

Review of the transmission projects being filed with our SB100 filing.

Energy Zone 1

Short-term:

The upgrade of the Pawnee to Smoky Hill and the Pawnee to Daniel Park 230 kV lines are currently being upgraded by raising structures and replacing termination equipment. Studies indicate that an additional 300-400 MW of generation can be injected at Pawnee. The details of upgrades are shown in the Pawnee-SH - DP appendix B. The cost for these upgrades is \$1.5 million and the work has been approved in the PSCo capital budget. The work has been started with completion expected in the first quarter of 2008. **See Appendix B.**

Long Term:

Pawnee - Smoky Hill

PSCo is anticipating filing a CPCN for a Pawnee to Smoky Hill 345 kV for the potential increase of 500 MW. (Not including the 300-400 MW from the short term solution.)

Ault - Cherokee

PSCo has studied two generation requests (GI-2007-3 and GI-2007-4) These requests were for an additional wind of 300 MW respectively for each request. The network upgrades required were Construct a new 85-mile 230 kV transmission line using 2-conductor bundle of 954 kcmil "Cardinal" conductor per phase from the Ault Substation to Cherokee Substation rated at 800 MVA. This will consist of a single 59-mile line from Ault to just outside of Ft. Lupton. From this point the line will become rebuilding the existing 115 kV line from Ft. Lupton to Cherokee where one side is operated at 115 kV for the TSGT load serving substations and the other side will operate a 26-mile double circuit 230 kV line by rebuilding the existing 115 kV line from Ft. Lupton to Cherokee where one side is operated at 115 kV for the TSGT load serving substations and the other side at 230 kV completing the circuit from Ault to Cherokee.

The estimated cost is an "indicative" (+/-30%) preliminary cost in 2007 dollars (\$ 70 million) and is based on typical construction costs for previously performed similar construction. The estimated length of time required to complete the project is 60 months.

Keenesburg to Ft. Lupton

PSCo has studied two generation requests (GI-2007-5 and GI-2007-6) These requests were for an additional wind of 50 MW and 200 MW respectively. The network upgrades required were:

Construct a new 20-mile, 230 kV line from Keenesburg to Ft. Lupton Substation. The new transmission line construction can be described in two sections:

- o The first section consists of stringing a 3rd circuit, approximately 4-miles long, using the existing 345 kV triple circuit steel structures in the existing right-of-way for the Ft. St. Vrain to Green Valley 230 kV transmission line.
- o Rebuild 16-miles of the existing Ft. Lupton to Pawnee 230 kV transmission line to double circuit 800 MVA rated from Ft. Lupton to the point adjacent to the new 3rd circuit described above.

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Rebuild the existing 28-mile 115 kV transmission line from Cherokee to Ft. Lupton to double circuit: operate the existing circuit at 115 kV and operate the 2nd circuit at 230 kV (this circuit will be a new 230 kV Ft. Lupton to Cherokee transmission line)

Total cost was \$ 37.5 million and the schedule would be 54 months after CPCN approval.

Energy Zone 3

Short-term:

Boone to Lamar 230 kV line which is jointly owned with TSG&T. (56 % PSCO/ 44 % TSG&T). The thermal capability of this line is 478 MVA and is limited by termination equipment. PSCO has proposed a project in uprate the termination equipment at Lamar and Boone substations. These upgrades would increase the capacity to 620 MVA. The capacity of this line is shared with TSG&T on the above percentages. These upgrades will be accomplished by capital budget expenditures at Lamar substation of \$90,000 and \$893,000 at Boone substation. Once these uprates have been completed the thermal rating of the line will be 620 MVA. The operational limit of the line will remain approximately 300 MVA in the east to west direction.

Long-term: Energy Zones 2 and 3.

Lamar - Boone

The EPTP is joint transmission project between TSG&T and Western Area power Administration. The EPTP project would consist of approximately 1100 miles of high voltage backbone electric transmission facilities and associated substations. PSCO is entering in an MOU with TriState for our participation on this project. The benefits to a joint project would be Transmission for PSCO to gain access to the Energy Zone 2 and 3 and the potential generation resources in those area. This project would be projected in the 2012-2014 time period.

Lamar substation: 57 miles of new 230 kV transmission line into area south of Lamar to gain access to Baca County wind resources, and new switching station - This project would be associated with the EPTP project at a cost of \$27 million.

Energy Zone 4

Short term and long term:

PSCO has evaluated system capacity for the injection of generation resources at San Luis Valley Substation (jointly owned by Public Service and Tri-State). Preliminary studies indicate that PSCO could accept approximately 200 MW at the San Luis substation that is located north of Mosca, CO. PSCO and TSG&t have approved a joint budget item to add two 230 kV terminations to the San Luis 230 kV substation. The proposal would be to add a 230 kV terminal to the San Luis valley substation, in which a potential resource could be accommodated. A new 230 kV line from the resource to the San Luis substation would have to be constructed. The San Luis substation is a joint facility between PSCO and TSG&T. TSG&T and PSCO would add two 230 kV terminals to the substation. The first would be for TSG&T proposed Walsenburg to San Luis 230 kV line and the other a terminal for PSCO.

Appendix B

Pawnee - Daniels Park Line Uprate Summary

	To Uprate to: 637MVA	Comments
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Line 5165 Pawnee to Smoky Hill

Line Work	\$87,451	Raise 2 structures
Pawnee Sub	\$373,051	6 switches and one line trap to be replaced.
Quincy	\$0	
Smoky Hill	\$129,863	One line trap and single 1272 jumpers to be replaced.
SUBTOTAL	\$590,365	

Line 5163 Smoky Hill - Homestead - Murphy Creek - Sulphur

Line Work		Included under 5457 line work
Smoky Hill Sub	\$0	
Homestead Sub	\$0	
Murphy Creek Sub	\$0	
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
SUBTOTAL	\$59,029	

Line 5115 Sulphur-Lemon Gulch-Surrey Ridge-Daniels Park

Line Work		Included under 5457 line work
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
Lemon Gulch Sub	\$0	no work needed to get to 637MVA, however no overload capacity.
Surrey Ridge Sub	\$0	no work needed to get to 637MVA, however no overload capacity.
Daniels Park Sub	\$0	
SUBTOTAL	\$59,029	

Line 5457 Pawnee - Daniels Park

Line Work - Steel	\$392,397	9 tower extensions, one new structure
Line Work - Wood	\$87,451	raise 2 structures
Pawnee Sub	\$294,207	4 gang switches replaced.
Daniels Park	\$0	
SUBTOTAL	\$774,055	

Siting and Land Rights

Line Work	\$32,973	
SUBTOTAL	\$32,973	

Grand Total	\$1,515,451	
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Pawnee - Daniels Park Line Uprate Summary

	To Uprate to: 637MVA	Comments
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Line 5165 Pawnee to Smoky Hill

Line Work	\$87,451	Raise 2 structures
Pawnee Sub	\$373,051	6 switches and one line trap to be replaced.
Quincy	\$0	
Smoky Hill	\$129,863	One line trap and single 1272 jumpers to be replaced.
SUBTOTAL	\$590,365	

Line 5163 Smoky Hill - Homestead - Murphy Creek - Sulphur

Line Work		Included under 5457 line work
Smoky Hill Sub	\$0	
Homestead Sub	\$0	
Murphy Creek Sub	\$0	
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
SUBTOTAL	\$59,029	

Line 5115 Sulphur-Lemon Gulch-Surrey Ridge-Daniels Park

Line Work		Included under 5457 line work
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
Lemon Gulch Sub	\$0	<i>no work needed to get to 637MVA, however no overload capacity</i>
Surrey Ridge Sub	\$0	<i>no work needed to get to 637MVA, however no overload capacity</i>
Daniels Park Sub	\$0	
SUBTOTAL	\$59,029	

Line 5457 Pawnee - Daniels Park

Line Work - Steel	\$392,397	9 tower extensions, one new structure
Line Work - Wood	\$87,451	raise 2 structures
Pawnee Sub	\$294,207	4 gang switches replaced.
Daniels Park	\$0	
SUBTOTAL	\$774,055	

Siting and Land Rights

Line Work	\$32,973	
SUBTOTAL	\$32,973	

Grand Total	\$1,515,451
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Updated from 3-2-07:

The two major differences:

I made a mistake originally and left off \$87,450 worth of work on line 5457. I had left this off before because I thought it was double counting from line 5165, but after talking to Danny Pearson, this was an incorrect assumption.

After talking through this uprate with Dick Bush, the work required at Lemon Gulch and Surrey Ridge is not necessarily needed to get to 637MVA. In fact, the 1600A rating the line ruptors currently have meets the 1600A rating exactly. So this work is not needed but there would be no overload capacity whatsoever.

Pawnee - Daniels Park Line Uprate Summary

	To Uprate to: 637MVA	Comments
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Line 5165 Pawnee to Smoky Hill

Line Work	\$87,451	Raise 2 structures
Pawnee Sub	\$373,051	6 switches and one line trap to be replaced.
Quincy	\$0	
Smoky Hill	\$129,863	One line trap and single 1272 jumpers to be replaced.
SUBTOTAL	\$590,365	

Line 5163 Smoky Hill - Homestead - Murphy Creek - Sulphur

Line Work		Included under 5457 line work
Smoky Hill Sub	\$0	
Homestead Sub	\$0	
Murphy Creek Sub	\$0	
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
SUBTOTAL	\$59,029	

Line 5115 Sulphur-Lemon Gulch-Surrey Ridge-Daniels Park

Line Work		Included under 5457 line work
Sulphur Sub	\$59,029	Add a second jumper to the breakers.
Lemon Gulch Sub	\$266,379	Replace two 1600A Line Ruptors with 2000A line ruptors
Surrey Ridge Sub	\$266,379	Replace two 1600A Line Ruptors with 2000A line ruptors
Daniels Park Sub	\$0	
SUBTOTAL	\$591,787	

Line 5457 Pawnee - Daniels Park

Line Work	\$479,848	9 tower extensions, one new structure, ALSO Raise 2 Structures	3/19/2007
Pawnee Sub	\$294,207	4 gang switches replaced.	1/23/2007
Daniels Park	\$0		1/23/2007
SUBTOTAL	\$774,055		

Siting and Land Rights

Line Work	\$32,973		2/7/2007
SUBTOTAL	\$32,973		

Grand Total	\$2,048,209
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Pawnee - Daniels Park Line Uprate Summary

	To Uprate to:		Comments
	637MVA	735MVA	

Line 5165 Pawnee to Smoky Hill

Line Work	\$0	\$501,276	800: Add 20 Phase raisers
Pawnee Sub	\$369,566	\$369,566	6 switches and one line trap to be replaced.
Quincy	\$0	????	800: 3 line ruptors will require replacement.
Smoky Hill	\$119,928	\$704,856	637: One line trap and single 1272 jumpers to be replaced. 800: Also replace 3 breakers, 6 switches, 1 ground switch.
SUBTOTAL	\$489,494	\$1,575,698	

Line 5163 Smoky Hill - Homestead - Murphy Creek - Sulphur

Line Work			Included under 5457 line work
Smoky Hill Sub	\$0	\$0	
Homestead Sub	\$0	\$0	
Murphy Creek Sub	\$0	\$0	
Sulphur Sub	\$56,973	\$56,973	Add a second jumper to the breakers.
SUBTOTAL	\$56,973	\$56,973	

Line 5115 Sulphur-Lemon Gulch-Surrey Ridge-Daniels Park

Line Work			Included under 5457 line work
Sulphur Sub	\$56,973	\$56,973	Add a second jumper to the breakers.
Lemon Gulch Sub	\$0	\$289,638	735: Replace Line Rupters
Surrey Ridge Sub	\$0	\$289,638	735: Replace Line Rupters
Daniels Park Sub	\$0	\$275,552	735: Replace 2 switches and 1 breaker
SUBTOTAL	\$56,973	\$911,801	

Line 5457 Pawnee - Daniels Park

Line Work	\$360,056	\$1,068,000	637: 6 tower extensions, one new structure, and lower one distribution circuit. 735: steel: 10 tower extensions, one new structure, and lower one distribution circuit. Wood: ???
Pawnee Sub	\$290,565	\$330,766	637: 4 gang switches replaced. 735: Also a line trap replaced
Daniels Park	\$0	\$414,849	735: 4 Switches and 1 breaker would have to be replaced.
SUBTOTAL	\$650,621	\$1,813,615	

Grand Total	\$1,254,061	\$4,358,087	
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