The Garden Club of New Haven

Promoting the preservation of natural resources is one of the primary missions of The Garden Club of New Haven and of the organizations with which is affiliated, the Federated Garden Club of Connecticut and the Garden Club of America. Since 2011, GCNH has actively participated in educating the public about issues involving trees and power and advocating for a balanced approach to preserving the benefits of trees and protecting public safety, including power reliability.

MEMORANDUM IN SUPPORT OF A STATEWIDE STRATEGY FOR UNDERGROUNDING OF ELECTRIC AND COMMUNICATION WIRES AND CABLES

January 26, 2022

The Garden Club of New Haven supports development and implementation of a long term statewide strategy to replace overhead pole and wire electric and communication (telephone, television, internet) distribution systems with underground wires and cables (hereinafter, wires will be deemed to include cables). As the state transitions toward far greater reliance on electricity for power, it is essential that incremental undergrounding proceed at the same time. Undergrounding of electric and communication wires will significantly reduce the frequency and duration of power and communication outages and reduce operating and maintenance costs, especially for electric utilities, over time. It would also protect and enhance the essential role of a robust roadside tree canopy (defined here as trees along public highways, streets and roads) in reducing the harm caused by climate change in urban, suburban and rural communities, especially in high density low income and underserved communities.

Overall, a statewide undergrounding strategy would:

- reduce greenhouse gases,
- help Connecticut be more resilient in dealing with climate change,
- make Connecticut's economy stronger and more attractive with reliable and resilient electricity and communications infrastructure,
- reduce the costs of the distribution system over time, and
- ensure more equitable distribution of the benefits of tree canopies throughout the state.[1]

I. A reliable and resilient electric and communication system is critical to the state's economy and the health and safety of its residents, and should be regarded as basic infrastructure. More frequent extreme weather due to climate change -- tropical storms, hurricanes, tornadoes and microbursts – increases the likelihood of frequent long power and communication outages. The socio-economic costs of frequent long outages justify a long-term plan for replacement of the overhead pole and wire distribution system with an underground system.

Reliable and resilient electric distribution without long power outages is becoming ever more essential as the state moves toward renewable electric power for vehicles, heating, and cooking to reduce the rate of climate change from greenhouse gas emissions. Communications reliability over the internet is already essential to business and will be increasingly essential, especially as a substantial part of the workforce is expected to work remotely, even after the Covid-19 pandemic. Although distributed renewable electric energy can provide some increased reliability, it does not eliminate reliance on electric distribution wires for most residents and businesses, many of whom cannot afford or are not situated to take advantage of renewable power. For distributed renewable energy sources to contribute to achieving a stable supply of clean energy for the state, they must be connected to a reliable and resilient distribution grid.

For extreme weather, standard utility line clearance (in the area surrounding the poles and wires) plus removal of hazardous trees that could fall on the lines outside of the clearance zone does not adequately protect the existing overhead pole and wire distribution system. Aggressive pruning and removal of trees cannot prevent long-term power outages from extreme weather, and aggressive pruning arguably weakens trees, making them more likely to fail in any storm. Some clearance and removal is needed in proximity to the electric wires in order to prevent contact for day to day reliability, but it is extremely difficult if not impossible to identify trees outside the clearance zone that will do damage during extreme weather. In fact, in the most extreme weather, especially in tornadoes and microbursts, even non-hazardous trees and other objects can come from anywhere to damage the overhead pole and wire system.

The socio-economic costs of power outages to the state, municipalities, residents and businesses are *not* borne by the electric utilities, and avoiding those costs is therefore not considered by them when determining whether to place distribution wires underground. Distribution wires are critical infrastructure for the state, on which other critical public infrastructure depends, *e.g.,* sewage treatment, water supply, and transportation. A cost benefit analysis of undergrounding must take into account not only the cumulative costs of maintaining and repairing an overhead system, but also consider the full costs of the inevitable more frequent power outages from extreme weather to the residents, businesses and industries, and public infrastructure of Connecticut -- loss of income, extra expenses during long power outages and for recovery from them, and threats to health and safety.[2]

Studies of undergrounding make it clear that underground distribution wires are far more reliable than overhead pole and wire distribution systems.[3] Because an underground system is far less likely to be damaged by a severe storm, it avoids the costs and time needed to restore the pole and wire overhead distribution system after a severe storm, and is therefore more resilient. The more frequent the severe weather, the greater the total costs of restoring the pole and wire distribution system will be over time. Restoration of the damaged overhead pole and wire system and the continued need for vegetation management does not increase reliability and resiliency, but does lead to increased rates to customers as the utilities recoup their costs for restoration and for continuous vegetation management -- vegetation management that impairs the maintenance and development of a robust tree canopy, discussed in II below.

In a webinar entitled, Strategic Undergrounding: A Panel Discussion, the convener, Distributech stated: "Recent technological and material advances now make UG [undergrounding] more safe, reliable and resilient than OH [overhead] over the life of the asset."

The electric utilities that participated in the panel discussion report that, as a result of their strategic undergrounding, not only are their customers more satisfied, but the utilities' operating and maintenance costs have declined as undergrounding proceeds. Outages are less frequent and restoration times shorter. Day to day reliability has also increased.[4]

II. A long-term strategy to eliminate reliance on a predominantly overhead electric and communications infrastructure is also essential to protect the existing roadside tree canopy and permit development of robust tree canopies where they do not now exist. A healthy, strong tree canopy is increasingly important to coping with the negative impacts of climate change, as well as to reducing carbon and other pollution.

By eliminating tree/wire conflict, removal of overhead poles and wires allows those responsible for maintenance of the roadside tree canopy to focus solely on tree health, strength and safety without concern for overseeing utility pruning and removal of trees to accommodate the overhead distribution system.

Specifically with regard to climate change, a robust tree canopy provides mitigation of greenhouse gases due to carbon capture, and is critical to climate adaptation and resilience -- reducing the stress of heat by providing shade, lowering cooling and heating bills by reducing demand, absorbing stormwater and reducing flooding, and improving air quality by removing pollutants. Other benefits include increased property values, increased business income, protection of street pavement, improved mental and physical health, noise reduction, safer communities and traffic calming (reduction in traffic speed). [5]

Mature large trees provide far more of the climate mitigation, adaptation and resilience benefits[6] than the smaller, shorter trees that now must be planted to avoid tree/wire conflicts in the overhead pole and wire distribution system in accordance with "right tree/right place" standards. In densely populated parts of urban, suburban and rural communities without a robust tree canopy, often with lower incomes and otherwise disadvantaged, the heat island effect and air pollution often have disproportionately large impacts. Undergrounding will permit trees that can attain taller stature and provide more benefits to be planted in those areas. In communities where large mature trees are diseased, dead or dying, undergrounding will permit those trees that must be removed to be replaced by trees that will become large. It will also prevent damage from aggressive pruning or removal of healthy mature trees that can remain and would otherwise be "in the wrong place."[7]

III. A long term incremental plan to reduce reliance on the legacy overhead pole and wire electric and communication infrastructure and achieve a predominantly underground system has to address many issues: technical and practical, establishing priorities for conversion, and financing.

Technical and Practical Issues:

It is beyond the scope of this memorandum to specifically discuss these issues, which have been addressed in other states and municipalities, and by organizations such as the Power Delivery Intelligence Initiative (PDi²) in webinars, research papers and articles, all of which should be consulted in planning. A good starting point would be the PDi² updated Utility Infrastructure Resiliency Playbook, December 2021. The organization's "purpose is to drive

maximum power grid resiliency and reliability at the lowest life-cycle cost." Relying on this and other sources of information, it is clear that changes in technology to the present day make undergrounding feasible in areas that, in earlier years, were thought ineligible or too difficult. Other issues that have arisen for electric utilities pursuing strategic undergrounding, such as persuading communication utilities to agree to put their distribution underground, and ensuring that service lines to abutting properties are put underground, can be dealt with by appropriate legislative and regulatory action.

Priorities for undergrounding:

The focus of undergrounding studies and initiatives to date has been solely on achieving reliability and resiliency of the distribution infrastructure, especially for the most critical parts of the distribution infrastructure, and where undergrounding occurred, priorities to that end were established by the utilities. To best serve Connecticut's interests, there ought to be state involvement in consultation with the electric utilities and other stakeholders to establish priorities. Clearly, all new development should have underground distribution, as most now do, and when deteriorating, obsolete overhead systems need replacement, they should be replaced by underground wires. Preserving and enhancing the green infrastructure of a robust roadside tree canopy must also be factored into decisions about conversion to undergrounding. Thus, for example, in deciding between two areas for undergrounding of distribution lines when results for reliability and resiliency would be otherwise equal, priority should be given to areas with the least robust tree canopy, and/or areas where an existing tree canopy is diseased and dying so that trees can be replanted that will be large at maturity.

Financing:

The total cost of converting the legacy overhead electric and communication distribution system to undergrounding may be high, but it is important to remember that the total cost will be spread over a long period of time, subject to adjustment for changed circumstances, the availability of funds, and technological advances. It is justified by avoiding the significant costs of long power outages and the increasingly expensive restoration and maintenance of the overhead pole and wire system, and by protecting and enhancing the roadside tree canopy's ability to reduce the costs of dealing with the effects of climate change.

Because it is critical infrastructure that should proceed as soon as possible, financing for undergrounding of overhead electric and communication distribution wires should not be based solely on increasing customer rates, as most projects have done in other municipalities and states. A better option is combined investor owned utility and public (Federal, state and municipal) financing that can ensure that the burden on ratepayers is not high, and particularly that it doesn't fall on ratepayers (or municipalities) least able to afford it. An example of this joint financing is an undergrounding project of the District of Columbia and Pepco, its electric utility, in one of the District's least reliable circuits. Rates are only increased for customers of this distribution line, and the plan exempts low income ratepayers from rate increases.[8]

ENDNOTES

[1] An undergrounding strategy serves the "five overlapping lenses" set forth for development of Connecticut's Comprehensive Energy Strategy in the January 6, 2022 Notice of Proceeding and Scoping Meeting: "Climate, Equity, Affordability, Economic Development, and Resilience," at p.2, and is consistent with recommendations for incremental undergrounding of utilities, in the Policy on Resilient Forests for Connecticut's Future (PRFCT Future) Final Report, (12.14.21, accepted by DEEP on 1.11.22), at p.11.

[2] A partial list of the impacts of such power outages include: Wires/cables mixed with fallen trees and debris prevent rapid clearing of roads by public works departments, who must wait for "make safe" crews. These uncleared roads then prevent emergency vehicles from reaching those in need, prevent caregivers from reaching patients and prevent residents from moving to more secure shelter, or getting needed provisions in anticipation of long power outages. Uncleared roads also can prevent fuel deliveries to generators that may run out of fuel before power goes on, jeopardizing any resident whose life depends on electricity. For residents who cannot work from home, impassable roads make getting to work impossible, For roads that are clear, traffic lights may cease to function, increasing the risk of accidents. For the increasing number of residents who do work from home, the loss of electricity, internet and phone communication also makes work difficult and in some cases impossible, and harms their employers as well. Businesses, industries and public facilities require communications as well as power to function. For many, expensive medicines that need refrigeration are lost. For the 23% of people in Connecticut who rely on private wells, there is no water. In the winter, without heat, pipes can freeze, causing damage and requiring extensive repair.

[3] *See* Edison Electric Institute, Out of Sight, Out of Mind 2012; An Updated Study on the Undergrounding of Overhead Power Lines. Underground distribution showed significantly lower average interruption minutes and frequency of interruption compared to overhead distribution. It was only the total cost of undergrounding and the predicted doubling of utility rates that argued against it.

[4]The panel discussion can be found in the On Demand section of the Distributech website. Access to the site is free, but one must register. The participants were Teco Energy (Florida), Dominion Energy (Virginia), and Wisconsin Public Service [aka WE Energies]. *See* also "Is it time for you to consider undergrounding some of your distribution lines?" by Jennifer Runyon, 8.4.2021, which includes comments by two of the panelists, Dominion Energy and Wisconsin Public Service. The Power Delivery Intelligence Initiative (PDi²) website includes numerous webinars, articles and research on issues involving undergrounding of electric distribution, and is focused on electric grid resiliency and reliability.

[5] Many lists of the importance of the tree canopy are on the internet. *See,* for example: "22 Reasons Trees in Cities Keep Us Healthy and Save Us Money," Blue Zones. The PRFCT Future Final Report cited the benefits of forests and trees at p. 5.

[6] *See* State Vegetation Management Task Force Report, August 2012 at pp. 16-17: (" . . . ecosystem services are almost always directly related to the volume of a tree's crown and the area of leaf surface within that crown.") and at p. 80: ("100 mature trees catch 139,000 gallons of rain water per year."; "100 mature trees remove 430 pounds of pollutants out of the air each year. An acre of trees produces enough oxygen for 18 people and absorbs 2.6 tons of carbon to offset driving 26,000 miles."; "Properly sited trees can save up to 56% on air conditioning costs and up to 30% on heating costs.")

[7] Concern has been expressed about possible damage to mature trees from undergrounding. Directional drilling or boring can be used to go under and avoid tree root systems in order to preserve mature trees. Dominion uses this method, and numerous drilling companies that use it to avoid tree roots and other impediments can be found on the internet.

[8] DCPlug Fact Sheet