INTRODUCTION

Almost all of the electrical power in the United States is supplied to users via vast miles of interconnected transmission lines. These are interconnected through three power grids: the Western Interconnect, the Eastern Interconnect, and the Texas Interconnect. Each of the three grids is further divided by region and some are controlled by independent Regional Transmission Organizations (RTO). Each RTO is responsible for ensuring the reliability of the electric transmission system under its functional control and coordinating the movement of wholesale electricity within the larger interconnect. The PJM Interconnection (PJM) is an RTO in the Eastern Interconnect responsible for all or part of 13 states and the District of Columbia—heavily developed areas with growing electrical demands. Public Service Electric and Gas Company (PSE&G)[1] is one of the 20 zones or utilities that make up the PJM.

U.S. Electricity Consumption in 2011

U.S Electricity Consumption in 1950

The modern power grid system in the United States is aging and systems are becoming overloaded because of high demand. Electricity consumption in the United States totaled nearly 3,856 billion kilowatt hours (kWh) in 2011, according to the United States Energy Information Administration. This is approximately 13 times greater than electricity consumption in 1950[2]. In the early part of the twenty-first century, a planning study was undertaken to forecast transmission needs for the next 15 years in the PJM region. According to the study, approximately 23 existing power lines in northern New Jersey and eastern Pennsylvania will become overloaded within 15 years, some exceeding capacity as early as this 2013. In 2007 the Susquehanna–Lackawanna–Jefferson–Roseland 500kV circuit was one of three "new major backbone transmission facilities" approved by the PJM Board to alleviate forecasted overloads beginning in 2015. In response the utilities in the PJM are upgrading the existing electrical system necessary to ensure safe and reliable service within their power grid.

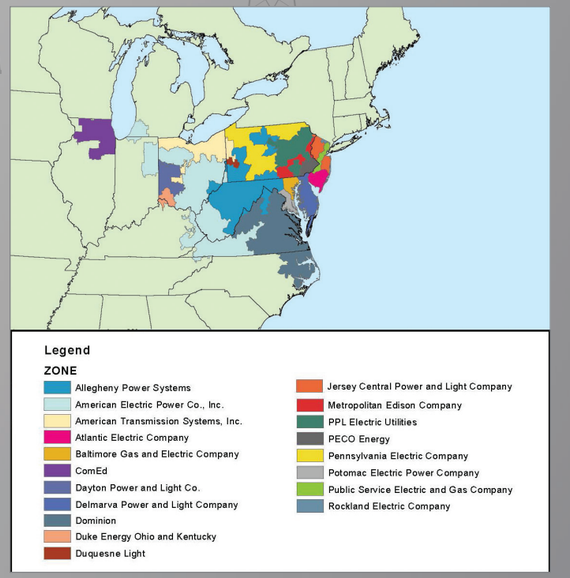

Figure 1 – PJM Service Area, 2012.

These upgrades include replacing a historical 230kV transmission line stretching across Pennsylvania and New Jersey with a new 500kV transmission line. This project is being undertaken by two utilities in the PJM: PPL Electric Utilities Corporation (PPL) and PSE&G.

The current 230kV line runs from PPL's Susquehanna Substation in Salem Township, Luzerne County, Pennsylvania, to PSE&G's Roseland Switching Station and Substation in Roseland Borough, Essex County, New Jersey. The 500kV upgrade will require the replacement of over 500 towers, approximately 70 percent of which were built between 1925 and 1932 as part of the Pennsylvania-New Jersey Interconnection (PNJ), the predecessor of the PJM. The PNJ was a 210-mile-long transmission ring that connected the electricity networks of three independent utility companies: PPL, PSE&G, and the Philadelphia Electric Company. At the time of its construction, the PNJ was noted as "one of the largest electric power pools in the world," integrating large-scale electric utility systems under separate ownership for the first time in North America[3]. The PNJ agreement, signed in 1927, and its transmission ring were landmark accomplishments in American utility history. This is the story of the development of the Roseland to Bushkill segment of the PNJ Interconnection, completed by Public Service in 1932.