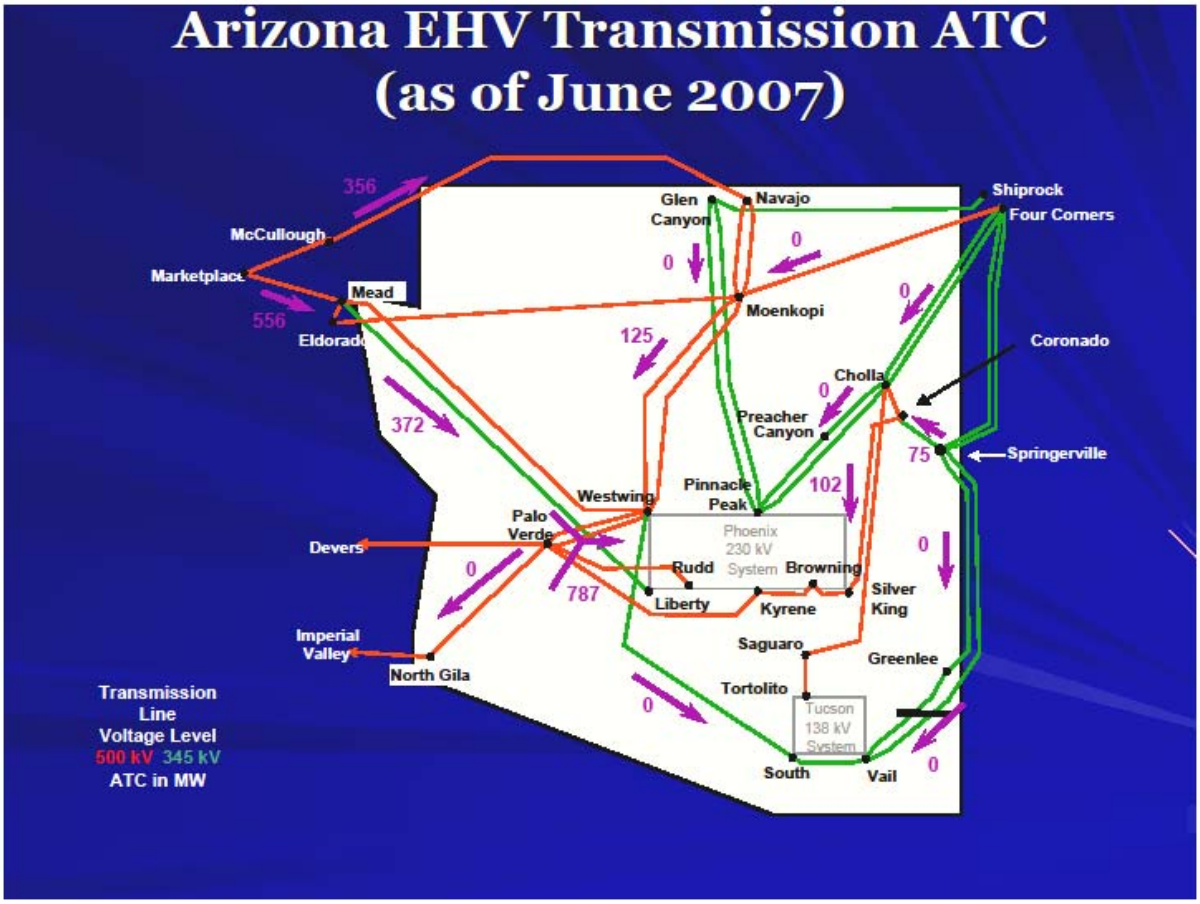
Transmission Needs for the Bowie, Arizona, Power Plant
Norm "Mick" Meader, Cascabel Working Group, August 24, 2010

Tom Wray and SunZia have stated in the past that the SunZia Project is not needed for transmission of power from the Southwestern Power Group's proposed Bowie, Arizona, natural gas generating station to potential markets. The Bowie power plant was, indeed, permitted in 2002 with an interconnection to TEP's two 345-kV lines that run from its Springerville generating stations to Tucson. These two lines provide power to the southern part of Tucson and to points south along the Santa Cruz River. At that time, the Arizona Corporation Commission was sufficiently assured that this transmission scheme was possible. Both Tucson Electric Power Company (TEP) and the Southwest Transmission Cooperative (SWTC) agreed to the project, thus providing initial transmission capability for it.

What is perplexing about this is that both of these 345-kV lines are currently at capacity. As of June 2007 they had no available transfer capacity (ATC) (see figure below[1]). From the definition of ATC at the end of this document, this means that no additional transmission capacity can be sold for these lines. Although ATC varies with time, this still provides a fundamental basis for assessing what is available to the Bowie plant. While the use of these lines by the Bowie power plant was approved with TEP's consent, the sale to the Southwestern Power Group of transmission



capacity means that TEP would at times have to limit the power it uses from its own Springerville generating stations.

At the most, TEP's two lines are each capable of carrying 750 MW of power, or a total of 1500 MW. Their actual capacity is presumably less. This compares with a maximum generating capacity at the Bowie power plant of 1000 MW. While the full power-carrying capacity of these lines is approached only during peak demand, it is apparent that when this capacity is reached that they cannot carry any power from the Bowie plant. In addition, a measure of unused capacity must be reserved in case one of the TEP lines fails, further limiting the Bowie power plant's access to transmission. Peak generating capacity at the Bowie plant would in itself not be reached until peak demand required it, and at that point, the plant could not deliver any power to the grid without TEP significantly limiting its own power transmission. The Southwest Transmission Cooperative's 230-kV line, which intersects TEP's 345-kV lines at Willow, could carry some power, but the line's transmission capacity is much smaller and could not accommodate significant Bowie power, especially with the line's current transmission commitments.

While the Bowie power plant would provide additional stability to TEP's and SWTC's power grids, the full capacity of this plant cannot be used without building additional transmission capacity. The most economical solution to do this would be to build single 500-kV lines away from the power plant. This size of line could carry the maximum power that the Bowie plant could generate. For the owners of the plant to have full market availability, i.e., to sell power to California as Tom Wray of SunZia has indicated[2], this 500-kV line would need to reach the southeast Phoenix area to connect with that part of the electrical grid that services California.

While Tom Wray of SunZia denies that building the Bowie power plant depends upon the SunZia Southwest Transmission Project, the full capacity of the plant cannot be utilized without either using SunZia's lines or building new lines to carry the power. The plant's power generation is greatly limited by having to compete with TEP's own transmission needs and cannot be fully utilized without additional transmission capacity. Delivery of power from the Bowie plant depends largely upon TEP's good graces, although the Federal Energy Regulatory Commission could require TEP to provide enhancements to its transmission system to help facilitate it. It is unclear why the Arizona Corporation Commission did not fully take this into consideration in its decision to approve the plant.

Although transmission capacity built by other operators (TEP, SWTC) will undoubtedly grow in southern Arizona independently of the Bowie power plant's needs, the full use of the plant's eventual capacity still appears to require at least one extra-high-voltage transmission line dedicated to delivering power from the plant.

A. Definition of Available Transfer Capacity (ATC)

> For market participants, *ATC is essentially a measure of unused transmission that a transmission provider can offer for sale pursuant to Order Nos. 888 and 889*. Transmission providers sell transmission service to customers in the form of transfer capability. Transfer capability is the measure of the ability of the interconnected electrical system to move electric energy reliably from one point to another and is limited by,

among other things, the capacity either of equipment (such as transformers or transmission circuits) or interfaces (one or more circuits). *ATC is the amount of transfer capability still available for sale after all existing uses are accounted for*. Transmission providers calculate ATC by subtracting existing transmission commitments, transmission reserve margin, and capacity benefit margin from total transfer capability.

(This definition taken from the Federal Energy Regulatory Commission's "Information Requirements for Available Transfer Capacity," dated May 27, 2005, Docket No. RM05-17-000.)

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[1] *Arizona Renewable Transmission Task Force BTA Response*, by Peter Krzykos, Chairman of SWAT RTTF, BTA Workshop, May 22-23 2008, available from http://www.congestion09.anl.gov/documents/doc/AZCC_BTA_Response_on_Renewables_FINALl_4.pdf.

[2] Tom Wray in "SWAT Meeting Minutes 10.18.06 Las Vegas," Accessed from http://www.westconnect.com/filestorage/swat_mtg_min_101806.pdf, September 16, 2010.