STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service	))))	**Case 25-E-0072**
Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service	))))	**Case 25-G-0073**

CORRECTED DIRECT TESTIMONY OF
RON NELSON
ON BEHALF OF
ENVIRONMENTAL DEFENSE FUND

Dated: June 16, 2025
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<u>I. Introduction and Qualifications</u>

Q: Please state your name, title, and business address.

A: My name is Ron Nelson. I am a Founding Partner of Current Energy Group LLC ("CEG"). My business address is 2900 E Broadway Blvd Ste 100 #780, Tucson, Arizona 85716.

Q: On whose behalf are you submitting this testimony in this proceeding?

A: I am submitting this testimony on behalf of Environmental Defense Fund ("EDF").

Q: Please provide a summary of your education and experience.

A: CEG specializes in providing clients regulatory services in the areas of cost-of-service modeling, regulatory innovation, performance-based regulation, distributed energy resources ("DER"), rate design, renewable program development, grid modernization, new grid technologies, integrated resource planning, and electric vehicles ("EVs"). I have worked with numerous consumer advocates, nongovernmental organizations, utilities, and public utility commissions on issues related to cost-of-service modeling, rate design, grid modernization, distributed energy resource valuation and integration, and performance-based regulation. Prior to founding CEG, I briefly worked for my own sole proprietorship and was a Senior Director at Strategen Consulting in various roles for six years.

Before joining Strategen in early 2018, I worked for the Minnesota Attorney General's Office for almost five years, where I led that office's work on cost of service, rate design, renewable energy program design, performance-based regulation, and utility business model issues. Before that, I worked for two universities and the United States Geological Survey as an economic researcher. I have a Master of Science from Colorado

State University in Agriculture and Resource Economics, and a Bachelor of Arts in Environmental Economics from Western Washington University, where I also minored in Mathematics. I have attached a copy of my curriculum vitae in Exhibit __ (RN-2).

Q: Have you previously filed testimony before regulatory or judicial bodies?

A: Yes. I have testified in over 80 proceedings in Colorado, Georgia, Illinois, Indiana, Maine, Maryland, Massachusetts, New Hampshire, North Carolina, Nevada, North Dakota, Michigan, Minnesota, Ohio, Oklahoma, Pennsylvania, South Carolina, Utah, and Vermont. The issues covered in these proceedings include marginal and embedded cost of service studies, revenue allocation, rate design, load management, renewable program design, fuel clause adjustments, formula rates, decoupling, performance-based regulation, multi-year rate plans, performance metrics, DER interconnection, flexible interconnection, pre-emptive DER and load upgrades, DER compensation, DER integration, EV infrastructure investments, pilot frameworks, automated metering infrastructure, prudence review, distribution system planning, capital investment plan review, and smart inverter integration, among other topics.

I have also advised the Hawaii, Colorado, Kentucky, and Connecticut state utility commissions, and have testified and supported clients at the Federal Energy Regulatory Commission ("FERC").

Q: Have you previously provided testimony before the New York Public Service Commission ("PSC" or "Commission")?

A. No.

II. Purpose of Testimony and Recommendations

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to propose two alternative residential heat pump rates that will make heat pump adoption more accessible and affordable for residential customers of Consolidated Edison Company of New York ("Con Edison" or "Company"). The two proposed rates are: a flat seasonalized kilowatt hour ("kWh") heat pump rate (the "Seasonal Heat Pump Rate") and a time-of-use ("TOU") heat pump rate (the "TOU Heat Pump Rate").

Q: Please provide a summary of your testimony and recommendations.

A: This testimony provides a brief overview of state policy goals and current electric rate offerings of Con Edison. This testimony provides an overview of rate design principles and options and demonstrates that additional rate offerings for Con Edison heat pump customers would help facilitate reductions in climate pollution through reduced reliance on fossil fuel combustion, while preserving equity between residential customers. The proposed heat pump rates herein seasonally differentiate transmission and distribution costs, and further temporally differentiate for the TOU Heat Pump Rate. Additionally, this testimony recommends slight modification to how supply costs for Rate IV are recovered to align with the TOU Heat Pump Rate. The proposed rates will benefit more customers and homes if more customers have awareness and access to these rates, and thus the recommendations in Witness Lopez's testimony on behalf of Alliance for a Green Economy ("AGREE") regarding marketing, education, and outreach strategies are complementary to this testimony.[1] A summary of my proposed distribution and

[1] *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service,* Cases 25-E-0072 & 25-G-0073, Direct Testimony of Alexander Lopez (May 30, 2025).

transmission heat pump rates is displayed in Figure 1 below.[2] Please note that all figures referenced in testimony are included in Exhibit __ (RN-1).

Figure 1. Proposed Heat Pump Rates (Corrected)

Proposed Seasonal Heat Pump Rate		
Customer Charge	$35.81	per month
Energy Delivery Charges		
Charges applicable for the months of June, July, August, and September	17.19	cents per kWhour
Charges applicable for all other months	8.52	cents per kWhour
Proposed Time-of-Use Heat Pump Rate		
Customer Charge	$35.81	per month
Energy Delivery Charges		
Charges applicable for the months of June, July, August, and September		
On-peak: Weekdays, excluding holidays, 2 PM to 8 PM	33.42	cents per kWhour
Off-peak: All other hours of the week	9.01	cents per kWhour
Charges applicable for all other months		
On-peak: Weekdays, excluding holidays, 2 PM to 8 PM	21.95	cents per kWhour
Off-peak: All other hours of the week	4.21	cents per kWhour

Q: Are you providing any exhibits for your testimony?

A: Yes. I am attaching the following exhibits to my testimony:

- **Exhibit __ (RN-1):** Figures Supporting Proposed Heat Pump Rates
- **Exhibit __ (RN-2):** Curriculum Vitae
- **Exhibit __ (RN-3):** Con Edison Response to Information Request EDF-1-5 (May 5, 2025).
- **Exhibit __ (RN-4):** Con Edison Response to Information Request EDF-1-11 (May 5, 2025).
- **Exhibit __ (RN-5):** Con Edison Response to Information Request DPS-1-80 (Jan. 31, 2025).

[2] The rates displayed are premised on the Company's proposed revenue requirement and will likely change based on the Commission's final order.

- **Exhibit __ (RN-6):** Con Edison Response to Information Request EDF-2-8 (May 19, 2025).
- **Exhibit __ (RN-7):** Con Edison Response to Information Request EDF-2-9 (May 19, 2025).
- **Exhibit __ (RN-8):** Con Edison Response to Information Request EDF-1-1 (May 2, 2025).
- **Exhibit __ (RN-9):** Con Edison Email Response to EDF Regarding Information Request EDF-1-1 (May 6, 2025).

III. Basics of Rate Design

Q: Please summarize the basic purpose of rate design.

A: The basic purpose of rate design is to facilitate appropriate recovery of a utility's cost of service by assigning charges to customers in a manner that reflects a customer's individual contribution to system costs, gives customers a reasonable opportunity to control their bills, and promotes policy goals such as decarbonization, consumer protection, and equitable social outcomes. This is typically accomplished by separating utility costs into the various functions that support service, assigning those costs to the utility's different customer classes according to their class contributions, and dividing class cost recoveries by projected billing determinants (i.e. number of monthly bills, kilowatt ("kW") of demand, total kilowatt-hours ("kWh") or gallons delivered).

Q: Please describe a default residential rate design.

A: A default residential electric rate design, SC 1 for the Company, typically consists of a fixed customer charge that recovers the fixed costs incurred by the utility to service an individual customer, and a variable or volumetric $/kWh charge that recovers delivery costs that vary depending on a customer's total volumetric usage. The fixed charge is a set monthly fee that does not differ by customer consumption characteristics (e.g., kW or kWh requirements). The variable delivery charge is typically accompanied by a $/kWh supply charge that recovers the cost of the energy being generated, as well as variable transmission and ancillary services costs. This type of rate design is often referred to as a "flat rate" because the variable delivery rate does not change over the course of a day. In the case of Con Edison, the default residential rate design has what is referred to as an "inclining block" rate during the summer, where a customer's monthly usage incurs a flat rate up to a certain level (in this case, the first 250 kWh/month), with a higher rate being charged to usage above that threshold.

Q: Please describe a time-of-use rate design.

A: In a time-of-use ("TOU") rate design, the volumetric $/kWh rate changes during distinct hourly windows of the day. Typically, this means a higher volumetric rate during the afternoon/early evening, when system usage is higher. A period with high system usage is referred to as the on-peak, or peak, period. Some TOU rate designs incorporate more than two rate periods, with an even higher rate during a "super-peak" period in a smaller afternoon/evening window, or an even lower overnight rate, when system usage is at its lowest.

Q: Please describe a demand charge rate design.

A: Typically, ratepayer costs are recovered through the volumetric $/kWh delivery charge. In a demand charge rate design, however, costs are instead collected through a $/kW demand charge. While kWh as a unit describes the volume of energy consumed over a given period, kW is a measure of the instantaneous level of power being drawn by a system at any given time. The demand charge is determined by a customer's peak sub-hourly or hourly usage. A kW rate component, or a demand charge, can be billed in various ways. Most commonly, customers are billed demand charges based on their non-coincident peak demands over a small period of time (e.g., 15 to 30 minutes).

IV. Policy Context and Assessment of Con Edison's Current Rate Design

Q: Please summarize New York's greenhouse gas emissions reduction targets.

A: The Climate Leadership and Community Protection Act ("Act" or "CLCPA"), which became effective on January 1, 2020, requires New York to adopt measures to reduce statewide greenhouse gas ("GHG") emissions by 40 percent by 2030 and 85 percent by 2050. The CLCPA set an additional goal of achieving net zero emissions across all sectors of the economy by 2050 (the remaining 15 percent can come from carbon offsets).[3]

Q: What is the role of heating electrification in achieving New York's clean energy goals?

A: According to the New York State Department of Environmental Conservation's most-recent GHG emissions report, buildings are the single biggest source of GHGs in New York, accounting for 31 percent of statewide emissions.[4] The building sector's emissions are primarily the result of combustion of natural gas (or other fuels) for space heating, water heating, and cooking, making building electrification a major strategy in achieving statewide climate goals. New York has a zero-emission electricity goal by 2040.[5] Decarbonizing New York's built environment will require the "rapid adoption of high-efficiency heat pumps so that one to two million energy-efficient homes use heat pumps

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[3] New York State Climate Leadership and Community Protection Act ("CLCPA"), 2019 N.Y. Laws 106 § 2, available at https://legislation.nysenate.gov/pdf/bills/2019/S6599.

[4] NYS DEP'T ENV'T CONSERVATION, *2023 Statewide GHG Emissions Report,* Summary Report, at vi, tbl. ES.3, https://dec.ny.gov/sites/default/files/2023-12/summaryreportnysghgemissionsreport2023.pdf (last accessed Dec. 10, 2024).

[5] NYSERDA, *Clean Energy Standard,* https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard (last accessed May 26, 2025).

by 2030, and by 2050, the large majority of buildings statewide use electric heat pumps for heating, cooling, and hot water[,]" according to extensive modeling by NYSERDA.[6]

Q: How is electric rate design related to achieving New York's clean energy goals?

A: Strategic electric rate design can incentivize positive customer behavior including adopting beneficial and clean technologies. In the Scoping Plan, the New York Climate Action Council specifically identified electric rate reform as a key strategy for building sector decarbonization and tasked the Public Service Commission and the Department of Public Service with aligning electric price signals to achieve GHG reduction goals in the building sector.[7] A key technology for achieving New York's clean energy goals is the heat pump, a versatile heating and cooling system that harvests ambient heat from the ground or the air, efficiently leveraging each unit of input electricity into 2-4 units of heat.[8] Heat pumps allow customers to electrify their heating needs, which reduces emissions related to heating as the electric power system decarbonizes. Customers who adopt a heat pump after previously heating their residence by other means—such as oil, propane, or natural gas combustion—will naturally experience an increase in their monthly electric bill during colder months, as they shift their space heating expenditures onto their electric bill. Strategic electric rate design can ensure that these electric costs are reasonably distributed throughout the year and are not overly burdensome for customers.

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6 *See* N.Y. CLIMATE ACTION COUNCIL, Scoping Plan at 176 (Dec. 2022), https://climate.ny.gov/resources/scoping-plan/.

7 *See id.* at 206 (Key Strategy B7).

8 U.S. DOE, *Air-Source Heat Pumps,* https://www.iea.org/reports/the-future-of-heat-pumps/how-a-heat-pump-works (last accessed May 29, 2025); *see also* IEA, *How a heat pump works,* https://www.iea.org/reports/the-future-of-heat-pumps/how-a-heat-pump-works (last accessed May 29, 2025).

Q: What is the structure of Con Edison's default residential electric rate?

A: Con Edison's default residential electric rate, SC1 Rate I, is an inclining block flat volumetric rate design. Fixed customer-related costs are recovered through a fixed customer charge, while variable delivery costs are recovered through a flat volumetric $/kWh rate. During the summer months, the volumetric rate is an inclining block rate, with a flat $/kWh rate for the first 250 kWh of a customer's monthly usage, and a higher flat rate for usage above that threshold.

Q: What changes to rate design can better reflect the costs caused by customers with heat pumps?

A: Many residential customers currently use some form of fossil fuel, such as natural gas or oil, to heat their homes. When a customer switches to a heat pump, their winter electrical consumption will increase. Because Con Edison's residential rates are designed based on the average residential consumption for the entirety of a year, they do not reflect seasonal or temporal differences. Because Con Edison customers' electric demand peaks in the summer season, the majority of its costs are caused during the summer. Increasing winter loads can better utilize the Company's supply assets by increasing utilization and spreading costs over more units of consumption. Designing heat pump rates that are seasonally and temporally differentiated can better reflect the costs being caused by incremental heat pump consumption and therefore better incentivize adoption.

Q: Does Con Edison have any rate or program offerings to incentivize customers to adopt heat pumps?

A: Yes. The Company administers heat pump rebates and has two rate options aimed at incentivizing customers to switch to clean heating options. Rebates play an important role in facilitating heat pump uptake by defraying the upfront costs of the appliance for customers. Rate design plays an important role in ensuring that customers' monthly bills are manageable and equitable. Specifically, Con Edison has a residential TOU rate option, Rate III, and a time varying demand charge rate, Rate IV, that are intended to incentivize clean heat adoption.[9]

Q: Do the current rate design offerings accomplish the Company's commitments and obligations under statewide clean energy targets?

A: No. By replacing natural gas heating with electric heating, heat-pump customers increase their kWh electric usage in the winter. The default residential electric rate does not facilitate decarbonization because it causes electric-heating customers to experience significantly higher energy bills during those winter months. The bill increase experienced by these customers does not necessarily reflect their cost causation and can lead to unfair revenue collection.

Q: Please describe Con Edison's electric residential Rate III.

A: The residential Rate III has a seasonally and temporally differentiated delivery charge. The peak period for Rate III is from 8 AM to midnight, or 16 hours of the day. The peak period charge in the summer is approximately twice as high as in the winter. The Rate III delivery rate structure is presented in Figure 2 below.

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[9] *See Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service,* Case 25-E-0072, Direct Testimony of Electric Rate Panel at 69 (Jan. 31, 2025); *see also* Con Edison, *SC 1 Rate IV: An Optional Demand-Based Rate for Residential Customers,* Presentation (Mar. 22, 2024), https://www.ny-geo.org/assets/pdf/2024.03.22+-+Con+Edison+SPP+on+Lets+Talk/.

Figure 2: Current Residential Rate III[10]

Customer Charge	\$29.00 per month
Energy Delivery Charges	
Charges applicable for the months of June, July, August, and September	
On-peak: All days, 8 AM to midnight, including holidays	60.32 cents per kWhour
Off-peak: All other hours of the week	6.21 cents per kWhour
Charges applicable for all other months	
On-peak: All days, 8 AM to midnight, including holidays	30.33 cents per kWhour
Off-peak: All other hours of the week	6.21 cents per kWhour

Q: Do you have any observations regarding Con Edison's current residential Rate III offering?

A: Yes. The residential Rate III delivery peak period, from 8 AM to midnight, is excessively long. Having a broad peak period may not accurately reflect cost causation and prove to be challenging for customers to shift energy outside of the peak period.

Q: Please describe Con Edison's electric residential Rate IV.

A: The residential Rate IV rate recovers a delivery charge through a temporally differentiated non-coincident demand charge, with the peak period covering between noon and 8 PM on weekdays excluding holidays. Rate IV is also seasonally differentiated, with summer demand charges set at approximately 30 percent higher than winter charges. The Rate IV delivery rate structure is presented in the figure below.

10 *See* Consolidated Edison Company of New York, Inc., *Schedule For Electricity Service* (effective Apr. 1, 2012), https://cdne-dcxprod-sitecore.azureedge.net/-/media/files/coned/documents/rates/electric/psc-10/electric-tariff.pdf?rev=858d518fafda438aa8744cc4e5485df4&hash=BD75B523FA693E858549E31A6E03D803.

Figure 3: Current Residential Rate IV[11]

Customer Charge	$34	per month
Billable Demand Charges		
Charges applicable for the months of June, July, August, and September		
On-peak: Weekdays, excluding holidays, 12 Noon to 8 PM	$32.34	per kW
Off-peak: All other hours of the week	$8.87	per kW
Charges applicable for all other months		
On-peak: Weekdays, excluding holidays, 12 Noon to 8 PM	$24.88	per kW
Off-peak: All other hours of the week	$8.87	per kW

Q: Do you have any observations regarding Con Edison's residential Rate IV offering?

A: Yes. The main attribute of Rate IV is the demand charge. Demand charges are not commonly used within residential rate design. Many residential customers may find demand charges unclear or confusing. When a rate is challenging to understand, it could impact adoption of the rate and the customer's ability to modify their behavior in beneficial ways that align with cost causation.

Q: Are there any other issues with Con Edison's Rate IV?

[11] *See* Consolidated Edison Company of New York, Inc., *Schedule For Electricity Service* (effective Apr. 1, 2012), https://cdne-dcxprod-sitecore.azureedge.net/-/media/files/coned/documents/rates/electric/psc-10/electric-tariff.pdf?rev=858d518fafda438aa8744cc4e5485df4&hash=BD75B523FA693E858549E31A6E03D803.

A: Yes. Rate IV currently has relatively low participation from residents with only 642 participants.[12] Additionally, the Company has not surveyed participants to gain an understanding of the rate structure.[13]

Q: Are you aware of any evidence relating to residential customers' familiarity with demand charges?

A: Yes. Duquesne Light, a Pennsylvania electric utility, piloted a demand charge rate and requested further approval of the rate in its 2021 rate case.[14] Duquesne Light issued a survey to residential customers that participated in the demand charge rate. The survey found that 96 percent of customers incorrectly interpreted the demand charge bill. Additionally, the survey found that 75 percent of customers did not correctly define kilowatts. These findings are concerning from a customer acceptance and understandability perspective, and suggest this approach to residential rate design and public outreach overestimates the level of utility bill knowledge among the general public, especially with regard to the benefits of alternative rate designs.

Q: Is it common for heat pump rates to contain a residential demand charge?

A: While I have not conducted a formal survey of all heat pump rates, the rates I am aware of do not have a demand charge. Those heat pump rates are as follows:

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12 See Exhibit __ (RN-3), Con Edison Response to Information RequestEDF-1-5 (May 5, 2025).

13 See Exhibit__(RN-4), Con Edison Response to Information Request EDF-1-11 (May 5, 2025).

14 *See Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company,* Docket No. R-2021-3024750, Evidentiary Hearing Index to Exhibits (Aug. 17, 2021),https://www.puc.pa.gov/pcdocs/1718986.pdf. The specific rate in this proceeding is a subscription rate with a non-coincident peak demand charge.

- In Massachusetts, Unitil has an approved heat pump rate with a kWh-based distribution rate. Unitil's heat pump rate has a flat kWh seasonal distribution rate with a summer rate of $0.09621/kWh and a winter rate of $0.003435/kWh. The customer charge for the heat pump rate is the same as the standard rate.
- National Grid in Massachusetts was ordered to file a heat pump rate similar to Unitil's.[15]
- Central Maine Power has a seasonal heat pump rate. The rate has a summer rate of $0.25457/kWh and winter rate of $0.011418/kWh. The customer charge is higher than the default residential rate.[16]
- In Illinois, Commonwealth Edison Company recently retracted a demand charge proposal for its time-differentiated supply rate and provided an updated proposal that is kWh-based in response to stakeholder feedback.[17] While this is not specifically a heat pump rate, it demonstrates the concerns and challenges presented by demand-based charges for residential customers. Interveners stated in opposition to the demand charge that "a demand-based capacity charge requires customers to gamble

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[15] MASS. D.P.U. Case No. 23-150, Petition of Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, pursuant to G.L. c. 164, § 94 and 220 CMR 5.00 for Approval of a General Increase in Base Distribution Rates for Electric Service, a Performance-Based Ratemaking Plan, and a Capital Recovery Mechanism (Sept. 30, 2024), https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/18232137; *see also* Sarah Shemkus, *Mass. regulator orders National Grid to set lower winter rate for heat pumps,* CANARY MEDIA (Oct. 4, 2024), https://www.canarymedia.com/articles/heat-pumps/mass-regulator-orders-national-grid-to-set-lower-winter-rate-for-heat-pumps.

[16] CENTRAL MAINE POWER, *Seasonal Heat Pump Rate,* https://www.cmpco.com/account/understandyourbill/newseasonalheatpumprate (last accessed May 26, 2025).

[17] ICC Case No. 24-0378, *Commonwealth Edison Company Revenue-neutral tariff changes related to rate design*, Rebuttal Testimony on Rehearing of Bradley R. Perkins (May 12, 2025), https://www.icc.illinois.gov/docket/P2024-0378/documents/365088/files/639684.pdf.

> all summer, every day, whether their usage will contribute to their Monthly Capacity Charge and TMC the following year."[18]

Q: Why is a demand charge not an ideal rate design to facilitate clean heat pump usage by residential customers?

A: As noted above, demand charges can be challenging for customers to understand. The technical difference between kW and kWh as units can be difficult to explain to a lay person, and this difference is critical to understanding demand charges. If customers do not understand a rate enough to predict its bill impact, it will not achieve widespread adoption.

Q: How do you recommend the Commission further support heat pump adoption?

A: The Commission should consider additional rate offerings to support heat pump adoption. The TOU Heat Pump Rate described below can improve understandability and acceptance for customers. Additionally, the Seasonal Heat Pump Rate, with a seasonalized flat kWh rate, also described herein, can serve as a simple way to reflect cost causation and encourage clean heat adoption.

V. Overview of EDF's Residential Heat Pump Proposals

Q: Did you rely on rate design principles to design your heat pump rates?

[18] ICC Case No. 24-0378, *Commonwealth Edison Company Revenue-neutral tariff changes related to rate design*, Direct Testimony on Rehearing of Richard McCann for Citizens Utility Board & EDF (Apr. 29, 2025), https://www.icc.illinois.gov/docket/P2024-0378/documents/364682/files/638693.pdf.

A: Yes. Most accepted rate design principles stem from James Bonbright's seminal work "Principles of Public Utility Rates."[19] I rely on the rate design principles below, adapted from Bonbright.

- **Effectiveness in yielding total revenue requirements.** The utility should have an expectation that it will approximately recover its revenue requirement from customer rates, with a reasonable amount of stability from year to year.
- **Customer understanding and acceptance.** Prices should not be so overly complex or convoluted such that customers cannot understand how their bills are determined or how they can manage their bills. Customers and the public should generally accept that the prices they are charged for electricity service are fair for the service they are receiving.
- **Equitable allocation of costs and the avoidance of undue discrimination.** The apportionment of total costs of service among the different customers should be done fairly and equitably.
- **Efficient price signals that encourage optimal customer behavior.** On a forward-looking basis, electricity prices should encourage customers to use, conserve, store, and generate energy in ways that are most efficient.[20]

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[19] *See Principles of Public Utility Rates by James C. Bonbright,* POWELL GOLDSTEIN LLP (2005), https://www.raponline.org/wp-content/uploads/2023/09/powellgoldstein-bonbright-principlesofpublicutilityrates-1960-10-10.pdf.

[20] *See* John Shenot et al., *Rate-Making Principles and Net Metering Reform: Pathways for Wisconsin,* REGULATORY ASSISTANCE PROJECT (Feb. 2022), https://www.raponline.org/wp-content/uploads/2023/09/rap-shenot-kadoch-linvill-shipley-rate-making-net-metering-reform-wisconsin-2022-february.pdf.

While rate design principles speak to the technical process of cost allocation and recovery, rate design should also consider the achievement of public policy goals. Encouraging electrification by offering an innovative heat pump rate design will help Con Edison meet its responsibilities and obligations under New York's clean heat and climate goals.

Q: For what customer class are you proposing a new rate design?

A: The two rate designs proposed herein would apply to SC-01, the residential customer class. Con Edison has 3.05 million customers that currently rely on SC-01, including single-family homes, townhouses, and individually-metered units in multifamily structures. Therefore, these rate designs would be available to a wide variety of customers living in different housing formats across Con Edison's service territory.

Q: Are you recommending that your heat pump rates replace any of the Company's current residential rate offerings?

A: No. The proposed heat pump rates would act as additional, complementary rate options for residential customers.

Q: Please describe your proposed residential heat pump rates.

A: This proposal includes two volumetric residential heat pump rates: 1) a flat $/kWh rate that is reflective of the increased winter electricity consumption of heat pump customers, referred to as the Seasonal Heat Pump Rate, and 2) a TOU rate that both reflects increased winter consumption and uses a shorter peak period than Rate III and Rate IV, referred to as the TOU Heat Pump Rate. The objective is to provide additional options for heat pump customers that provide savings opportunities similar to those afforded by Rate IV, while being easier for customers to understand.

Q: Do your proposed residential heat pump rates align with your rate design principles and generally accepted ratemaking practices?

A: Yes. These proposed rates are revenue neutral to the residential customer class. Doing so ensures that non-participants do not have costs shifts onto them from participating customers. The proposed rates are also easy for customers to understand, especially compared to the demand charge Rate IV offering. Finally, the proposals incorporate seasonal and temporal differentiation, which improves their efficiency when compared to the default residential rate.

Q: What customers should be eligible to take service under your proposed heat pump rates?

A: The heat pump rates should be available to customers that use a heat pump as their primary heating source. See Direct Testimony of AGREE witness Alex Lopez for additional information on the rate's participation terms and customer outreach and education.[21]

VI. Methodology for Developing Alternative Heat Pump Rate Proposals

Q: How is this section of your testimony organized?

A: Because Con Edison operates in a restructured electric market, its electric rates include the primary rate components of distribution delivery, transmission, and supply charges; each representing different levels of the power system. Our objective here is to seasonally differentiate each level of the power system to reflect cost causation, as well as time-vary

[21] *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service,* Cases 25-E-0072 & 25-G-0073, Direct Testimony of Alexander Lopez (May 30, 2025).

each component as applicable. Achieving these objectives will ensure that rates reflect seasonal cost causation, and provide clear price incentives for customers to choose to decarbonize their heating systems and manage their electricity consumption efficiently. This section will explain how each of the primary rate components was designed. Because the temporal differentiation of each level of the power system requires the identification of peak and off-peak periods, I begin by explaining the temporal analysis for determining the appropriate TOU periods.

A. <u>Temporal Analysis</u>

Q: What temporal analysis is required to establish a rate?

A: The cost to deliver a kilowatt hour of electricity to customers is highest at certain peak times when demand—and therefore strain on the system—is greatest. The electric system must be designed and maintained to be able to satisfy these peak demands, and that incurs greater costs for customers. A temporal analysis can show what hours of the day present the highest electric demand in order to determine when peak rates should be appropriately levied.

Q: Please explain the temporal analysis that you conducted to inform the peak and off-peak periods.

A: The peak and off-peak periods for the proposed rate are based on analysis of historical NYISO locational marginal prices ("LMPs") and coincident transmission peaks ("CPs").[22] I first collected hourly LMPs for the three NYISO Control Zones comprising the Company's service territory for the period of 2022-2024, and calculated the average

[22] LMPs are the instantaneous spot market prices for electricity supply on the NYISO transmission system; CPs are the seasonal peak loads placed on the NYISO transmission system.

hourly LMP for each month of the year.[23] These LMPs were then indexed to the highest hourly LMP of each month, and then an average hourly index was calculated for the year. The six highest average hourly indexes were in the 2 PM to 8 PM period, with the next two highest ranked hours coming in mid-morning. I then collected NYISO summer and winter CPs for the past ten years, 2015-2024; these all fall within an even more narrow band of hours, 4 PM to 6 PM.[24]

Q: What peak and off-peak periods are you recommending for your TOU Heat Pump Rate?

A: I recommend a single, six-hour peak period from 2 PM to 8 PM, for all days of the year.

Q: Why do you recommend a narrower peak period than Con Edison's existing residential rates?

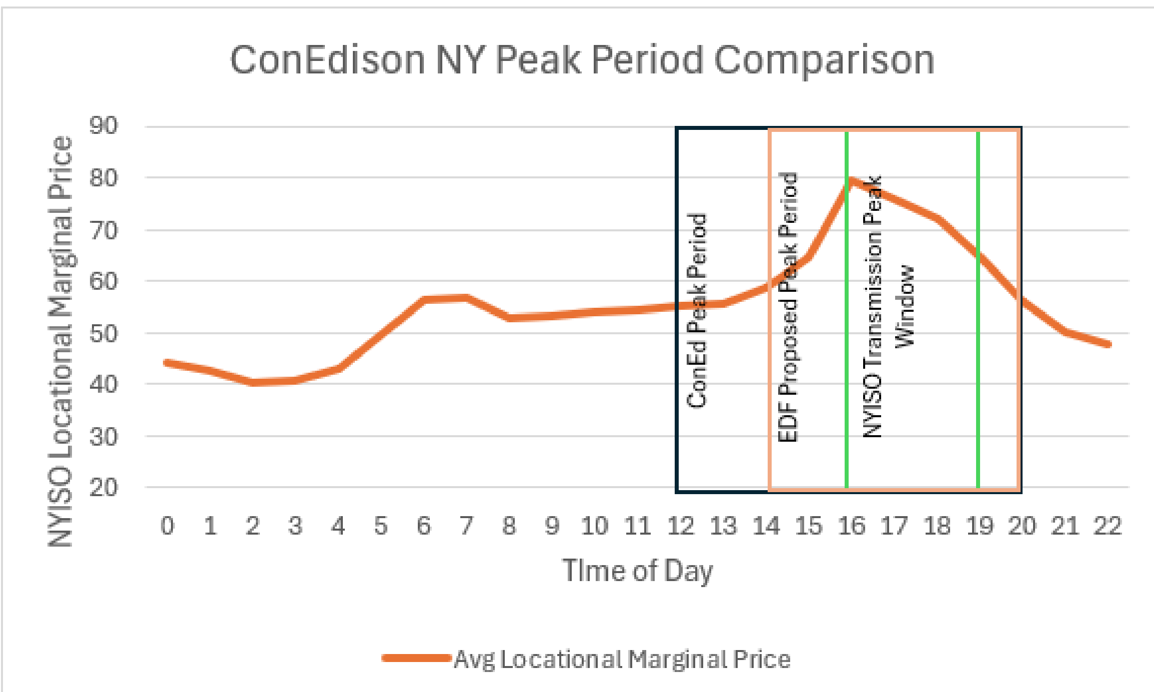
A: Based on an analysis of transmission and supply costs, this alternative rate proposal's peak period more accurately reflects the period of highest system costs. First, in the past ten years, NYISO has not experienced a summer or winter transmission peak outside of this period. An analysis of the Company's local supply costs demonstrates that the two hours this proposed shortened period removes from the Company's peak period are more similar, on an annual basis, to the rest of the day than to my proposed peak period. The average LMP for hours 12 PM and 1 PM is $55.78, almost exactly the same as my proposed off-peak period's LMP of $55.75, whereas the average LMP for the hours of 2

[23] NYSIO, *Custom Reports*, https://www.nyiso.com/custom-reports (last accessed May 29, 2025).

[24] NYSIO, *2024 Load & Capacity Data* at 69 (Apr. 2024), https://www.nyiso.com/documents/20142/2226333/2024-Gold-Book-Public.pdf/170c7717-1e3e-e2fc-0afb-44b75d337ec6.

PM – 8 PM is $67.59. Furthermore, narrowing the peak period provides an improved incentive for customers to shift energy out of peak periods. The longer a peak period is, the more challenging it is for customers to shift energy out of that timeframe. Therefore, narrower, cost-reflective peak periods also provide customers with more control over their bills. Figure 4 shows the average hourly LMP for the three Con Edison Control Zones, and three different time periods: the current peak period for Rate IV, the peak period for the proposed heat pump rates, and the window containing the past ten summer and winter NYISO transmission peaks.

Figure 4: Comparison of Peak Periods



Q: Please describe how you divided costs between summer and winter seasons.

A: Because electricity usage patterns, and therefore utility cost causation, are dramatically different in the summer and winter months, it is important to assign cost recovery to the two periods in a manner that is proportional to those different usage patterns. For each category of variable costs (primary distribution, secondary distribution, and transmission costs), the total costs were multiplied by a ratio representing the different level of cost causation in the season, and the proportion of months in the year each season contains. The ratio of summer to winter cost causation for primary distribution costs was determined as the ratio of average summer hourly usage to average winter hourly usage; the ratio of summer to winter transmission cost causation was determined as the ratio of maximum peak summer hourly usage to maximum on-peak winter hourly usage. Secondary distribution cost causation was divided evenly between the summer and winter periods. Each cost category was then multiplied by a factor representing each season's variation in number of months from average, i.e. 4/6 for the summer period and 8/6 for the winter period.

B. <u>Distribution Delivery</u>

Q: What constitutes the distribution delivery component of a rate?

A: The distribution delivery component consists mostly of poles, wires, and distribution substations, among other distribution costs not collected through the fixed charge.

Q: How did you design the distribution delivery components of your flat heat pump rate?

A: Because the heat pump rates proposed here are largely a supplement to the Company's current Rate IV, I followed the Company's methodology in setting the customer charge—with the exception that 100 percent of customer-related costs are included in the fixed customer charge, rather than 95 percent of customer-related costs as in the Company's proposal.[25] However, if the Commission approves an alternative customer charge, I recommend that my heat pump rates share the same customer charge as Rate IV. The remaining distribution related costs were seasonalized into summer and winter, based on cost causation. Specifically, I divided primary demand-related costs (i.e. high-tension primary lines and substations) between summer and winter according to the ratio of each season's average hourly load to annual average hourly load. Secondary demand-related costs, related to low-tension overhead and underground lines and transformers, were divided equally between summer and winter seasons.

Q. How were distribution costs assigned to customers under your TOU delivery rate?

A. Primary and secondary distribution costs were divided seasonally according to the same methodology in the flat kWh rate. Secondary distribution costs were then divided evenly between peak and off-peak recovery periods, while primary distribution costs were assigned to peak charges according to the ratio of peak to off-peak average hourly load, with the remainder being recovered in off-peak charges.

Q. How did you estimate the relative hourly load for heat pump customers in developing this rate?

A. To develop this TOU rate, it was necessary to estimate an annual load profile for the average residential heat pump customer. To do this, I used monthly load profiles for baseline and high-efficiency heat pump residential customers from the National

[25] *See* Exhibit__ (RN-5), Con Edison Response to Information Request DPS-1-80, Rate Design Working Paper, 4_Rates_RateDesign_WP(RY1), at tab 16J (Jan. 31, 2025).

Renewable Energy Laboratories (NREL) ResStock tool,[26] using profiles for New York State. By scaling each hour of the baseline residential profile to the summer and non-summer usage estimates in Con Edison's proposed rate design, I developed the estimated load profile for a non-heat pump Con Edison customer for both seasons. I then scaled the monthly heat pump customer load profiles to estimate an annual hourly load profile for Con Edison heat pump customers. This load profile served as the basis for the seasonal and peak/off-peak cost assignments in my TOU rate. Development of an estimated load shape was necessary due to the lack of data provided by Con Edison in response to our discovery request; this data was not provided until the day before this testimony was filed and because the Company did not have readily available residential heat pump load profiles.

C. <u>Transmission</u>

Q: How are the Company's transmission costs currently recovered from residential customers?

A: Con Edison collects transmission costs from SC IV customers through the summer and winter peak period demand charges, which is differentiated seasonally through the Company's Summer Peak Ratio.

Q: How did you design the transmission component within your flat heat pump rate?

A: Transmission costs were included in the flat volumetric delivery rate, seasonally differentiated according to the ratio of each season's peak hourly load to the average system hourly load.

[26] NAT'L RENEWABLE ENERGY LAB., *ResStock Dataset 2024.2,* "High efficiency cold-climate air-to-air heat pump with electric backup," https://resstock.nrel.gov/datasets (last accessed May 29, 2025).

Q: How did you design the transmission component within your TOU heat pump rate?

A: Transmission costs were wholly assigned to each season's peak charges, and divided between summer and winter according to the same peak hourly load ratio as in the flat heat pump rate.

D. Supply

Q: What does Con Edison's supply rate consist of and how are these costs recovered from residents?

A: The supply rate contains generation-related charges from NYISO, as well as some transmission costs. For the default residential rates, the Company collects supply costs through a flat $/kWh rate. For Rate IV customers, these costs are collected through a TOU rate.

Q: How do you recommend modifying the supply rate to align with your flat kWh heat pump rate?

A: For the flat kWh seasonal heat pump rate, I do not recommend any changes from how these costs are recovered through the default residential rate.

Q: How do you recommend modifying the supply rate to align with your TOU heat pump rate?

A: For the TOU heat pump rate, I recommend that the Company retain the current practice it uses for Rate IV but aligning it with the TOU Heat Pump Rate's peak period.

VII. Impact of Proposed Heat Pump Rates

Q: When compared to the default residential rate, would heat pump customers save on their annual bills under your proposed heat pump rates?

A: Yes. Because rate proposals herein better reflect seasonal and temporal cost causation, heat pump customers would save on their annual bills. Specifically, a typical heat pump customer would save $508.61 under the flat kWh seasonal heat pump rate and $438.54 under the TOU heat pump rate annually. The distribution and transmission cost impacts of each rate compared to the default residential rate is shown in the figure below.

Figure 5: Cost Impact of Proposed Rates by Customer Load Type

	Low Use Customer	Average Customer	High Use Customer
Average kWh Usage			
Summer			
On-Peak	116	231	462
Off-Peak	173	347	694
Total	289	578	1156
Winter Total			
On-Peak	92	185	369
Off-Peak	239	477	954
Total	331	662	1324
SC Rate I Bills			
Summer	$80.10	$144.44	$273.11
Winter	$87.08	$151.16	$279.32
Proposed Flat Rate Bills			
Summer	$85.50	$135.20	$234.59
Winter	$64.01	$92.20	$148.60
Proposed TOU Rate Bills			
Summer	$90.05	$144.30	$252.79
Winter	$66.11	$96.41	$157.02
Annual Savings vs. SC1 Rate I			
Flat Rate	$162.99	$508.61	$1,199.85
TOU Rate	$127.95	$438.54	$1,059.71

Q: How did you calculate the bill impacts of the heat pump rates to the default residential rate?

A: The bill impacts for the flat and TOU heat pump rates were based on an average heat pump customer by applying the average of the estimated seasonal heat pump load profiles used in the TOU rate. We used an estimate of hourly load shapes for "High efficiency cold-climate air-to-air heat pump with electric backup," sourced from the

National Renewable Energy Laboratory ("NREL") ResStock dataset.[27] It was necessary to use this estimate because Con Edison would not provide us with the load shape of an average heat pump customer.

Q: What impact will your proposed heat pump rates have on non-participating residential customers?

A: Non-participating residential customers should not be impacted by the alternative rate proposal because it is designed to be revenue neutral to the residential class.

Q: Which of your rates better incentivizes load flexibility and efficiency?

A: While the flat kWh heat pump rate increases system efficiency by increasing system utilization in winter months and out of the peak summer season, the TOU heat pump rate goes further to incentivize load shifting during the day out of peak times. For these reasons, both rates improve system efficiency and/or load flexibility incentivizes for residential customers when compared to the default rate.

Q: How will the proposed heat pump rates make building electrification more accessible for low- and moderate-income customers?

A: These heat pump rates will be easier to understand than the Company's existing rate for heat pump customers and provide cost-reflective rates that create savings over the standard SC 1 rate. Improving the understandability, while still generating savings, will better incentivize equitable clean heating adoption for all customers including low- and moderate-income customers.

[27] NAT'L RENEWABLE ENERGY LAB., *ResStock Dataset 2024.2,* "High efficiency cold- climate air-to-air heat pump with electric backup," https://resstock.nrel.gov/datasets (last accessed May 29, 2025).

Q: Please provide an example of the potential bill impacts of the proposed heat pump rates for a low- or middle-income customer.

A: Household energy burden is the percentage of annual household income spent on annual energy bills. Energy burden is an important metric to assess challenges faced by ratepayers to afford their energy needs, to identify which groups may shoulder disproportionally higher burdens, and thus to be able to identify solutions.[28] Low-income and minority communities face disproportionately high energy burdens – for example, the median energy burden of African-American households is 43% higher than that of white, non-Hispanic households.[29] According to the American Council for an Energy Efficient Economy, in the New York City metro area, Black and Hispanic households face a 0.7% and 0.8%, respectively, higher median energy burden than overall households.[30] Older adults face a 1.3% higher median energy burden than overall households in the NYC metro area. The proposed Heat Pump TOU Rate could reduce annual energy burden by 1.4% compared to the default residential rate, and the proposed Heat Pump Flat Rate could reduce annual energy burden by 1.6% (estimated based on average energy usage of Rate IV customers).

28 *See generally* Ariel Drehobl et al., *How High are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United States*, ACEEE (Sept. 2020), https://www.aceee.org/sites/default/files/pdfs/u2006.pdf.

29 *Id.* at 11.

30 *Id.* at 16.

Figure 6. Assessment of Energy Burden Impacts of Proposed Rates, Based on 100% of Federal Poverty Line for a Family of Four

	Low Use Customer	Average Customer	High Use Customer
Annual Bills			
SC 1 Rate I	$1,017.05	$1,787.04	$3,327.02
Flat Rate	$854.06	$1,278.43	$2,127.16
TOU Rate	$889.10	$1,348.50	$2,267.31
Energy Burden Contribution			
SC 1 Rate I	3.2%	5.6%	10.3%
Flat Rate	2.7%	4.0%	6.6%
TOU Rate	2.8%	4.2%	7.1%
Energy Burden Reduction			
Flat Rate	0.5%	1.6%	3.7%
TOU Rate	0.4%	1.4%	3.3%

VIII. Implementation Considerations

Q: Are there implementation considerations that need to be considered with your heat pump rate proposals?

A: Yes. First, it is possible that some of the changes to transmission and supply rates may need to occur in separate proceedings, as has been the practice in other deregulated states. However, the Commission can state a preference for the structure of my proposed rates to ensure coordinated implementation of the rate structure within other proceedings.

Q: Are there any other considerations?

A: Yes. As the Commission continues to adopt more dynamic rates for customers to better reflect cost causation and rapidly changing system resources (e.g., increase renewables and storage), it is important to collect data to enable efficient iteration on rate designs. Rates that are based on temporal and seasonal cost structures will, by nature, need to be updated to reflect the Company's changing cost structure. Additionally, technology-specific rates can serve a purpose in the near term, but rate offerings should continue to evolve to efficiently incentivize load flexibility. The Company should consider how targeted rates for each customer class could complement demand response and other efficiency programs.

Q: What data should the Company collect on heat pump customers?

A: The primary data needed is heat pump specific load profiles. While I would assume that the Company currently has estimates or actuals for these types of customers, the Company stated in discovery that it does not have them "readily available."[31]

IX. Discovery Issues

Q: Did you have any unanticipated discovery issues in this proceeding?

A: Yes. The Company's cost of service and rate models relies on its demand analysis as primary inputs into these models. I requested the demand analysis from the Company.[32] The Company replied that the demand analysis is "a report generated from proprietary third-party software written in SAS" and did not provide the information.[33] Given that utilities throughout the country often rely on proprietary third-party models and provide them confidentially, it is unclear why the Company would be justified in withholding information critical to evaluating its cost of service and rate models based on this

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[31] *See* Exhibit __ (RN-6), Con Edison Response to Information Request EDF-2-8 (May 19, 2025); Exhibit __ (RN-7), Con Edison Response to Information Request EDF-2-9 (May 19, 2025).

[32] *See* Exhibit __ (RN-8), Con Edison Response to Information Request EDF-1-1 (May 2, 2025).

[33] *See* Exhibit __ (RN-9), Con Edison Email Response to EDF Regarding Information Request EDF-1-1.

reasoning. In my experience, testifying in over 80 proceedings across approximately 19 states, I find this unreasonable.

Q: Why was the requested information important to evaluate the Company's rate proposals?

A: The demand analysis determines the results of the Company's cost of service model and directly informs rates. If the demand analysis has mistakes or issues, it would bias both the cost study and rate design. For this reason, it is unreasonable to withhold this information from parties to the Company's rate case who have a reasonable interest in understanding and evaluating the cost study and the rate designs. Furthermore, withholding the demand analysis makes it more resource-intensive for stakeholders to propose alternative rate designs. It also makes stakeholders rely on estimated load profiles instead of actuals, which impacts the accuracy of their analysis. Based on the Company's current explanation for withholding this information, I recommend the Commission require the Company to provide the demand analysis confidentially in future proceedings.

Q: Are there any final updates related to these discovery issues?

A: Yes. Late in the afternoon on May 29, 2025, the day before intervener testimony is due in this proceeding, the Company released a dataset that may be a partial response to the information we sought. I am unable to review or use this data in this testimony being filed May 30, 2025, but will evaluate the information provided to determine if it would improve the analysis submitted herein.

X. Conclusion

Q. Does this conclude your testimony?

A. Yes.