Daniel R. Canavan
Senior Counsel

Via Electronic and Overnight Mail

March 1, 2019

Mr. Robert Stein
Chairman
The Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Docket No. F- 2019/2020 Connecticut Siting Council Review of the Ten Year Forecast of Connecticut Electric Loads and Resources (2019-2028) – The United Illuminating Company

Dear Chairman Stein:

The United Illuminating Company (the "Company") respectfully submits to the Connecticut Siting Council an original and 15 copies of the Company's Report to the Connecticut Siting Council on Loads and Transmission resources.

Please feel free to contact me with any questions or concerns regarding this filing.

Very truly yours,

Daniel R. Canavan

Daniel R. Canavan
Senior Counsel
UIL Holdings Corporation
As Agent for The United Illuminating Company

Enclosures: 16

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Report to the Connecticut Siting Council on Loads and Transmission Resources

March 1, 2019

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100 Marsh Hill Road
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The United Illuminating Company
Report to the Connecticut Siting Council
on Loads and Transmission Resources
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Section I. Load Forecast Update

This section presents the results and a summary of the methodology for The United Illuminating Company's ("UI" or "Company") most recent ten-year energy sales forecast ("Sales Forecast") and ten-year system peak load forecast ("Peak Load Forecast"). The Sales Forecast is used for budgeting and financial planning purposes. The Peak Load Forecast is used by the Connecticut Siting Council ("Council" or "CSC") for resource planning purposes in Connecticut. The two forecasts use different forecasting methodologies chosen to fulfill their intended purpose.

Sales Forecast Purpose & Methodology

The primary purpose of the Sales Forecast is to accurately project monthly sales-by-class that is then converted to a revenue forecast using electric service rates by class. The principal output of the Sales Forecast is monthly energy sales. UI uses the ten-year Sales Forecast for a number of purposes. A key use of the Sales Forecast is to project the energy sales as the basis for predicting revenue over the next 12 to 24 months. The UI Sales Forecast produces monthly forecasted energy sales weather-adjusted to "normal weather" or average weather conditions.

Weather has a large impact on both sales and peak load. Any analysis of the actual historical sales and peak load must consider the weather conditions under which those sales and peak loads occurred. The Company's sales forecasting process begins by weather-adjusting the actual, customer-class specific, historical sales data to the sales that would have been experienced under normal weather, using heating degree days ("HDD") and cooling degree days ("CDD") based on a standard of 65 degrees Fahrenheit for the transition from heating-based to cooling-based sales.

The sales forecasting process then moves to the creation of a Base Energy Sales Forecast which reflects the projected sales from UI's existing base of customers. The Base Sales Forecast development employs focused analytical processes that weather-adjusts and evaluates the most recent energy sales history of its customers, trends in the local and state economies and the sales forecast team's interpretations of how these factors are likely to impact UI's future monthly sales.

The impact to sales from Conservation and Load Management ("C&LM") and Distributed Generation ("DG") currently on the UI system are embedded in the historical data used to develop the Base Energy Sales Forecast, and therefore, the future impact of these resources is accounted for in the Base Energy Sales Forecast results. UI adds to the Base Energy Sales Forecast the projected future annual impact of incremental additions of new C&LM and DG to account for the future additions of these resources.

Peak Load Forecast Purpose & Methodology

The purpose of the peak load forecast shown in Exhibit I is to allow the Council to effectively forecast and evaluate the demand and supply balance in Connecticut. The primary output of UI's Peak Load Forecast is the forecast of system peak loads under both normal and extreme weather conditions. Normal weather or average weather, also referred to as a 50/50 forecast, refers to a probability-based weather normalization of the historical system peak load data. A 50/50 weather normalization indicates a 50% probability of being exceeded and a 50% probability of falling short of the forecasted value in any given year. Extreme weather, also referred to as a 90/10 forecast, indicates that the forecasted extreme weather-adjusted system peak has a 10% probability of being exceeded on the system peak day, due to weather conditions. In other words, the forecasted 90/10 peak load will be exceeded once every ten years.

The Peak Load Forecast for 2019 was developed using a Direct Peak Forecast methodology, which utilizes the most recent ten years of weather-adjusted system peaks and econometric forecast models. The weather-adjustment for historic peak loads is based on a model that relates the twelve-hour average Temperature Humidity Index (the output of a mathematical formula that combines temperature and humidity into a single number) to historical summer weekday peak loads (THI Model). The THI Model is then used to adjust historic peak loads to the loads that would have been seen under normal or average temperature and humidity conditions and for extreme conditions. The methodology for calculating historical weather normalized system peaks (50/50 and 90/10) was adjusted in 2019 to more closely reflect the weather conditions that affected system peak. The econometric forecast relates the system peaks to economic drivers, obtained from independent sources using a multi-variable regression model.

The impact to the peak load from C&LM and DG currently on the UI system are embedded in the historical data used to develop the Base Peak Load Forecast. Similar to the Sales Forecast, the Company accounts for projected new C&LM, and DG programs separately. The Company also takes into account new or removed large customer loads separately. UI's final Peak Load Forecast results from the summation of the Base Load Forecast and new or removed large customer loads along with reductions due to new DG and new incremental C&LM. Similar to ISO New England, the Company does not currently forecast the impact to peak load from Electric Vehicle (EV) charging due to the low levels of adoption and deployment in the region. In response to Connecticut Public Act 15-5[1] and subsequent Connecticut Department of Energy and Environmental Protection's ("DEEP") notices and request for proposals, UI submitted a DER and Load Forecasting Demonstration Project, which was approved by DEEP in February 2017 and by PURA in December 2017. This demonstration project is currently being implemented at one of UI's substations and will allow the Company to forecast load and DERs at the circuit level, including the effect of electric vehicle charging. Lessons learned from this demonstration project will inform the potential development of scalability plans for the rest of the system.

UI will continue to monitor EV forecasts and make adjustments to the system peak load forecast methodology as required.

[1] Connecticut Public Act 15-5, Section 103 requires each electric distribution company ("EDC") to submit a proposal or proposals for a pilot program to build, own or operate grid-side system enhancements for the purpose of demonstrating and investigating the reliable and cost effective integration of distributed energy resources ("DERs") into the electric distribution systems.

Normal Weather-Adjusted Historical and Forecasted Data

The data shown in Exhibit 1 includes actual historical data for system energy requirements, sales and peak load. Exhibit 1 also includes historical and forecasted sales and peak load adjusted to normal weather conditions. UI is a summer peaking utility primarily due to the air conditioning loads on its system. During recent history, between 2009 and 2018, UI has experienced a decline in normal weather-adjusted sales of 9.0% as compared to a simultaneous decline in its normal weather-adjusted peak load of 8.2%. This is attributed to changes in customer behavior regarding energy usage and the economic recession. It should be noted that in four of the last ten years of historical data (2010, 2011, 2013, and 2018); the actual peak load has exceeded the normal weather-adjusted peak load. This recent history of peak loads reinforces the need for the Company to consider extreme weather in its Peak Load Forecasts. The forecast of the normal weather-adjusted peak load projects a growth rate of 2.1% or 0.21 % compounded annually between 2018 and 2028.

Extreme Weather-Adjusted Historical and Forecasted Data

In addition to the normal weather-adjusted data, Exhibit 1 also shows historical and forecasted peak loads adjusted to extreme weather conditions. The 2009 to 2018 historical data in Exhibit 1 shows a decline in the extreme weather-adjusted historical Peak Loads of 7.8%. The Company's extreme weather-adjusted Peak Load Forecast shows an increase of 2.0% or 0.20% compounded annually during the period from 2018 to 2028.

It should be noted that in one of the last ten years of historical data (2011), the actual peak load value was approximately the same value as the extreme weather-adjusted peak load. This is consistent with the design of the extreme weather adjustment in that typical variations in weather alone will cause the extreme weather-adjusted value to be exceeded 10% of the time on the peak load day.

The ability to predict when extreme weather will occur or the exact amount of economic activity that will be realized is always problematic. Therefore, prudent planning requires that the possibility of the effects of extreme weather (i.e., high temperatures and high humidity) within the forecast time period be recognized, as well as appropriate assumptions of future economic development activity. Plans must be formulated to meet this possible demand. The bounds of the Company's forecasts from the normal and extreme weather-adjusted scenarios are intended to provide a plausible range of futures. No single forecast will be accurate throughout the forecast period. When extreme weather occurs, regardless of the timing, the system infrastructure must be in place to serve the load safely and reliably.

Distributed Generation and Electric Vehicles

Distributed Generation

The Connecticut General Assembly passed a landmark legislative initiative in 2005: Public Act 05-01, June Special Session, *An Act Concerning Energy Independence* ("PA 05-01"). The implementation of the Act, carried out by the former DPUC, provided monetary grants to offset the capital cost of installing DG, but the program was discontinued for all projects that submitted applications on or after October 14, 2008. The program successfully added about 36 Megawatts of DG capacity in the UI service territory. The program also successfully added 7.6 MW of Emergency Generation capacities required to operate in the Independent System Operator – New England ("ISO-NE") demand response programs.

On July 1, 2011, former Governor Malloy signed into law Public Act 11-80, *An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future* ("PA 11-80"). Section 103 of PA 11-80 establishes a three year pilot program to promote the development of combined heat and power projects, a three year pilot program for anaerobic digestion projects to generate electricity and heat, and a Low & Zero Emission Renewable Energy Credit (LREC/ZREC) program that is expected to drive the development of Class 1 Renewable Resources through a five year solicitation program for LREC's and six year solicitation program for ZREC's administered by both utilities in Connecticut. Public Act 17-144 extended the LREC/ZREC Program to Year 7, and the budget allocations for year seven remained the same as Year 6. As with Year 6, the budget was divided 50/50 between ZREC and LREC projects. Public Act 18-50 extended the LREC/ZREC program to Year 8, and the budget allocations for the LREC, Large ZREC and Medium ZREC categories for Year 8 will remain the same as Years 6 and 7. The solicitation of LRECs was conducted

under CGS Section 16-244t for years 1-5 of the program, but for years 6-8 will be conducted under CGS Sections 16-244r and 16-244s. Due to the passage of Public Acts 16-196 and 17-144, the base LREC funding will be unchanged from year 5 to years 6-8. CGS Section 16-244t expired after 5 years of LREC solicitations.

The PA 11-80 DG pilot program offers significantly lower dollar incentives than those provided through the earlier program established in PA 05-01, capped at $200 per kilowatt of capacity. Capacity built via the LREC/ZREC program is dependent on the outcome of the solicitation program. UI will continue to monitor the development of the DG pilot program established through PA 11-80.

All grants approved through the PA 05-01 DG program that have not been built, totaling 8.5 Megawatts[2] of capacity, have expired. There is no reason to believe that customers who had approved grants and chose not to construct a DG unit will decide to do so with current incentives. Tracking will commence following any new projects potentially submitted after the Department of Energy and Environmental Protection ("DEEP") re-initiates or establishes a new program. Even with the grants made available, each customer must decide for themselves, within the timeframe allotted, whether the installation is economically attractive.

The State of Connecticut continues to look for ways to further its clean energy vision through the implementation of the Comprehensive Energy Strategy. This will give Connecticut residents and businesses the power to choose from a wide array of energy options and guides the State on a path toward a cheaper, cleaner, and more reliable energy future. UI will monitor these efforts, identify potential opportunities and support Connecticut's clean energy vision. The

[2] Operational DG output is based on capacity listed on grant application and not the actual generator output.

Company continues to monitor all programs related to DG and is prepared for its growth in the future.

Part of House Bill No. 6838, Sec 16-245ff and Sec 16-245gg stipulates that the Solar Home Renewable Energy Credit ("SHREC") program be established by the Connecticut Green Bank. The program was signed in to law in mid-2015 with an end date of December 31, 2016. This program was designed to procure up to 300 megawatts of new residential solar in the state and the REC's will be held by the Connecticut Green Bank and transferred to the Utilities under a master purchaser agreement. The master purchase agreement was finalized by the Connecticut Green Bank and the utilities in May of 2016, and approved by PURA in January 2017. Thus far, in UI's service territory, 55.6 MW were approved under the program and 39.2 MW have been installed. Under this program, REC's will last for a period of 15 years from the project start date.

Under CT Public Act 13-303 and more recently Public Act 15-107, Connecticut along with Massachusetts and Rhode Island issued the Final Clean Energy RFP in order to identify projects that will advance the clean energy goals for the three states. While the Clean Energy RFP was not for customer sited resources, it was the first step in three RFP's designed to guide the state in selecting the best mix of resources to address the regions reliability challenge, meet clean energy goals, and save rate payers money. DEEP issued a Request for Proposal on March 9, 2016 for renewable projects between 2-20 MW including Passive Demand Response and Energy Storage. Projects were submitted for UI's service area however, none were accepted.

In development of the sales forecast shown in Exhibit 1, those projects no longer anticipated have been excluded from the sales forecast. In development of the peak load forecasts presented in Exhibit 1, the forecasted DG units have been included as offsets to load (utilizing calculated generator output during times of peak demand).

Electric Vehicles

Under CT Public Act 16-135, Section 5, UI is required to integrate electric vehicle charging load projections into distribution planning efforts based on the number of electric vehicles registered in the state, and the projected increase or decrease in sales of such vehicles.

Based on State of Connecticut Department of Motor Vehicle registration data there are 560 Battery Electric Vehicles (BEVs) and 950 Plug-in Hybrid Electric Vehicles (PHEVs) in UI's territory as of December 31,2018. Using projections from the US Energy Information Administration's Annual Energy Outlook 2018 Reference case for vehicle sales in the New England, UI anticipates these numbers to increase to 32,187 BEVs and 21,306 PHEVs in the next ten years. UI expects the majority of vehicle charging will occur at home, during off-peak hours. On peak charging typically occurs at the workplace; however, the increase in load is 3-6 kilowatts per charge, roughly the size of a small air conditioning unit[3]. The use of DC fast charging is becoming more common and due to the nature of these charging stations and their locations, they are more likely to be used during peak hours. There was a moderate increase in the number of DC fast charging ports in UI's service area in 2018. The majority of these are the result of a new, eight port Electrify America charging station installed in Stratford, CT and a six port EVgo Network charging station in North Haven, CT. DC fast charging ports typically have a plug load of 45 kilowatts per charge.

As of February 14, 2019 there are 138 public charging ports in UI's territory. There are two Level 1, 87 Level 2 and 49 DC Fast Chargers located at 55 different locations across the 17 towns and cities served by UI. EV charging load is currently integrated into UI's distribution forecast as part of the historical data used to develop the base forecast model.

[3] US DOE "Evaluating Electric Vehicle Charging Impacts and Customer Charging Behaviors – Experiences from Six Smart Grid Investment Grant Projects" December 2014

UI will continue to monitor EV forecasts including state policy goals and the Department of Energy (DOE). UI will also continue to collaborate with other AVANGRID operating companies as well as be part of the Connecticut DEEP EV Roadmap development as envisioned in the Governor's Comprehensive Energy Strategy.

Conservation & Load Management

By statute and regulation, Connecticut supports expanded investments in the state's C&LM programs. The state is required to give priority to energy efficiency and demand side management, specifically stating that "resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable and feasible."

Pursuant to Conn. Gen. Stat. § 16-245m, as amended by Connecticut Public Act 13-298m the Company is required to develop a plan to implement cost-effective C&LM programs which the DEEP Commissioner has the authority to approve, modify, or reject. On December 20, 2018 DEEP issued an Approval with Conditions of the 2019-2021 Conservation and Load Management Plan ("Plan"). This decision represents continued support for full funding of energy efficiency programs. Consistent with the findings of the 2018 Comprehensive Energy Strategy for Connecticut, the decision highlights the primary role of energy efficiency in reducing the state's energy consumption while growing its economy and reducing harmful pollutants associated with energy use.

The primary funding for the 2019-21 C&LM Plan continues to be the three-mill charge and a Conservation Adjustment Mechanism ("CAM") of up to three-mill assessed on customer electric bills in 2019. Beginning in 2020, the CAM increases to six mills and the three-mill statutory charge is eliminated pursuant to Public Act 18-50. The electric C&LM budget is also supported by proceeds from the sale of carbon dioxide ("CO_2") emission allowances to the power sector through the Regional Greenhouse Gas Initiative ("RGGI"), and revenues from the ISO-NE Forward Capacity Market ("FCM"). After January 1, 2014, C&LM programs are no longer eligible to generate revenues from the sale of Class III Renewable Energy Credits.

RGGI is the first mandatory, market-based effort in the United States to reduce greenhouse gas emissions. The participating RGGI states cap allowable CO_2 emissions, sell emissions allowances through auctions, and use the auction proceeds to fund energy efficiency, renewable energy, and other clean energy programs and technologies. Per June Special Session Public Act 17-2, approximately $10 million per year of RGGI funding was diverted from the Energy Efficiency Fund retroactive to July 1, 2017 and ending June 30, 2019.

The ISO-NE FCM has been fully implemented since June 1, 2010. The FCM allows market participants to bid their peak demand savings into the capacity market. Market participants earn capacity payments for qualifying resources, such as distributed generation, energy efficiency, load management or load response, equivalent to supply-side generation sources. UI has entered peak demand savings from energy efficiency and load management projects for the FCM on behalf of the Connecticut Energy Efficiency Fund and has successfully bid capacity in the first twelve capacity auctions, with a thirteenth auction held on February 4, 2019.

PA 11-80 assigned the responsibility for development of an Integrated Resource Plan ("IRP") to the DEEP. PA 07-242, *An Act Concerning Electricity and Energy Efficiency* ("2007 Act"), established the initial integrated resource planning process, which resulted in the EDCs preparing the previous IRPs. DEEP produced the 2014 IRP in consultation with the EDCs. The 2014 IRP presents a long-term, resource scenario for Demand Side Management ("DSM").

The 2014 IRP was issued on March 17, 2015 and continues to support the commitment to energy efficiency. It recommends continued investment in energy efficiency to maintain a critical offset to load growth resulting from economic activity. It indicates that over the next ten years, this efficiency investment is expected to nearly eliminate growth in the state's annual electricity consumption (projected to rise an average of only 0.05% per year), and reduce growth

in electricity consumption during peak demand periods to 0.5% per year as well as put the state on the path to have 80% of the state's homes weatherized by 2030, another goal established in PA 11-80.

On February 8, 2018, the DEEP released the second Comprehensive Energy Strategy for the State of Connecticut. The Comprehensive Energy Strategy is an assessment and strategic plan for all commercial, industrial, and residential energy issues, including: electricity supply (including all renewables), energy efficiency, industrial energy needs, natural gas, and transportation. The Comprehensive Energy Strategy is a blueprint for the DEEP, the Connecticut Energy Advisory Board, the Energy Efficiency Board, the Companies, and a myriad of stakeholders to provide cheaper, cleaner, and more reliable energy for Connecticut's future.

The Energy Independence and Security Act of 2007, a nationwide lighting efficiency standard ("Lighting Efficiency Standard") is fully reflected in the Plan savings. The purpose of the Lighting Efficiency Standard is to introduce minimum energy performance standards for standard incandescent bulbs that will, over a period of time, remove inefficient lighting products from the marketplace. These federal standards lower the energy consumption of a standard incandescent bulb, effectively reducing the energy savings of general service Compact Fluorescent Light bulbs ("CFLs") and LEDs in the C&LM programs.

Throughout 2019-2021, UI will continuously monitor the dynamic lighting marketplace to proactively address new regulations and their implementation, and emerging technologies. The 2019-2021 C&LM Plan will provide support for LEDs while strategically withdrawing support for CFLs. This strategy allows the Companies to anticipate and prepare the Connecticut market for the implementation of the 2020 performance standards of the Energy Independence and Security Act of 2007's ("EISA") requiring greater efficiency in many light bulb categories, without losing CFL and LED market share to less-efficient halogen bulbs in the interim.

The strategic focus of UI's programs is the result of a multi-level collaborative process involving UI and a diverse group of stakeholders. These stakeholders include: the DEEP, the Energy Efficiency Board, Connecticut state government, consumer and business interests, national and regional environmental and energy efficiency organizations, design professionals and energy services providers.

UI participates in national and regional activities to develop a long-range focus for energy efficiency. To stay abreast of latest development, technologies and best practices, UI partners with the Consortium for Energy Efficiency ("CEE"), the American Council for an Energy-Efficient Economy ("ACEEE"), Northeast Energy Efficiency Partnerships ("NEEP"), and other utility and public benefit fund organizations. Together with these partners, UI is involved in regional or programmatic evaluations, market baseline research, and development of efficiency standards, exchange of programmatic ideas and concepts, and the assessment of the need for incentives. These efforts have produced many of the energy efficiency concepts and measures upon which the programs are based.

Since the 1990's, the Companies and the Energy Efficiency Board have been recognized as national leaders in the design and delivery of cost-effective and innovative energy-efficiency programs. The state's energy-efficiency programs (and other state energy policies and programs) have been perennial top-ten performers in the ACEEE State Energy Efficiency Scorecard, including first place recognition in 2006.

Additionally, individual Connecticut programs have been recognized by the ACEEE as among the best energy-efficiency programs in North America. Every five years, the ACEEE recognizes the energy-efficiency industry's top performing programs and Connecticut's

programs are consistently recognized. In the 2018 ACEEE Review[4], the Companies' Small Business Energy Advantage program was once again named one of three "Exemplary" small business programs nationally, as it was previously in 2003, 2008 and 2013. In the 2003, 2008 and 2013 ACEEE Reviews, the Companies' Energy Conscious Blueprint program and other Retrofit programs for commercial and industrial customers were recognized by the ACEEE as "Exemplary," and both continue to be emulated national models today. Additionally, the Companies' Residential Program portfolio has also been recognized by the ACEEE with both the Home Energy Solutions and Residential New Construction programs earning "Exemplary" recognition in the 2013 ACEEE Review.

It is not just the recognition that Connecticut has outstanding energy-saving programs that is worthy of note; it is the persistence of that recognition over time. As the ACEEE noted in its 2018 Review:

> *"While the need for innovation and adaptation has remained constant across the ACEEE reviews timeframe, program administrators face a constantly evolving set of challenges to administering successful energy efficiency programs. Recent developments include the tightening of many building codes and lighting and appliance standards, concern that utilities have already harvested much of the low-hanging fruit, and the widespread adoption of technological advancements such as advanced metering and smart technologies.2 Those factors all contributed to our decision to conduct a new exemplary programs review in 2018."*

During the implementation of the 2019-2021 Plan, the Energy Efficiency Board and the Companies received numerous awards and recognitions. A list of these awards and recognitions can be found in Exhibit 3.

4 "The New Leaders of the Pack: ACEEE's Fourth National Review of Exemplary Energy Efficiency Programs," January, 2019, p. 104.

Per June Special Session Public Act 17-2, approximately $63.5 million for Fiscal Year 2018 and $53.5 million for Fiscal Year 2019 was diverted from the Energy Efficiency Fund. Per C.G.S. § 16-245m, this diversion only impacted the State's electric Companies. UI's share of the $53.5 million is approximately $11.7 million per year and is reflected in the 2019 C&LM budget.

Section II. Transmission Planning

UI projects included in this report help UI fulfill its obligation to provide reliable service to its customers and to meet the reliability standards mandated by national and regional authorities responsible for the reliability of the transmission system, i.e., the North American Electric Reliability Corporation ("NERC"), the Northeast Power Coordinating Council ("NPCC") and ISO-NE.

Transmission Planning – National and Regional Reliability Standards

In 2006, the Federal Energy Regulatory Commission ("FERC") designated NERC as the nation's Electric Reliability Organization ("ERO"). FERC approved mandatory reliability standards developed by NERC in 2007. These mandatory reliability standards apply to UI as a transmission owner ("TO") and as a transmission planner ("TP") of the bulk power system, as designated by NERC through its compliance registry procedures. In addition to satisfying NERC reliability standards, UI must also satisfy NPCC and ISO-NE reliability standards. Both monetary and non-monetary penalties may be imposed for violations of the NERC, NPCC, and ISO-NE Reliability Standards.

Transmission Planning Process

ISO-NE, as the registered NERC reliability authority, along with UI and Eversource Energy ("Eversource"), formerly known as Connecticut Light & Power ("CL&P"), as the TOs in Connecticut, must comply with NERC and NPCC planning standards by performing reliability assessment studies of the transmission system. Needs Assessments in sub-areas such as Southwestern Connecticut ("SWCT") are performed to determine if reliability issues are

projected to occur within a ten year planning horizon. If a reliability problem is identified from a Needs Assessment, then mitigating solution alternatives are developed to ensure NERC, NPCC, and ISO-NE reliability standards are met. Viable transmission solution alternatives are compared based on a number of factors including overall cost, effectiveness, solution longevity, construction feasibility, and environmental impact. All recommended solutions are vetted through the ISO-NE process which includes the Planning Advisory Committee ("PAC") and the New England Power Pool ("NEPOOL") Reliability Committee. Final selected solutions eventually progress into detailed engineering and construction phases to mitigate all reliability exposure risks identified in the needs assessment study.

UI Proposed Transmission Projects

To address future reliability needs and consistent with the process described above, UI has multiple reliability projects at various stages in the process. UI's current transmission system projects are listed in Exhibit 2.

To address reliability, substation capacity, voltage support, and aging infrastructure in the UI service territory, UI must request and receive a CSC Certificate of Environmental Compatibility and Public Need or a Declaratory Ruling from the Council that no Certificates of Environmental Compatibility and Public Need are required for a particular project.

Transmission Projects which have Received CSC Approval or Exemptions

- Substation Security Upgrade Program – In 2015, UI received a Declaratory Ruling for this project which addresses physical security needs at various UI substations. This four year program is expected to be completed by September 2019.
- Baird-Housatonic River 115-kV Railroad Lines Upgrade – This project, which addresses the need for increased thermal capability for the 115-kV overhead railroad lines between Baird Substation, Stratford and the Housatonic River Crossing, received a Declaratory Ruling from the CSC in 2017. UI expects to complete this project by May 2020.
- East Shore 115 kV Raising Impacted Equipment - The UI Coastal Substation Flood Mitigation Solution Report[5], which was completed January 23, 2017 provided the mitigating strategy for each of the various "at-risk" UI substations. At East Shore substation, three 115-kV disconnect switch motor operators will be raised to address the flooding risk there. UI received a Declaratory Ruling for this project. The in-service date for this project is in 2020.
- East Shore 345 kV Circuit Switcher Replacement – This project which addresses the need to mitigate the multiple issues with obsolete equipment including the 345kV circuit switchers and P&C equipment at the East Shore Substation, received a Declaratory Ruling from the CSC in 2017. UI expects to complete this project by June 2020.

[5] UI Coastal Substation Flood Mitigation Solution Report – Final, 1/23/2017, available at the following link: https://www.iso-ne.com/committees/planning/planning-advisory

- Congress 115 kV Substation Flood Wall - To address the flooding risk at Congress Street Substation identified in the UI Coastal Substation Flood Mitigation Solution Report a perimeter floodwall system (including access gates, pumps, piles, etc.) will be installed at this substation. UI received a Declaratory Ruling for this project. The expected in-service date for this project is in 2021.
- Singer 345 kV Substation Flood Wall – The potential flooding risk at Singer Substation which was identified in the UI Coastal Substation Flood Mitigation Solution Report, calls for a perimeter floodwall system (including access gates, pumps, piles, etc.) to be installed at this substation. UI received a Declaratory Ruling for this project. The expected in-service date for this project is in 2022.
- June Street Battery Bank Addition – UI received a Declaratory Ruling for the June Street Battery Bank Addition project in 2018. This project addresses the system stability related issues. The project is planned to be completed in 2019.
- Pequonnock 115/13.8 kV Substation Rebuild - Due to the combination of asset condition deficiencies and flooding risk also identified in the 2017 UI Coastal Substation Flood Mitigation Solution Report, Pequonnock 115 kV Substation will be raised and rebuilt on a more elevated property near the existing substation location. This project received a CSC Certificate of Environmental Compatibility and Public Need Approval and is expected to be in-service in 2022.

Transmission Reliability Projects Requiring CSC Approval

- Grand Avenue-Mill River 115 kV Substation Flood Wall - To address the flooding risk at Grand Avenue-Mill River Substation identified in the UI Coastal Substation Flood Mitigation Solution Report a perimeter floodwall system (including access gates, pumps, piles, etc.) will be installed at this substation. The expected in-service date for this project is in 2022.
- Railroad Lines Upgrade Project - This series of projects addresses the asset condition needs for the 115-kV overhead lines in the railroad corridor. The lines will be upgraded on the following segments: Milvon Substation to West River Substation, Pequonnock Substation to Fairfield, Pequonnock Substation to Congress Street Substation, West River Substation to Allings Crossing Substation, and Allings Crossing Substation to Milvon Substation. The project is expected to be fully completed by early 2028.
- Derby Junction to Ansonia – The lattice structures supporting the 115 kV conductor from Derby Junction to Ansonia Substation are in very poor condition and require replacement. This project is expected to be in-service in 2022
- Old Town Substation Rebuild – Bridgeport's Old Town Substation, originally constructed in 1968, was recently evaluated for solutions to address equipment obsolescence and condition issues, transmission electrical clearance issues and control room space restrictions. A proposal involving a new 115/13.8-kV substation adjacent to the existing Old Town Substation is expected to be submitted to the CSC in December 2019. The projected in-service date for the Old Town 115/13.8-kV Substation Rebuild project is December 2023.

Please note that Exhibit 2 includes only those planned transmission projects that UI is responsible to undertake. It does not include any plans or proposed actions by third parties that would require transmission system modifications in UI's service territory. It would be the responsibility of such third parties to provide the CSC with a report of their plans as appropriate. Any such proposed modifications would require notification and coordination with UI so the Company can assess the impacts on its transmission system and ensure the system's continued reliability.

Section III. EXHIBITS

EXHIBIT 1 System Energy Requirements, Annual Sales, and Peak Load Table

The United Illuminating Company

System Energy Requirements, Annual Sales, and Peak Load

History								Normal Weather Adjustment					Extreme Weather Adjustment		
Year	Total Sys. Req. (GWh)	Annual Change (Pct.)	Actual Sales (GWh)	Annual Change (Pct.)	Actual System Peak (MW)	Annual Change	Load Factor (Pct.)	Weather Adjusted Sales (GWh)	Annual Change (Pct.)	Weather Adjusted System Peak (MW)	Annual Change	Load Factor (Pct.)	Weather Adjusted System Peak (MW)	Annual Change	Load Factor (Pct.)
2009	5,673	-	5,493	-	1,253	-	52%	5,593	-	1,375	-	47%	1,434	-	45%
2010	5,950	4.9%	5,735	4.4%	1,369	9.2%	50%	5,587	-0.1%	1,352	-1.7%	50%	1,411	-1.6%	48%
2011	5,783	-2.8%	5,576	-2.8%	1,398	2.2%	47%	5,485	-1.8%	1,342	-0.8%	49%	1,401	-0.7%	47%
2012	5,679	-1.8%	5,431	-2.6%	1,317	-5.8%	49%	5,411	-1.3%	1,339	-0.2%	48%	1,398	-0.2%	46%
2013	5,617	-1.1%	5,422	-0.2%	1,365	3.6%	47%	5,375	-0.7%	1,336	-0.2%	48%	1,395	-0.2%	46%
2014	5,507	-2.0%	5,327	-1.8%	1,186	-13.1%	53%	5,342	-0.6%	1,308	-2.0%	48%	1,367	-2.0%	46%
2015	5,625	2.1%	5,450	2.3%	1,241	4.6%	52%	5,359	0.3%	1,303	-0.4%	49%	1,362	-0.4%	47%
2016	5,521	-1.8%	5,334	-2.1%	1,264	1.9%	50%	5,193	-3.1%	1,272	-2.3%	50%	1,331	-2.2%	47%
2017	5,259	-4.8%	5,094	-4.5%	1,193	-5.6%	50%	5,098	-1.8%	1,273	0.1%	47%	1,332	0.1%	45%
2018	5,355	1.8%	5,191	1.9%	1,274	6.8%	48%	5,091	-0.1%	1,263	-0.8%	48%	1,322	-0.8%	46%
2009 - 2018 growth		**-5.6%**		**-5.5%**		**1.7%**			**-9.0%**		**-8.2%**			**-7.8%**	

Forecast				Normal Weather Scenario					Extreme Weather Scenario		
Year	Total Sys. Req. (GWh)	Annual Change (Pct.)		Weather Adjusted Sales (GWh)	Annual Change (Pct.)	System Peak (MW)	Annual Change	Load Factor (Pct.)	System Peak (MW)	Annual Change	Load Factor (Pct.)
2019	5,213	-5.3%		5,015	-6.1%	1,270	-2.5%	47%	1,329	-2.4%	45%
2020	5,190	-0.4%		4,993	-0.4%	1,281	0.9%	46%	1,340	0.8%	44%
2021	5,141	-0.9%		4,946	-0.9%	1,284	0.2%	46%	1,343	0.2%	44%
2022	5,114	-0.5%		4,920	-0.5%	1,286	0.2%	45%	1,345	0.1%	43%
2023	5,093	-0.4%		4,899	-0.4%	1,287	0.1%	45%	1,346	0.1%	43%
2024	5,089	-0.1%		4,896	-0.1%	1,289	0.2%	45%	1,348	0.1%	43%
2025	5,055	-0.7%		4,863	-0.7%	1,291	0.2%	45%	1,350	0.1%	43%
2026	5,040	-0.3%		4,848	-0.3%	1,291	0.0%	45%	1,350	0.0%	43%
2027	5,026	-0.3%		4,835	-0.3%	1,290	-0.1%	44%	1,349	-0.1%	43%
2028	5,031	0.1%		4,840	0.1%	1,290	0.0%	45%	1,349	0.0%	43%
2018 - 2028 growth		**-0.060539**			**-4.9%**		**2.1%**			**2.0%**	
Compounded Annual Growth Rate (2018 - 2028)		**-0.62%**			**-0.50%**		**0.21%**			**0.20%**	

1. System Requirements are sales plus losses and Company use.
2. Load Factor = System Requirements (MWh) / (8760 Hours X System Peak (MW)).
3. All forecasts include C&LM, DG & potential new large customer planned loads identified by UI Economic Development.

EXHIBIT 2 Transmission System Planned Modifications

Report to the Connecticut Siting Council

List of Planned Transmission Projects for which Certificate Applications are being contemplated, may be subject to Declaratory Ruling, or have already been filed

Projects for which Certificate Applications are being Contemplated	kV	Date of Completion
1. Grand Avenue-Mill River 115-kV Substation Flood Wall Project	115	2022
2. Milvon to West River 115-kV Railroad Lines Upgrade Project	115	2028
3. Pequonnock to Fairfield 115-kV Railroad Lines Upgrade Project	115	2028
4. Pequonnock to Congress 115-kV Railroad Lines Upgrade Project	115	2028
5. West River to Allings Crossing 115-kV Railroad Lines Upgrade Project	115	2028
6. Allings Crossing to Milvon 115-kV Railroad Lines Upgrade Project	115	2028
7. Derby Junction to Ansonia (lattice structures replacement)	115	2022
8. Old Town 115/13.8-kV Substation Rebuild Project	115	2023
Projects which have Received CSC Declaratory Approval		
1. Substation Security Upgrade Program	115	2019
2. Baird-Housatonic River 115-kV Railroad Lines Upgrade Project	115	2020
3. East Shore 115-kV Raising Impacted Equipment Project	115	2020
4. East Shore 345-kV Circuit Switcher Replacement	345	2020
5. Congress 115-kV Substation Flood Wall Project	115	2021
6. Singer 345-kV Substation Flood Wall Project	345	2022
7. June Street Battery Bank Addition	115	2019
Projects which have received a CSC Certificate of Environmental Compatibility and Public Need Approval		
1. Pequonnock 115/13.8-kV Substation Rebuild Project	115	2022

EXHIBIT 3 Conservation & Load Management Awards and Recognitions

2013 ENERGY STAR® Partner of the Year in Energy-Efficiency Program Delivery. The U.S. Environmental Protection Agency ("US EPA") recognized the Connecticut Energy Efficiency Fund and the Companies as a 2013 ENERGY STAR Partner of the Year;

2013 ENERGY STAR Sustained Excellence Award. The US EPA recognized the Northeast Energy Efficiency Partnerships' ("NEEP") Northeast Retail Products Initiative, including the Companies and the Energy Efficiency Board, with the 2013 ENERGY STAR Sustained Excellence Award for Excellence in ENERGY STAR Retail Products Promotion;

2013 ACEEE Certificate of Recognition for Exemplary Programs. The ACEEE recognized the Residential New Construction program as Exemplary;

2013 ACEEE Certificate of Recognition for Exemplary Programs. The ACEEE recognized the Home Energy Solutions program as Exemplary;

2013 ACEEE Certificate of Recognition for Exemplary Programs. The ACEEE recognized the Small Business Energy Advantage program as Exemplary;

2013 ENERGY STAR-Certified Homes Leadership in Housing Award. The US EPA recognized the Energy Efficiency Board, Eversource, and UI for the Residential New Construction program's achievement of reaching the threshold of 300 ENERGY STAR-certified homes in a calendar year, and for increasing builder, contractor, and homeowner awareness of the ENERGY STAR brand;

2013 Connecticut Quality Improvement Award ("CQIA") Silver Innovation Prize. The CQIA Silver Innovation Prize was awarded for the Connecticut Energy Efficiency Fund's Comprehensive Initiative for Commercial and Industrial customers;

2013 NEEP Business Leader Champion. Covidien, a UI customer, was nominated for the NEEP Business Leader Award and was chosen as the State champion;

2014 ENERGY STAR Partner of the Year for Sustained Excellence. The US EPA recognized NEEP's Northeast Retail Products Initiative with the 2014 ENERGY STAR Sustained Excellence Award for excellence in ENERGY STAR Retail Products Promotion;

2014 ENERGY STAR Award for Excellence. The US EPA recognized UI and the Energy Efficiency Board for Excellence in ENERGY STAR Promotion through the Retail Products program at the SmartLiving™ Center;

2014 ENERGY STAR Award for Excellence. The US EPA recognized the Connecticut Energy Efficiency Fund for its continued enhancement and expansion of the Home Performance with ENERGY STAR program;

2015 NEEP Business Leader State Champion. Aptar-Stratford, a UI customer, was nominated for the NEEP Business Leader Award and was chosen as the State champion;

2015 ENERGY STAR Partner of the Year Award for Sustained Excellence. The US EPA recognized NEEP's Northeast Retail Products Initiative with the 2015 ENERGY STAR Sustained Excellence Award for Excellence in ENERGY STAR Retail Products Promotion;

2015 ENERGY STAR Award for Excellence. The US EPA recognized UI and the Energy Efficiency Board for the Great Light Bulb Exchange Initiative.

2016 ENERGY STAR® Partner of the Year in Energy-Efficiency Program Delivery. The U.S. Environmental Protection Agency ("US EPA") recognized the Connecticut Energy Efficiency Fund and the Companies as a 2016 ENERGY STAR Partner of the Year;

2016 EPA Environmental Merit Award. The US EPA recognized UI for its innovative efforts to promote energy efficiency. Each year, the EPA New England district office recognizes individuals and organizations in New England who have worked to protect or improve the environment in distinct ways;

2017 ENERGY STAR Partner of the Year in Energy-Efficiency Program Delivery. The U.S. Environmental Protection Agency ("US EPA") recognized the Connecticut Energy Efficiency Fund and the Companies as a 2017 ENERGY STAR Partner of the Year;

2017 EPA Environmental Merit Award. The US EPA recognized UI for its innovative efforts to promote energy efficiency. Each year, the EPA New England district office recognizes individuals and organizations in New England who have worked to protect or improve the environment in distinct ways;

2017 ENERGY STAR Certified Homes Market Leader Award. The ENERGY STAR Certified Homes program presents Market Leader Awards to outstanding partners who have made important contributions to energy–efficient construction and environmental protection by building or verifying an outstanding number of ENERGY STAR certified homes, or by sponsoring a local program that supported these activities during the previous year.

2018 ENERGY STAR Partner of the Year Sustained Excellence Award. The US EPA recognized the Northeast Energy Efficiency Partnerships' ("NEEP") Northeast Retail Products Initiative, including the Companies and the Energy Efficiency Board, with the 2013 ENERGY STAR Sustained Excellence Award for Excellence in ENERGY STAR Retail Products Promotion;

2018 the Association of Energy Service Professionals ("ASEP"). The ASEP recognized the Companies with an Outstanding Achievement in Residential Program Design & Implementation Award

2018 Small Business Energy Advantage ACEEE's Exemplary Programs. The ACEEE recognized the Small Business Energy Advantage program as Exemplary;