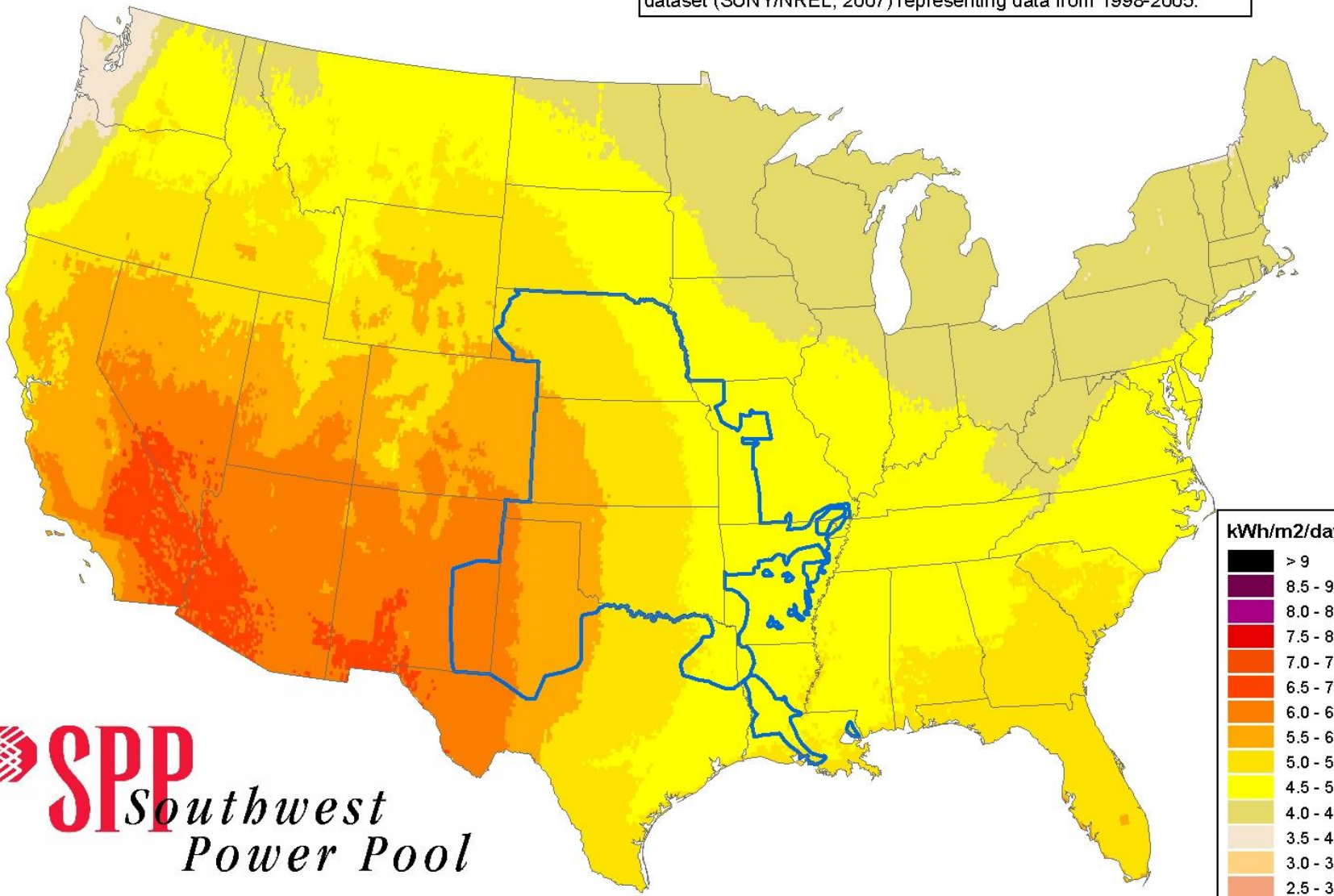
AWS Truewind

NREL National Renewable Energy Laboratory
Innovation for Our Energy Future

PV Solar Radiation
(Flat Plate, Facing South, Latitude Tilt)

Annual

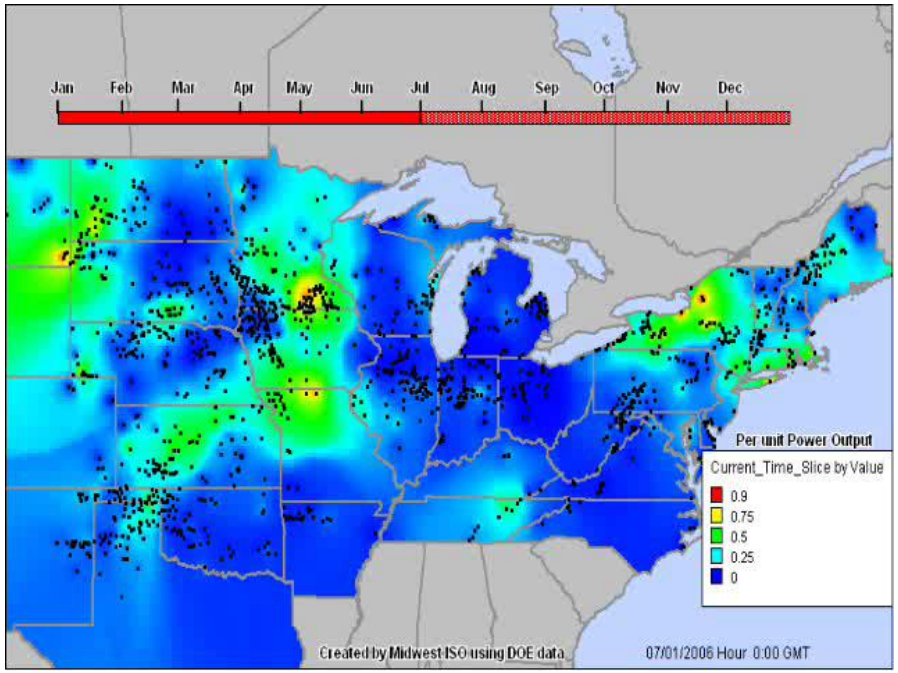
This data represents annual average solar resource potential for 48 Contiguous United States and Hawaii, in High Resolution. The data for Hawaii and the 48 contiguous states is a 10 km, satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.



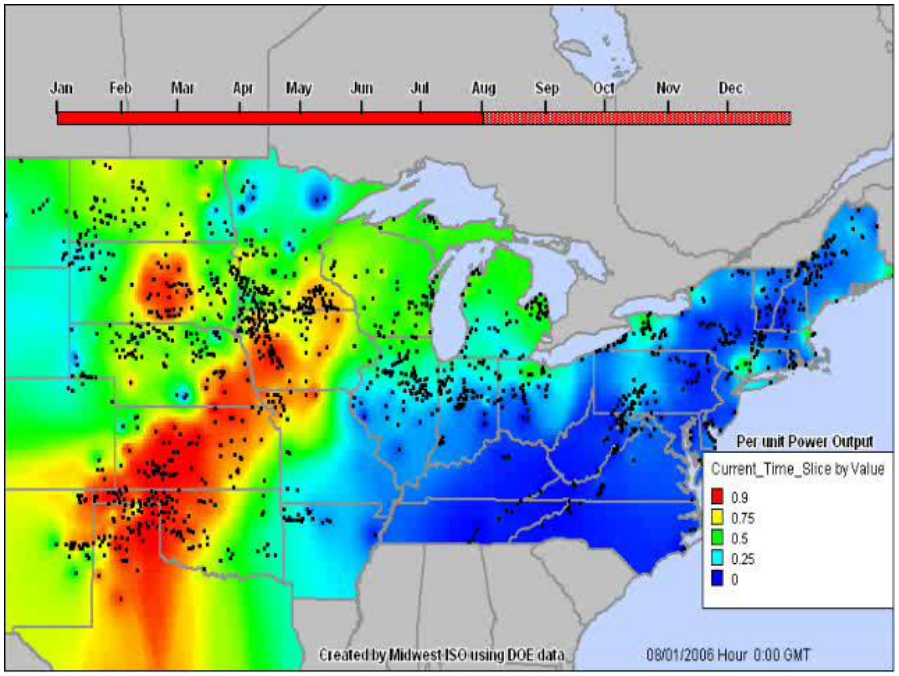
SPP Southwest Power Pool

Source: National Renewable Energy Laboratory (NREL), U.S. Department of Energy

The Stochastic Nature of Wind



July 1 2006 HE 0100 Wind Profile

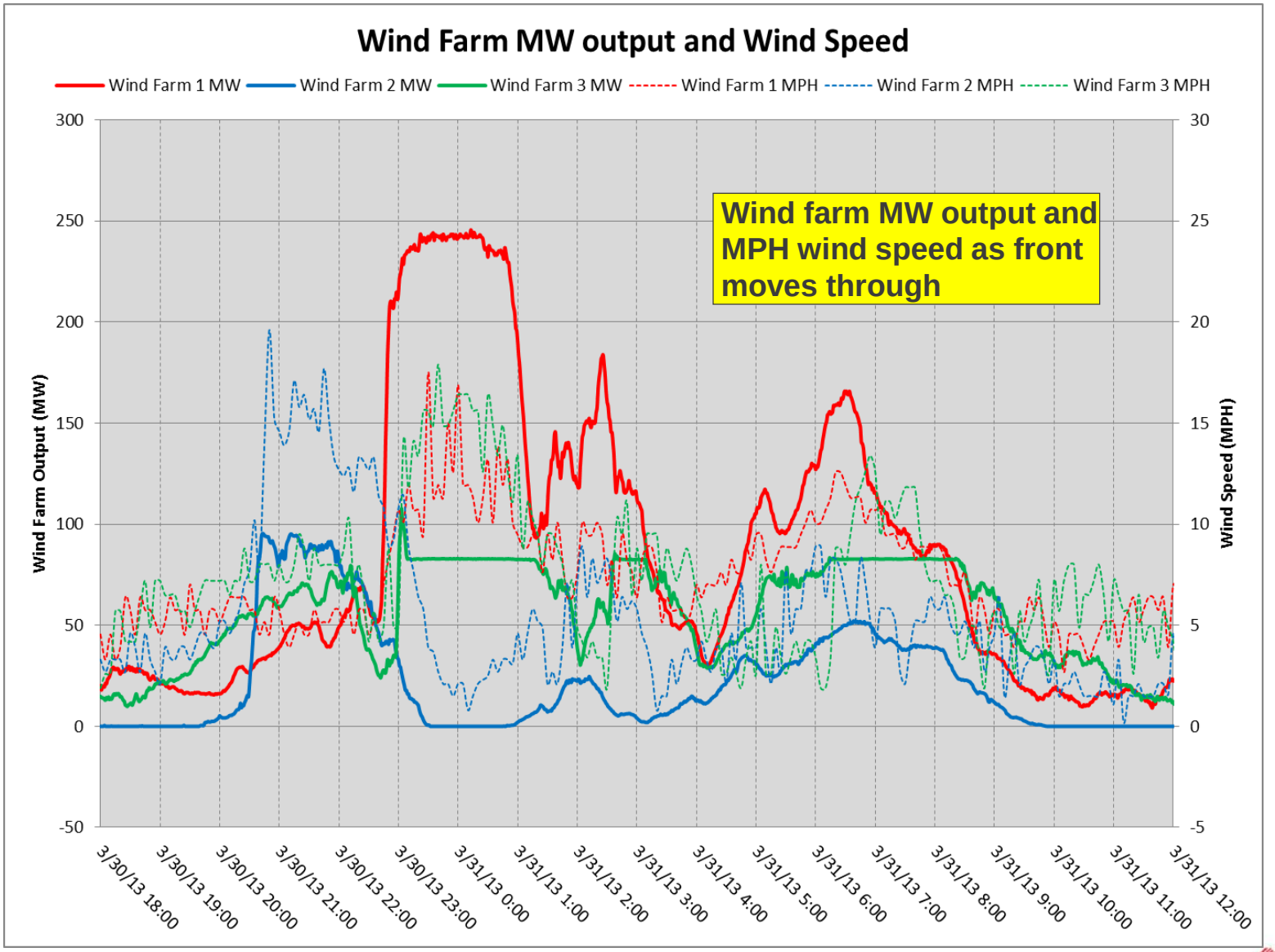


Aug 1 2006 HE 0100 Wind Profile

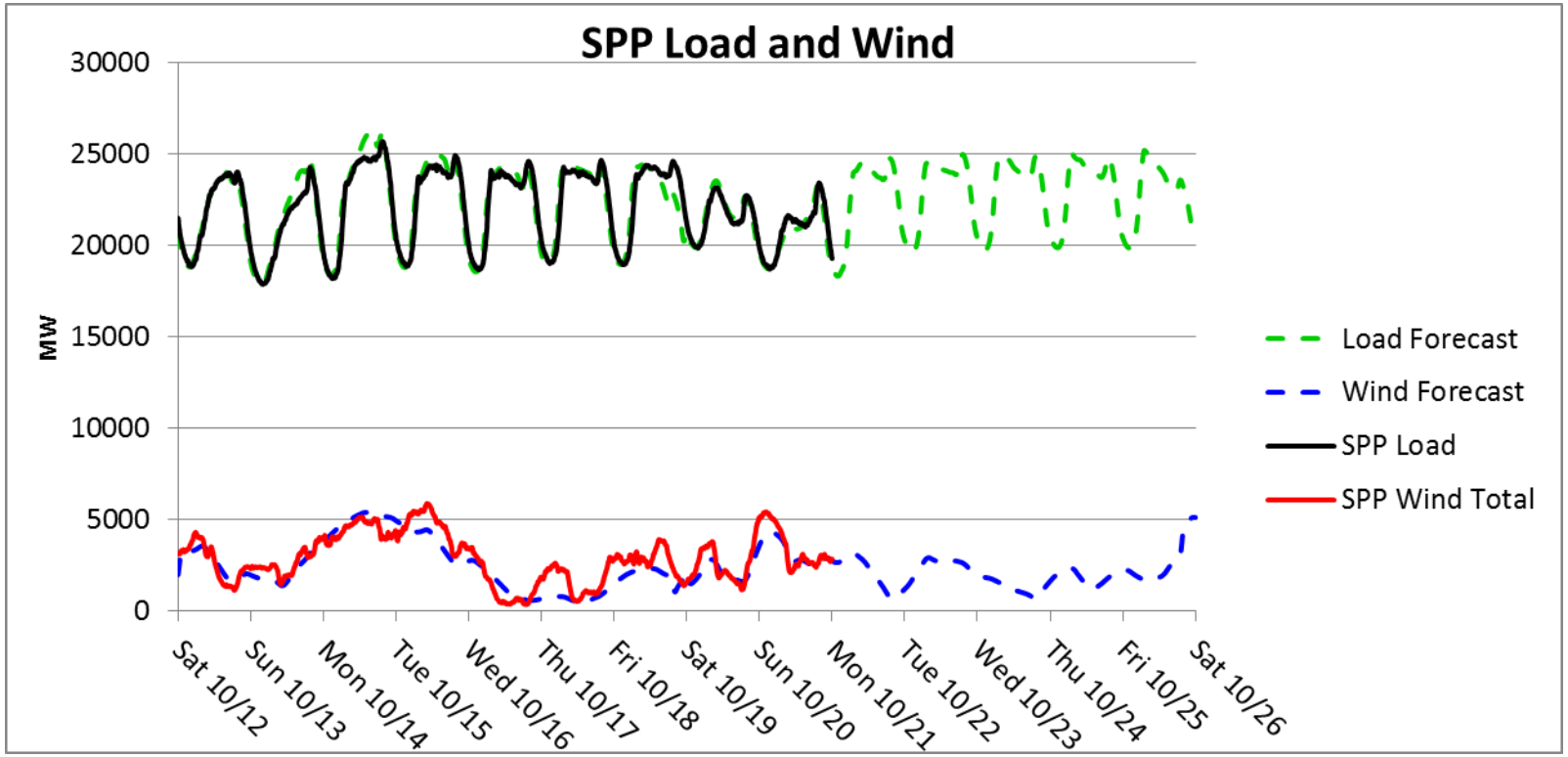
Legend:

- Good Wind
- No Wind

Wind Farm Spring Output



Forecasting is Key Success Factor

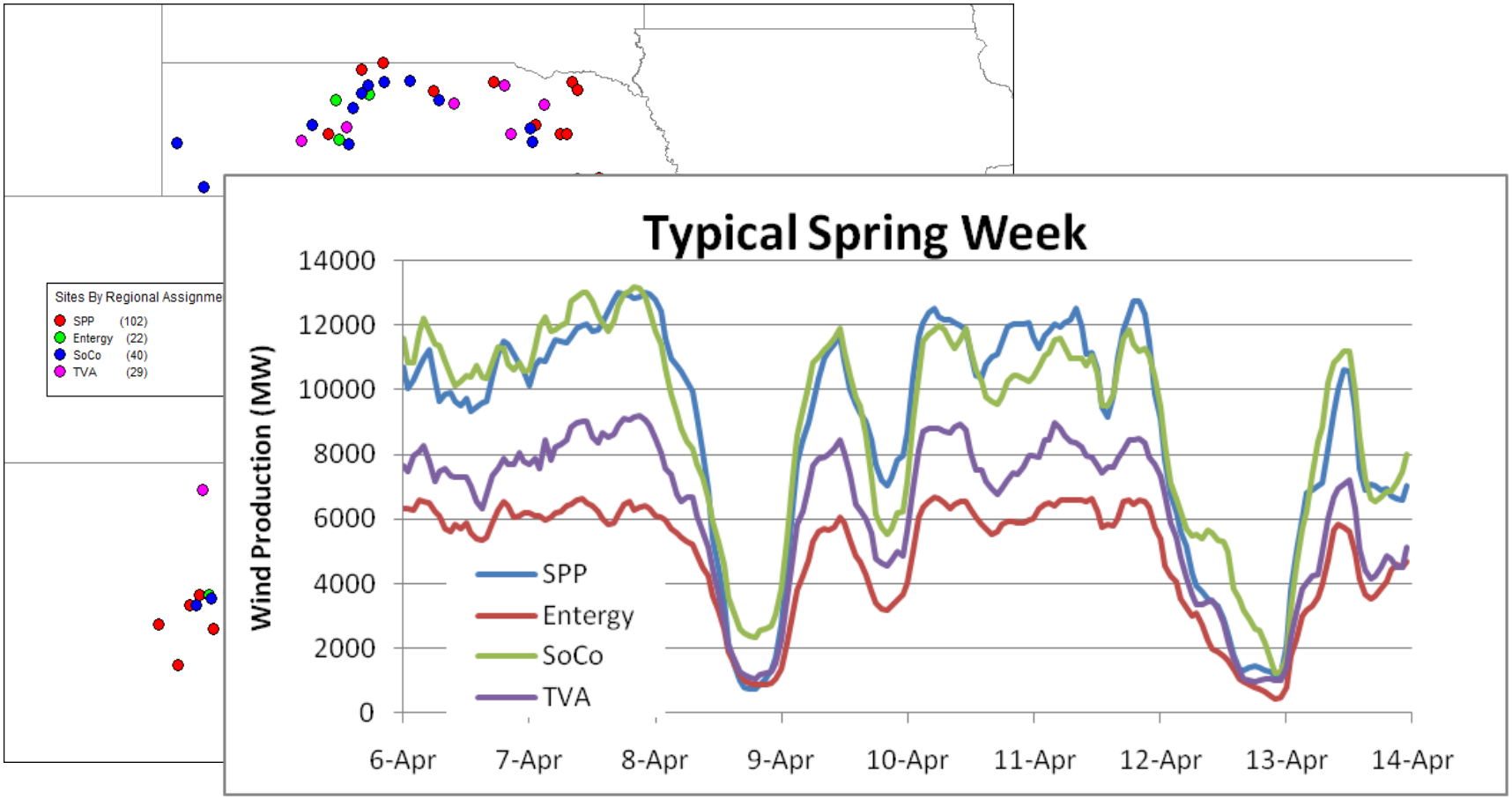


*** The load and wind forecasts used are the 7-day forecasts taken from each Saturday monring at 00:00; wind forcast assumes no directives**

	All-Time Peak	Peak (10/12 – 10/18)	Next week's Peak (forecast)
SPP Market Load	48,059 MW (8/2/11)	25,733 MW	25,197 MW
SPP Wind	6,467 MW (10/10/13)	5,888 MW*	5,115 MW
1 new wind directives issued or amended this week *40 MW of potential wind capacity limited by RC directives at wind peak (10/15 10:11), market load was 24,108 MW at the time			

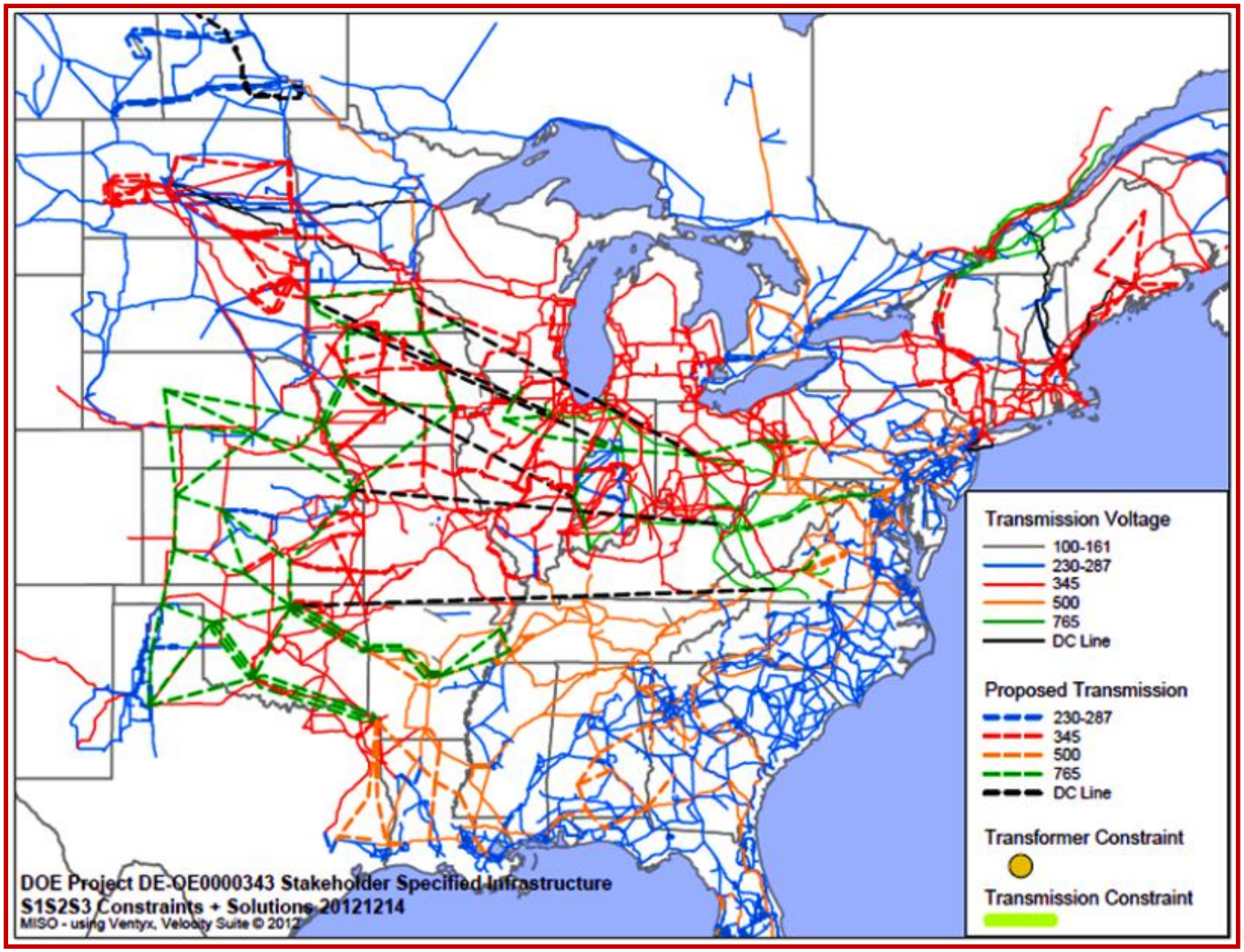
Risk-Based Planning is Required

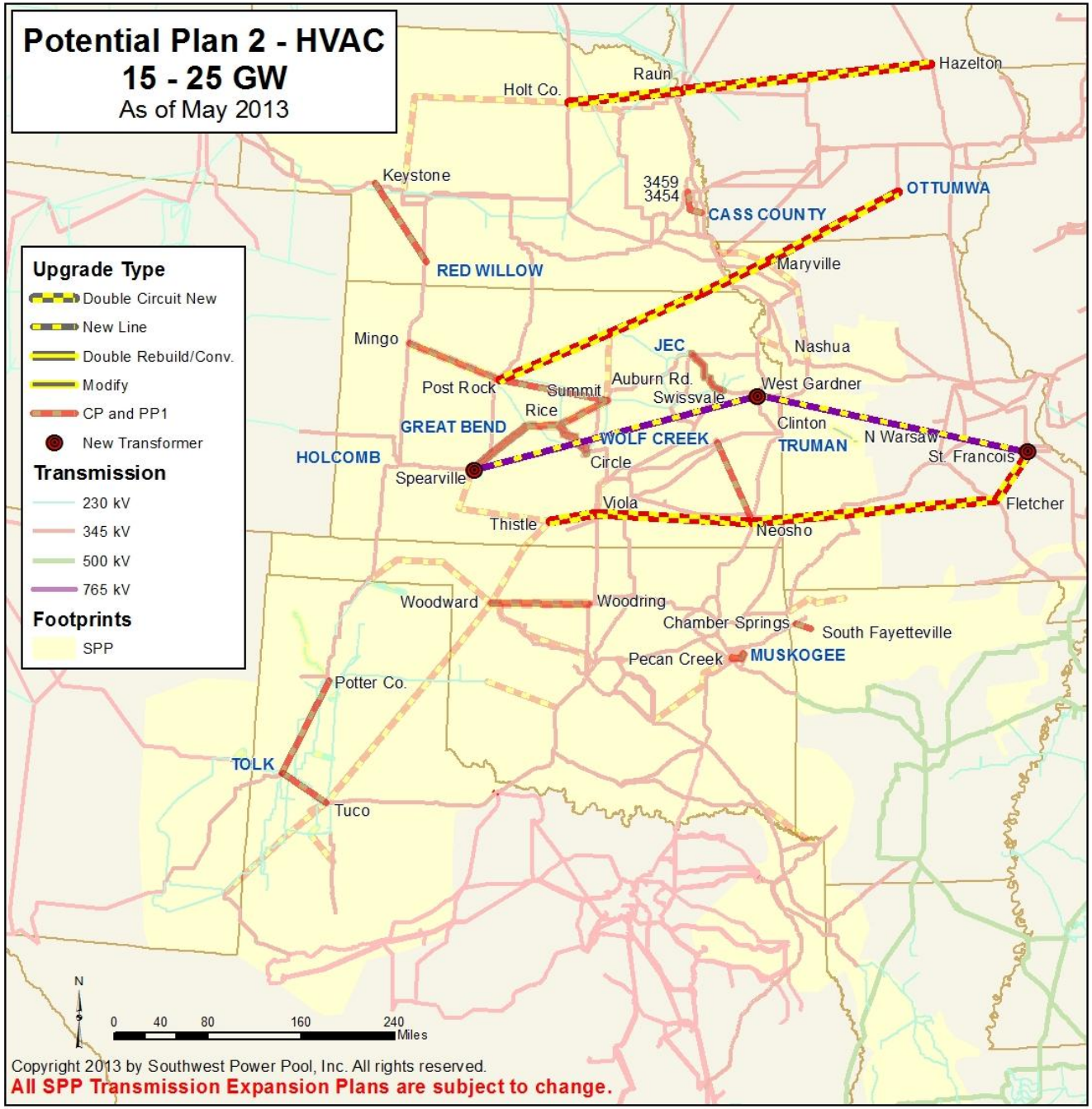
Wind Plant Allocation to BAs



Source: *Brooks ,Tuohy, Caspary, Roubique, & Burkey, "DOE "Integrating SPP Wind Energy into Southeast Electricity Markets" Project Findings", WINDPOWER 2012, Atlanta GA June 2012 © EPRI, 2012; used with permission of the authors.*

EIPC S1 Transmission Expansion Plan



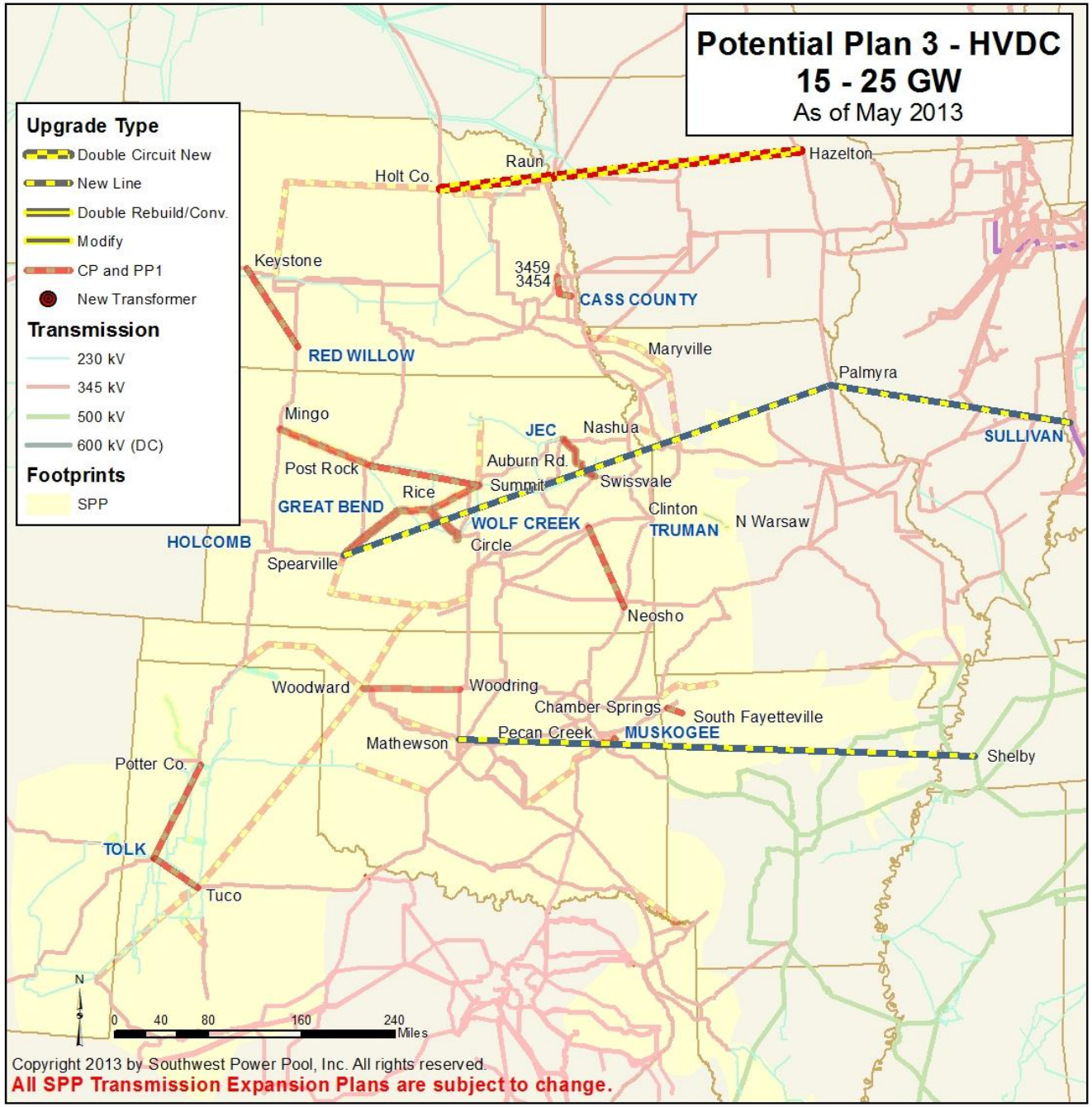


Potential Plans

Proposed upgrades to accommodate increasing wind in the SPP footprint.

Incremental Cost:

$4.9B

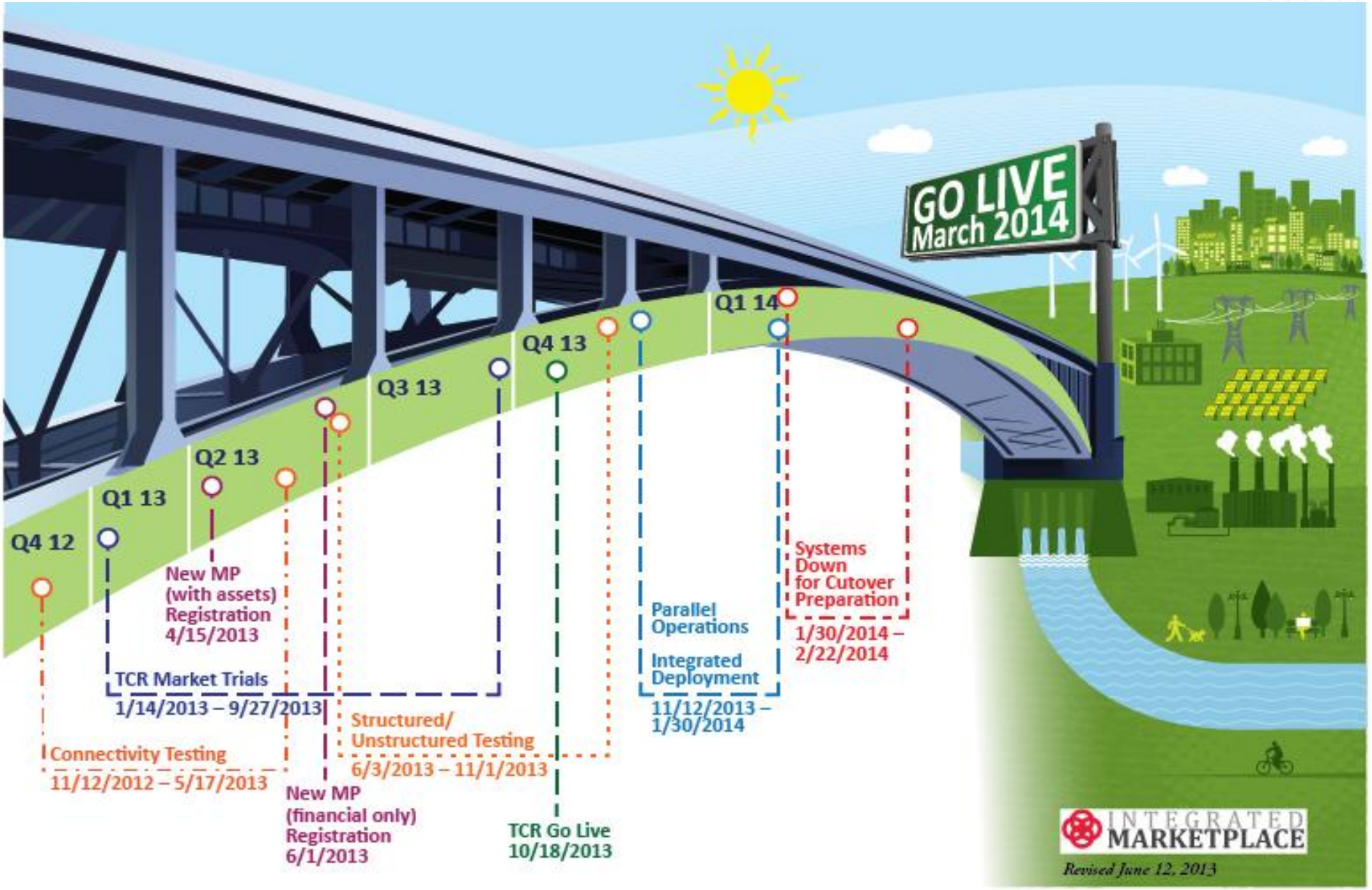


Potential Plans

Proposed upgrades to accommodate increasing wind in the SPP footprint.

Incremental Cost:

$5.05B


GO LIVE
March 2014
Q4 12
Q1 13
Q2 13
Q3 13
Q4 13
Q1 14
New MP
(with assets)
Registration
4/15/2013
TCR Market Trials
1/14/2013 – 9/27/2013
Connectivity Testing
11/12/2012 – 5/17/2013
New MP
(financial only)
Registration
6/1/2013
Structured/
Unstructured Testing
6/3/2013 – 11/1/2013
TCR Go Live
10/18/2013
Parallel
Operations
Integrated
Deployment
11/12/2013 –
1/30/2014
Systems
Down
for Cutover
Preparation
1/30/2014 –
2/22/2014
INTEGRATED
MARKETPLACE
Revised June 12, 2013

American's for a Clean Energy Grid Heartland Webinar

Dorothy Barnett, Executive Director

climate + energy project

The Climate + Energy Project (CEP)

- Started in 2007
- Non-partisan 501(c)3
- Located in Kansas, work across the Southwest Power Pool

Connects people, organizations and ideas
Facilitates productive, pragmatic, long-term solutions
Ensures a wide rage of voices are represented and reached

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- **Wind Energy in Kansas**
  - 13,000 direct and indirect jobs
  - $13 million annually to landowners
  - $10 million annually to communities

- **Buying and using renewable energy is a good economic decision for businesses.**
  - Renewable “fuel” wind and sunlight is zero

- **The world’s largest companies are investing in renewable energy.**
  - Mars, Sprint, Wal-Mart

- **Renewable energy cuts energy prices for everyone.**
  - Power Forward – David Gardiner & Associates

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Consolidated Balancing Authority – More than a dozen balancing authorities now operate under the separate control of investor owned utilities, public power, municipalities, and co-ops. Under the Integrated Marketplace, minute-to-minute balance of electricity supply and demand across the entire region will be the responsibility a single combined balancing authority (CBA) under SPP's control.

The day-ahead market will look across the whole region and choose the most cost-effective mix of resources to meet the next day's anticipated demand, rather than individual utilities committing their own generation – the current practice. This will allow remote wind resources to fill demand in more places, thereby reducing the need to commit expensive generation units and reducing cost of generation for all utilities in the region.

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Transmission Congestion Relief (TCR) market will compensate generators for congestion costs they might experience as a result of allowing SPP to optimize how their generating resources are used in the regional market.

A Real-Time Balancing Market will replace the current Energy Imbalance Service Market. The region-wide market will allow renewables to compete directly with other resources to meet the real-time balancing needs of any utility in the region – reducing prices and driving out higher cost resources.

An Operating Reserve Market will allow much more efficient region-wide sharing of reserve resources, and will again allow renewables, whenever available, to drive higher cost resources out of the various reserve markets.

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Opportunity for Advocates and Supporters of Renewable Energy

- Heartland Alliance for Regional Transmission (HART)
  - Non-traditional stakeholder group focused on supporting clean energy policy at the state, regional and federal level.

- EPA rulemaking carbon pollution standards under Clean Air Act
  - Listening sessions, public comments and state implementation plan participation.

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Questions?

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785-424-0444

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Questions?

THANK YOU FOR JOINING US

- Please visit our site at www.cleanenergytransmission.org
- Follow us on Twitter @clean_energy_grid
- Join us for future webinars and events, and feel to reach out to us for any transmission-related questions.

Americans for a Clean Energy Grid

energy future℠ COALITION