

## Having Effective and Efficient Energy Transmission and Distribution Systems

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### Background Information

#### Electricity Transmission & Distribution System

Regional electricity reliability is the responsibility of PJM Interconnection (PJM), a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM is responsible for transmission planning as well as the energy, capacity and ancillary service markets in the region. The Delaware Public Service Commission (PSC) has responsibility for assuring adequate and reliable service. Some jurisdictional overlap exists between PJM and the PSC.

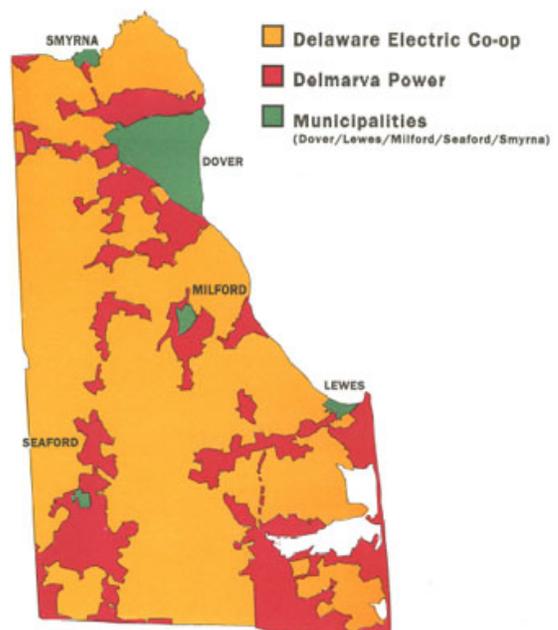
Electricity distribution systems are operated by Delmarva Power (Delmarva), Delaware Electric Cooperative (DEC), and municipal electric systems falling under the umbrella organization, Delaware Municipal Electric Cooperative (DEMEC).

The Delmarva Peninsula is a net importer of power and has also had a history of reliability issues related to reactive power deficiencies.

The economic transmission program at PJM is the mechanism for bringing economic transmission facilities from the study arena to being in service. Total congestion hours on the Peninsula have dropped from a high of 3,269 in 2001 to 405 in 2006, in response to transmission upgrades recently completed.

#### Electricity Service Areas

The map of service areas for Kent and Sussex Counties is shown below. Delmarva serves all of New Castle County, with the exception of the following municipalities: City of Newark, City of New Castle, Town of Middletown, Town of Clayton and the Town of Smyrna.



### Role of Transmission in Meeting Delaware's Electricity Needs<sup>1</sup>

Load requirements can be meant in two basic ways: Generation and/or Transmission, both are needed to make the overall delivery system work. In the past, utilities would design their system to maximize the use of the generation (build it where it is most economical) and then utilize transmission to deliver the generation to the load. In the current system in Delaware, siting of generation facilities is left up to the marketplace and economic decisions of generation companies. These generation companies are not required to assure that the load is being met. This places a demand on the transmission system to fill any gaps in the generation capability to ensure that the load is being met. PJM focuses on meeting the load requirements up to a reliability level defined by the NERC Reliability Standards. After that, it is up to the market entities (load serving entities and transmission owners) to determine and decide if additional transmission will be built to meet any additional local load requirements.

Both transmission and generation have environmental impacts. Typically, generation would have a larger overall environmental impact, while transmission assets tend to have a greater local impact (on individual customers). The states also play into this as some states have generation requirements on utilities and most states still govern the approval of new transmission lines. Air pollution regulations impact construction of new conventional generation, affecting both the choice of new generation locations and types as well as potentially leading to a need for transmission to handle load growth.

### MAPP Project

The Mid-Atlantic Power Pathway (MAPP) is a proposed 230-mile, 500- kilovolt transmission line, intended to enhance electric reliability in the Mid-Atlantic region. The new line would increase the region's ability to import power.

The proposed project schedule is to complete the first segment of the line in 2011, completing the entire line by 2014. Details on the construction timeline can be found on the MAPP Project Website.<sup>2</sup>

The DEC has expressed support of the MAPP Project. Based on their preliminary studies on the impact of MAPP to ODEC and its members, energy savings could exceed \$13 million on an annual basis. This would equate to energy savings of just over 6% for ODEC and DEC.

### Natural Gas Transmission & Distribution System

Interstate natural gas transmission is regulated by the Federal Energy Regulatory Commission (FERC); distribution systems off the transmission lines are regulated by the Delaware Public Service Commission (PSC). Eastern Shore Natural Gas Company (ESNG) is the transmission company that provides natural gas to the distribution systems of Chesapeake Utilities

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<sup>1</sup> Adapted from response of DEC to Consultant question. Submitted via e-mail by Mark Nielson, 3/3/2008.

<sup>2</sup> MAPP Project Website, <http://www.powerpathway.com/schedule.html>. April 11, 2008.

(Chesapeake) and Delmarva Power (Delmarva), in addition to electric generation and industrial customers.

ESNG receives customer-owned gas supplies from two major upstream open access natural gas pipelines at two interconnections in southeastern Pennsylvania (Columbia Gas Transmission Corporation (Columbia) at Daleville and Transcontinental Gas Pipe Line Corporation (Transco) at Parkesburg) and one interconnection in northern Delaware (Transcontinental Gas Pipe Line Corporation at Hockessin. The gas commodity delivered through those pipelines is sourced from production areas primarily in the US Gulf Coast / Gulf of Mexico. Additional supplies come from Canada, and Midwestern and Western US production areas, as well as liquefied natural gas (LNG) imported from Trinidad, Algeria, Qatar, and elsewhere. LNG blended into gas distributed in Delaware is usually brought into the US at terminals in Louisiana and Maryland. The nature of the interstate pipeline system causes the natural gas actually to the distribution systems to be a blend of gas from many sources, regardless of which individual producers hold contracts for shipment from their wells to satisfy our purchases.<sup>3</sup>

As of December 31, 2007, ESNG's system in Delaware consisted of ~275 miles of high pressure pipeline and ~5,540 horsepower of compression at two compressor stations. ESNG's pipeline enters Delaware in northern New Castle County and traverses the entire state. ESNG recently extended its pipeline to supply new markets in eastern Sussex County. Natural gas is now available to the residents in and around the Towns of Milton, Georgetown and Millsboro. ESNG has stated that, if the economics work out, it would further extend the pipeline to Dagsboro and Selbyville.<sup>4</sup>

YEAR-END PIPELINE CAPACITY<sup>5</sup>

2003 - 113.9 (thousand dekatherms)

2006 - 158.5

Gas utilities generally cannot afford to speculatively contract for additional interstate pipeline capacity to support unidentified proposals for unknown new large uses. The interstate pipeline capacity expansion that is currently under contract for Delmarva addresses both current operating needs and the most likely customer sales and peak demand growth through 2012-13. The expansion project is not sized for capacity to serve unidentified new large uses of natural gas.<sup>6</sup>

The map below shows the location of the ESNG pipeline system. It passes through Middletown, Smyrna-Clayton, Dover, Camden-Wyoming, Harrington, Seaford and Laurel. The pipeline also extends to Milford, and as mentioned above, now has been further extended to Milton, Georgetown, and Millsboro.

The service territories of Chesapeake and Delmarva are also shown on the map. Chesapeake's service territory consists of southern New Castle County, Kent and Sussex counties. The deliveries in 2006 were 21,148 MMcf (million cubic feet), of that amount 15,910

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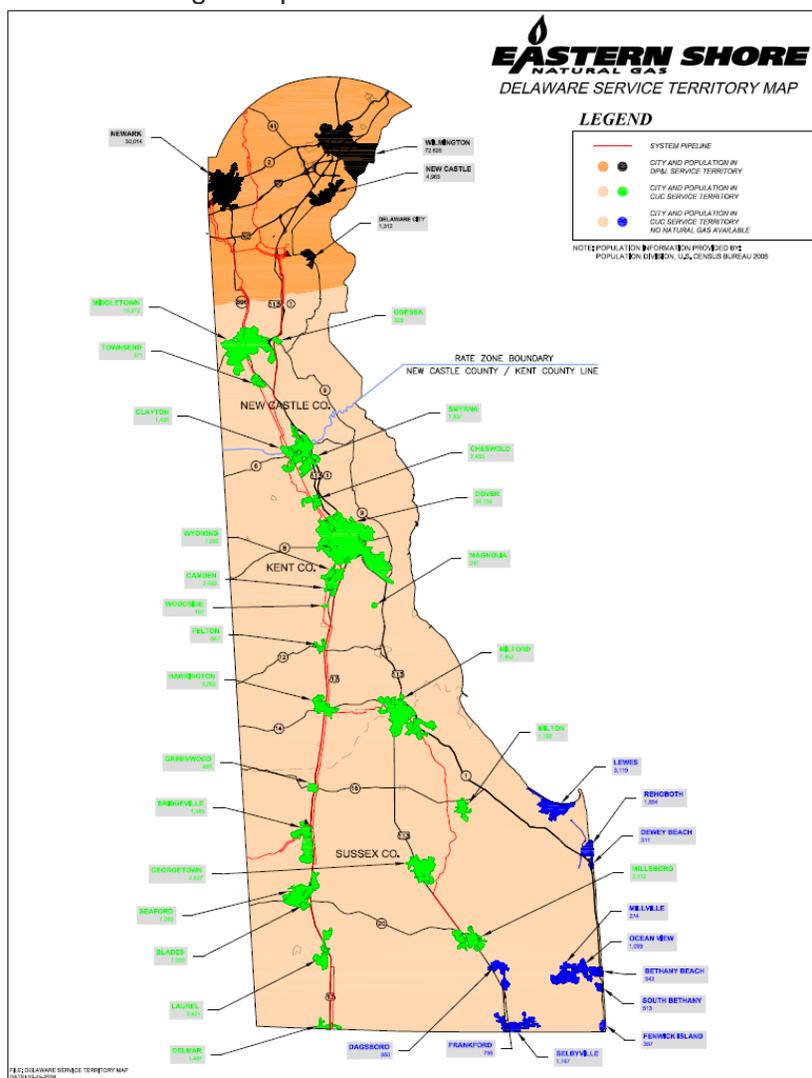
<sup>3</sup> Information provided by ESNG and Delmarva.

<sup>4</sup> Response to consultant questions, submitted via e-mail from Cynthia Davis, 2/20/2008.

<sup>5</sup> For entire 366 mile ESNG system, not just Delaware. A dekatherm is a unit of energy equal to 10 therms or one million British thermal units (MMBtu)

<sup>6</sup> Response to consultant questions, submitted via e-mail from Charles L. Driggs, 2/27/2008

MMcf was delivered to transportation customers<sup>7</sup> taking service from third party suppliers. Delmarva's service territory is northern New Castle County. In 2006, Delmarva delivered 18,300 MMcf of natural gas to retail customers in its Delaware service territory, of which 36% were sales to residential customers, 25% to commercial customers, 4% to industrial customers, and 35% to customers receiving transportation service.



Changes in sales have varied for the two distribution companies. For Delmarva, actual sales (unadjusted for weather) dropped 11.4% between 2003 and 2007. They are project to increase 1% between 2007 and 2011. For Chesapeake, actual sales increased 7.9% between 2003 and 2007, and are projected to grow 29% between 2007 and 2012 (from 4,652 MMcf to 6,022 MMcf) (not including transportation service).

### Governance of Interstate Pipelines

<sup>7</sup> Transportation service is used by large commercial, institutional and industrial customers who are sufficiently sophisticated and adequately funded to purchase their own gas needs in commodity markets and arrange for delivery to their site by Delmarva.

Natural gas transmission pipelines are governed by the FERC, with no state governance role. The mechanics of FERC regulation of interstate pipelines effectively mandate that installed delivery capacity serving any regional area be relatively close to current needs, as measured by customer willingness to enter into firm contracts for pipeline capacity. Pipeline contracts typically have a duration of at least ten, and more commonly fifteen to twenty years, to provide the long term cash flows needed to justify the expense of constructing and operating the delivery capacity. New pipelines are rarely built, but existing pipelines are infrequently expanded in capacity when sufficient demand appears to make the investment attractive. Opportunities therefore may not materialize for periods as long as ten years at a time, and years of discussion, negotiation, and obtaining construction approvals precede the actual in-service date for new pipeline capacity. When an interstate pipeline can demonstrate to FERC that they have sufficient firm commitments with customers to pay for a capacity expansion, FERC may grant construction approval, with additional approvals are required from state and local governments.

A significant portion of natural gas is shipped by interstate pipelines and delivered to large commercial and industrial customers under Transportation service. Delivery to Delmarva's system at the Delaware border typically takes advantage of alternative delivery provisions within FERC pipeline rules. The capacity used by shippers to bring gas to the state border is not often under long-term contract on behalf of Transportation customers. Such deliveries are subject to curtailment under extreme weather, interstate pipeline operating difficulties, or intrastate delivery system emergency conditions. All gas pipeline deliveries are always subject to Force Majeure and other unavoidable (natural or man-made) operating curtailment risks existing at any location on the pipeline system. Transportation customers knowingly bear these risks, and obtain their shipment services by temporarily 'renting' interstate pipeline capacity from others via a FERC regulated market for short-term capacity.<sup>8</sup>

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<sup>8</sup> Response to consultant questions, submitted via e-mail from Charles L. Driggs, 2/27/2008

## **Key Questions for the Work Group**

1. Are the Transmission and Distribution systems sufficient to meet Delaware's future needs?
2. What should the relationship be between transmission & generation in meeting Delaware's electricity needs
3. Where and how should natural gas service be extended?
4. How can the transmission/distribution system be utilized to moderate price shocks or create price stability over time? What is the likelihood of price stability/instability?
5. What is the likelihood of environmental or climate regulations impacting transmission/distribution?