Integrated Transmission Planning Process

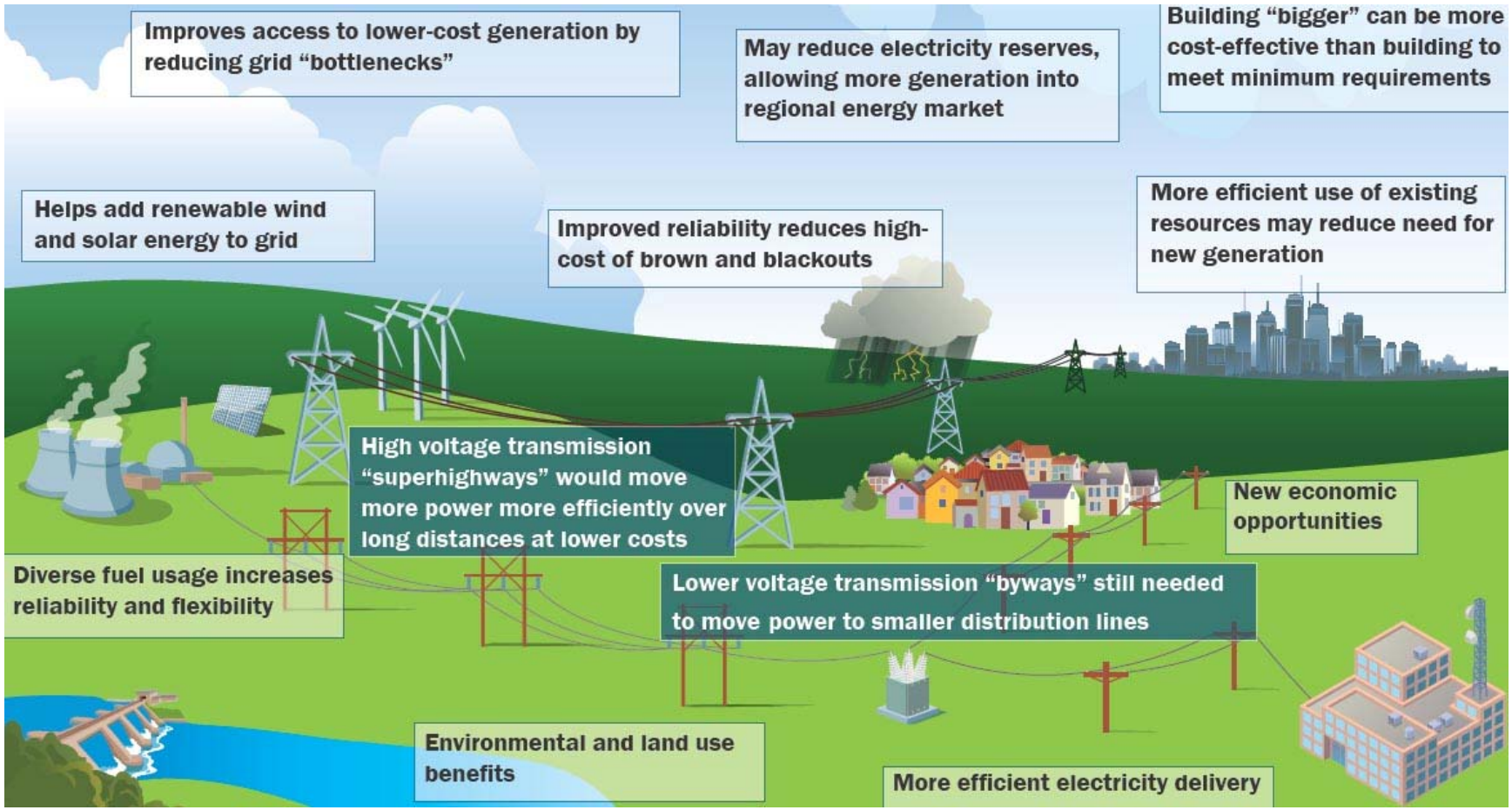
FERC Technical Conference

Charles Cates, SPP staff

March 19 - 21

SPP Southwest Power Pool

Why do we need more transmission?



What and where is transmission needed?

- Generation Interconnection Studies
  - Determines transmission upgrades needed to connect new generation to electric grid
- Aggregate Transmission Service Studies
  - Determines transmission upgrades needed to transmit energy from new generation to load
  - Shares costs of studies and new transmission
- Specific transmission studies
- Integrated Transmission Planning process

ITP: Economics and Reliability Analysis

- Annual Near-Term plan
- Reliability is primary focus
- Identifies potential problems and needed upgrades
- Coordinates with ITP10, ITP20, Aggregate and Generation Interconnection study processes

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- Analyzes transmission system for 10-year horizon
- Establishes timing of ITP20 projects

- Develops 345 kV+ backbone for 20-year horizon
- Studies broad range of possible futures

Who pays for these transmission projects?

- Sponsored: Project owner builds and receives credit for use of transmission lines
- Directly-assigned: Project owner builds and is responsible for cost recovery
- Highway/Byway: Most SPP projects paid for under this methodology

Voltage	Region Pays	Local Zone Pays
300 kV and above	100%	0%
above 100 kV and below 300 kV	33%	67%
100 kV and below	0%	100%

What role do state regulators play?

- **Regional State Committee - Retail regulatory commissioners from:**

Arkansas	Nebraska	Oklahoma
Kansas	New Mexico	Texas
Missouri		

Louisiana maintains active observer status

- **Primary responsibility for:**
  - **Cost allocation for transmission upgrades**
  - **Approach for regional resource adequacy**
  - **Allocation of transmission rights in SPP's markets**

Integrated Transmission Planning in Action:

2012 ITP10

2012 ITP10 Methodology

- 10th year study (2022)
- Potential congestion
- Potential overloads and voltage violations
- Benefit measurements
- Transmission expansion plan
  - Project staging
- Stability analysis

2012 ITP10

- Two futures:
  - Directed by SPC
  - Supported by ESWG and TWG
- 2010 ITP20 plan tested in 2012 ITP10
- Categorized upgrades:
  - Reliability upgrades
  - Economic upgrades
  - Policy upgrades

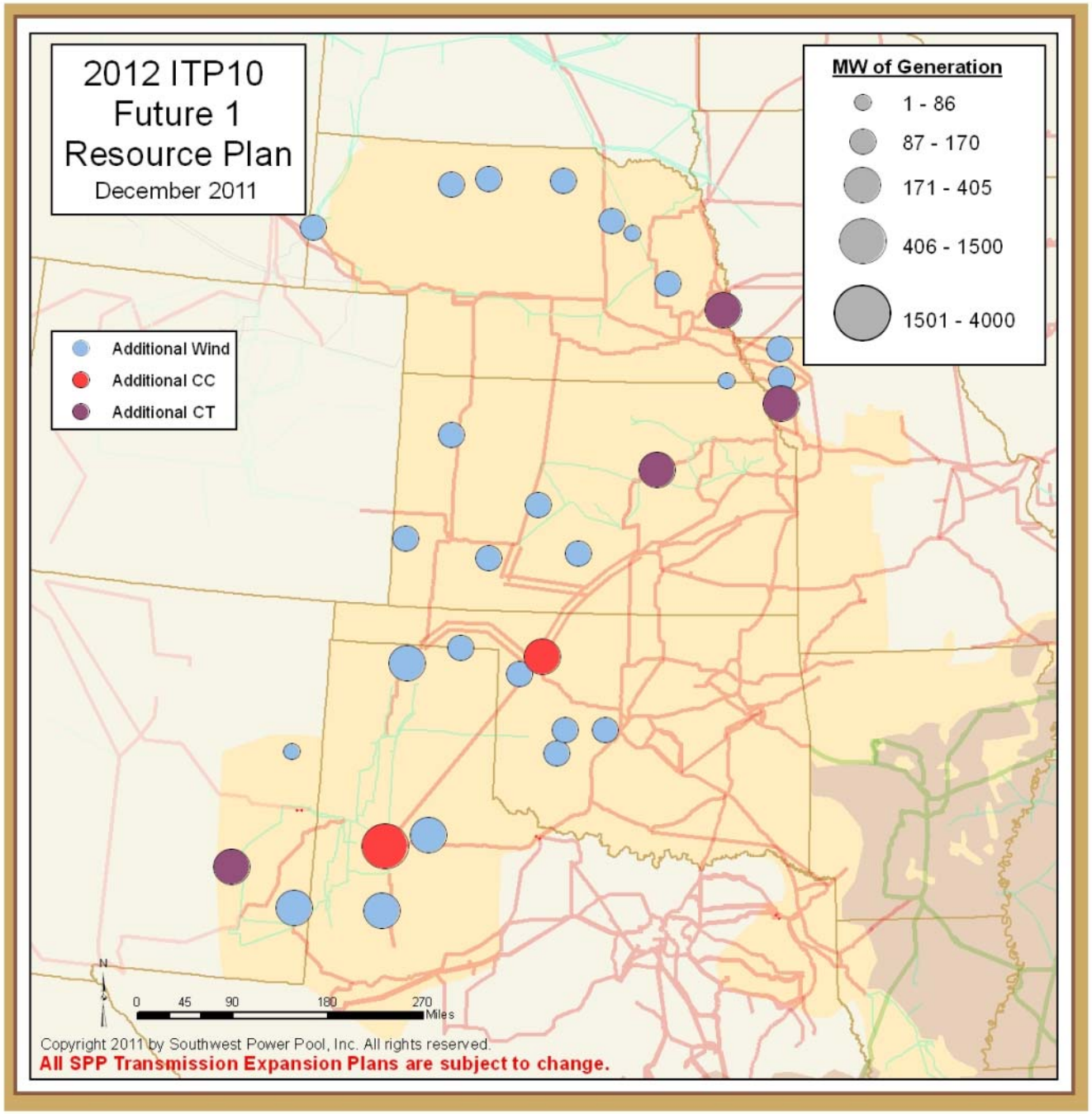
2012 ITP10 ESWG & TWG Collaboration

- Stakeholder Driven Items
  - Futures
  - Sensitivities
  - Resource Plan
  - Fuel Prices
  - Metrics
  - 2012 ITP10 Process
  - 2012 ITP10 Report
  - Benchmark results
  - Transmission solutions
  - 40-Year financial analysis
  - Staging & timing
  - Constraints
  - AC models
  - Reliability scan results
  - Transmission solutions
  - Stability results
  - Staging & timing

2012 ITP10 Futures

Future 1
Business as Usual

Future 2
EPA Rules with Additional Wind



Additional Sites

25 Wind

2 Combined Cycle

3 Combustion Turbine

Additional Capacity

1,410 MW Natural Gas

Total Wind Capacity

10,038 MW

Total Conventional Capacity

58,814 MW

Additional Sites

25 Wind
7 Combined Cycle
5 Combustion Turbine

Additional Capacity

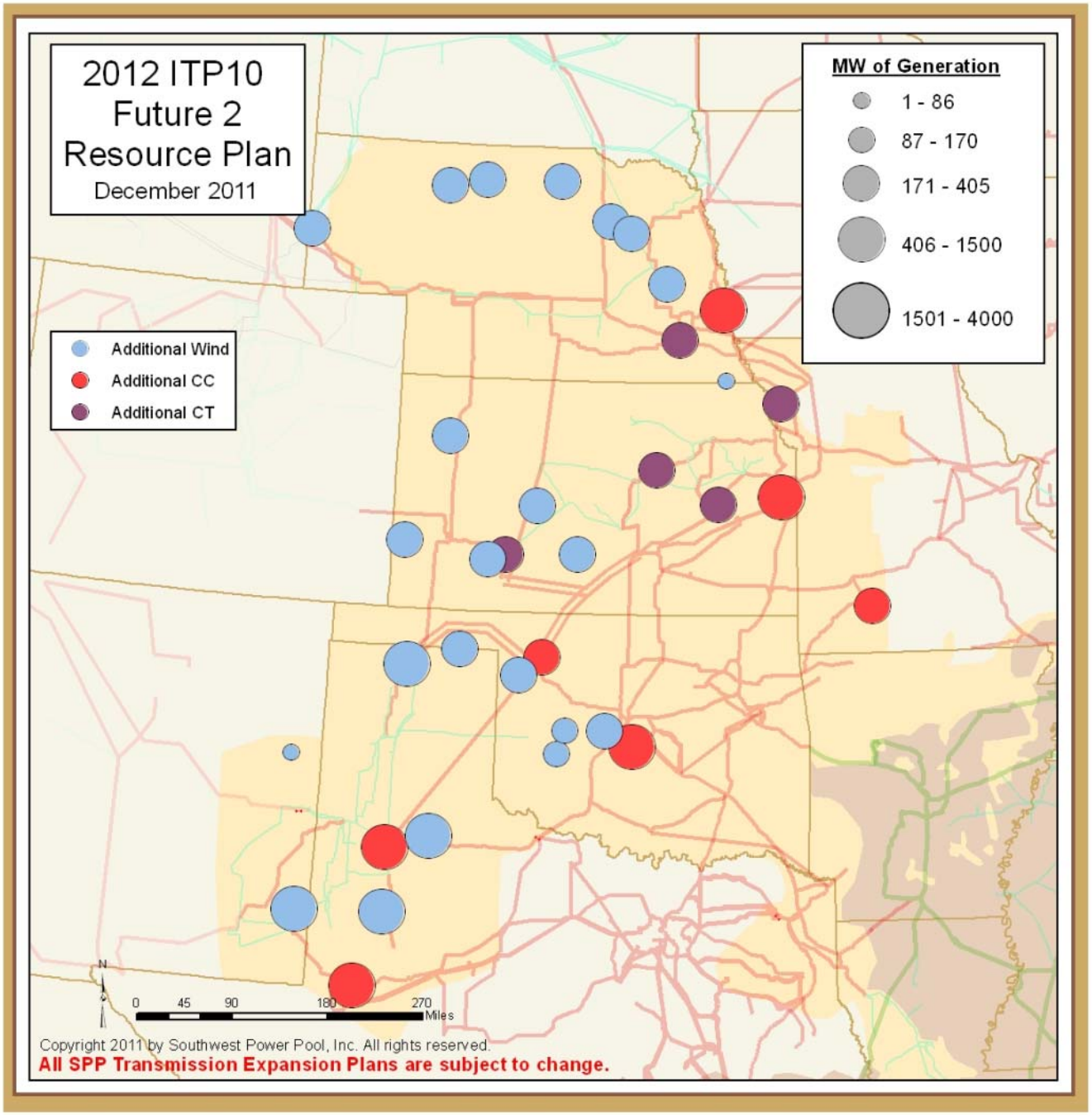
4,270 MW Natural Gas

Total Wind Capacity

14,048 MW

Total Conventional Capacity

61,694 MW



2012 ITP10 Metrics

Metric No.	Benefit Discussion	Unit(s)
CM1	Adjusted Production Cost Savings (APC)	$
1.1.1	Value of replacing previously approved projects	$
1.3	Reduced Losses	$
1.6	Positive Impact on Losses Capacity	$
10	Reduction of Emissions Rates and Values	$
1.1.2	Value of Improved Available Transfer Capabilities	MW & %
6	Limited Export/Import Improvements	MW & %
14	Ability to Serve New Load	MW & %
2	Levelization of LMP's	Std Dev $ and %
3	Improved Competition in SPP Markets	Std Dev $ and %

2012 ITP10 Sensitivities

- **Sensitivity analysis performed for variables having significant impact on recommended transmission plan**

	Hi Demand	Mid Demand	Low Demand
Hi Natural Gas	✓	✓	-
Mid Natural Gas	-	-	-
Low Natural Gas	-	✓	✓
Performed upon Future 1 (Business as Usual) and Future 2 (Additional Wind w/ Carbon Constraint)			

- **Two additional sensitivities for only Future 2**
  - **High carbon tax of $54 per ton**
  - **Low carbon tax $14 per ton**

2012 ITP10 Stability Analysis

- Transient stability – no unstable machines
- Load Pocket voltage stability – no voltage collapse
- Wind dispatch voltage stability – feasible

Portfolio Objectives

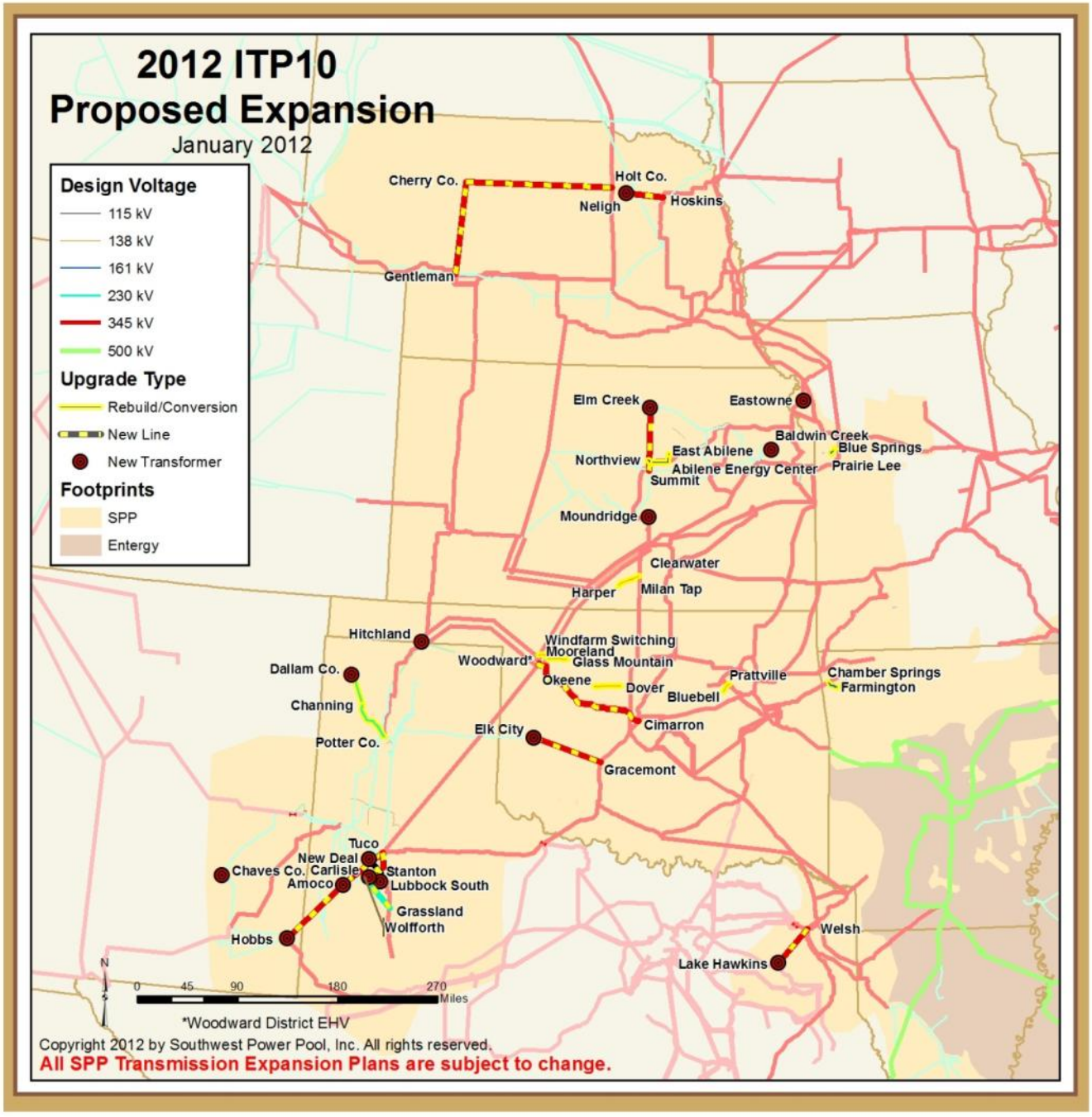
- Projects that synergistically provide value by optimizing
  - Reliability concerns
  - Provide economic benefits
  - Fulfill policy requirements
- Collaborate with stakeholders
- Determine project need by dates

Economic and Policy Project Inclusion Criteria

- **Reliability Projects**
  - Included upgrades that mitigate potential overloads
- **Economic Projects**
  - Included upgrades with B/C > 1.0 in both futures
- **Policy Projects**
  - Included any additional upgrades required to meet policy goals & mandates

Portfolio Summary

- 36 projects total
- 9 major projects
- 4 projects consistent with 2010 ITP20
- Primary driver for each project identified
  - Reliability
  - Policy
  - Economic



2012 ITP10 Proposed Expansion Plan

2011 E&C Costs
$1.475 Billion

Reliability: $980 Million
Economic: $206 Million
Policy: $289 Million

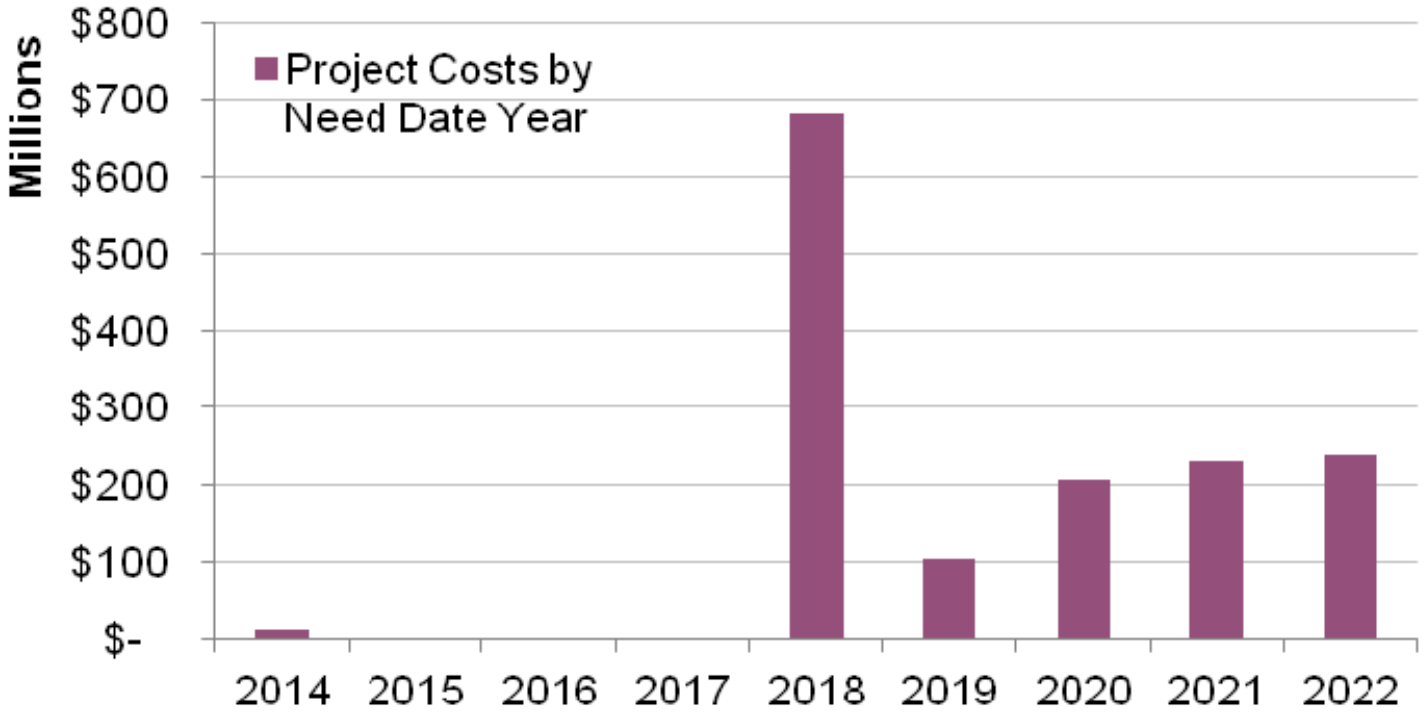
Miles of line:

345 kV – 786 miles
230 kV – 124 miles
161 kV – 17 miles
138 kV – 108 miles
115 kV – 73 miles

15 transformers

Project Staging

- Staging based upon primary need
- Most projects planned in-service starting 2018



Measuring the benefit of the portfolio

Multiple benchmarks ensure reasonable results

Transmission creates efficiencies that reduce emissions

Assessment of expected project life over 40-years

Potential reliability concerns mitigated

Potential impacts to system stability

states' renewable goals or targets achieved

ITP20

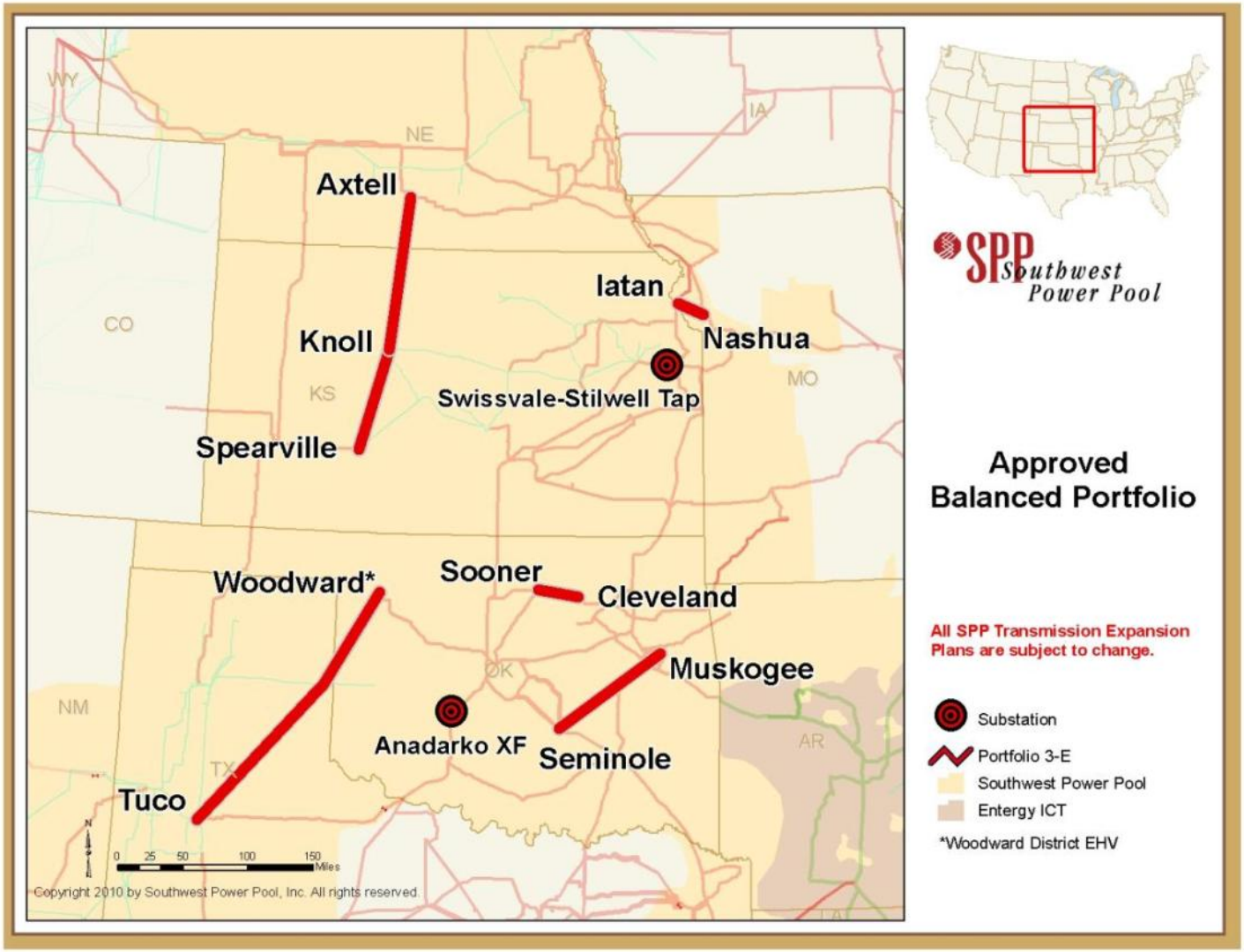
Following the strategic 20-year plan

Added together – how does this affect the ratepayer?

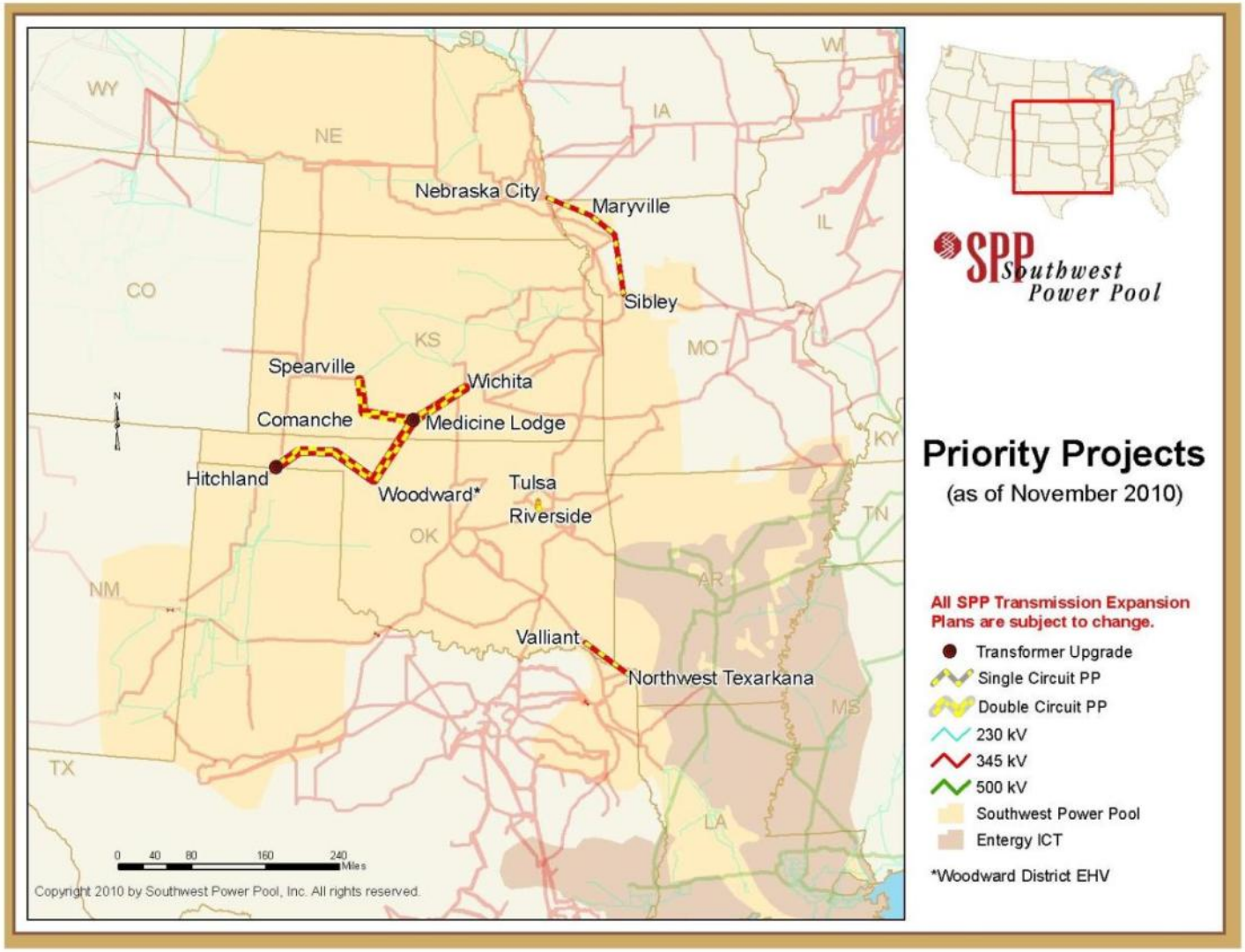
Services

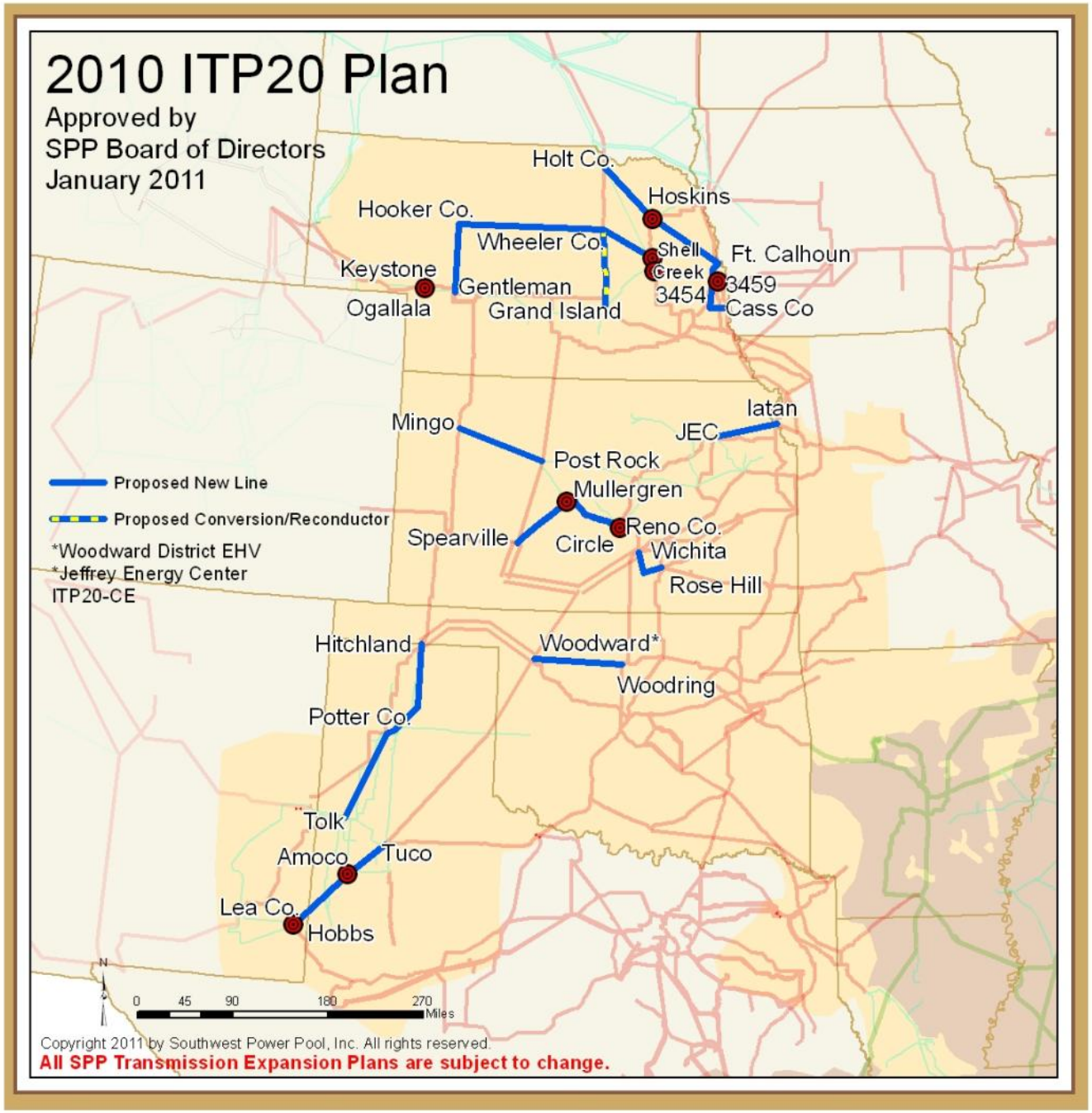
TRANSMISSION PLANNING MAPS

Balanced Portfolio



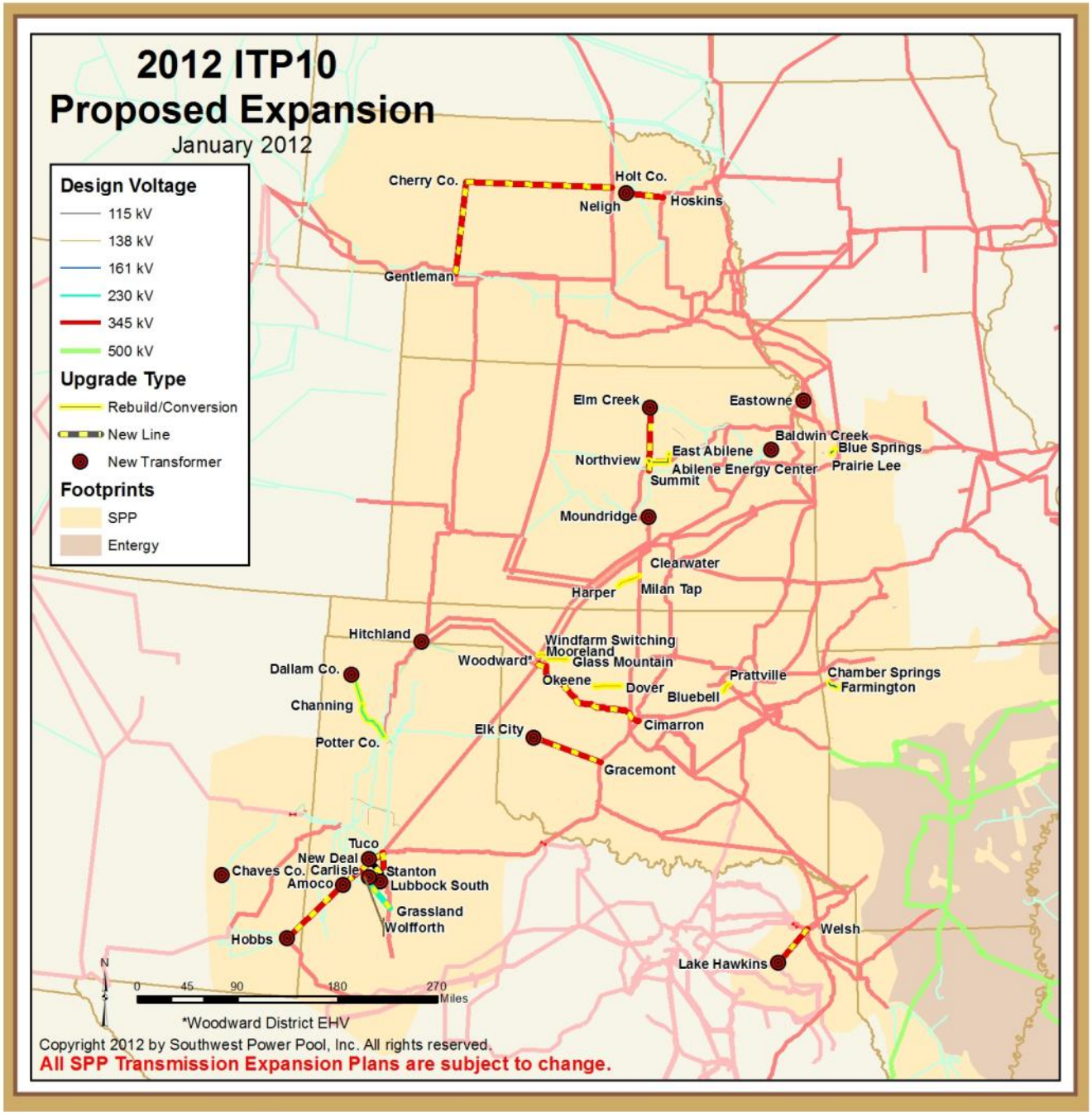
Priority Projects





SPP 2010 ITP20 Plan

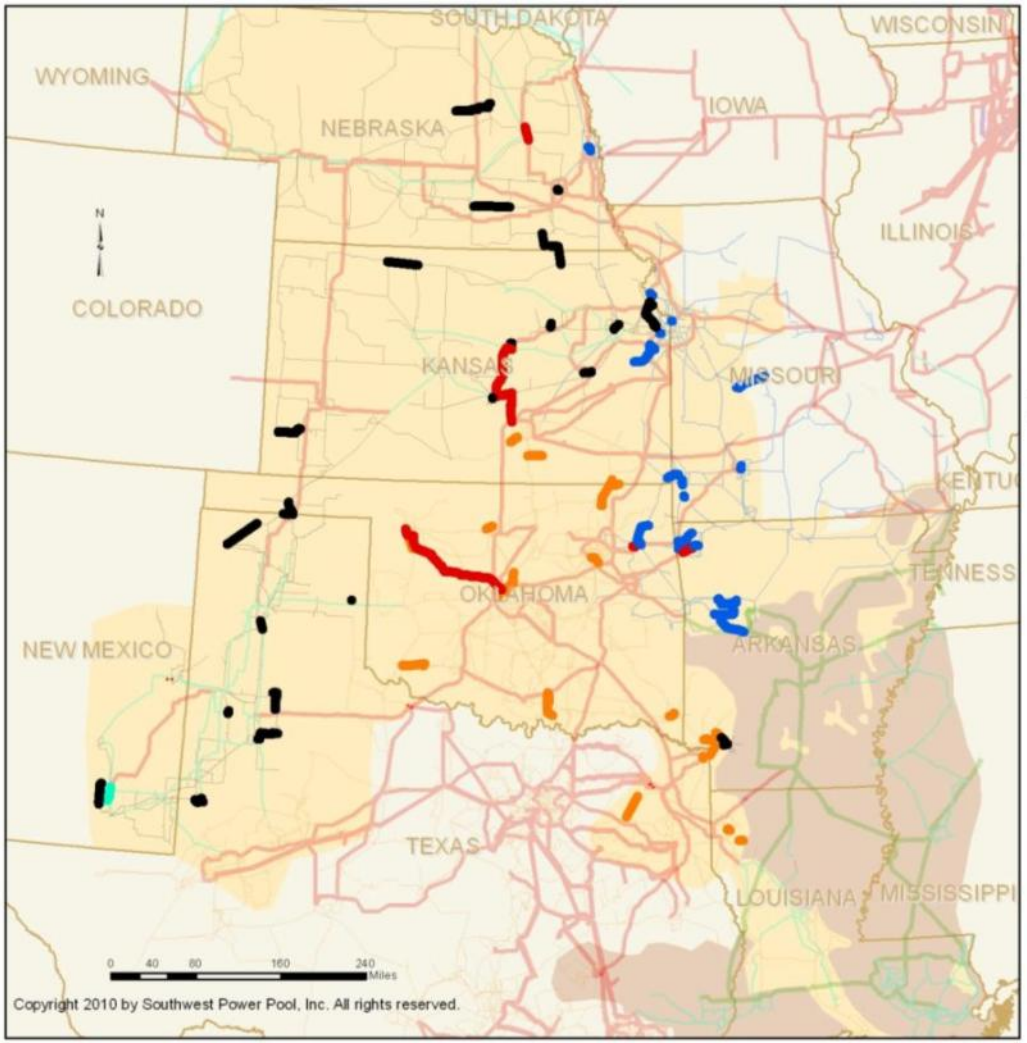
ITP20



SPP 2012 ITP10 Plan

ITP10

Projects Constructed 2005-2011



SPP Southwest Power Pool

Projects Constructed

(2005-2011)

- 115 kV
- 138 kV
- 161 kV
- 230 kV
- 345 kV
- Southwest Power Pool
- Entergy ICT

Map Created January 2012

Projects with Notifications to Construct