DELIVERING POWER:

AN OVERVIEW OF MISSISSIPPI'S ELECTRIC TRANSMISSION SYSTEM

Introduction

In Advance Mississippi's first issue brief, *Keeping Mississippi Powered*, we discussed one of the two basic building blocks of powering our homes and business – generation. The following issue brief presents an overview of the second component – transmission.

The U.S. Department of Energy (DOE) estimates that demand for electricity will increase by 30 percent between 2006 and 2030.[1] That's the equivalent of adding four states the size of California with equivalent power demand to the nation's grid. Facing this type of growth, it is easy to understand why a strong transmission system in the U.S. and Mississippi is critical to ensuring that homes and businesses have the power that they need.

The existing U.S. electric grid is massive, and may well be the largest sophisticated machine in the world. If the machine goes down, quality of life as we know it ceases. Nationwide there are over 200,000 miles of high-voltage transmission lines which deliver electricity from power plants to the customer. While that may seem like more than enough, the North American Electric Reliability Corporation (NERC), a non-profit corporation set up by FERC to develop and enforce mandatory reliability standards for bulk power system operations, states that the U.S. will need more than 15,000 miles of additional transmission lines over the next decade.[2]

Regionally, the Southeastern Electric Reliability Corporation (SERC) oversees the reliability and infrastructure in most of Mississippi and several other southeastern states. In a report prepared for NERC, SERC states that an additional several hundred miles of transmission line will be needed in their region by 2017.[3] As Mississippi's need for additional electricity continues to grow, it is important that utility companies can continue to deliver reliable power to their customers at an affordable price. The map on page two shows SERC's region and five sub-regions.

[1] "Annual Energy Outlook 2009 with Projections to 2030," U.S. Energy Information Administration: http://www.eia.doe.gov/oiaf/aeo/electricity.html
[2] 2008 Long-Term Reliability Assessment, 2008-2017. North American Electric Reliability Corporation, p. 15. http://www.nerc.com/files/LTRA2008.pdf
[3] Ibid.

SERC's region and five sub-regions

Transmission Challenges in the United States

While Mississippi has mostly avoided the mass power outages that have made headlines in recent years, other parts of the U.S. have not been so lucky. Major service interruptions have occurred in New York and California, often because transmission systems have not kept pace with increasing customer demand and upgrades have not been made.

Notorious blackouts include:

- The Northeast blackout of August, 2003 resulted in power outages which left 40 million Americans in eight states and 10 million in Ontario, Canada without electricity. The blackout is estimated to have cost approximately $1 billion.

- In 2006, a power outage in Queens, New York resulted in power outages that left over 100,000 customers without power and cost more than 750 businesses in damaged goods and lost revenue.

- During the 2006 heat wave, California experienced a series of rolling blackouts when temperatures reached 100 degrees over a period of many days. The system was overwhelmed as a result of so many homes and businesses running air conditioners.

As the above examples demonstrate, blackouts are costly for the local economy as factories and businesses are forced to shut down. Extended power interruptions are also a public safety hazard, particularly for those who rely on life-saving medical equipment or are susceptible to extreme temperatures.

Furthermore, the 2003 blackout resulted in the 2005 Energy Policy Act that gave FERC the authority to establish an Electric Reliability Organization (ERO) to enforce mandatory reliability standards. NERC applied for and was approved as the ERO and SERC was subsequently approved as the regional reliability organization.

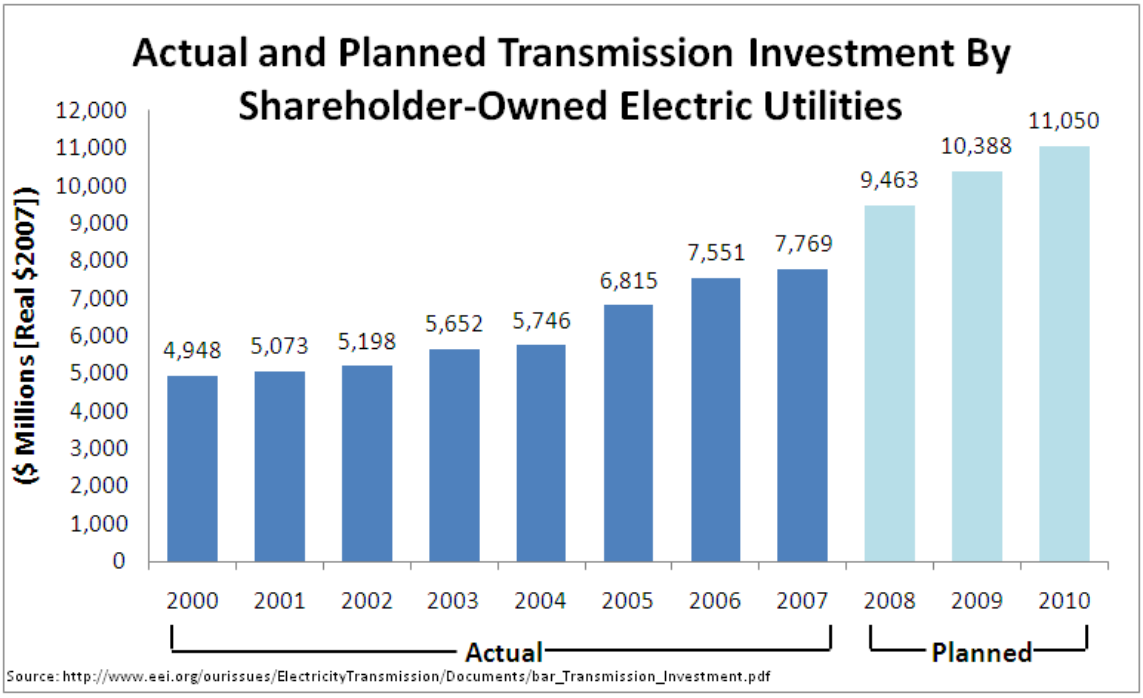
Some have advocated for a nationwide overhaul of the way electricity is delivered to customers, saying that the current grid is antiquated 20th century technology not equipped to meet the

needs of 21st century society. Proponents of “smart grid” technologies, which are designed to increase two-way communication between electricity users and producers, say that this new technology will increase reliability, allow utility companies to quickly locate power disruptions, and more easily allow for the incorporation of renewable energy sources into the national grid.

Although many in the utility industry disagree in labeling the current grid as being “antiquated,” they do agree that there is a need to expand the nation’s transmission grid to relieve congestion, accommodate more baseload power and incorporate renewable resources into the grid.

Because the DOE estimates that it would take tens of billions of dollars to upgrade the transmission system (and it has yet to be determined who is responsible for paying for this massive project), some have cautioned for a more tempered approach to launching significant transmission changes.

The chart below from the Edison Electric Institute demonstrates the magnitude of actual and planned transmission investment by shareholder-owned utilities from 2000 through 2010.



Mississippi’s Transmission System

Similar to blood flowing through the human circulatory system, electricity flows throughout the entire transmission system, and changes in one area affect the entire system. Because of this, utility companies continually invest in transmission throughout their system, which benefits not just the location where the transmission project or upgrade is located, but all of the customers in their electric transmission system.

In Mississippi, there are three predominant electricity providers that also manage the transmission infrastructure in their respective service areas. Entergy Mississippi, Inc., Tennessee Valley Authority (TVA), and Mississippi Power Company all work with sister companies or internally to send electricity across state lines as part of managing a reliable transmission grid and meeting the growing demand for electricity. To ensure that the transmission infrastructure continues to be reliable, regular investments are made on a consistent basis. Costs for these investments cannot be understated, and depending on the voltage, each mile of a power line costs millions of dollars. The chart on page four shows transmission unit costs in 2008 dollars.

Recent Unit Transmission Costs
2008 Dollars

Voltage (kV)	Cost (Thousands of Dollars/Mile)	Capacity (MW)	Cost (Millions of Dollars/GW-Mile)
230	$2,076.50 ($2,076,500/mile)	500	$5.46
345	$2,539.40	967	$2.85
500	$4,328.20	2,040	$1.45
765	$6,577.60	5,000	$1.32

Source: EEI's "Transmission Projects at a Glance," January 2008.

Entergy Mississippi, Inc. provides power in the 45 counties in the western part of the state and is a subsidiary of Entergy, Inc., which also provides electricity in Louisiana, Texas and Arkansas. Entergy, Inc. maintains more than 15,000 miles of high-voltage transmission lines and since 2003 Entergy, Inc. has invested over $2 billion in expanding and upgrading its transmission systems in the four southern states where it provides electricity.

The Tennessee Valley Authority (TVA) provides electricity in the 36 northeastern Mississippi counties in addition all of Tennessee and portions of Kentucky, Virginia, Georgia and Alabama. TVA operates one of the largest transmission systems in the country covering approximately 80,000 square miles that sends electricity produced by TVA-owned and independently owned generating facilities that reach nine million customers.

Mississippi Power provides electricity to nearly 189,000 customers in 23 southeastern Mississippi counties and the company manages over 2,000 miles of transmission lines. It is a subsidiary of Southern Company, which also provides electricity in Georgia, Florida and Alabama. The company oversees more than 27,000 miles of transmission lines in the four states and spent approximately $1.6 billion on its system from 2006-2008.

Conclusion

As demand for power in the U.S. and Mississippi will continue to increase over the next several decades, having a reliable and efficient transmission system is key to ensuring that homes and businesses are able to get the power that they need. Electric utility companies like Advance Mississippi members Entergy Mississippi and TVA will continue to make investments to

enhance the existing grid and ensure a high quality transmission system. As new technologies are developed and renewable energy sources integrated, it is important that changes to the transmission grid take these challenges into account while providing Mississippians with dependable and affordable electricity.

Additional Resources

North American Electric Reliability Corporation
http://www.nerc.com/files/LTRA2008.pdf

SERC Reliability Corporation
http://www.serc1.org/Application/HomePageView.aspx

Southwest Power Pool – 2008 Annual Report
http://www.spp.org/publications/SPP%202008%20Annual%20Report.pdf

Southwest Power Pool – "The Benefits of a 'Transmission Superhighway'"
http://www.spp.org/publications/Benefits_of_Robust_Transmission_Grid.pdf

Entergy, Inc. transmission website
http://www.entergy.com/transmission/default.aspx

Southern Company transmission website
http://www.southerncompany.com/transmission/home.aspx

Tennessee Valley Authority transmission website
http://www.tva.com/power/xmission.htm

Advance Mississippi's mission is to advocate for sensible energy policy that will fuel economic opportunity in Mississippi, and educate policy makers, business and community leaders, and the general public about superior energy policies that will foster economic growth. For more information visit www.advancemississippi.com.