BEFORE THE
NEW YORK STATE
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 Number: 19-E-0065
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 Number: 19-G-0066

DIRECT TESTIMONY TESTIMONY OF BOB WYMAN

May 24, 2019

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Introduction

Q. What is your name?

A. I am commonly known as Bob Wyman. My formal name is Robert Mark Wyman.

Q. Mr. Wyman, have you previously testified before the Commission?

A. Yes. I presented direct testimony during the recent Central Hudson[1] and Orange & Rockland rate cases.[2] I have also given verbal testimony at a variety of PSC public hearings, have helped others prepare testimony for a variety of PSC proceedings, and am an active party in a variety of PSC matters.

Q. In what PSC matters are you now a registered party?

A. I am currently registered as an individual party in the following PSC matters or cases:

12-G-0297, Proceeding on Motion of the Commission To Examine Policies Regarding the Expansion of Natural Gas Service.

15-E-0751, In the Matter of the Value of Distributed Energy Resources

17-01276 In the Matter of the Value of Distributed Energy Resources Working Group Regarding Value Stack.

17-01277, In the Matter of the Value of Distributed Energy Resources Working Group Regarding Rate Design.

17-01278, In the Matter of the Value of Distributed Energy Resources Working Group Regarding Low and Moderate Income Customers.

17-E-0459, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service.

[1] 2017-11-21_Bob_Wyman_Direct_Testimony2.pdf, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={54FA5861-8DDE-44A8-9255-74749D9368DB}

[2] ORU_Testimony_Bob_Wyman.pdf, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={BE297296-9267-48A0-B02D-55974E3EBF99}

17-G-0460, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service.

17-G-0606, Petition of Consolidated Edison Company of New York, Inc. for Approval of the Smart Solutions for Natural Gas Customers Program.

18-E-0067, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Electric Service.

18-G-0068, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Gas Service.

18-M-0084, In the Matter of a Comprehensive Energy Efficiency Initiative.

18-M-0376, Proceeding on Motion of the Commission Regarding Cyber Security Protocols and Protections in the Energy Market Place.

19-E-0065, 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.

19-G-0066, 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.

19-G-0080, In the Matter of Staff Investigation into a Moratorium on New Natural Gas Services in the Consolidated Edison Company of New York, Inc. Service Territory.

19-M-0265, In the Matter of a Program to Encourage Clean Energy in Westchester County Pursuant to Public Service Law Section 74-a.

19-G-0309, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of The Brooklyn Union Gas Company d/b/a National Grid NY for Gas Service.

19-G-0310, Proceeding on Motion of the Commission as to the Rates, Charges, Rules

and Regulations of KeySpan Gas East Corp. d/b/a National Grid for Gas Service.

Q. Do you always participate in PSC matters as an individual, representing only yourself?

A. No. In addition to participating in PSC proceedings as an individual, I have, from time to time, assisted others in preparing for these proceedings or have spoken for them. For instance, I have several times assisted NY-GEO[3] in developing testimony and/or evidence. I also represented NY-GEO as a participant in ConEd's "Peak Gas Collaborative" which had been established as a result of the prior ConEd rate case (16-G-0061).[4].

Q. What is your background?

A. I am a New York City-based advocate for renewable energy and Beneficial Electrification with a focus on geothermal heat pumps. I am a member of the New York Geothermal Energy Organization, (NY-GEO)[5], the Renewable Thermal Alliance[6], and the International Ground Source Heat Pump Association (IGSHPA)[7] on whose Advocacy Committee I serve. I am a founder and shareholder, but not an employee, of Dandelion Energy[8], the Google X[9] spin-off company that currently installs geothermal heat pump systems in New York State.

Although most of my career was spent in the computer software business, during which I worked for a variety of companies, including Digital Equipment Corporation, Microsoft, Google, Medio Multimedia, and Pubsub Concepts,[10] I have been advocat-

[3] https://ny-geo.org/

[4] 16-G-0061, 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.

[5] https://ny-geo.org/

[6] https://cbey.yale.edu/programs-research/renewable-thermal-alliance

[7] https://igshpa.org/

[8] https://dandelionenergy.com/

[9] https://x.company/

[10] See my LinkedIn profile for more detail: https://www.linkedin.com/in/bobwyman/

ing on energy related issues for at least 45 years, having first given public testimony in hearings concerning Pres. Nixon's "Project Independence"[11] in 1973.

Purpose of Testimony

Q. What is your purpose in submitting this testimony?

A. I wish to comment on several aspects of the proposals made by Consolidated Edison of New York, Inc. ("The Company") in the current cases and to advocate for several modifications or additions to those proposals. My testimony is intended to ensure a more complete record of the relevant issues and to advocate for policies that will be more fair, more in the public interest, and more likely than those proposed by the Company to conform to existing State policy goals.

Some of the issues that I wish to discuss include:

- The Company's proposals concerning
  - Depreciation
  - Excess Deferred Income Tax (EDFIT).
- Electric Rates and Bill Credits
- Home Area Network (HAN) access to AMI Smart Meters
- Smart Kids Curriculum

[11] https://en.wikipedia.org/wiki/Project_Independence

Depreciation

Q. Do you believe that the Company's Depreciation Proposal is reasonable?

A. No. The Company's proposal[12] to hide over $2 Billion of depreciation reserve deficiencies,[13] by using accounting assumptions that their Depreciation Panel has said are unreasonable,[14] is egregiously irresponsible, cynical and incompatible with the State's and the City's environmental and energy policy goals.

	Estimated Depreciation Deficiency		Amount to be Ignored
	Depreciation Study	Company Proposal	
Electric	$ (2,824,381,419)	$ (1,145,889,042)	$ (1,678,492,377)
Gas	$ (379,685,094)	$ (90,925,416)	$ (288,759,678)
Common	$ (60,320,488)	$ 34,114,630	$ (94,435,118)
Total	$ (3,264,387,001)	$ (1,202,699,828)	$ (2,061,687,173)

Table 1: Deficiency Estimated by Depreciation Study Compared to Company Proposed Deficiency. (Source: Exhibit DP-3)

As I will explain later, even the $2 Billion current deficiency, that the Company proposes to ignore, is based on out-dated Depreciation Study methods that dramatically under-estimate the true depreciation deficiency for gas assets. This is the result of the Company and its depreciation experts setting depreciation rates based on the expected technical life of installed assets rather than their reasonably expected economic life – given the State's and City's aggressive CO_2 emission reduction goals. While the Depreciation Study recommends accelerating depreciation to reflect an expected 60 year life for gas services and 80 year life for gas mains, State and City goals call for an 80% reduction of CO_2 emissions by 2050 – in just 30 years. Given this, the

[12] Depreciation Panel Testimony

[13] See Table 1 on page 7

[14] Depreciation Panel Testimony, Page 38 at lines 8-13: "Q. In your judgment, does the reserve deficiency based on existing depreciation rates reasonably reflect the magnitude of the existing deficiency? A. No. Based on the results of the Depreciation Study, we find the deficiency as calculated on that basis to be understated for all types of plant." Note: As shown in Table 1, the "understatement" is on the order of $2 billion dollars.

expected service lives for existing and future gas infrastructure investments should be adjusted to ensure that the cost of 80% of that infrastructure must have been recovered by 2050.

There are also issues with the way that the Depreciation Study has analyzed depreciation of electric assets. While it is expected that natural gas use will be reduced dramatically over the following thirty years and eventually eliminated, it is also expected that the utilization of electrical infrastructure will increase dramatically over the next thirty years and will continue to be used for the foreseeable future. The force at work here is Beneficial Electrification, which substitutes electricity for fossil fuels in a variety of applications, most notably at this time in the form of electric vehicles, heat pumps, and cooking.

Various experts estimate that Beneficial Electrification will result in as much as a doubling of electricity consumption prior to 2050. While providing this electricity will be a challenge, the increased utilization of existing as well as future infrastructure means that the future benefits provided by that infrastructure will be greater than is currently reflected in the Depreciation Study. It also means that there will be a greater quantity of electricity use over which the costs of electrical infrastructure may be spread. The effect of expected increased electricity use is the exact opposite of the effect of the expected decline and eventual elimination of natural gas use. While today's natural gas users are paying less than their fair share for infrastructure and pushing costs onto future generations, we may one day discover that today's electricity users have paid more than their fair share and are thus providing an unintended windfall to future electricity users.

Given the scale of the current and anticipated depreciation deficiencies, it will be a

challenge to return the Company's operations to a responsible and equitable footing. A significant increase in the rate of depreciation in this and future rate cases will inequitably require that future rate payers carry the burden of costs deferred by earlier rate payers. Ideally, we could reach back in the past and insist that past rate payers now make up for their previous underpayments. Of course, that would normally be somewhat problematic. However, in this specific case, we are fortunate to discover that while past rate payers have been underpaying for the cost of the infrastructure that benefits them, they have also been substantially overpaying for deferred taxes.[15]

The Excess Deferred Federal Income Tax (EDFIT) balances which now exist as a result of the Federal Tax Cuts and Job Act of 2017 ("TCJA") are substantial. These are over-payments made by previous rate payers to cover once expected Federal tax obligations. These over-payments were made, of course, by precisely the same rate payers who under-paid for depreciation expense. While some have argued that the EDFIT balances should be distributed to rate payers, it would appear that the most equitable treatment of those over-payments is to use them to address past under-payments by those same rate payers.

Clearly, aggressive action must be taken to ensure the elimination of existing depreciation deficiencies, to ensure that correct service lives, etc. are used in the future, and to prevent aggravating both the current and future problems by installing still more natural gas infrastructure. What is needed is the creation of a process of managed decapitalization of the Company's gas assets. Steps to be taken to achieve this goal include:

- Reject the Company's proposal to ignore the Gannett Fleming Depreciation Study.

[15] See discussion of in the Company's Tax Panel Testimony.

- End gas expansion now to help prevent continued depreciation deficiencies and the accumulation of stranded assets.
- Dedicate the EDFIT over-payments to reducing the deficiencies caused by previous under-payments for depreciation. Unprotected EDFIT should be applied immediately to the existing deficiencies and the remaining EDFIT should be applied to future deficiencies until they are completely eliminated.
  - For gas accounts, expected asset lives should be significantly reduced to ensure recovery of at least 80% of costs before 2050. Doing so will probably consume all available EDFIT.
  - For electric accounts, any remaining EDFIT, after deducting the cost of current and expected deficiencies, may be refunded to rate payers directly.)
- Create a “Depreciation Collaborative" to provide a forum for stakeholders to provide input on the methods that should be used in future Depreciation Studies to ensure that State and City environmental, energy and other policies are properly considered when determining the expected service lives, etc. for gas and electric assets.

Q. What motivates the Company to make a proposal such as they have?

A. The Company clearly states that their motivation for ignoring the Depreciation Study and using service lives, survivor curves and net salvage values that they admit are unreasonable, is to “mitigate the rate request”[16] and thus, by offering the prospect of lower rates in this rate case, to make it easier to negotiate a settlement.

The Company also appears motivated by a desire to “kick the can down the road.”

[16] Depreciation Panel Testimony, Page 7 at lines 9-15: “The Company has taken various steps in this filing to mitigate the rate request, and one of those steps is to not request any changes to the Company’s current depreciation rates. Additionally, the Company’s proposed treatment of reserve deficiencies has also been moderated to mitigate the overall rate request.”

They acknowledge that accepting their proposal will not provide a long-term solution:

> "A long-term solution is required in order to first relieve the Company of the burden of carrying costs that should have been recovered in the past and relieving customers of the burden of paying carrying costs on the unrecovered costs that remain in rate base. The sooner that first step is accomplished the better for future customers."[17]

Having acknowledged the inadequacy of their proposal, they leave us only with an exhortation to others to address the issue at some other time.

Q. Why is "mitigating the rate request" a problem?

A. While "mitigating the rate request" would allow lower rates to be approved for this rate case, the Company clearly and correctly states that: "by pushing costs out into the future, depreciation deferrals increase costs in the long run."[18] Thus, the Company admits that it is imprudently offering the sweet honey of near-term rate reductions in exchange for the bitter pill of inevitably higher rates in the future. They appear to be cynically assuming that the parties to the current rate case will selfishly accept lower rates even while knowing that doing so does little more than "kick the can down the road" and will force parties in future rate cases to approve higher rates than would have been necessary if the now known problems had been responsibly addressed in this rate case.

Depreciation deficiencies cannot accumulate forever. They must eventually be either recovered from rate payers or disallowed by the Commission. The longer we wait to address these deficiencies, the larger they will grow, and thus, the greater will be the

[17] Depreciation Panel Testimony: Page 40-41.
[18] Depreciation Panel Testimony, Page 36 at lines 10-11.

impact of addressing them.

Q. Explain why the $2 Billion of hidden deficiencies is actually an understatement of the problem.

A. Unfortunately, the problem of depreciation deficiencies is actually much greater than the $2+ billion problem documented in the Company's filings. Not only has the Company proposed ignoring a Depreciation Study done using legacy methods only appropriate in past years, it has failed to ensure that the Depreciation Study methods were adjusted to address the new regulatory environment created by New York State's and New York City's establishment of aggressive Carbon Emission Reduction Goals which are intended to reduce CO_2 emissions by 80% before 2050 – in only 30 years. As a result, the Depreciation Study dramatically overestimates the reasonably expected service life for gas assets. Achieving the State and City goals will inevitably require a dramatic reduction in the use of all fossil fuels within the Company's service area. This reduction will reduce the revenue generated by existing gas assets and will increased the rate of service[19] abandonment.

Q. Was the Depreciation Study done using methods traditionally used in the such cases?

A. Yes. However, such methods are no longer either adequate or prudent.

While a Depreciation Study written in the past could assume that technical characteristics of the installed assets had the dominant influence on their service lives, such a study performed today must recognize that State and City environmental and energy policies are likely to become the primary constraint on the expected service lives of gas assets. Thus, the focus of an up-to-date Depreciation Study would be more on the expected economic life of assets rather than merely their potential technical lives. Unfortunatley, the Gannett Fleming study focuses only on technical potential. For

[19] Account 380

example, even though State and City policy requires dramatic reduction in gas assets before the end of 30 years, the Gannett Fleming Depreciation Study proposes that the costs of gas services be recovered over 60 years[20] and that the costs of gas mains be recovered over 80 years.[21] While these estimated service lives are both five years shorter than those currently used, and five years shorter than those proposed by the Company in this rate case, they are much longer than would be expected for assets whose use is expected to be reduced 80% in only 30 years. The harsh reality for a gas distribution utility is that there will be very few gas rate payers from whom costs can be recovered in 60 to 80 years (i.e. between 2090 and 2100)...

Q. What will be the long-term impact of accepting the Company's proposal?

A. The result of the already rapidly growing depreciation deficiencies, when compounded by the reasonably expected shorter economic life of gas assets, will, unless addressed seriously, result in the accumulation of stranded assets – assets which cost rate payers more than the benefits received from their use. In many cases, these stranded assets will provide no benefit at all since they will have been abandoned. As these stranded assets accumulate, a declining number of gas customers will be asked to pay for them, even though they provide no net benefit to those customers. The inevitable increase in rates will make alternatives to gas appear more competitive and that, of course, will accelerate the abandonment of gas, thus, increasing the rate of stranded asset accumulation. This sort of dynamic is known as a "death spiral."

Q. Who will be most impacted by the "death spiral" caused by rising gas delivery rates?

A. While all gas users will be impacted by the need to pay the increasing gas delivery charges resulting from the death spiral, the greatest personal impact will be felt by

[20] See Exhibit DP-3, page 3 of 4: For Account 380.10, Gannett Fleming recommends the 60-R1 survivor curve while the Company proposes 65 - h1.25

[21] See Exhibit DP3, page 3 of 4. For Account 367.10, Gannett Fleming proposes survivor curve 80 - R2.5 while the Company proposes 85 - h2.75.

those with the most limited disposable income. The greatest impact will be felt by low and moderate income (LMI) gas customers, some of whom might have been enticed by artificially low gas prices to switch to gas from alternative fuels such as oil.

As is well known, LMI customers do not have access to the capital needed to fund conversion from now deprecated fossil fuel heating systems to long-term, sustainable solutions such as heat pumps. Given this, we should expect to see a continuation of current trends: Wealthier gas customers often recognize that gas is a poor investment and are able to convert to long-term sustainable solutions while capital-poor LMI customers have no choice but to continue using their fossil fueled systems. If this trend continues, we'll see the gas customer base grow continually more dominated by financially constrained LMI customers. Gas, like oil, will become a "poor man's fuel." Thus, while the wealthier customers will be able to escape the impact of the gas death spiral, LMI customers will shoulder progressively more of the burden and disruption that it will cause. Extrapolated to the extreme, we can imagine that one day, the last gas customer will be an 85 year-old, handicapped, woman of color, whose modest use of gas for heat and cooking will result in a monthly gas delivery bill of millions of dollars...

Q. Will gas efficiency programs slow or eliminate the gas "death spiral?"

A. No. While energy efficiency programs of all sorts should generally be pursued, it must be recognized that gas efficiency programs will exacerbate and strengthen the natural gas "death spiral." While gas efficiency programs can be expected to reduce the quantity of gas burned and emissions produced, they will also reduce the quantity of gas over which the largely fixed, shared costs of gas infrastructure can be spread. The result of effective gas efficiency programs will be higher gas delivery charges and an accelerated "death spiral." Eventually, those higher charges will overwhelm whatever

financial benefit might motivate a customer to pursue increased gas efficiency. As gas efficiency increases, gas users with access to capital will be increasingly motivated to abandon gas and adopt non-fossil fuel alternatives. Also, the remaining gas users will be motivated to employ even more aggressive efficiency measures – only to discover that by doing so, they will have caused their rates to rise again.

Reducing gas consumption by any amount will not reduce the utility's costs of service by a similar amount. Most of the utility's costs are related to financing and maintaining the infrastructure which provides them with a known capacity to deliver gas. But, while delivery capacity is expensive, the utility's delivery costs are largely independent of the actual volume of gas delivered. The utility's costs are determined when their assets are acquired, not when they are used. A pipe in the ground, whose costs are recovered over an 85 year period, costs just as much each year if it is used at full capacity as it does when it not used at all. Thus, as long as the utility's fixed costs are recovered by adding a delivery charge to each unit of gas sold (i.e. volumetric recovery), per unit delivery charges must be increased with every incremental unit of reduced gas use. For gas customers, this means that if they successfully reduce their gas consumption, any savings from reduced fuel charges will be at least partially consumed by higher delivery charges on their future gas use.

It should be remembered that most of the existing gas infrastructure was installed during a time when it was assumed that gas use would continue without substantial reductions for the full life of the installed equipment. At the time of installation, with those assumptions, investments in gas expansion probably appeared to be prudent. However, changing circumstances now reveal that those investments were not nearly as wise as they might then have appeared. This should not surprise us. Very few people are capable of making investment decisions that are sure to remain valid over

85 or more years. When such investments do work out, it is often more the result of luck than foresight. Those who made the decisions, decades ago, to install gas pipes whose financial viability is now compromised by the combination of environmental, energy, and efficiency goals could not have been expected to realize the mistake they were making. On the other hand, those who advocate continued long-term financing of short-term gas assets can clearly be faulted.

Q. Is this problem of depreciation deficiencies a new one?

A. No. As detailed in the Company's testimony,[22] the growing problem of depreciation deficiencies has been discussed in several previous rate cases since at least Case 07-E-0523. In previous cases, a consistent desire to "mitigate rate increases" has always lead to a decision to take at most minimal action while leaving the problem to be addressed in the future. As one might expect, this desire to keep rates low in the short-term, at the cost of higher rates in the long-term, has resulted in more pressure on rates today than there would have been had the issue been dealt with earlier. Previous rate payers, by paying less than their fair share of costs, have forced future rate payers to pay more than their fair share of those costs.

Q. Will the Company's depreciation proposal impact achievement State and City goals?

A. Yes. Accepting the Company's proposal will make it harder to achieve the State's and City's goals for CO_2 emission reductions.

The Company's proposal to "mitigate rate increases," by ignoring the true cost of providing gas service, distorts the energy market by making gas appear, in the short-term, as though it is cheaper than it really is. This tends to make gas more competitive relative to alternatives, such as heat pumps. The result of this market distortion will be a greater near-term market demand for gas expansion than would exist

[22] Depreciation Panel Testimony, page 33

if gas rates were fairly and equitably set. The unnaturally high demand for gas will accelerate the rate at which gas expansion occurs and thus exacerbate the already problematic accumulation of depreciation deficiencies and stranded assets. The unnaturally low demand for gas alternatives, such as heat pumps, will have the effect of slowing and increasing the costs of converting the State's and City's housing stock to non-polluting, non-emitting heating systems before 2050.

As we consider the installation of future gas assets, we must ask the question: "Will we use these new assets for 60 to 80 years or more? Who is going to pay for them in the fufure?"

Q. Will the Company's proposal for handling of EDFIT impact achievement of State and City Goals?

A. Yes. The Company's proposal for EDFIT[23] will, by refunding EDFIT directly to ratepayers, have the effect of lowering rates in the near term while doing nothing to address the substantial depreciation deficiencies. The greatest market distortion will result from gas customers benefiting from yet-another inappropriate and misleading mitigation of gas rates. These unnaturally low gas rates will encourage increased near-term demand for gas, increased investment in short-lived gas assets, and make gas even more unnaturally competitive with non-emitting alternative energy sources.

If, instead of refunding EDFIT directly to rate payers, the past over-payments that resulted in EDFIT are used to defray the impact of past under-payment for depreciation expense, the cost of electric and gas infrastructure will be more equitably allocated to rate payers of various generations. Rather than providing existing rate-payers a windfall, financed by over-payments by previous rate payers, we should use the over-payments to reduce the impact of previous under-payments by previous rate payers.

[23] Income Tax Panel Testimony

The result will be that future rate payers are presented with rates which more accurately reflect the proper and fair cost of providing them with service. It is generally more likely that rate payers will make decisions which are compatible with State and City goals and policies if those decisions are based on fairly and equitably set rates.

Q. Is the Company's proposal supported by the members of its Depreciation Panel?

A. No. The proposal is so unrelated to any objective rate making process that the Company's outside depreciation expert, Ned W. Allis, Vice President of Gannett Fleming, has taken the rather unusual step of explicitly denying any association with the Company's proposals.[24] This denial is not surprising since the Company proposes to ignore the detailed Depreciation Study performed by Allis at Gannett Fleming and, instead, use "service lives, survivor curves and net salvage"[25] that the Company admits are unreasonable. For any non-regulated, "normal" corporation, a proposal to ignore a third-party Depreciation Study, performed by a firm with Gannett Fleming's reputation and experience, would spark shareholder suits and might even trigger fraud investigations.

Q. Are you suggesting that the Company's proposal is in any way fraudulent?

A. No. I am merely pointing out my understanding of a significant difference between the way regulated and un-regulated businesses are managed. While I am neither an accountant nor a lawyer, I have been led to believe that a variety of accounting procedures that would not be considered to conform to Generally Accepted Accounting Procedures (GAAP), if adopted by a non-regulated corporation, are accepted as GAAP-compliant if they have been clearly described to and approved by an appro-

[24] Depreciation Panel Testimony, Page 7 at lines 19-24: "Mr. Allis and Gannett Fleming Valuation and Rate Consultants, LLC have no responsibility for the Company's decisions on these subjects as filed in these proceedings whether in testimony, discovery responses or pleadings of any nature and express no view on them."

[25] Depreciation Panel Testimony, Page 39 at line 9.

priate regulator. Thus, if the Commission were to accept the Company's depreciation proposal, I believe it would be considered GAAP-compliant, even though it would still be exceptionally unwise and imprudent – for the reasons I have outlined above.

Q. Have others written about these deprecation issues?

A. Yes, The Environmental Defense Fund recently published *Managing the Transition: Proactive Solutions for Stranded Gas Asset Risk in California.*[26] which, although focused in part on issues specific to those being addressed by the California Energy Commission, consists mostly of material which is relevant to New York and the the Company's rate case.

[26] EDF, *Managing the Transition: Proactive Solutions for Stranded Gas Asset Risk in California.*, 2019, https://www.edf.org/sites/default/files/documents/Managing%20the%20Transition_1.pdf

Electric Rates and Geothermal Rate Impact Credits

Q. Please summarize your proposal for Electric Rates and Geothermal Rate Impact Credits.

A. It is broadly understood, and accepted by the Commission, that the current volumetric electric rates approved for use by the Company's residential customers tend to charge customers who use Geothermal Heat Pumps (GHP) more for delivery services than the fairly computed cost of providing delivery services to those GHP customers. Given that rates are required to be fair and non-discriminatory, it is essential that the Company adjust rates to eliminate the inequity created by the current rates. This can be accomplished either by creating new rates or by providing, as approved by the Commission in its Dec 13, 2018 order, bill credits to customers who are inequitably impacted by the existing rates.

While GHP users consume more electricity than do average electric customers, the average cost per kWh of delivering electricity to them is lower than the average cost per kWh of delivery to average customers. The result of charging rates based on average costs to customers whose cost-of-service is below average is known as a "reverse cost-shift." GHP users pay more than their fair share of costs which means that other customers will need to pay less than the fair cost of the service that they receive. (i.e. The "Rate Impact" of GHP adoption is to reduce rates.) Thus, GHP users subsidize the use of electricity by customers who rely on non-electric heating systems such as those powered by oil or gas.[27] The burden of paying to subsidize the electric use of customers who do not use heat pumps discourages the installation of heat pumps by making heat pumps less cost-competitive with technologies that are not similarly

[27] It is ironic, and unjust, that those who adopt an environmentally sustainable HVAC solution, like heat pumps, are forced by current rates to pay part of the energy costs of those who continue to use polluting fossil fuel based systems.

burdened. This market distortion ensures that an economically inefficient number of heat pumps will be installed and that progress towards achieving the State's and City's environmental and energy goals will be slower than otherwise possible.

Given that volumetric rates, if set based on average consumption in a market dominated by non-heat pump users, will inevitably result in reverse cost-shifts, it is necessary to create new rates which address the specific cost-impacts of heat pump users. In fact, the Company has begun to make progress in this direction by creating the new "Rider-Z" rate which is designed to combine demand-based and time-of-use rate determinants. This new rate is expected to reduce the size of the reverse cost-shift, but not eliminate it. In part, the reason for its inadequacy is that it designed to be a mass-market rate, applicable not only to heat pump users but to non-heat pump users who simply use large quantities of electricity.

NYSERDA has estimated that the size of the annual reverse cost-shift for a ConEd customer replacing an oil heating system with geothermal heat pumps is \$827/year.[28] In making this calculation, they found that upon converting from oil to GHP, the customer's bill for electricity delivery service would increase by \$1,030/year while the Company's costs would increase by only \$203/year.[29] (i.e. $\$1,030 - \$203 = \$827$) Thus, a GHP customer in the Company's territory can be said to pay \$827 each year for the electricity used by other customers. Clearly, this is not fair.

My belief is that the reverse cost-shift should be eliminated by creating new electric

[28] See Table 9-1, "Inverse Cost Shift per Installation per Year, Single-Family, Fuel Oil Replacement Retrofit (2019)" on page 60 of *New Efficiency: New York Analysis of Residential Heat Pump Potential and Economics*, NYSERDA Report Number 18-44, January 2019

[29] NYSDERA has apparently made minor adjustments to their reverse cost-shift calculations since January. These calculations have been provided to the Company, but are not yet available to other parties in this case. Some updates to the January analysis were provided on May 23, 2019 and were filed in Case 18-M-0084.

rates that properly allocate the cost of delivery service. As indicated above, Rider-Z takes a step in this direction, but, as currently designed, it is expected to eliminate at best only 10% to 20% of the actual reverse cost-shift. Ideally, either a new rate or an update to Rider-Z would ensure fair and equitable rates, however, such a rate would probably be considered "technology-specific" in that it would consider the specific load profiles and usage characteristics of customers who used Beneficial Electrification technologies, such as heat pumps. Current Commission policy discourages "technology-specific" rates.

The Commission addressed the need for new rates in their Dec 13, 2018 Order in Case 18-M-0084. While they recommended that rate design innovation be pursued, they stated a preference to avoid technology-specific rates and suggested that bill credits, such as the Geothermal Rate Impact Credit (GRIC) adopted by Central Hudson, and after Dec 13 by Orange & Rockland, "will suffice in the near term" before progress is made in new rate design. The Commission wrote, on pages 62 and 63 of their order:

> As a general matter, technology-specific rate designs are not preferred where they are not necessary. In this instance, bill credits or incentives will suffice in the near term. In the longer term, generic rate design reform that is under consideration in other venues may have the effect of compensating heat pump customers for volume-based values.

Given the Commission's clear support for bill credits, such as the Geothermal Rate Impact Credits approved in other recent rate cases, I propose that the Company provide users of Geothermal Heat Pumps with an annual Geothermal Rate Impact Credit (GRIC) sufficient to return to those customers an amount equal to the NYSERDA computed annual reverse cost-shift. (i.e. $827/year or whatever value is shown in more recent NYSERDA calculations.) This GRIC should be provided to all customers

of the Company who use Geothermal Heat Pumps and for whom reverse cost-shifts have been calculated (i.e. both single-family and small multi-family customers).

- For customers on volumetric rates, the Company should provide a Geothermal Rate Impact Credit equal to the NYSERDA calculated reverse cost-shift.
- For customers on Rider-Z, the Company should provide a Geothermal Rate Impact Credit which is equal to the difference between the amount the customer saves by using Rider-Z and the NYSERDA calculated reverse cost-shift (but not less than zero dollars). If the customer's use of Rider-Z does not result in a savings over volumetric charges, the full NYSERDA calculated reverse cost-shift should be provided to that customer.
- All customers who use heat pumps should be encouraged to install AMI Smart Meters in order to enable adoption Rider-Z and in order to provide a data base of load patterns that can be used to make reverse cost-shift calculations more precise in future rates cases.
- The Company should provide an annual detailed report describing the number of customers receiving the GRIC, the amount of bill credits provided, as well as the energy use characteristics of those customers and how those customers' characteristics differ from those of other customers.
- The funds used to pay the GRIC should be taken from Rate Decoupling Mechanism (RDM) accounts and should not result in an increase to the Company's recoverable costs. This is reasonable because the inequity addressed by the GRIC results in the collection of excess payments that would otherwise be refunded to all customers in the next rate case (i.e It is that refunding that results in the "subsidy" of other customers' costs.) This method of funding GRICs was used previously approved by the Commission in the Central Hudson and Orange & Rockland rate cases.

Q. Should the Geothermal Rate Impact Credit (GRIC) be considered an "incentive?"

A. No. The purpose of the GRIC is to ensure that rates are fair, reasonable and non-discriminatory (FRAND). Thus, the GRIC is about equity while an incentive is some benefit which is provided with the primary intention of motivating a change in customer's behavior. If the GRIC were, in fact, an incentive, it would be inappropriate to provide it to existing Geothermal Heat Pump users since doing so would not result in any specific behavior change. Because the GRIC addresses equity, it is completely appropriate to provide it even to customers who long ago chose to adopt Geothermal Heat Pumps. The mere fact that those customers previously chose GHP, even in the face of inequitable rates, cannot be used as a justification to continue forcing them to pay for other people's energy use.

Certainly, providing fair, reasonable and non-discriminatory rates will tend to encourage those who were once discouraged by unfair rates from adopting heat pumps to do so. Thus, the GRIC, by addressing the inequity, will have the side-effect of changing behavior in the same way that an incentive would. However, the expectation of behavior modification does not, in itself, make something an incentive.

Q. What, if anything, would be a reasonable and equitable alternative to the Geothermal Rate Impact Credit?

A. Because the GRIC addresses inequities in the current rate designs and is not an incentive, it is exceptionally difficult to craft an alternative to it other than by designing new rates which eliminate the reverse cost-shift and thus make the GRIC unnecessary. As suggested by the Commission, such rate design issues should be addressed in the future. In the meantime, the GRIC "will suffice" and is the best available alternative.

Some have suggested that rather than providing the GRIC, the Company should make an up-front payment to new heat pump customers which is equal to the net present value of the "reverse cost-shift" amounts that will be paid over the expected life of newly installed equipment. Those who support this approach argue that the incentive should be, according to NYSERDA's calculations,[30] about $10,944 for each single-family residential New York City customer who replaces fossil fuels with heat pumps. Such a substantial up-front payment would certainly do a great deal to encourage the adoption of heat pumps. However, unless a similar payment were made to the existing users of heat pumps, such an up-front payment would do nothing to compensate exiting users for the inequitable rates that they would continue to pay in the future. It would, of course, be inequitable to address the inequity for only one group of customers...

It should also be noted that any method which attempts to estimate the net present value of reverse cost-shift payments is almost certain to produce inaccurate results which will result in over-payments. The problem here is that it is quite likely that we will eventually address the current rate designs inadequacies and produce new rates that generate either no or little reverse cost-shift. Once that it is done, we're likely to discover that we had over-estimated the net present value of the future reverse cost-shifts – because the cost-shifts had ended earlier than estimated (e.g. We might fix the rates in two or three years, while the NPV value had been based on an estimated life of over 20 or more years.). Given that it is exceptionally unlikely that we would then attempt to "claw-back" the previously granted excess NPV payments, addressing the rate design inequities would create an unwarranted windfall for customers who had received such NPV payments.

[30] See: NYSDERDA, *New Efficiency: New York Analysis of Residential Heat Pump Potential and Economics, Update May 2019*, page 10

Q. Should the Company provide incentives for heat pump adoption in addition to the GRIC?

A. Yes. Addressing inequities in current rate design does not make it unnecessary to provide incentives. For instance, as previously discussed, in NYSERDA's May 2019 updated calculations, they estimate that the "missing money" needed by one who is considering the installation of new geothermal heat pumps to replace fossil fuel heat is about $16,501. Even if we reduce this amount by the estimated $10,944 NPV of the projected reverse cost-shifts, we're left with $5,557 that must be provided in order to make someone financially indifferent to the costs of installing new heat pumps rather than a new fossil fuel system. Thus, the Company's incentive programs should provide at least $5,557 per new installation in order to ensure an incentive sufficient to encourage heat pump adoption.

Q. Are Beneficial Electrification rates really "technology-specific?"

A. No. We are just beginning the transition from a world in which heating is primarily provided by burning fossil fuels to a world in which the dominant technology used to provide heating will be heat pumps. We are also moving from a world in which electricity only provides a portion of a customer's energy needs to a world in which essentially all of the customer's energy needs are provided by electricity. The full implications of this transition are only now being discovered and are not generally well appreciated. Thus, there is some confusion during the interim. What looks unusual and technology-specific today will be norm in the not-so-distant future.

We have found that volumetric rates, which are now the default or normal rates, have reasonably served our needs for the last hundred of so years. Nonetheless, it has always been known that volumetric rates provide a non-optimal allocation of the costs of providing electric service. The problem we face today is that the adoption

of Beneficial Electrification technologies are so drastically changing the load profiles of customers that the inadequacies of traditional volumetric rate designs are becoming more and more evident. It is also become clear that more optimal rates would focus more on demand (kW) as the key determinant for setting delivery rates, even as volumetric rates continue to be the basis for energy charges (kWh).

In 2050, or at some other point in the future, when heat pumps have become the dominant heating technology, when cooking is always done using electric appliances, and when virtually all vehicles will be electric, it will be clear and obvious to all that demand-based delivery rates should be the default rates. At that point, if we were to change the default rate from volumetric to demand-based, the remaining users of legacy fossil fueled heating systems are likely to insist that they should be allowed to continue to use volumetric rates. At that point, we're likely to see that those who object to "technology-specific" rates will argue against maintaining volumetric rates. What is considered "technology-independent" today will be considered "technology-specific" in the future. The reverse is also true.

Rather than seeing rates that fairly allocate the costs of serving customers who adopt Beneficial Electrification technologies as "technology-specific," it would be more useful to see such rates as the "rates of the future." We should then expect that while those using these "rates of the future" will be small in number today, they will eventually grow to dominate the population of rate payers while those that use today's rates will shrink from the vast majority to an eventual small minority.

Q. Please describe "reverse cost-shift" in greater detail.

A. Rather than craft my own description, I will defer to that provided by NYSERDA in their January 2019, Analysis of Residential Heat Pump Potential and Economics. They

write:

> The "inverse cost shift" refers to the following effect. Customers who install heat pump technology to replace conventional oil or gas combustion heating and air conditioning increase electricity usage during the winter and decrease electricity usage during the summer. For many customers, the result is a net increase in annual electricity usage that results in a net annual bill increase and increased revenues for the utility. Because the system is generally less constrained in the winter heating season, the increase in cost for the utility to provide the additional electricity in the winter is often less than the increase in revenue for the utility. This phenomenon most typically occurs for installations in the residential sector and is largely due to the structure of volumetrically based retail rates in the residential sector, which are designed to recover both variable costs as well as a portion of fixed-system infrastructure costs through a variable rate.
>
> For regulated utilities that earn a specified return on invested capital, an increase in utility revenues that exceeds the cost to serve additional load cannot be retained as profit but must be returned to utility ratepayers. As a result of these dynamics, the installation of a heat pump may lead the customer to start paying for a relatively larger fraction of the total systemwide grid infrastructure costs, which in turn, translates to a rate decrease for ratepayers as a whole; an "inverse cost shift" from non-heat pump ratepayers to the heat pump customer occurs.[31]

[31] NYSERDA, *New Efficiency: New York Analysis of Residential Heat Pump Potential and Economics*, Report Number 18-44, January 2019, pages 58-59

Home Area Network (HAN) Access to AMI Smart Meters

Q. What do you have to say about HAN access to Smart Meters?

A. HAN Access to AMI Smart Meters must be provided.

The Commission has clearly ordered that utilities who install AMI Smart Meters must provide "customers direct, real-time access to electric meter data." and that AMI systems must "connect with a home area network (HAN)."[32] Additionally, the Company's AMI Business plan was adopted by the Commission based, in part, on the expectation that the Company would satisfy the before-mentioned minimum requirements by installing and enabling ZigBee® chips in each AMI Smart Meter.[33] It should also be noted that representatives of the Company, including its President,[34] have regularly promised that these minimum requirement would be met. In fact, this ability has been said to be one of the most compelling reasons for rate payers to carry the

[32] In Appendix 1 of its 13-Feb-2009 *Order Adopting Minimum Functional Requirements for Advanced Metering Infrastructure Systems and Initiating an Inquiry into Benefit-Cost Methodologies*, the PSC established "Advanced Metering Infrastructure Minimum Functional Requirements." Those minimum requirements include, in part, the following:

> (f) AMI systems must have the ability to provide customers direct, real-time access to electric meter data. The data access must be provided in an open non proprietary format.
> (h) At the point where the customer or the customer's agent interfaces with the AMI system, the data exchange must be in an open, standard, non-proprietary format.
> (j) AMI systems must have the ability to send signals to customer equipment to trigger demand response functions and connect with a home area network (HAN) to provide direct or customer-activated load control.
> (l) AMI systems must have the following security capabilities
> [Note: list of capabilities omitted for brevity]

[33] On page 34 of its March 17, 2016 *Order Approving Advanced Metering Infrastructure Business Plan Subject to Conditions*, the PSC wrote:

> "To allow the AMI meters to communicate with customers who wish to install a HAN, BAN or similar systems, a ZigBee® chip will be installed in each AMI meter."

[34] During his address to the NY-GEO Annual Conference on April 10, 2019, Timothy P. Cawley, President of Consolidated Edison Company of New York, briefly described ConEd's plans for Smart Meters. In response to an audience question, immediately following his formal presentation, Mr. Cawley expanded on his prepared statements, saying that ConEd "will allow these meters to speak to appliances through home area networks and so you'll be able to sort of have a smart home in part enabled by the data."

substantial financial burden of installing AMI Smart Meters.

Nonetheless, the Company has, without formally notifying the Commission, chosen to disable HAN access and does not intend to even review their decision until after all AMI Smart Meters have been installed.[35] In so doing, the Company presumes to independently "review" their compliance with clear Commission orders and, they intend to do so only after it is too late to address any issues that might arise as a result of that review. One must ask: If upon review, the Company determines that the installed meters do not meet the Commission's minimum requirements, who will be responsible for paying the costs of installing non-complying equipment? Will rate payers be asked to pay for meters that the Company installed without being sure that they would meet minimum requirements? Such a result seems inappropriate.

The Company claims that during September, 2016, they notified DPS Staff of their decision to disable HAN access to Smart Meters.[36] However, discussions with DPS staff indicate that while they have a record that the Company expressed concerns about HAN access during 2015-2016 discussions of their AMI Business Plan:

> "DPS Staff is not aware of Con Edison's 'decision to disable HAN communications.' It is Staff's understanding that the ZigBee chip is installed in the AMI meters and will be activated upon customer request."[37]

Additionally, DPS staff confirm that it is their understanding that the before-mentioned PSC's Orders in this matter remain in force.

[35] In response to IR Wyman 8-40 (e), the Company wrote: "The Company will review the requirements and use cases for communications to the Smart Meters using the ZigBee communications capability presently disabled in the Smart Meter and the cyber security risks upon the completion of the rollout of the Smart Meters."

[36] In its response to IR WYMAN-8-40(a), the Company wrote: "The Company communicated its business decision with DPS Staff in September 2016 that the HAN would initially not be turned on."

[37] Private email from Lindsey Overton to Bob Wyman, received on May 14, 2019.

Given that the Commission has ordered that HAN access is required for AMI Smart Meters installed, that the Company has known about this requirement since 2009, and given that Zigbee chips have been installed in all meters, the Company should either immediately begin to enable such access on customer demand or provide a plan for how they will, at their own expense, replace or repair all existing meters to ensure that installed meters do, in fact, meet the Commission's minimum requirements. Until the Company is able to demonstrate their capability and intention to install meters that conform to Commission minimum requirements and to enable HAN access to those meters, the Company should cease all meter installations.

Q. Why is HAN access to Smart Meters important?

A. While there are many reasons for providing such access, I am particularly interested in ensuring that customers who adopt Rider-Z and thus switch from volumetric to demand-based rates, are able to receive the information they need in order to optimize their use of electric system capacity. The ability to monitor a home or building's aggregate demand (kW) is extremely important to any customer using demand-based rates. Such an ability would also allow the providers of devices, such as heat pumps, the ability to modify their control software so that the devices not only attempt to optimize the consumption of electricity (kWh) but also the size and timing of demand (kW) presented by such devices.

Q. Can you provide an example for how a heat pump might respond to demand data?

A. Yes. Imagine that someone in a home begins to use a hair dryer. The use of that hair dryer might increase the home's demand by 1.5kW. In theory, a heat pump or other device that was monitoring whole-house demand, as reported by the Smart Meter through the HAN, could choose to switch to a lower demand level in order to trim the hair dryer's 1.5kW demand increase to something less than 1.5kW. If appropriately

timed, this shifting of the device's demand could result in significant savings for the home owner as well as a smoothing of aggregate system demand and thus a benefit for all rate payers.

Q. Do heat pumps currently exist that provide the kind of dynamic demand management that you describe above?

A. No. This is, of course, because demand-based rates are rarely provide to residential home owners. Thus, homeowners, and their equipment providers have never before had a financial motivation to optimize whole-house demand. Nonetheless, I have engaged in numerous and detailed discussions with all major providers of geothermal heat pumps in the United States and have been assured by them that if access to whole-house demand could be provided by AMI Smart Meters, they would pursue the opportunity to provide value to their customers, and to the grid, by upgrading their control software to use the data.

Smart Kids

Q. What do you have to say about the Smart Kids Program?

A. The Company's Smart Kids program annually introduces 200,000 or more fifth-grade students to a variety of issues related to energy use and energy efficiency. However, while the curriculum for this program addresses issues such as solar energy, energy efficiency, etc. it does not currently include any instruction whose intent is to inform or educate its students about the benefits and use of heat pumps. Given that heat pumps are an essential part of achieving the State's and City's environmental and energy goals, the curriculum of the Smart Kids program should be updated to inform students of this technology.

Q. Does that conclude your direct testimony in this case?

A. Yes.