SPS 10-Year Transmission Plan/20-Year Strategic Vision

May 2009

This report contains transmission planning data that may be conceptual in nature and is subject to change. The transmission projects listed may change scope, in-service dates or may not be constructed.

Xcel Energy®

Purpose

- **Summarize various planning efforts across SPP and SPS**
- **Document 10 year plan based on current snapshots**
- **Meet FERC Order 890 requirements**
- **Provide roadmap that evolves to changing business and regulatory environment**

Key Points to Take Away

- **SPS transmission system has expansive projects**
- **Forecasts showing increasing load growth**
- **Customer demand may vary due to economic conditions, but transmission system demand will likely continue to increase due to renewable energy production**

Key Messages

- **10-Year Plan Key Messages**
  - Plan is primarily load serving and reliability based
  - Plan developed in coordination with SPP STEP processes
  - Five year capital budget created with ten year construction identified
  - No speculative transmission proposed for wind energy development
  - ~17,000 MW of generation interconnection requests in SPP queue
- **20-Year Vision Key Messages**
  - 20 Year Vision is a conceptual plan
  - Three scenarios evaluated, focused on load serving
  - 345 kV Transmission construction expected, not 765 kV
  - No major transmission initiatives (SPP EHV Plan, etc.)

SPS

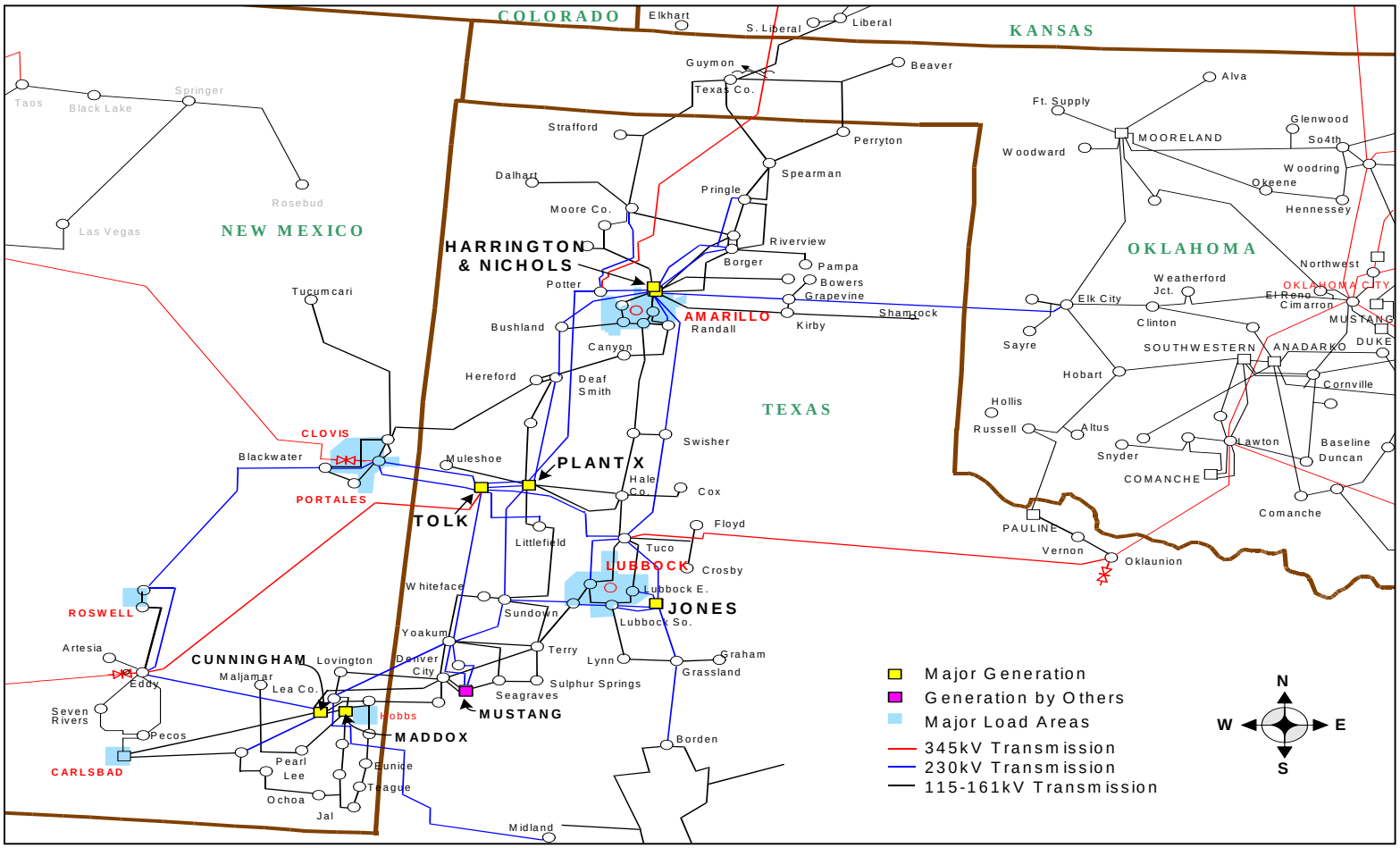
10-Year Transmission Plan/20-Year Vision

- **Overview**
- **SPS System Characteristics**
- **Transmission Planning Zones**
- **10 Year Transmission Plan**
  - **By Zone**
- **20 Year Transmission Vision**

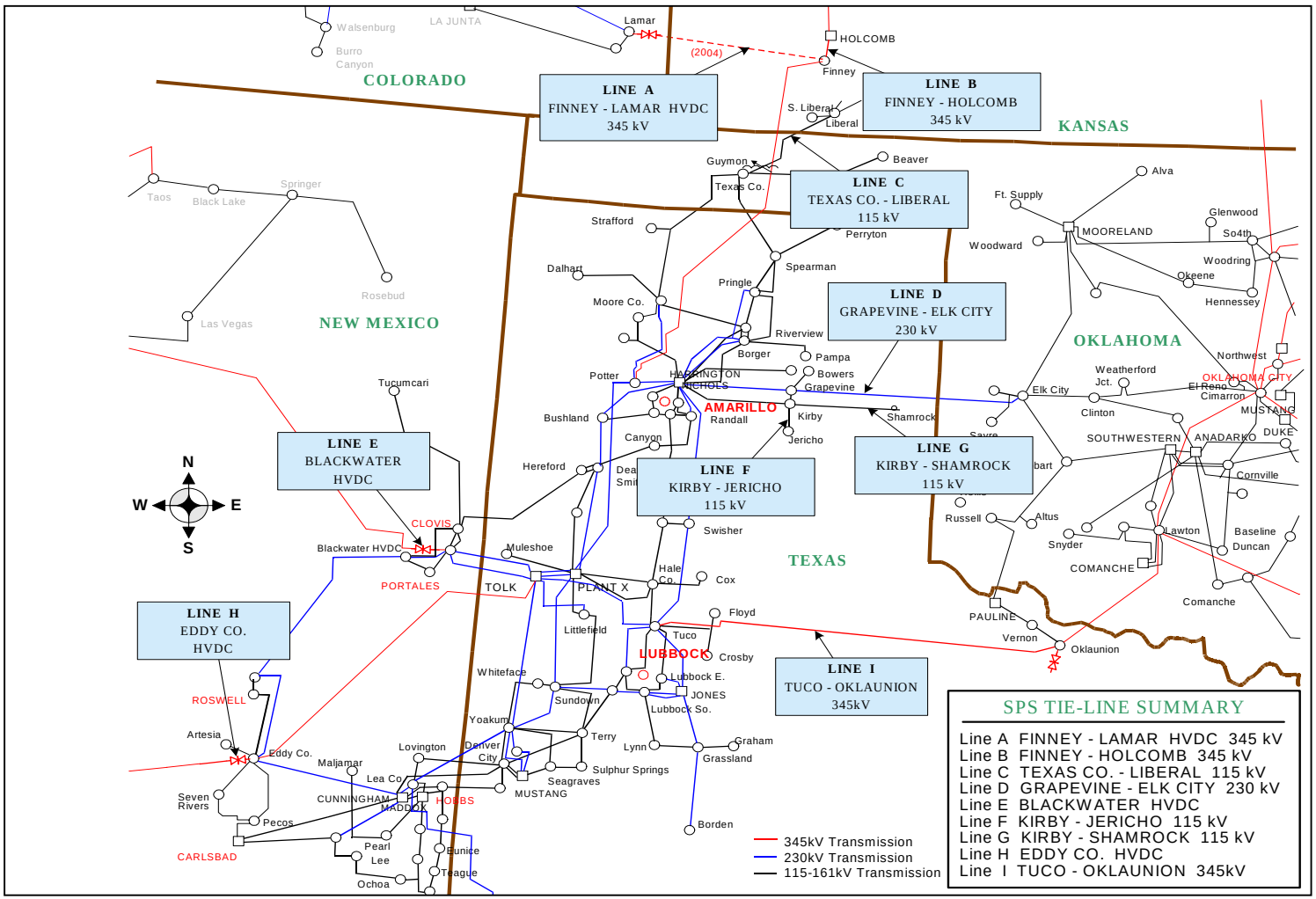
SPS System Characteristics

- System Control Center - Amarillo, Texas
- RTO/RRO - Southwest Power Pool (SPP)
- Transmission Line Miles - 6,336 miles (345kV-69kV)
- 304 Transmission and distribution stations served
- 2008 Summer Peak Load - 5,502 MW
- Generators Served/ Connected - 47
- Wind/Solar Interconnection Points/MW - 7/920
- 10 Wholesale Customers
- 14 Interconnected Major Utilities
- Energy Sales Class Breakdown
  - 12% residential, 47 % commercial/industrial, 39% wholesale
  - Remainder public authorities and lighting
- Service territory - 52,000 square miles
- Boundary of three electrical grids: East, West & ERCOT

SPS Service Territory



Tie Lines, Interconnections



Planning Process

- **SPP STEP**
  - Annual Process
  - Focus is overall reliability of entire SPP region
  - SPP conducts the studies for 10 years out
  - SPP invites participation in process
  - Study synopsis
    - SPP uses various models to test system under different flow conditions
    - Purpose is to determine upgrades to support increasing loads, sold transmission service
    - Results are “Notices to Construct” (“NTC”) to Transmission Owners each February - letters are on the SPP website

Planning Process

- **SPS FERC 890 - Local Planning Process**
  - Primarily aimed at 69 KV systems
  - Sub-regional load serving focus
  - Minimum of one annual meeting per year
  - All stakeholders invited to participate
  - Integrates with SPP's FERC Order 890 process
- **SPP EHV Planning Process**
  - Long-range 20-year horizon 345 kV, 765 kV plans
  - Coordinated with other RRCs and regions

Transmission

Planning Drivers

- **Load Growth Rate**
- **Regional Economic Conditions**
- **Wholesale and Retail Load Interconnections**
  - Heavy industrial and commercial development
  - Currently 20 requests in study queue, 200-300 MW
- **SPP STEP Planning Process**
- **Transmission Service Studies - SPP Aggregate Study process**
- **SPP Generator Interconnection Queue - 17,000 MW, mostly wind**
- **Regulatory/Environmental Considerations**
  - State Mandates
  - Wind Rich Area

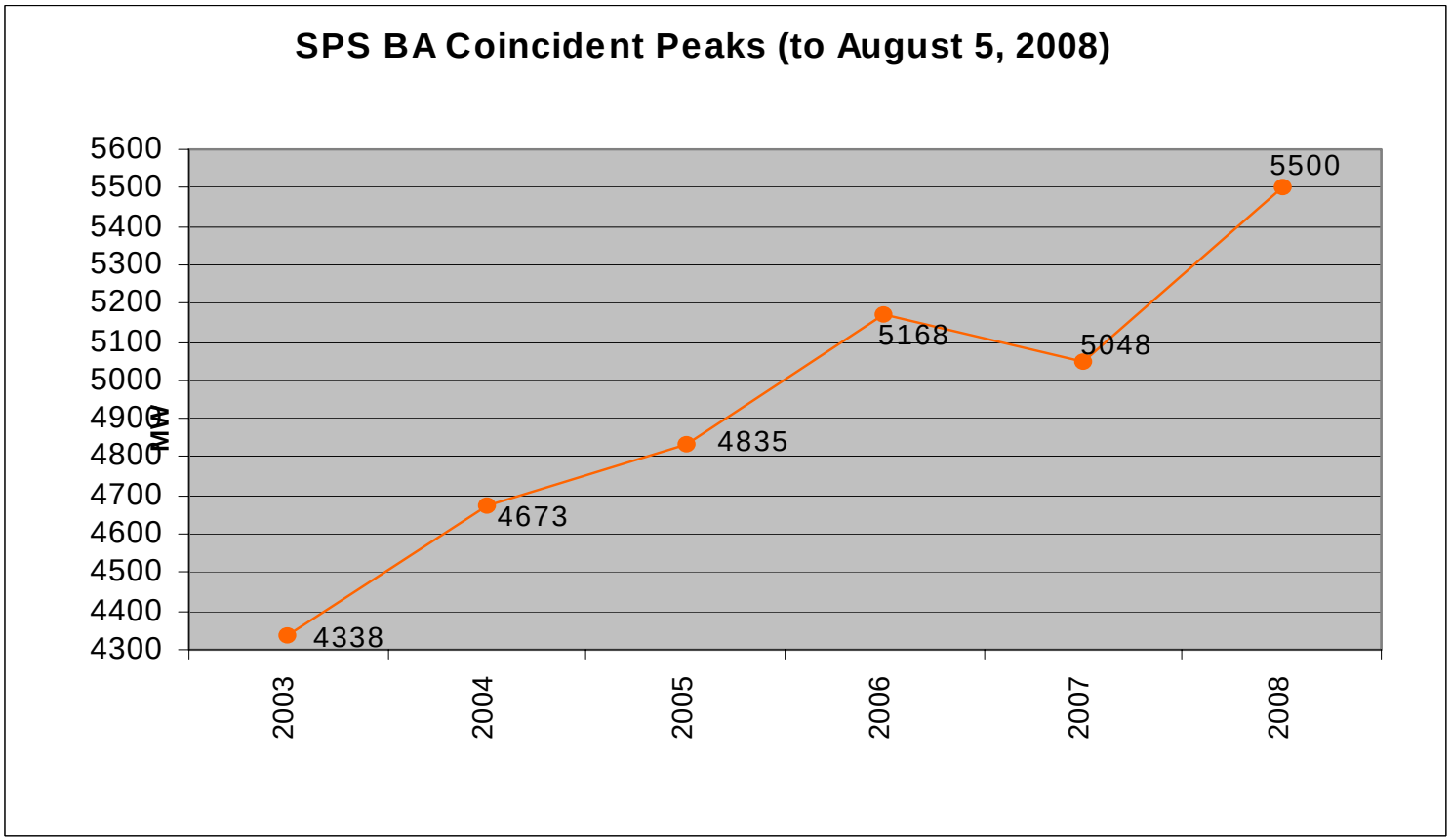
Transmission

Planning Drivers

- **Stakeholder Concerns**
  - Cooperatives - GSEC, NM Cooperatives
  - Munis - WTMPA
  - Neighboring Utilities - Caprock, WECC (PNM, EPE, PSCo), AEPW, Sunflower
  - IPPs - wind developers and fossil developers
    - PURPA and QFs - large issue!

Transmission
Planning Drivers

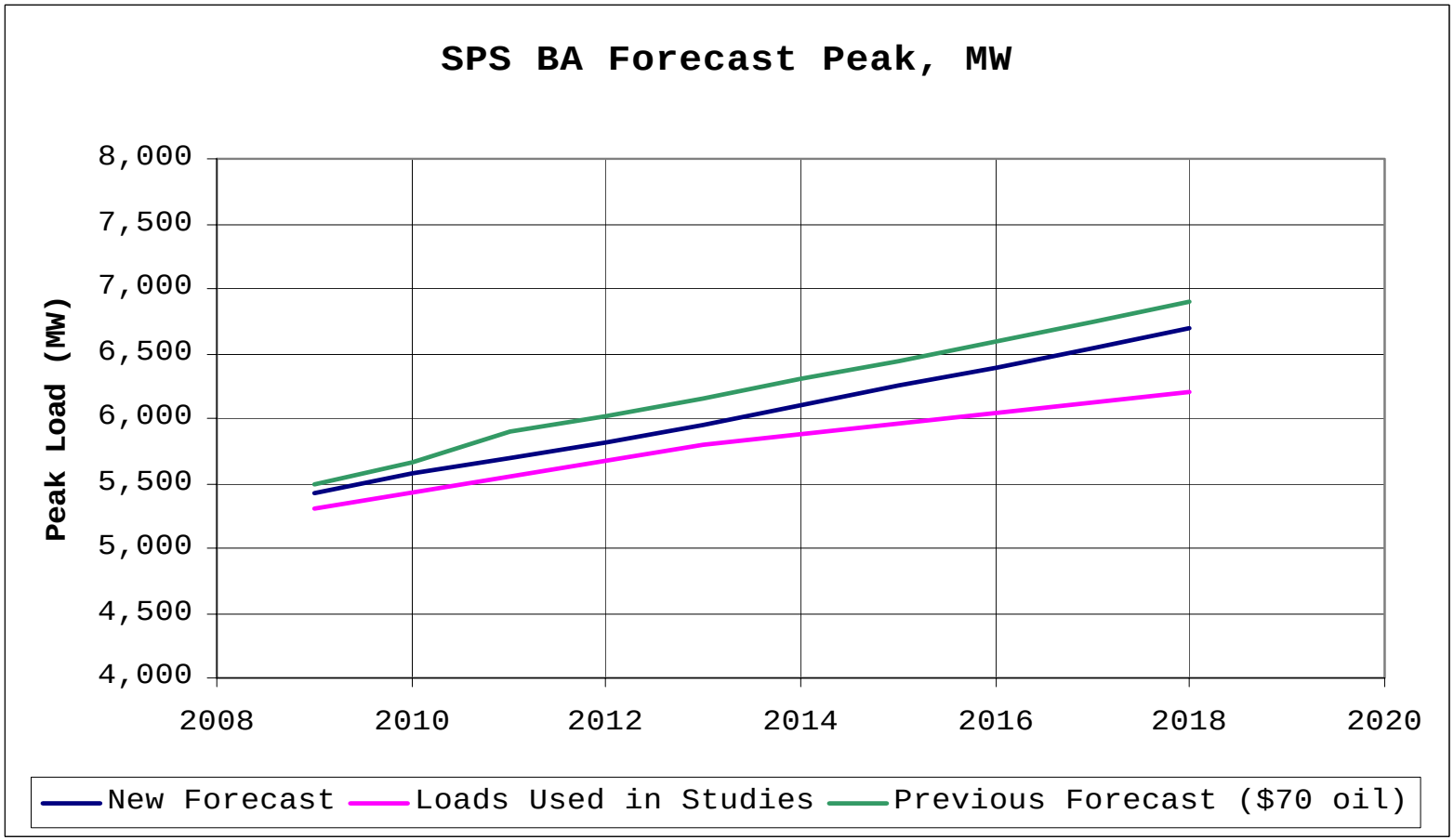
- **Load Forecasts**



Transmission

Planning Drivers

Load Forecasts

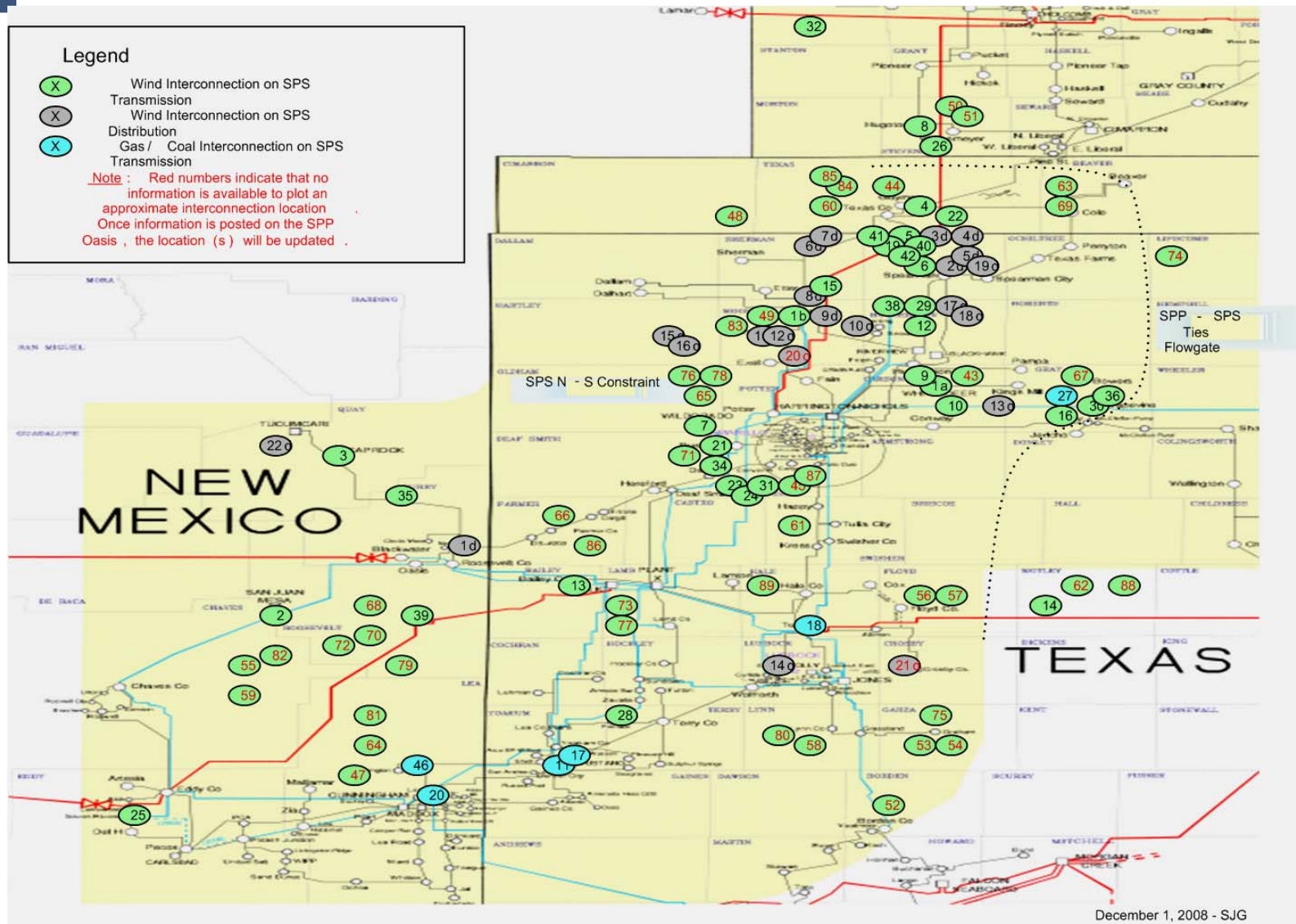


Implications

- **Project delay – CCN process may not go forward if transmission needs change**
- **Forecast Rebound – if project is delayed, load picks up, the transmission is behind schedule**
- **Lower forecast – slower build-out, not necessarily canceled projects**
- **Load forecast – may not be the most significant driver as compared to generation interconnections and transmission service sold by SPP**

Transmission Planning Drivers

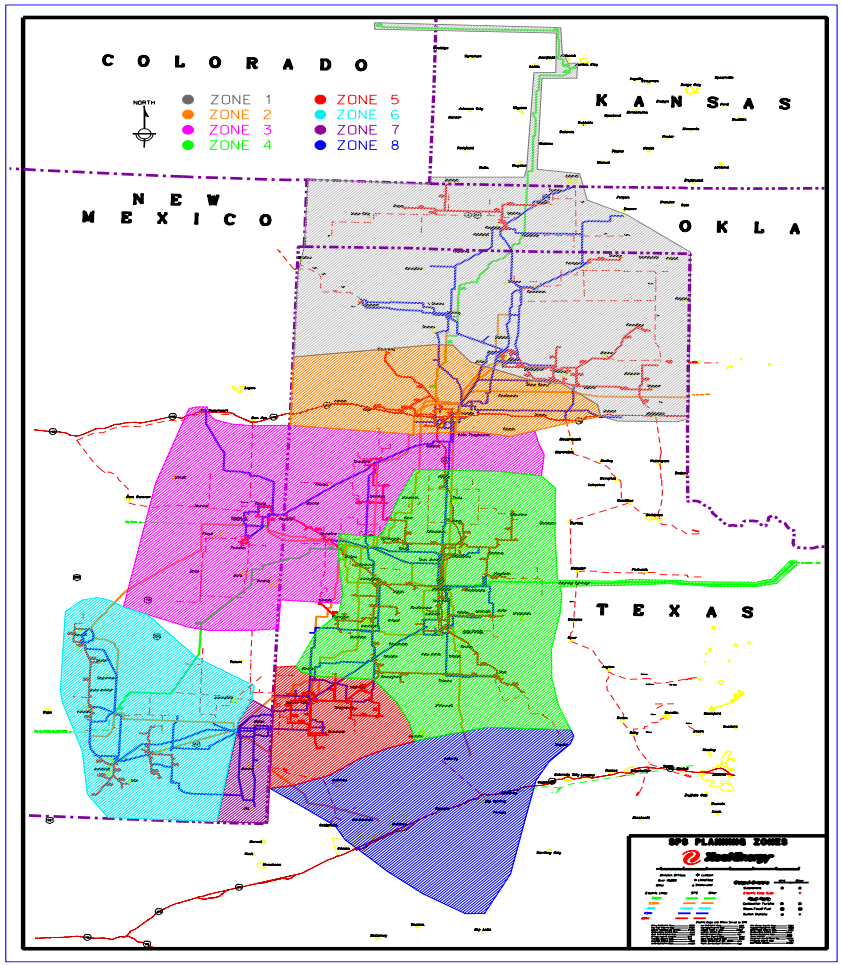
Generation Interconnections



Planning Criteria

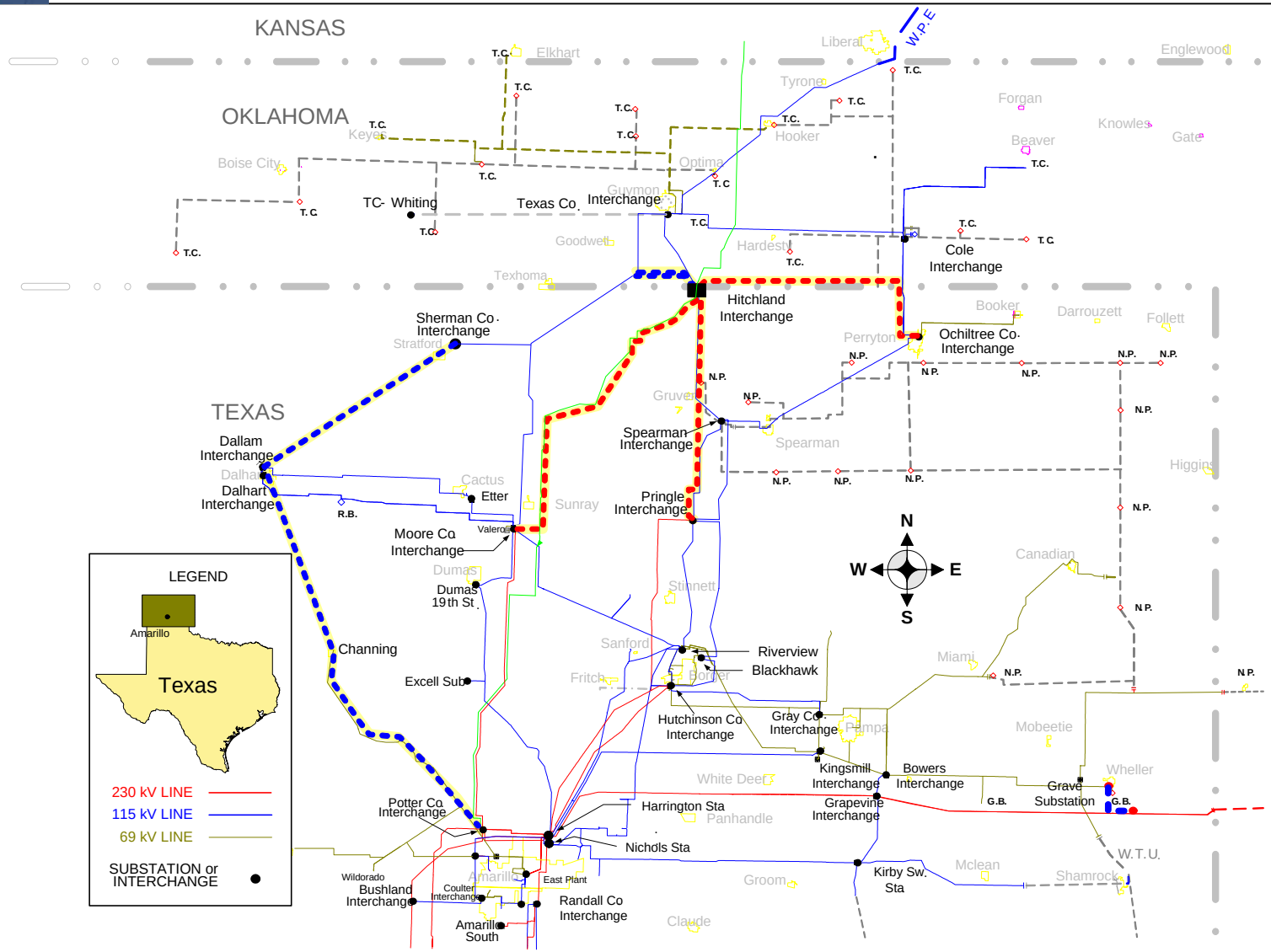
- **SPP Criteria**
- **SPS Criteria - filed as part of FERC 715**
  - Minimally restrictive
  - Primary focus in interconnection reliability
- **NERC Planning Standards**

Planning Zones



Zone 1, 2, and 3 Projects

Texas North Upgrades



Zone 1, 2 and 3 Projects

Year	Project	Descriptions	Issues	Cost $
2010	Texas North Upgrade	Hitchland Interchange: New 345/230/115 kV interchange.	Provide new source to the Texas and Oklahoma Panhandle area; to serve load growth during system intact conditions and contingencies.	93.9M
		Hitchland - Texas Co 115 kV lines: 2 lines, intercepting existing 115 kV lines		
		Hitchland - Spearman 115 kV line: 1 line, intercepting existing line		
		Hitchland - Perryton 115 kV line: 1 line, intercepting existing line		
		Hitchland - Moore Co 230 kV line: 230 kV line to existing Moore Co Interchange	Provide second 230 kV source to Moore Co. Area and provides voltage support for Potter-Moore 230 kV Line contingency	
		NW Intg - Channing-Dallam 115kV Line: Construct 230 kV operated at 115 kV	Provide relief to growing reliability problems on 69 kV serving Channing and Tascosa subs	
2011	Texas North Upgrade	Hitchland - Pringle 230 kV line: 230 kV line to existing Pringle Interchange	Provide another 230 kV source to Pringle Sub to enhance reliability in the area.	

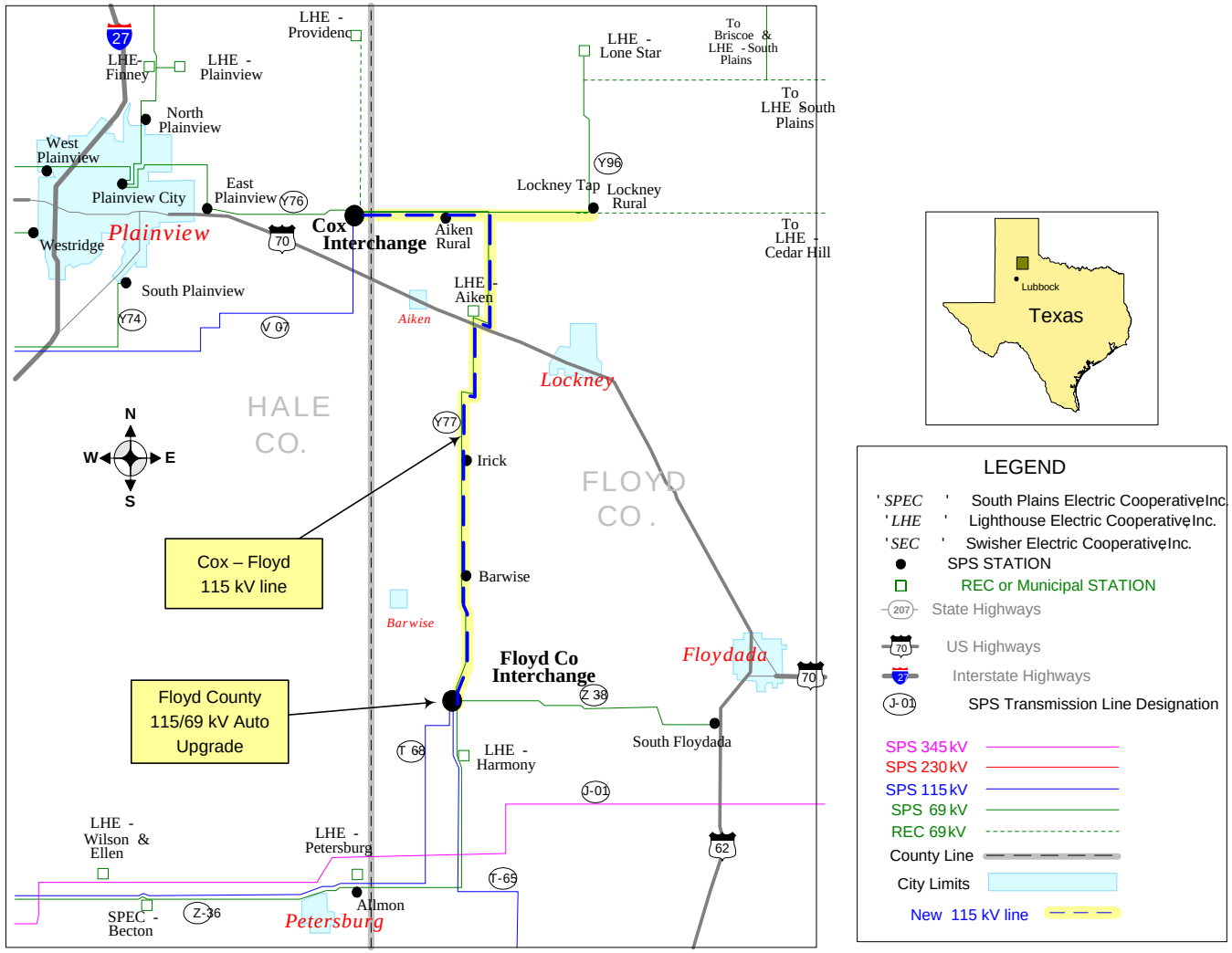
Zone 1, 2 and 3 Projects

Year	Project	Descriptions	Issues	Cost $
2009	Nichols Auto Upgrade	Change out 150 MVA units (2) with 252 MVA units	Required for firm transmission service service for Mustang GT's and Wildorado Wind.	6.2M
2010	Wheeler Project	New 230/115 kV Interchange; new 115 kV line to Grave Substation; new 115/69 kV transformer and new distribution Sub	Required to serve addition wholesale and retail loads in E. Panhandle area. Area need stronger source - current transmission is only 69 kV.	9.1M
2011	Texas North Upgrade-Phase 2	Hitchland -Ochiltree 230 kV line. New 230 kV Line to Ochiltree Intg (230/115 kV) near Perryton	Provides source to developing load area which has insufficient transmission. Mitigate contingency overload and voltage problems.	8.5M
2016	S. Georgia Intg - Osage Switching Station 115kV line	Upgrade 115 kV Line ratings to 100 deg. C.	Provide system reinforcement for the Nichols-Amarillo South 230 kV line contingency. SPP compliance required project.	1.3M
2018	Van Buren Tap-Hastings – Northwest 69 kV Line re-conductor	Re-conductor existing 69kV line	Contingency overload based on current conductor rating. Needs larger conductor	2.4M

Zone 1, 2 and 3 Projects

Year	Project	Descriptions	Issues	Cost $
2009	GSEC Deaf Smith #6	Install 3-way switch to serve new cooperative load	Coop adding new load near Hereford	0.3M
2010	GSEC Deaf Smith #24	Install 3-way switch to serve new cooperative load and 14.4 MVAr Cap Bank at Parmer Co	Cap bank will provide voltage support for the Curry Co. Interchange- Deaf Smith #20 115kV line segment contingency	0.9M
2010	Curry Co-Roosevelt Co. 115 kV line	Re-rate 115 kV Line from 90°C to 125 °C temp design.	Line upgrade will provide system reinforcement for outage of the 230/115kV auto at Oasis Intg.	0.2M
2010	North Clovis project	Upgrade from 69 kV to 115 kV service and upgrade Curry County line terminal	Prevents overload of Curry 115/69 KV autos by converting 69 kV dist transformers. Line terminal's low rated equipment needed upgrade	0.8M
2016	Deaf Smith Co. Interchange	Upgrade existing 230/115 KV Auto-transformer #1 to 252 MVA	Provide system reinforcement for Deaf Smith Interchange Autotransformer #2 contingency.	3.5M

Zone 4 - Projects



LEGEND

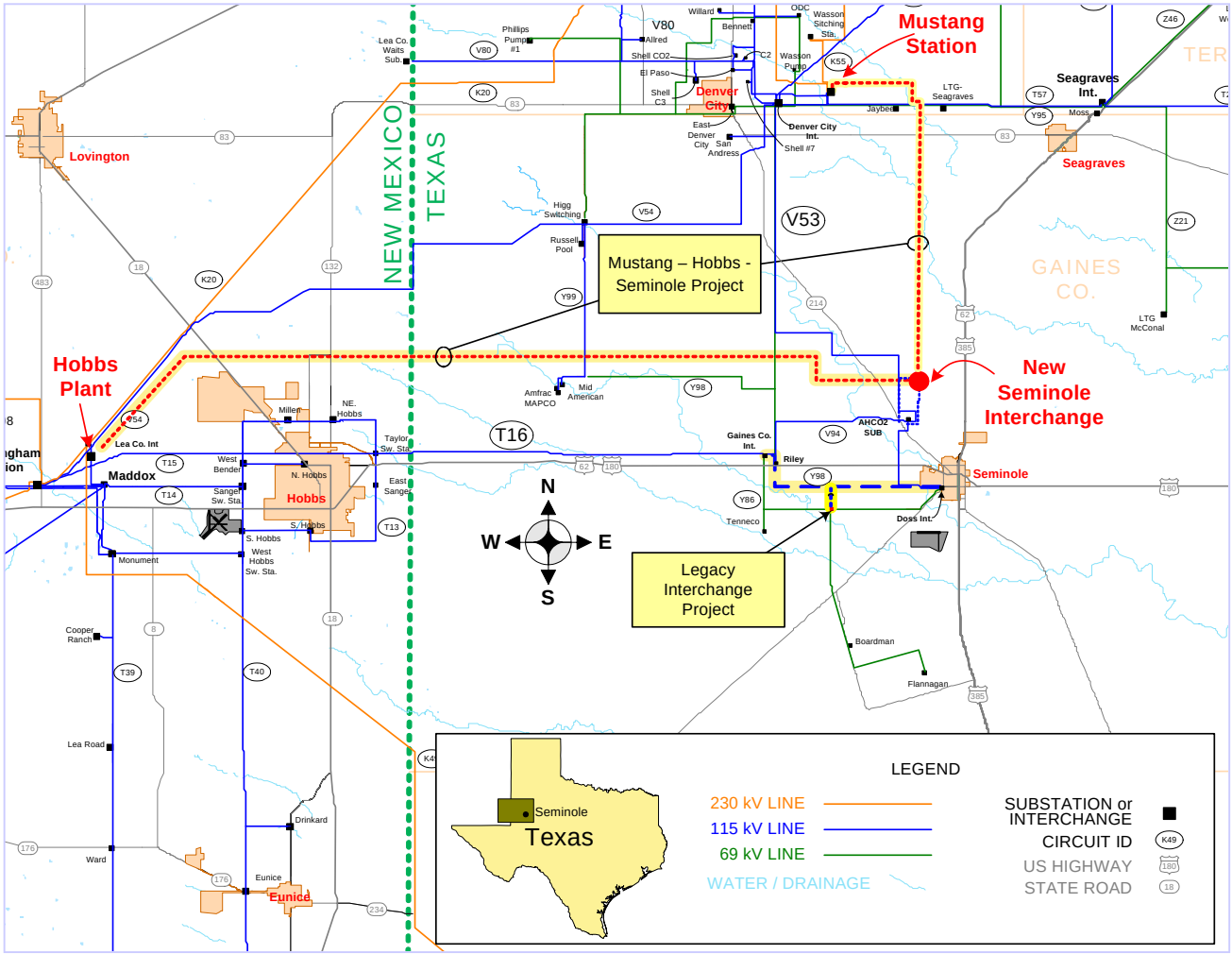
- 'SPEC ' South Plains Electric Cooperative Inc.
- 'LHE ' Lighthouse Electric Cooperative Inc.
- 'SEC ' Swisher Electric Cooperative Inc.
- SPS STATION
- REC or Municipal STATION
- 207 State Highways
- 70 US Highways
- 27 Interstate Highways
- J-01 SPS Transmission Line Designation

SPS 345 kV
SPS 230 kV
SPS 115 kV
SPS 69 kV
REC 69 kV
County Line
City Limits
New 115 kV line

Zone 4 Projects

Year	Project	Descriptions	Issues	Cost $
2008	WTMPA Transmission Service Request	Upgrade Floyd Co 115/69 kV from 40 MVA to 84 MVA and install 2nd 230/115 kV auto at Tuco	Provide 325 MW firm network transmission service for WTMPA customers/network upgrades required under SPP tariff.	5.0M
2008	Terry Co. Auto Upgrades	Upgrade both 115/69 kV autos to 84 MVA units	Provide N-1 contingency relief for the loss of the other transformer.	2.0M
2008	Cochran Co. Auto Upgrades	Upgrade both 115/69 kV autos to 84 MVA units	Provide N-1 contingency relief for the loss of the other transformer.	2.3M
2009	Cox-Floyd 115 kV line	Last of Crosby-Floyd Co upgrades	Final phase of Plainview-Floyd-Crosby upgrade project started in 2001 to mitigate system system intact and contingency problems on the south eastern most edge of the SPS system in Texas.	8.9M
2009	Hale County Intg. Auto Upgrade	Upgrade both 115/69 kV autos to 84 MVA units	Provide N-1 contingency relief for the loss of the other transformer.	1.7M
2009	Lubbock East Auto Upgrade	Upgrade both 115/69 kV autos to 84 MVA units	Provide N-1 contingency relief for the loss of the other transformer.	2.1M

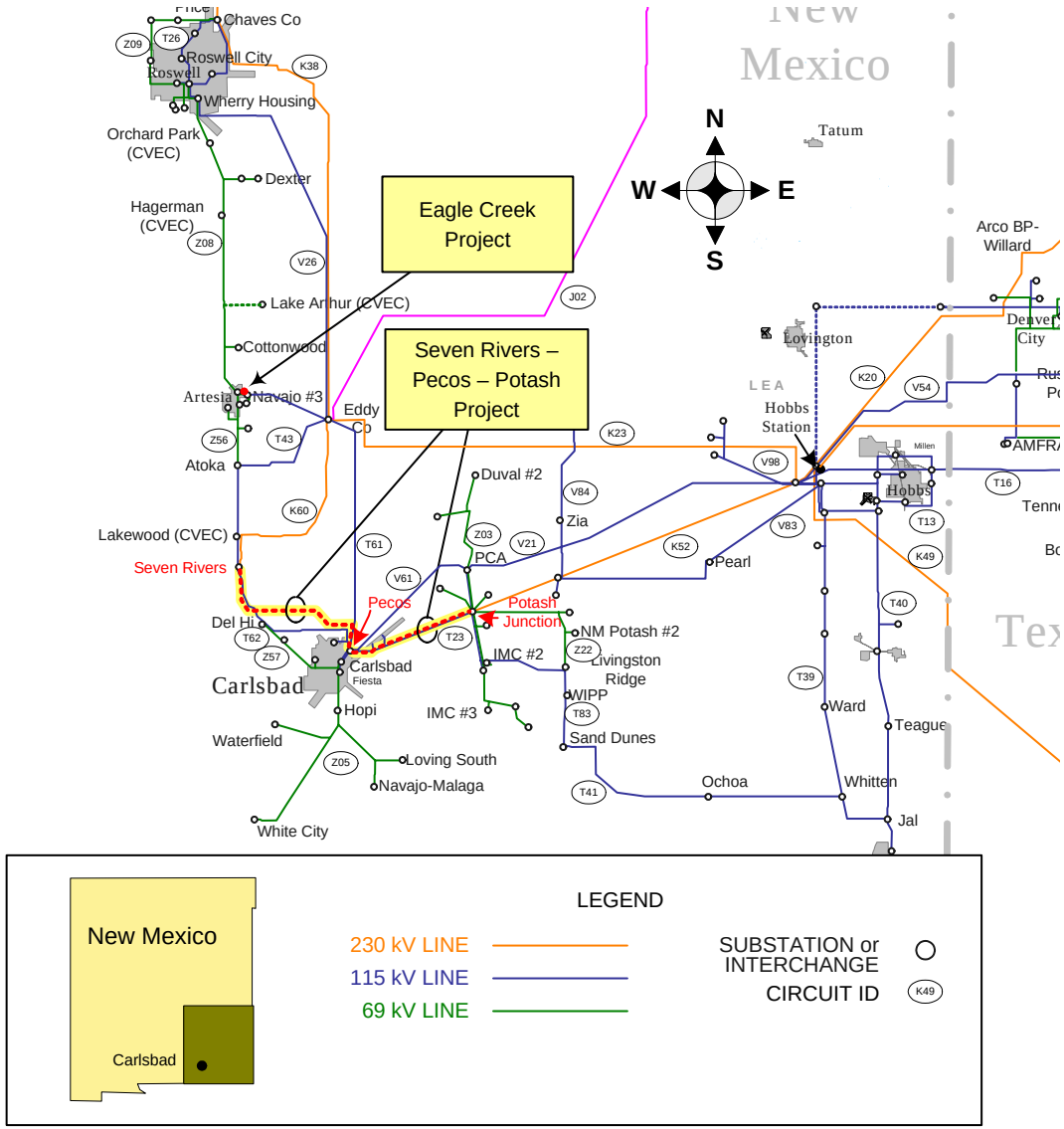
Zone 5 Projects



Zone 5 Projects

Year	Project	Descriptions	Issues	Cost $
2009	Yoakum County Intg.	Add second 230/115 150 MVA transformer	Provides relief of existing transformer overload due to line contingency in area.	1.9M
2010 and 2011	Mustang - Hobbs - Seminole Project	Construct 230 kV line from GSEC Mustang Plant- Seminole Intg. to Hobbs Plant. Install 2 230/115 kV autos at Seminole Intg. Re-terminate several 115 kV lines in and out of the 115 kV bus at Seminole	Provides load service for major Hess Corp. expansion project and network transmission service for Hobbs Generator	32.8M
2011	Legacy Intg Project	115/69 kV auto, convert 9.5 miles of 69 kV to 115 kV , construct ~ 3 miles of new 115 kV to connect station in to existing transmission.	Provides system reliability and reinforcement during intact and contingency conditions to developing oilfield loads in the Gaines Co area. Mitigates overload of Gaines co. transformer and 69 kV lines in that area.	7.6M

Zone 6, and 7 Projects



Zone 6 and 7 Projects

Year	Project	Descriptions	Issues	Cost $
2009	Eagle Creek Project	Construct new 115/69 kV interchange in Artesia, NM and re-terminate nearby Eddy Co - Seven Rivers 115 kV line at Eagle Creek. Re-terminate sources to Navajo refinery into this new station.	Provides network support for Artesia Intg that provides service to town and more reliable service to a large industrial customer.	14.6M
2010	Seven Rivers - Pecos - Potash Project	Construct 230 kV transmission from Seven Rivers - Pecos - Potash and install 230/115 kV auto at Pecos Intg.	Provides network transmission service for Hobbs Generator.	20.1M

Project Tracking

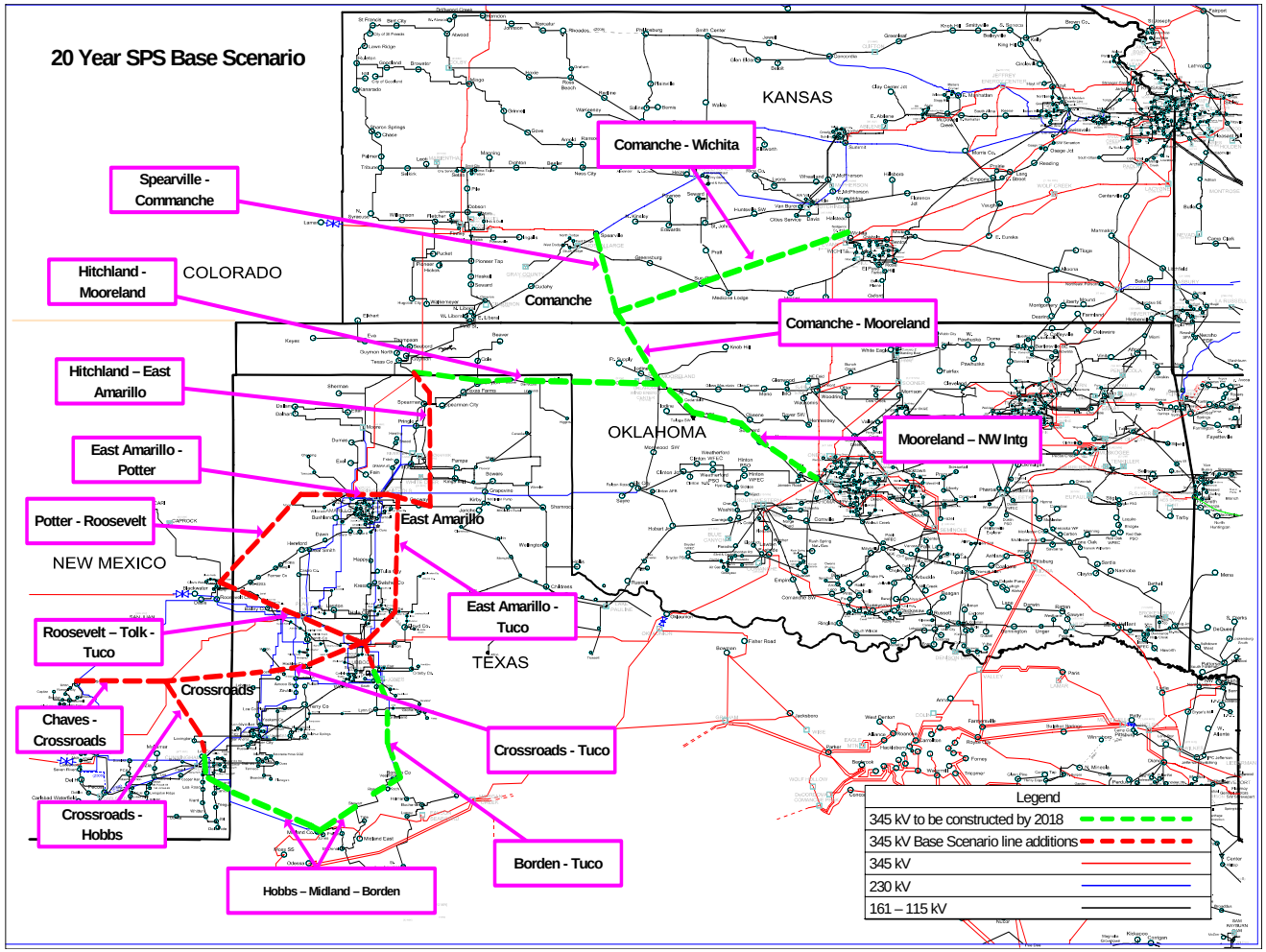
NTC_ID	PID	UID	Area	Project Name	Project type EXP	Project Owner Indicated In-Service Date	RTO Determined Need Date	Letter of Notification To Construct Issue date	Cost Estimate	Final Cost	Project Lead Time	Project Status	Project Status Comments
19987	21	10021	526	XFR - Denver City 115/69 kV	R	12/01/06	06/01/06	02/02/07	$3,000,000	$2,670,460			
19987	21	10022	526		R	12/01/06	06/01/06	02/02/07		$2,670,460			
19987	73	10091	526	XFR - Mustang Station N. 115 kV - Mustang Station 230 kV	R	06/22/07	06/01/08	02/02/07	$3,000,000	$2,269,005			
19987	74	10092	526	XFR - Artesia 115/69 kV	R	-	06/01/07	02/02/07	$2,750,000			Cancelled	Autos ok until 2017 w/switching. Study completed. Recommend construction of
19987	74	10093	526		R	-	06/01/07	02/02/07				Cancelled	Eagle Creek/Navajo Switching Station by summer 2010. Mitigates this problem,
19987	75	10094	526	XFR - Bailey Co 115/69 kV	R	04/01/07	06/01/06	02/02/07	$3,000,000	$2,476,344			
19987	75	10095	526		R	04/02/07	06/01/06	02/02/07		$2,476,344			
19987	76	10096	526	XFR - Terry Co 115/69 kV	R	11/01/07	06/01/07	02/02/07	$2,375,000				
19987	76	10097	526		R	09/26/08	06/01/07	02/02/07			18 months		Cannot change second transformer until Fall due to summer loading. Mitigation Plan verified by SPP staff.
19987	77	10098	526	XFR - Hockley 115/69 kV	R	11/21/08	06/01/06	02/02/07	$2,062,000		18 months		
19987	77	10099	526		R	12/19/08	06/01/06	02/02/07			18 months		Mitigation Plan verified by SPP staff.
19987	79	10101	526	XFR - Gaines County Interchange 69 kV - Gaines County Interchange 115 kV	R	-	06/01/07	02/02/07	$2,750,000				Legacy Interchange Project to replace this project scope. Submitted to capital
19987	79	10102	526		R	-	06/01/07	02/02/07					budget for approval 1/1/2008. Estimated ISD is 6/1/2011, with an estimated cost
20004	144	10183	526	Line - North Clovis	R	06/01/10	06/01/08		$200,000				Approved in 2008 budget. Replacement for upgrade of Curry autos. Requires changeout of 69 kV dist transformer to 115 kV. No mitigation needed
20004	146	10185	526	Multi - Seminole - Hobbs Project 230 kV	R	06/01/09	06/01/08	02/13/08	$8,762,733				
20004	146	10186	526		R	06/01/10	06/01/08	02/13/08	$8,920,699				
20004	146	10187	526		R	06/01/09	06/01/08	02/13/08	$7,715,262				
20004	146	10188	526		R	06/01/09	06/01/08	02/13/08					
20004	146	10189	526		R	06/01/09	06/01/08	02/13/08	$3,891,288				
20004	146	10190	526		R	06/01/09	06/01/08	02/13/08					
20004	147	10191	526	XFR - Roswell Interchange 115/69 kV	R	-	06/01/08	02/13/08	$600,000				Needs further study. Will likely convert 69 kV load to 115 kV . Studying new load requests on 69 kV in Roswell.
	148	10192	526	Line - Amarillo South - Springdraw 115 kV	PL	06/06/08	-		$5,713,560		24 months		
	149	10193	526	Line - Cox - Floyd 115 kV	PL	12/01/08	-		$9,898,838		28 months		
19987	150	10194	526	XFR - Kress 115/69 kV	R	12/26/08	06/01/08	02/02/07	$1,250,000		18 months		Mitigation Plan verified by SPP staff.
20004	151	10195	526	XFR - Tuco 115/69 kV	R	-	06/01/08	02/13/08	$1,260,000				New system configuration mitigates this project.
19987	152	10196	526	XFR - NE Hereford 115/69 kV #2	R	-	06/01/08	02/02/07	$1,260,000				New system configuration mitigates this project.
20004	153	10197	526	XFR - Potash Junction Interchange 115/69 kV	R	-	04/01/08	02/13/08	$600,000			Cancelled	No project here! Step study justified this project with a modeling error.
	154	10198	526	XFR - Tuco Interchange 230/115 kV Ckt 2	TS	10/31/08	06/01/08		$7,978,726		24 months		Project ISD has slipped due to transformer delivery. LPL generation will serve as a mitigation.
20004	155	10199	526	XFR - Nichols 230/115 kV	R	05/01/09	06/01/11	02/13/08	$6,000,000		24 months		
20004	156	10200	526	Multi - Hitchland - Texas Co. 230 kV and 115 kV	R	06/01/10	06/01/08	02/13/08	$5,132,829				Construct double-circuit 115 kV line from Hitchland Interchange to V30. (Estimated cost includes UID 10328 scope)
20004	156	10201	526		R	06/01/10	06/01/08	02/13/08	$31,915,701				Construct the new 345/230/115 kV Hitchland Interchange. (Estimated cost includes UID 10327 scope)
19987	157	10202	526	XFR - Hale Co 115/69 kV	R	02/06/09	06/01/07	02/02/07	$2,900,000		18 months		
19987	157	10203	526		R	03/13/09	06/01/07	02/02/07			18 months		Mitigation Plan verified by SPP staff.
19987	158	10204	526	XFR - Carlsbad Interchange 115 kV - Carlsbad Interchange 69 kV	R	-	06/01/08	02/02/07	$2,750,000		18 months		
19987	158	10205	526		R	-	06/01/08	02/02/07			18 months		Mitigation Provided by TO.
20004	159	10206	526	Line - Plant X Station - Tolk Station West 230 kV	R	12/01/08	06/01/08	02/13/08	$66,000				STEP study justification based on an invalid contingency. However SPS recognizes the line flow constraint of the these wave traps.
20004	160	10207	526	Line - Terry County Interchange - Wolfforth Interchange 115 kV	R	12/05/08	06/01/08	02/13/08	$5,000				Need to correct models to reflect field verified jumper ratings of 138/138 MVA summer normal/emergency ratings (winter rating 153/153) based on terminal CT ratings

Questions ?

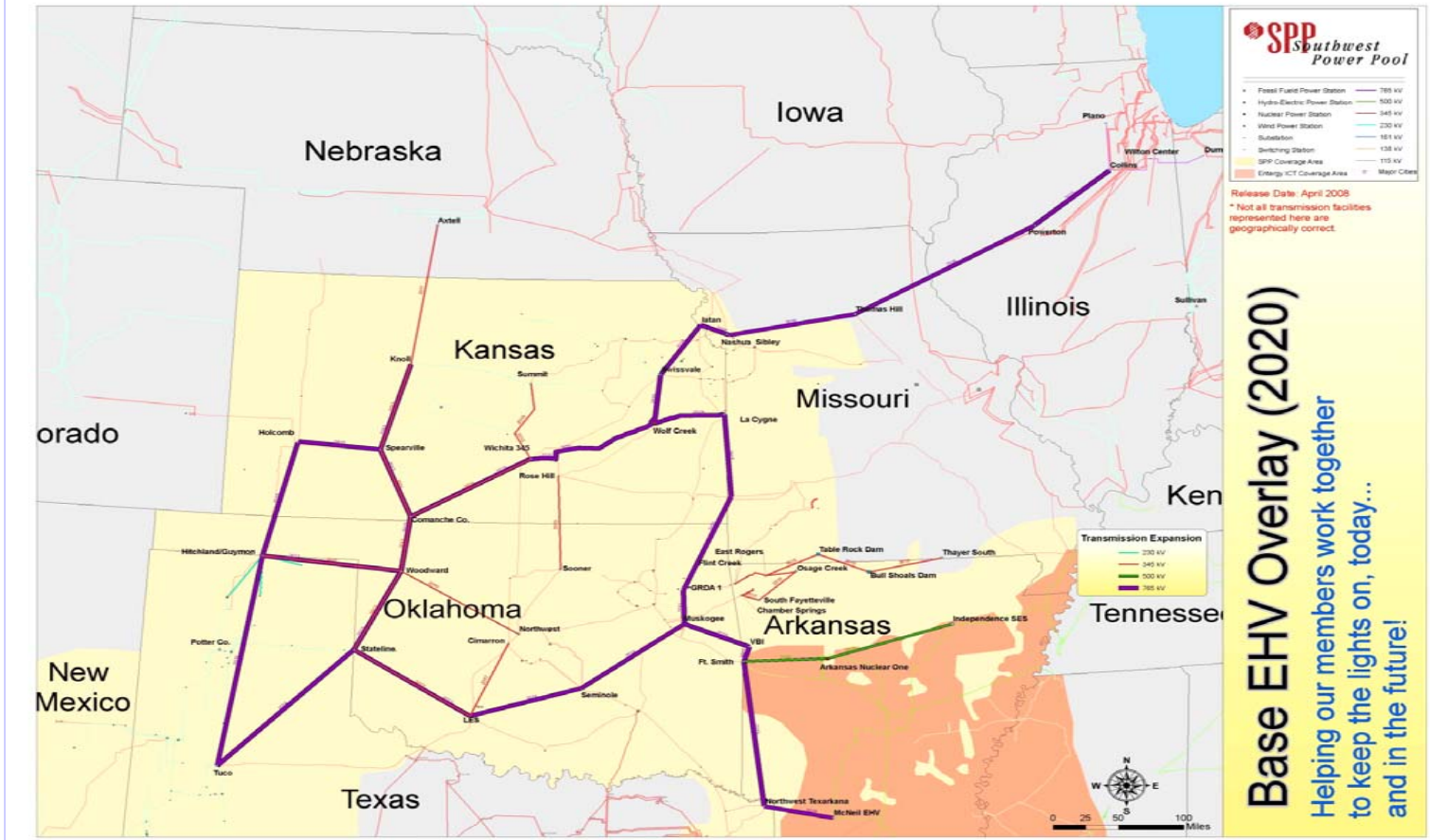
20-Year Transmission Vision

- **Not a detailed plan, but a 'vision'**
- **Three Scenarios**
  - **Scenario I - High Internal Renewables**
  - **Scenario II - High Resource Import**
  - **Scenario III - Minimum Load Growth**

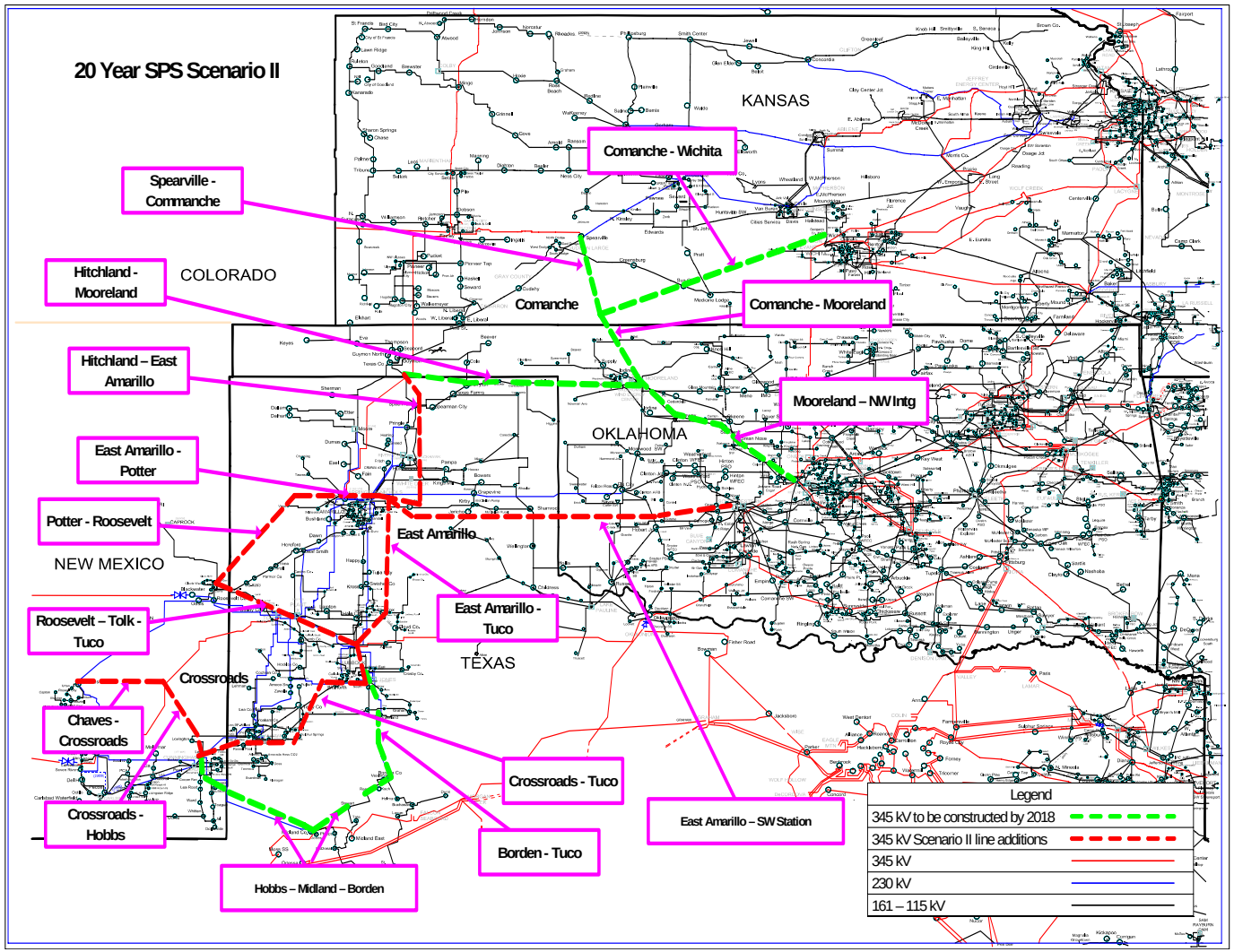
Base Scenario
Transmission Vision



Scenario I
Transmission Vision



Scenario II
Transmission Vision



Scenario III

Transmission Vision

- **No additional impacts beyond the Base Scenario expected**
  - **By 2028, only 100-150 MW would be needed for a 0.25% growth rate**
  - **345 KV Plan for Base Scenario likely adequate**

Questions ?