DOCKET NO. 461 - Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation, Greenwich, Connecticut, and related substation improvements.	}	Connecticut Siting Council May 12, 2016

Opinion

Introduction

On June 26, 2015, The Connecticut Light and Power Company doing business as Eversource Energy (Eversource), applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, maintenance, and operation of a new 115-kilovolt (kV) bulk substation located at 290 Railroad Avenue, Greenwich, Connecticut, and two 115-kV underground transmission circuits extending approximately 2.3 miles between the proposed substation and the existing Cos Cob Substation including related substation improvements in Greenwich, Connecticut (Greenwich Substation and Line Project or GSLP).

The Council does not have jurisdiction over electric distribution facilities. The Council's jurisdiction extends over electric transmission line facilities with a design capacity of 69-kV or more and electric substation facilities designed to regulate the voltage of electricity at 69-kV or more. Under the Public Utility Environmental Standards Act (PUESA), the Council's charge is to balance the need for adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the environment and ecology of the state. A public need exists when a facility is necessary for the reliability of the electric power supply of the state.

Under Section 16-50p of the Connecticut General Statutes (C.G.S), the Council shall not grant a Certificate, either as proposed or modified by the Council, unless it shall find and determine the nature of the probable environmental impact of the facility alone and cumulatively with other existing facilities, including a specification of adverse effects relative to electric and magnetic fields, impact on and conflict with the policies of the state concerning the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish, aquaculture and wildlife, and why the adverse effects are not sufficient reason to deny the application.

In the case of an electric transmission line, the Council shall also find and determine what portion of the facility shall be located overhead; that the facility conforms to a long range plan for expansion of the electric power grid of the electric systems serving the state and interconnected utility systems and will serve the interests of electric system economy and reliability; that overhead portions of the facility are cost effective and the most appropriate alternative based on a life-cycle cost analysis of the facility and are consistent with the purposes of the PUESA, the Council's Electric and Magnetic Fields Best Management Practices (EMF BMP) and the Federal Energy Regulatory Commission's Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities (FERC Guidelines).

The deadline for a decision on this application is June 24, 2016. In addition to the applicant, 12 parties and intervenors participated in this proceeding, which consisted of 6 evidentiary hearings and a public comment session. While the record was open, the Council received 227 written public comment letters from interested persons, Greenwich residents, the Attorney General, state and federal legislators, and various community and environmental groups in opposition to the GSLP. After the record closed, the Council received 57 written

public comment letters from Greenwich residents in opposition to the Hybrid Alternative. Common concerns shared and expressed by the parties, intervenors and other interested persons include, but are not limited to, impacts to the community, impacts to Bruce Park, lack of effective communication with the Town of Greenwich, lack of demonstration of the public need for the GSLP, lack of exploration of potential alternatives and exorbitantly high project costs. In deciding this application, the Council must balance the public need for the proposed 115-kV bulk substation, 115-kV transmission line to supply the proposed substation and additional substation modifications in Greenwich with the potential environmental impacts created by construction and operation of these facilities at the lowest reasonable cost to consumers.

Project Description

New Substation and Associated Improvements

The GSLP includes the construction of a new bulk power substation on Railroad Avenue in Greenwich. Two parcels were presented as possible candidates for the new substation: 290 Railroad Avenue (Preferred Site) and 281 Greenwich Avenue (Alternate Site). Although both parcels are in the same vicinity, the Preferred Site is more suitable for a substation given its larger size and distance from adjacent residential areas. Furthermore, operation of the substation equipment at the Alternate Site would not meet State noise control regulations, requiring Eversource to acquire three adjacent parcels to comply with the regulations.

The new substation would consist of a two story building fronting Railroad Avenue that would house gas insulated switchgear (GIS). The portion of the substation to the south of the GIS building would consist of an exterior yard containing three 115-kV circuit switchers, three 60 MVA power transformers, a metal switchgear enclosure, and a free standing pump house. The transformers would supply step down power from transmission level power (115-kV) to distribution level power (13.2-kV) for use by Greenwich customers. Eversource is committed to working with the Town to come up with an acceptable façade design for the GIS building, an acceptable exterior fence design and perimeter landscaping. The GIS design was proposed in order to fit the substation switchgear equipment on the parcel. The switchgear is being designed to connect the two new GSLP transmission lines as well as having the ability to connect a third future transmission line if the need arises. The potential third transmission line has a 30-40 year planning horizon and is not necessary for the functions of the GSLP.

The GSLP would expand the Cos Cob Substation to accommodate new equipment and support the two new 115-kV transmission lines that would extend between the Cos Cob Substation and new Greenwich Substation. All work would be on Eversource or State of Connecticut property and would not extend into adjacent Cos Cob Park.

After the GSLP is constructed, Eversource would remove the existing, antiquated 27.6-kV to 13.2-kV transformers at the Byram and Prospect Substations. All distribution supply from these substations to Greenwich customers would now be handled by the new Greenwich Substation.

Transmission Line

The GSLP includes construction of two new 115-kV transmission circuits originating from the Cos Cob Substation to the new Greenwich Substation. One of the lines would serve as a backup power source in the event of an outage on the other line.

As part of the application filing, Eversource initially determined that three potential transmission routes were viable: Preferred Route, Northern Alternative, and Southern Alternative. During the proceeding, a fourth route, the Hybrid Alternative, was developed and deemed viable. In addition, the Preferred Route and Southern Alternative have several route variations.

In summary, the Preferred Route and Southern Alternative are both approximately 2.3 miles long and follow underground routes on local roads and extend through or under sections of Bruce Park, generally extending parallel to Interstate 95 and MetroNorth Railroad (MNRR), both north and south of these transportation corridors. The Northern Alternative, 3.1 miles long, extends along local roads well north of I-95 and the MNRR. The Hybrid Alternative, approximately 2 miles long, would follow an overhead route along the MNRR right-of-way (ROW) between Station Drive and Steamboat Road. West of Steamboat Road, it would follow an underground route along local roads to the new substation.

The Council finds the cost of the Preferred Route, Northern Alternative and Southern Alternative exceedingly high for a relatively short transmission line project, ranging from $140 to $155 million depending on the route. Additionally, the Council is concerned about costs associated with the GIS substation design, which was selected by Eversource in order to accommodate a potential third transmissions line position within the substation. This potential third transmission line is in a 30-40 year planning horizon rather than with a demonstrated need for the GSLP and, as such, the Council would need more information to justify costs associated with this design.

Municipal Consultation

The Council is concerned about the apparent lack of communication and cooperation between the Town of Greenwich and Eversource during the initial development of this project application. The record reflects that Eversource initiated a meeting with the Town of Greenwich to announce plans for a new substation to address electric distribution system reliability issues on June 11, 2011. On February 6, 2015, Eversource delivered a Municipal Consultation Filing to the Town of Greenwich to commence the 60-day municipal consultation process for the GSLP. Although the Town of Greenwich recognized a need for the proposed new substation in their 2013- 2014 Annual Report, it appears that a lack of communication and cooperation developed between the Town and Eversource prior to the filing of the application with the Council. This is evidenced by the Town's "vehement" opposition to the transmission line route through Bruce Park, the lack of clarity on the part of the Town regarding the need for the GSLP, and failure to develop a mutually appropriate and reasonable alternative solution to address electric distribution system reliability issues in the Town of Greenwich.

The Council is also concerned about the Town of Greenwich neglecting to avail itself of the opportunity to attain party status in the proceeding until more than 6 months after the application was filed and on the eve of the fourth evidentiary hearing held on the application. Under the PUESA, host municipalities have a right to party status in a Council proceeding. On July 24, 2015, the Council sent correspondence to the Town informing them of the date, time and location of the public hearing on the GSLP and inviting the Town to actively participate in the proceeding in a number of different forms, including, but not limited to, party status. Prior to submitting the January 11, 2016 request for party status, the Greenwich Planning and Zoning Commission submitted 3 substantial and detailed comment letters to the Council regarding the GSLP on April 6, 2015, September 1, 2015 and November 23, 2015. Prior to the granting of the Town's request for party status, these letters amounted only to limited appearance statements. Therefore, neither the Council nor any of the other 12 parties and intervenors had the opportunity to cross examine the Town on these statements until the Town became a party and the Town exhibits were verified during the February 23, 2016 evidentiary hearing. Notwithstanding the lateness of the request for party status, the Council is pleased that the Town did become involved in the proceeding and offered meaningful testimony and cross examination, thus assisting in the development of a record of substantial evidence upon which the Council shall rely to render a decision on this matter.

Public Need

The Town of Greenwich is electrically isolated. It is located at the absolute farthest extent of Eversource's electric network in southwest Connecticut (SWCT). There are no electric ties to New York, which is located in a completely different region under the authority of the Independent System Operator of New York (ISO-NY) rather than under the authority of the Independent System Operator of New England (ISO-NE). Therefore, Greenwich could not import power from New York nor could it export power to New York. Greenwich relies on bulk power supply from Stamford, feeding the Tomac and Cos Cob Substations. A majority of power to Greenwich is supplied at the distribution level from the Cos Cob Substation, and as such, it carries the most load in Eversource's service territory. Greenwich is the third largest consumer of electricity among the 149 municipalities within Eversource's service territory behind Hartford and Stamford. Greenwich residential customers use twice as much electricity than the average Connecticut residential customer.

The GSLP application was brought forward by Eversource to address two issues occurring within the Town of Greenwich electric distribution supply system: distribution reliability concerns and limited bulk transformer capacity to provide electric service during contingency events. Although the Council's jurisdiction is limited to transmission level supply under C.G.S §16-50i(a), in this case, electric distribution and electric transmission components are intertwined.

SWCT is the largest load area in the state that comprises 54 towns and accounts for 50 percent of Connecticut's peak electric load demand. In 2011, ISO-NE engaged in a long term reliability needs assessment for the SWCT area to year 2018. A solutions study was later completed to address the criteria violations identified in the needs assessment and focused on developing solutions for five study subareas, including the Stamford-Greenwich subarea. Some solution alternatives were developed to address independent subarea needs whereas other solution alternatives were developed to address interdependent subarea needs.

Another SWCT project, known as the Stamford Reliability Cables Project (SRCP), entered service on November 21, 2014 and implemented an important component of long-range plans for the expansion of Connecticut's electric power grid in the Stamford-Greenwich subarea that included a new substation in Greenwich and additional transmission connections to this substation. The GSLP was proposed as the next step in the long range plan for the expansion of Connecticut's electric power grid in the Stamford-Greenwich subarea to address a local load deficiency that occurs only in Greenwich, as well as reliability issues associated with the current design of the electric distribution system only in Greenwich. The Council's 2012/2013 Review of the Ten Year Forecast of Connecticut Loads and Resources listed the GSLP as a new resource to meet load demand.

Eversource determined the best placement for a new substation would be within south-central Greenwich, west of Indian Harbor, where a pocket of load demand is centered. Currently, this load demand is served by the Cos Cob Substation, a 115-kV bulk substation that is located on Sound Shore Drive in Greenwich approximately 1.2 miles due east of the load pocket.

Reliability

The current electric system serving Greenwich is antiquated and was designed to serve much lower load demands than exist today. Most of the Greenwich load is served by the Cos Cob Substation. Underground 27.6-kV feeders from Cos Cob Substation supply 3 distribution substations: the Prospect Substation, Byram Substation and North Greenwich Substation. The permissible load rating of the 27.6-kV transformers at Cos Cob Substation is 135 megavolt ampere (MVA). The highest MVA recorded at Cos Cob Substation was 130.5 MVA in 2013. This level of supply was reached due to a high heat index. Despite some upgrades at the

Greenwich area transmission and distribution substations beginning in 1994, including improvements to Cos Cob Substation, reliability issues with the electric distribution system were elevated in 2011 when a storm knocked out service to a substantial number of Greenwich customers. Due to this event, Eversource determined it was time to address ongoing reliability concerns and electric load growth in the Town of Greenwich.

The GSLP would shift about half of the electric load from Cos Cob Substation to the proposed Greenwich Substation at the bulk power level, thereby reducing demand on the Cos Cob Substation and associated electric distribution feeders. The proposed Greenwich Substation, in turn, would be able to supply electric power to customers formerly supplied by the Byram and Prospect distribution substations. The GSLP would add 134 MVA of permissible load capacity at the proposed Greenwich Substation and replace 80 MVA of load capacity at the Byram and Prospect distribution substations. These two substations are obsolete and would be retired as distribution substations. Additionally, the redistribution of bulk power between two transmission substations, the Cos Cob Substation and the proposed Greenwich Substation, would enhance reliability to Greenwich customers by allowing load transfers during contingency events. Currently, load transfers are not possible leading to reliability issues and potential damage to existing equipment that operate above nameplate ratings to maintain electric service to customers during contingency events.

Load Forecasting

In planning for the GSLP, Eversource studied peak demand from 2010 to 2014. Within that period of time, the highest summer peak load value was 130.5 MVA that occurred in 2013. This peak occurred after consecutive days of high heat and humidity, a weather pattern that typically increases demand on the electric system on each consecutive day. In planning for future electric demand, Eversource applied a one percent growth rate to this value and determined that the summer peak load, under certain contingency conditions, would exceed the Cos Cob 27.6-kV transformer permissible load rating of 135 MVA beginning in 2017 when 135.8 MVA of demand is projected.

Although peak load demand did decrease by 17.5 percent in 2014 to 107.7 MVA, peak demand increased to 114.8 MVA in 2015. These overall decreases from the 2013 peak demand is attributed to the lack of consecutive days of a high heat index rather than a drop in electric usage by Greenwich customers. Overall usage by Greenwich customers has been relatively constant. Projections in electric demand are just that, projections. In this proceeding, the Council finds Eversource's one percent growth rate a reasonable projection that is in line with ISO-NE's growth projections. Although the Town of Greenwich disputes Eversource's energy demand forecast, the Town has not offered any evidence to refute Eversource's data. Furthermore, the Town has not offered any reasonable solution to reduce demand on the existing electric distribution network that serves the Town.

Eversource's Greenwich customer base consists of approximately 90 percent residential and 10 percent commercial/manufacturing. Despite low population growth, approximately 4.5 percent from 1990 to 2010, Greenwich electric usage in this time period increased by 45 percent. Greenwich residential customers use twice as much electricity than the average Eversource Connecticut residential customer. This use by Greenwich is further reflected in its number 3 ranking in electric usage in Eversource's service territory, only surpassed by the highly urban centers of Hartford and Stamford. Electric usage is partly the result of the replacement or reconstruction of existing residential homes with larger residential homes in Greenwich. The related service upgrades for these homes are on par with what would be considered a medium-sized commercial building in other areas of the State. The Council notes that although energy usage relative to its population is very high, Greenwich residential customers had the lowest participation rate in residential energy efficiency programs during the period of 2010 to 2015.

By examining the peak demand values from 2004 to 2015, peak demand approached the capacity of the Cos Cob transformers in 2012 and 2013. The overall trend in peak demand is fluctuating, rather than demonstrating a consistent upwards trend, as would be expected with variable weather conditions from year to year. Despite this fluctuating trend in peak demand, underlying electric usage in Greenwich has been consistent rather than declining.

The Council is cognizant that some action would have to be taken to improve the electric network in Greenwich. The record is clear that the proposed GSLP, or some variation thereof, is necessary for the reliability of the electric power supply of the Town of Greenwich. The Council is also well aware of Greenwich's unique location at the edge of Eversource's electrical service area in Connecticut and Eversource has demonstrated a potential reliability and demand issue under certain conditions in Greenwich. Quite simply, the existing electric distribution system in this area does not have the capacity to back up customers in the event of outages and capacity issues can arise at Cos Cob Substation during high heat index days.

Project Alternatives

Numerous alternatives to the GSLP were explored before and during the course of the proceedings on this application, including, but not limited to, a no action alternative, transmission alternatives and non-transmission alternatives, such as distribution alternatives, load transfers among existing substations in Greenwich, load transfers among existing substations in Stamford, installation of larger transformers at Cos Cob Substation, conventional generation, renewable generation, microgrids, generation interconnections, demand side management, distributed generation, demand response generation, load curtailment, emergency generation and energy efficiency measures. All of the alternatives explored during the course of the proceeding, with the exception of one transmission alternative suggested by this Council, were deemed infeasible based on a number of factors, including capital costs, property acquisitions, substantial environmental impacts, limited benefit, large on-shore or off-shore footprints, and complex technical challenges. Thus the Council finds that the project alternatives investigated would not serve the interest of the State's electric economy.

The transmission alternative developed upon the suggestion and request for more information from the Council during the proceeding on this matter, referred to as the Hybrid Alternative, would cost $22 million less than the proposed GSLP Preferred Route, avoid direct impact to Bruce Park and would reduce construction related impacts to traffic on local roads as a majority of the route is located within the MNRR ROW. Although construction within the MNRR corridor has certain construction challenges, it has successfully been accomplished by Eversource in other parts of the state. At the very least, an alternative route along the MNRR corridor should have been included with the application so that it could have been thoroughly examined rather than being first identified and subsequently studied during the evidentiary hearing stage of this proceeding. The Council finds it unfortunate that this potential alternative transmission line route was not explored and fully vetted prior to submission of the application to the Council as it became evident at the close of the record that if the Council found a public need and the basis of the public need for the GSLP, the Town of Greenwich would be more amenable to this alternative with some further modifications.

Environmental

In reviewing the environmental effects of the proposal, the Council is well aware of the Town's opposition to any transmission line route that goes through or under portions of Bruce Park. Bruce Park is an historic park containing developed recreational facilities including ball fields, walking paths, a museum, ornamental trees, as well as more natural areas such as wooded areas, exposed ledge outcrops and tidal basins, the largest of which is Indian Harbor. A network of roads traverses the park, accessing different areas of this important community asset.

The Council concurs with the Town that any trench route through the park would be too disruptive to park features and be in conflict with the policies of the State regarding the natural environment. It also conflicts with the FERC Guidelines by traversing parkland and requiring substantial ground disturbance and vegetative clearing.

Trenching activities, depending on the exact route, could disrupt ball fields, lawn areas, walking paths, park roads and result in the removal of large diameter trees, ornamental trees, and a wooded area that offers a noise and visual buffer to adjacent Interstate 95. Additionally, any trench route selected among the variations would have to traverse and disrupt the ecological habitat of two tidal basins in the park using coffer dams. Similarly, the Council finds installing the proposed transmission line using horizontal directional drilling (HDD) to be equally disruptive. Although the HDD would avoid direct impacts to the tidal basins, the Council finds the constant noise associated with this activity would occur for months and would be a nuisance to adjacent residences and people enjoying the park. Additionally, depending on the HDD route selected, recreational facilities could be impacted at either end of the drill segment.

The Council finds little environmental effect associated with the Northern Alternative with the exception of traffic disruptions and the potential for damage to historic structures along the route from vibrations caused by construction work.

In regards to the Hybrid Alternative, the Council notes that this route would extend along a developed rail corridor and would avoid any direct impact to Bruce Park. Furthermore, unlike the Preferred Route through Bruce Park, this alternative transmission line route would be consistent with the FERC Guidelines by jointly utilizing an existing ROW with different kinds of utility services and avoiding park, scenic and recreational land. The Council is concerned, however, about the visual impact of the necessary tall transmission line structures from adjacent residential areas, Bruce Park, and main arterial roads. Given the development of the Hybrid Alternative during the proceeding rather than prior to the application filing, the Council does not have enough information to determine the visual impact of the overhead portion of the Hybrid Alternative at this time.

The Council is satisfied that the electric and magnetic fields have been demonstrated to be well below recommended exposure standards established by the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety and are not of a concern. The three potential transmission line routes put forth in the application were analyzed in accordance with the Council's EMF BMPs. Although some magnetic field data for the Hybrid Alternative was presented during the proceeding and this data indicates no concern, the Council determines it would be prudent to analyze the Hybrid Alternative in accordance with the EMF BMPs as well.

Cost

Although the Council understands the complexities of construction of a transmission line in a highly urbanized area, the Council finds the estimated costs, $140 million for the Preferred Route and Southern Route, and $155 million for the Northern Route, too high for Connecticut ratepayers to bear for a localized issue. Although the Hybrid Alternative could be constructed for $118 million, the Council would need more information on specific project costs and life cycle costs of this alternative to make a definitive determination whether such costs are justifiable.

In determining a future solution for the capacity and reliability problems in Greenwich, the Council implores both Eversource and the Town work together to develop a reasonable solution that is acceptable to both parties as well as cost effective for the ratepayers of Connecticut.

Conclusion

The Council finds that it does not have enough information regarding the public need and the basis of the public need for the GSLP at this time. Although it is evident that the GSLP, or some variation thereof, is necessary for the reliability of the electric power supply of the Town of Greenwich, it is not evident to this Council that the GSLP is necessary for the reliability of the electric power supply of the state. As such, the Town should be more proactive in examining their electric demand needs and working to reduce energy consumption. It may be possible to meet peak demand needs through Town-mandated efficiency measures or Town-financed microgrids in conjunction with other interim measures employed by Eversource.

If electric demand cannot be reduced through energy efficiency measures in conjunction with any other measures, or if electric demand cannot be reduced by any additional short-term measures employed by Eversource to increase reliability and capacity, including supplying electricity during contingency events, the Council may have to re-examine the public need for the GSLP or some variation thereof. The Council encourages Eversource and the Town to work together in the short term rather than embark on a "wait and see approach," as the Council firmly believes high heat index days that put stress on the current electric distribution system will occur again in the near future.

The Council has a responsibility to the Connecticut ratepayers to encourage both the Town and Eversource to develop a mutually suitable solution to meet Greenwich's electric needs and hopes the Town and Eversource can work together to find a solution to Greenwich's energy consumption needs that does not place a substantial burden on Connecticut ratepayers.

In regards to the transmission line routes presented in the Application, the Council determines that the Preferred Route and Southern Alternative would be too disruptive to Bruce Park, the park environment and the community and should not be considered. Additionally, the cost of these two routes as well the cost of the North Alternative is prohibitively expensive and relies too much on Connecticut ratepayers.

As for the Hybrid Alternative, although it would cost less than the other routes presented in the application, the Council does not have enough information to make a decision on this route at this time. More information relative to the costs and necessity of equipment for a future additional transmission line at the proposed Greenwich Substation, an analysis of environmental impact, an analysis of visual impacts, and an analysis of electric and magnetic fields in accordance with the Council's EMF BMPs, would be necessary for a thorough examination of the Hybrid Alternative. Additionally, proper notice should be given to property owners who abut this potential alternative.

For the foregoing reasons, the Council finds and determines that there is not presently an immediate public need for the GSLP as presented in the application, there are substantial adverse environmental impacts associated with the Preferred Route and Southern Alternative through Bruce Park that cannot be adequately mitigated and the project costs for the Preferred Route, Southern Alternative and Northern Alternative are well beyond the lowest reasonable cost for consumers to resolve a localized issue. Therefore, the Council finds sufficient reason to deny the GSLP application without prejudice.