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STATE OF IOWA
BEFORE THE IOWA UTILITIES BOARD

IN RE:	))	
INTERSTATE POWER AND LIGHT COMPANY	))))	DOCKET NO. RPU-2017-0001

DIRECT TESTIMONY
OF
KARL R. RÁBAGO

On Behalf of

Environmental Law & Policy Center, Iowa Environmental Council,
Natural Resources Defense Council, Vote Solar, and Solar Energy Industries Association

August 1, 2017

I. INTRODUCTION AND OVERVIEW

Q. Please state your name, business name and address, and role in this proceeding.

A. My name is Karl R. Rábago. I am the principal of Rábago Energy LLC, a New York limited liability company, located at 62 Prospect Street, White Plains, New York. I appear here in my capacity as an expert witness on behalf of Environmental Law and Policy Center ("ELPC"), Iowa Environmental Council ("IEC"), Natural Resources Defense Council ("NRDC"), Vote Solar, and the Solar Energy Industry Association ("SEIA") (collectively "Environmental Intervenors").

Q. Please summarize your experience and expertise in the field of electric utility regulation and the renewable energy field.

A. I have worked for more than twenty-five years in the electricity industry and related fields. I am actively involved in a wide range of electric utility issues across the United States as an expert witness and, in my capacity as Executive Director of the Pace Energy and Climate Center, as a party in New York rate cases and in Reforming the Energy Vision proceedings.

My previous employment experience includes Commissioner with the Public Utility Commission of Texas, Deputy Assistant Secretary with the U.S. Department of Energy, Vice President with Austin Energy, and Director with AES Corporation, among others.

My experience includes making hundreds of decisions on the record in cases involving avoided costs, rates, tariffs, certificates of need, rulemakings, and other proceedings. I have also held executive responsibility for managing public and private budgets ranging to the hundreds of millions of dollars. A detailed resume is attached as Exhibit KR-01.

Q. Have you ever testified before the Iowa Utilities Board ("Board" or "IUB") or other regulatory agencies?

A. Yes. I supported ELPC and coalition partners in development of comments in IUB NOI-2014-0001 and provided comments on pilot rate proposals by both Alliant and MidAmerican in that same proceeding. In the past four years, I have submitted testimony, comments, or presentations in proceedings in Maryland, New Hampshire, Michigan, Virginia, New York, Hawaii, Iowa, Indiana, Ohio, Rhode Island, Georgia, Minnesota, Missouri, Louisiana, North Carolina, Kentucky, Arizona, Florida, Wisconsin, California, and the District of Columbia. A listing of my previous testimony is attached as Exhibit KR-02.

Q. Do you have any specific experience relating to utility transformation and grid modernization?

A. Yes. I have been engaged in studying, advancing, developing, and implementing smart grid, grid modernization, and utility transformation policies and practices for more than 20 years. This experience includes regulatory oversight as a public utility commissioner, research and development management as a federal executive, and management and implementation as a utility executive at Austin Energy with responsibility for distributed energy services for a utility serving about 400,000 customers. At Austin Energy, I played a lead role in establishing the Pecan Street Smart Grid Demonstration Project, and in managing a portfolio of energy efficiency, demand management, and distributed generation ("DG") programs, and in launching the utility's "Bring Your Own Thermostat" infrastructure. I developed and implemented the first Value of Solar tariff, and have been involved in Value of Solar and Net Energy Metering studies and regulatory proceedings in several states, including Minnesota, Maine, California, and New York. At the Pace Center, we manage a technical advisory program for combined heat and power funded by the U.S. Department of Energy. The Pace Center is an active participant as a public interest intervenor in a wide range of regulatory proceedings relating to the New York's Reforming the Energy Vision process, and to utility transformation in Maryland and Rhode Island. I have served as a regulatory affairs director for the AES Corporation, a multi-national power company with distribution utilities in several countries around the world and, at the time, one of the largest wind energy development companies in the United States.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to review and respond to proposals by Interstate Power and Light ("IPL" or the "Company") in this proceeding relating to an increase in the customer charge for residential customers, new rate classes for residential and small commercial customers with distributed generation, grid modernization, and a pilot demand charge rate for residential customers. I primarily address testimony and discovery responses provided by Company witnesses Vognsen, Nielsen, and McGovern.

Q. What information did you review in preparing this testimony?

A. I reviewed relevant prefiled testimony of Company witnesses, filed Company schedules and tables, and relevant Company responses to information requests submitted by Environmental Intervenors and other parties. I reviewed relevant provisions of the Iowa Administrative Code.

Q. Please summarize your recommendations to the IUB.

A. Based on my review of the evidence in this proceeding and the findings and conclusions that I have reached, I make the following recommendations to the IUB:

- The IUB should reject the Company's proposal to increase the customer charge in this proceeding, and direct the Company to submit revised tariffs that allocate any authorized revenue recovery proposed for the fixed customer charge to the residential and general service volumetric per-kWh charges instead.
- The IUB should direct the Company to review and revise its cost of service methodology to allocate to the customer charge only those costs that vary directly with customer count, and to ensure that demand- and energy-related costs are allocated only to the volumetric per-kWh charge.
- The IUB should reject the Company proposal to create new customer classes for residential and general service customers as well as the cost of service approach underlying the proposal.
- The IUB should direct the Company to revise and expand its current approach to grid modernization which is focused on seeing distributed generation ("DG") as a problem to be solved and which largely ignores other distributed energy resources ("DER"),

and instead take a much more comprehensive and holistic view of grid modernization that embraces a grid model based on two-way flows of energy, the avoidance or deferral of capital investments as a result of DER market growth, and the empowerment of customers to reduce their energy bills through increased reliance on DER and active engagement with a truly modern electric grid.

- The IUB should reject the Company proposal to offer a residential and general service demand charge rate pilot and direct the Company to first establish a comprehensive program of customer education, customer engagement tools, and performance metrics for evaluation of the program. In addition, the IUB should direct the Company to establish a cost based justification for any customer charge discounts or other incentives associated with the pilot program.

II. COMPANY PROPOSAL TO INCREASE FIXED CUSTOMER CHARGES

Q. What is the Company's proposal to increase fixed customer charges?

A. The Company proposes to increase the residential customer charge by 29%, from $10.50 per customer per month to $13.50. (Company witness Vognsen at 15-16) This compares to an overall residential rate increase of 12.32% (Vognsen Sch. A). The Company also proposes to increase the General Service fixed customer charge from $17.80 to $24.00 per customer per month, or by 35%. The overall proposed rate increase for the General Service class is 11.21%.

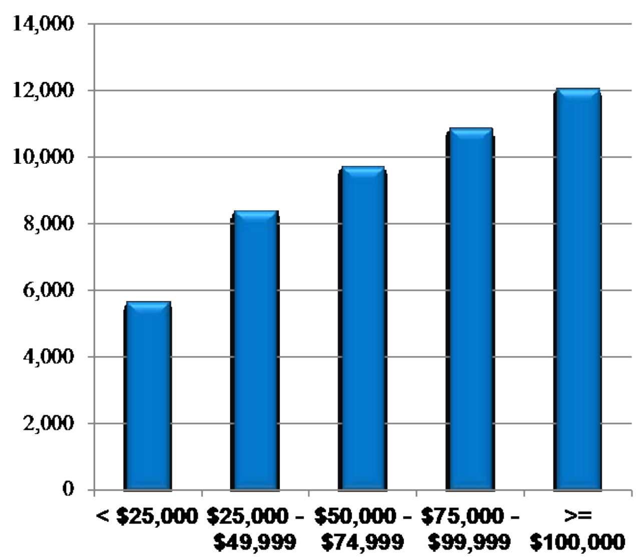
Q. What is the monthly bill impact of the proposed increase fixed customer charge?

A. The Company did not conduct any bill impact analysis for customers that varied by level of consumption or by customer demographics. (IPL Response to EI DR 56, attached as Ex. KR-03.) The impact of the proposed customer charge increase is economically regressive. That is, the proposed increase impacts those less able to pay more than other more affluent customers. The proposed fixed customer charge will be greater on a percentage of total bill basis for low energy users, who tend to be low income customers, retired customers on fixed incomes, students, and renters.

Q. What data is available about energy usage levels and income in Iowa?

A. The Company asserts that it has no such data. (IPL Response to EI DR 40, attached as Ex. KR-15.) According to data obtained from the U.S. Energy Information Administration's Residential Energy Consumption Survey for 2009, the most recent data available, and published by the National Consumer Law Center ("NCLC"),[1] energy usage is directly related to household income.

Median 2009 Residential Electricity Usage (KWH), by Income



[1] "Utility Rate Design: How Mandatory Monthly Customer Fees Cause Disproportionate Harm," available at: http://www.nclc.org/images/pdf/energy_utility_telecom/rate_design/IA-FINAL2.pdf.

In addition, the NCLC data, median electricity usage is also lower for households with residents older than 65 years, and for the homes of racial minorities.

2009 Residential Energy Consumption by Income, Race/Ethnicity, & Age

HOUSEHOLD INCOME	MEDIAN ELECTRICITY USAGE (KWH)
< $25,000	5,653
$25,000 - $49,999	8,401
$50,000 - $74,999	9,719
$75,000 - $99,999	10,871
>=$100,000	12,067
HOUSEHOLD RACE	**MEDIAN ELECTRICITY USAGE (KWH)**
Asian	8,927
African American	8,530
Caucasian	9,062
Latino	7,672
HOUSEHOLD AGE	**MEDIAN ELECTRICITY USAGE (KWH)**
65 years or older	7,306
Less than 65 years	9,401

Source: U.S. Energy Information Administration's Residential Energy Consumption Survey, 2009 (most recent data available)

Q. Is additional information available about the regressive impacts of increases in fixed energy costs?

A. In addition to the data from NCLC, the American Coalition for Clean Coal Electricity published data based on several U.S. government sources that confirms that low energy use is closely correlated with low income customers, the elderly, and minority households in Iowa.[2] According to the ACCCE, energy costs represent about 9% of the average Iowa pre-tax household income, while these costs represent 22% of household pre-tax income for households earning less than $30,000 per year. While Iowa household incomes are roughly equivalent to national median levels, at $52,228 per year in 2015, the 48% of Iowa households earning less than $50,000 before taxes devote an estimated 16% of their after-tax incomes to residential and transportation energy costs. Iowa's Black and

[2] Eugene M. Trisko, "Energy Cost Impacts on Iowa Families," American Coalition for Clean Coal Electricity (Mar. 2015), available at: http://www.americaspower.org/wp-content/uploads/2015/08/IOWA-Energy-Cost-Analysis-315R.pdf

Hispanic families are 45% and 26%, respectively, below the U.S. median household income. The median pre-tax income of Iowa's senior households is 30% below the U.S. median. These are the customers most vulnerable to a fixed customer charge increase in electric rates. This data is summarized in the table, below, taken from the ACCCE report. Such increases would be on top of a 24% increase in current dollars (or about 2% in constant dollars) in residential electricity prices in Iowa between 2005 and 2014.

U.S. and Iowa Median Pre-tax Household Incomes, 2013

	Median Household Income	IA Pct. Diff. Vs. U.S. Median	Pct. of Households
U.S.	$52,250		
Iowa	$52,229	0%	
IA: Black	$28,526	-45%	3%
IA: Hispanic	$38,892	-26%	4%
IA Age 65+	$36,690	-30%	25%

Source: U.S. Bureau of the Census, American Community Survey 2013 (2014)

Q. Did the Company evaluate the relative impacts of any alternative rate designs for recovery of approved costs?

A. The Company did not evaluate any alternative rate designs to its current proposal.

Q. Does the Company have alternatives to allocating increased costs to fixed customer charges?

A. Yes. A fixed customer charge is not the only mechanism for recovering fixed costs. Precisely because of the concerns that I cover in this testimony, utilities and regulators throughout the country have typically allocated a large proportion of fixed costs to volumetric rate elements for residential and small commercial customers. The notable exception to this approach are the customer costs related directly to connecting a customer to the grid, as these costs do vary with the number of customers served. This process starts with a more reasonable basic customer cost approach to cost classification.

Q. How does the Company assign costs to the customer charge for residential and general service customers?

A. The Company asserts that it assigns to customer charges those costs which it would incur regardless of whether connected customers used any energy—and asserts that these are costs that the Company incurs "simply to have the customer connected to the grid." (Vognsen at 14, IPL Response to EI DR 28, attached as Exhibit KR-04.) An examination of the schedules and work papers submitted by the Company reveals that instead of assigning costs based on the cost to connect, the Company assigns costs to the customer charge based on the label of the category in which it places its costs. (IPL Response to EI DR 54 and EI DR 55, attached as Exhibit KR-05 and Exhibit KR-06.) The Company compounds the cost assignment errors in the proposed charge by using an "across-the-board" technique that applies the proposed increased revenue requirement in the same fashion as used in its last litigated rate case, asserting that this approach advances the principle of gradualism. (IPL Response to EI DR 29, attached as Ex. KR-07.) Of course, the Company approach exacerbates the extent to which the historic rates already reflected a deviation from the important principle of cost-causation. (IPL Response to EI DR 30, attached as Ex. KR-08.)

Q. Does the Company assert that the costs it proposes to assign to the customer charge do not vary with changes in customer load?

A. No. The Company does not limit the customer charge to costs that vary primarily due to customer count, and instead appears to take the position that the customer charge should also collect for sunk distribution fixed costs. (IPL Response to EI DR 32, attached as Exhibit KR-09, referring to IPL Response to EI DR 27 and EI DR 28, attached as Exhibits KR-10 and KR-04.)

Q. Please explain.

A. First, it is important to understand that the Company position describes the kind of thinking that underlies straight fixed variable rate design. That is, the Company appears to argue that all sunk, or embedded, fixed distribution system costs should be assigned to the customer category because once incurred, sunk costs do not vary with usage. I address the flaw in this approach later in this testimony. Second, the Company states that it assigns costs of metering, service line, secondary service line transformation, the service drop, cost of billing, and customer service to the customer charge. When pressed to confirm how it decides which of these costs it assigns to the customer charge, the Company could not confirm that it assigns cost to the customer charge based on the cost to connect, and stated only that:

> *IPL relies upon Iowa Utilities Board orders in prior rate cases. See Docket Nos. RPU-94-2, RPU-05-3, RPU-06-1, RPU-07-4, RPU-2009-0002, and RPU-2010-0001. Specifically, the customer-related component should only include distribution system costs from and including transformers, meters, and associated customer service expenses. The Board has defined FERC accounts 368 through 369 as customer-related.* (Ex. KR-05 and Ex. KR-06.)

Q. Does the Company approach to assigning costs to the customer charge include examination of the differences in the cost to connect for rural and urban customers, or in single-family versus multi-family homes?

A. No. The Company does not rely on cost causation information related to the costs associated with connection for different kinds of residential customers. (IPL Response to EI DR 65(e), attached as Ex. KR-11.)

Q. Why is the Company's approach of assigning cost to the customer charge based on historical categories flawed?

A. The Company approach over-allocates costs to the customer charge, and assigns to the customer category distribution fixed costs related to usage levels, resulting in uneconomic price signals associated with the rates for residential and general service customers. Many of the costs cited by the Company and assigned to the customer charge vary to some extent based on customer count, but also vary based on energy use and demand. Distribution system fixed costs do vary, especially over the long term, with level of use. The Company provides data that demonstrates that demand increases with level of use and as such demand related costs increase with level of use, starting from a level of zero consumption. (Ex. KR-11)

Q. Are there other reasons the Company's categorical assignment of costs to the customer category is less reliable than a cost-based approach that would focus on costs incurred to connect the customer?

A. Yes there are. The Company's categorical approach ignores the expanding range of services and functions performed by equipment and personnel in the provision of electric distribution services. For example, modern "smart" meters do not just measure consumption in the way that old analog mechanical meters did when the Company first decided to propose including all meter costs in the customer charge. These modern meters also support energy efficiency, demand response, demand charges, and, in the future, the scheduling of electric vehicle charging and appliance controls when the meter serves as a communications platform for a modern electric grid. As such, categorizing all meter costs as customer-related is a simple answer that is simply wrong to the extent that any costs higher than the cost of consumption logging associated with meters are assigned to the customer category. Likewise, the costs associated with customer service staff will increase as these staff are increasingly engaged in referring customers to energy efficiency and bill management programs and assisting those customers in taking advantage of programs designed to reduce load. For these reasons, a volumetric charge for all costs other than the costs to connect the customer to the grid is more efficient and fair.

Q. Does the use of volumetric rates to carry fixed costs present a financial integrity risk to the utility that should be remedied with higher fixed charges?

A. No. First, the ratemaking principle is that rates should reflect costs, not be perfectly aligned with cost structure. There is no statistical likelihood of any real risk to the Company's financial integrity due to some customers using less energy than the utility had forecast in the interval between rate cases. The adverse impact on low use, low-income, and fixed income elderly customers, as well as upon the economics of efficient use of energy, discussed later in my testimony, outweighs any hypothetical risk to the Company's earnings. It should be noted that any revenue variances could more reasonably be addressed through better forecasting, more frequent rate cases, and, in times of market transformation, through the use of future test years.

Q. Why is it appropriate to continue recovering fixed costs through volumetric rates?

A. It is appropriate because of the price signal function of properly designed rates. Properly designed rates *reflect* properly allocated costs *and* send signals for efficient consumption in the future.

Sunk fixed costs, which appears to be the focus of the Company's concern in its customer charge proposal, can be reflected in *either* the fixed charge or a volumetric charge. An efficient price signal relating to future fixed costs can *only* be communicated with a volumetric charge. That is why a volumetric charge is the optimal rate design in this case for distribution-related fixed costs.

Q. Does recovery of fixed costs through volumetric charges violate principles of ratemaking or sub-optimize the economic efficiency of rates?

A. No. Sound ratemaking is based on ensuring that costs are properly allocated to customer classes based on cost causation. I know of no ratemaking or economic principle that finds that cost *structure* must be replicated in rate *design*, especially when significant negative policy impacts are attendant to that approach.

Traditional rate making limits customer charges to certain basic customer connection costs—the consumption measurement function of the meter, billing services associated with account set up and disconnection, and other similar general and administrative costs that vary with customer count and the cost to connect a customer to electric service. These fixed costs should form the basis and limit for fixed customer charges. Even so, when the policy impacts discussed below are considered, some of these costs are collected through variable charges.

Q. When costs associated with distribution systems are classified as fixed, should they be collected through the fixed customer charge?

A. Not necessarily, and not if the result is that low usage customers are disproportionately impacted, or that adverse impacts on energy efficiency, conservation, and renewables result, as discussed later in my testimony. Recently in other states, some utilities have argued that increased fixed customer charges secure revenue recovery in a world where customers have more options to reduce their level of usage. I am not aware of any evidence or analysis, and see none in this record, that increasing fixed customer charges improves system-wide economic efficiency or the efficiency of *customer* decisions. Absent evidence of system-wide or customer efficiency benefits, fixed customer charges should not be increased and costs should instead be allocated to variable charges. Again, the differences in costs that lead to labeling them as fixed or variable do not, standing alone, tell us anything about the rate design that should be used to recover them.

Q. Does the Company take a position on this issue?

A. The Company asserts that economic efficiency is advanced when rate design structure mimics Company cost structure and that when fixed costs are collected through fixed charges, economic efficiency is improved. The Company can identify no authority or data to support this position. The Company asserts that its position is consistent with 199 IAC 20.10. (IPL Response to EI DR 33, attached as Ex. KR-12.)

Q. Does 199 IAC 20.10 stand for the proposition that rate design structure should mimic Company cost structure in order to advance economic efficiency, or that straight fixed variable rates are preferable?

A. Absolutely not. The language in 199 IAC 20.10 is consistent with traditional rate making practices in stating that "[r]ates charged by an electric utility for providing electric service to each class of electric customers shall be designed, to the maximum extent practicable, to reasonably reflect the costs of providing electric service to the class." This language affirms that class rates should reflect class costs, not Company cost structure. Moreover, 199 IAC 20.10 also provides that "the design of rates should reasonably approximate a pricing methodology for any individual utility that would reflect the price system that would exist in a competitive market environment." In competitive markets, a great many businesses, including airlines, hotels, bus service, and others that are characterized by high fixed costs rely upon purely volumetric charges for recovery of costs in prices. Long-run marginal costs, and not a focus on embedded costs, are preferred under 199 IAC 20.10 for the purposes of determining rate designs within customer classes. The Company proposal to disproportionately increase the fixed customer charge and thereby result in a reduction in average rates as usage increases also runs afoul of the intent of the 199 IAC 20.10(3), which prohibits declining block rates, especially in light of Company evidence that increasing energy use is correlated with increases in demand. As the economist Steve Kihm, who served for more than twenty years as an analyst with the Wisconsin Public Service Commission succinctly summarized the issue, "[h]igh fixed charge pricing steers the economy away from efficient resource allocation, not toward it."[3]

Q. What is the key difference between fixed and variable costs?

A. The key discriminator for labeling a cost as fixed or variable is the element of time. It is important to remember that over the long term, all costs are variable; just as over the very

[3] Kihm, S., "Economic Concerns about High Fixed Charge Pricing for Electric Service," available at: http://americaspowerplan.com/wp-content/uploads/2014/10/Economic-analysis-of-high-fixed-charges.pdf

short term, one could argue all costs are fixed. This is why 199 IAC 20.10 expresses a preference for long-run marginal cost approaches in determining rate designs within customer classes. For example, distribution transformers are typically treated as a fixed cost because of their relatively long life. Loading on a transformer, especially during periods of high demand, will impact its useful life. As a result, load reductions can extend the useful life of transformers. In order to send a price signal that will encourage the reductions in load that could extend useful life and reduce revenue requirements in the future, a volumetric rate should be used for small customers.

Q. How do residential and small general service customers exercise control over their variable and fixed costs?

A. With volumetric rates to recover fixed and variable costs, residential customers have meaningful, practical, and realistic opportunities to exercise control over their energy bills and costs. As discussed below, reductions in use—through efficiency, conservation, or self-generation—all contribute to reductions in variable energy costs. Moreover, these behaviors also reduce peaks, and by doing so customers directly contribute to reduced fixed costs going forward. Efficiency, demand response, west-facing solar, and other options allow customers to contribute to fixed cost reduction.

All of these options are frustrated by shifting cost recovery from volumetric to fixed charges, as proposed by the Company. The overwhelming experience in the United States is that a utility can recover the exact same amount of authorized revenue requirement through a volumetric charge and avoid such unwelcome consequences.

Q. If the utility has costs that it classifies as fixed, should the charge to recover those costs be a fixed charge, in order to send a price signal to customers?

A. No. There is no meaningful price signal in charging a rate that few if any customers can effectively respond to through modification in behavior. Residential demand drives marginal distribution infrastructure investments and costs. Residential and small commercial customers have only limited options for changing their demand independently of their energy use, and this is especially true of renters; so volumetric energy rates are the best rate design option for sending price signals for both energy and demand cost causation on a going-forward basis. A customer's demand, especially for low-income and low use customers, is a function of the energy performance of their home, which is often rented; their major appliances, which are often expensive to replace or upgrade; and the weather. Imposing high fixed charges on these customers takes bread from their tables by increasing their energy burden, and is the economic regulation equivalent of suggesting to customers in response, "Let them eat cake."

Q. What is your recommendation for a rate design that would recover increased costs that the Company proposes to collect through increased fixed customer charges?

A. The prudently incurred distribution-related costs above those strictly associated with the cost of connecting the customer to the grid that the Company proposes to allocate to fixed customer charges should be allocated to volumetric rate elements unless and until the Company demonstrates the reasonableness of its proposed rate design in light of the potential adverse impacts discussed below, and after consideration of the relative impacts of alternative rate designs.

Q. How does the Company justify its proposal to shift cost recovery from a volumetric energy charge to a fixed customer charge?

A. The Company offers a completely superficial and inadequate justification for its proposal to disproportionately increase fixed customer charges in this proceeding. Witness Vognsen states that when a customer charge is set below its "functionalized cost," fixed cost recovery will be shifted to variable charges and high users would end up subsidizing low users. (Vognsen at 14-15) This argument is wrong in several important ways. First, it presumes that the Company is proposing a perfect assignment of functionalized costs to the customer charge. As previously explained, the Company has over-assigned costs to the customer charge. Second, even with perfectly functionalized costs, volumetric charges are still preferable to fixed charges for recovery of marginal fixed costs. Finally, the Company asserts that cost-based rates reflect economic efficiency, a point which I do not contest. Of course, reflecting costs in rates does not require and should not involve the mimicking of Company cost structure in rate design, especially when the results are economically regressive and inimical to energy efficiency, distributed generation, and market competition for electric service provision. It is not surprising that a monopolist would argue for increased non-bypassable customer charges, but it is not good rate making policy.

Q. Are there other factors besides cost functionalization and allocation guiding sound rate design?

A. Yes. In fact, James Bonbright articulated several more objectives that must be considered. A review of these objectives from "Principles of Public Utility Rates" reveals additional objectives not addressed by the Company. While different commentators group these objectives differently, all full lists of rate design principles generally include:

- Sound rate design characteristics include simplicity, understandability, public acceptability, and feasibility of application and interpretation;
- Rates should be effective in yielding total revenue requirements;
- Rates should support revenue and cash flow stability on a year over year basis;
- Specific rates should be stable and unexpected changes that are seriously adverse to customers should be avoided or minimized to prevent "rate shock;"
- Rates should fairly apportion cost of service among different customers;
- Rates should avoid "undue discrimination;" and
- Rates should promote efficient use of energy and competing services and products.[4]

Q. Is the Company's statement of justification for its increase in fixed customer charges adequate and reasonable?

A. The Company's justification for its residential and general service rate design is not adequate or reasonable. First, the Company appears to confuse fixed costs and sunk costs. Sunk costs do not vary with levels of usage; they are, by definition, not subject to change with usage of the associated asset. Once the money is spent to install a conductor of a certain size, that investment is fixed no matter how much, or how little, electricity is carried over it. Sunk costs are historical, or embedded. But given that usage of almost every asset impacts its useful life and the ultimate replacement costs for that asset, very few fixed cost investments involve truly sunk costs from a system perspective.

Fixed costs are costs, like sunk costs, that *tend* not to vary with level of use over the short term. Over the long term, fixed costs do change with the level of use. An increasing number of utilities are also recognizing, with so-called Non-Wires or Non-Transmission

[4] James Bonbright, "Principles of Public Utility Rates," available at: http://media.terry.uga.edu/documents/exec_ed/bonbright/principles_of_public_utility_rates.pdf.

Alternatives projects, that some future fixed costs can be cost-effectively deferred or avoided in the mid- and short-term as well.

In the past, electric utilities did not worry about over-forecasting load and incurring excessive fixed distribution costs. If the system was overbuilt, year-over-year growth in energy sales quickly caught up with any over-building. As Warren Buffet commented in a letter to Berkshire Hathaway investors, "[h]istorically, the survival of a local electric company did not depend on its efficiency. In fact, a 'sloppy' operation could do just fine financially." [5]

In recent years, utilities have experienced decreasing sales growth, flat sales, and even negative sales growth. At the same time, loads have become peakier, and load factors have declined. Peakier system loads can be addressed in three ways:

(1) aggressively pursuing peak reduction programs for all customers,

(2) spending more on the system to meet peaks safely and reliably, and/or

(3) implementing rate structures that immunize the utility from the consequences of increased fixed cost investment through non-bypassable rates that ensure utility revenues remain constant regardless of customer usage.

The Company's residential rate proposals focus on the rate design approach, with the likely result that they will have to spend even more money than necessary on distribution system infrastructure.

[5] Warren Buffet, Chairman's Letter, Berkshire Hathaway 2015 Annual Report, available at: http://www.berkshirehathaway.com/2015ar/2015ar.pdf.

It is understandable that the Company would try to fix a larger portion of its revenues collected from customers, but it is not reasonable. If a utility company forecasts greater load than it ends up experiencing, it will have an overbuilt system and face a situation where sunk fixed costs are potentially stranded—not subject to recovery under current rates. The economically efficient solution is good price signals that do not undermine the economics of demand response and energy efficiency, better forecasting, and a smarter grid that leverages the potential benefits of all manner of distributed energy resources. As explained later in the section discussing impacts on energy efficiency and distributed generation, the Company residential and general service rate proposal not only constitutes the bad choice, it frustrates the good ones.

For example, if the utility forecasts that load on a particular feeder will be heavy, it may install a larger, more expensive transformer. The money spent on that transformer typically will become a historic or sunk cost. Since the money is for a transformer, the costs typically will be treated as a fixed cost, and allocated accordingly. If load does not match the forecast, the utility will face problems recovering the cost of the too-large transformer through volumetric rates. Of course, if the utility is guaranteed recovery of the costs through fixed charges, it will have no incentive to improve the accuracy of its forecasts. Importantly, the size of the *next* transformer and associated cost is a fixed cost that can be impacted by customer load *in the future*. Energy efficiency, demand response, and other factors can reduce the fixed cost requirements in the future, and perhaps even allow for the installation of smaller replacement equipment. These measures can also extend the useful life of the installed fixed cost assets. For these reasons, the price signal impacts of rate design can and do impact fixed costs on a going forward basis, as preferred in 199 IAC 20.10.

Second, even if demand and customer connection costs are the primary drivers of distribution costs, this does not compel or even justify the allocation of distribution-related fixed costs to a customer charge. The Company offers no evidence to support the leap of logic that distribution costs should be collected as a customer cost, i.e. in the category of costs that varies primarily and directly with the number of customers.

Third, it is widely accepted—and a strong justification for grid modernization investments—that customers can reduce the requirement for expensive infrastructure investments by reducing their usage during particular times of the day. These reductions arise because of reduction in system loading, which in turn reduces the need for costly system upgrades, reduces wear and tear (temperature-related degradation), and results in capital cost deferrals related to replacement. Higher volumetric charges for on-peak usage can support demand response programs and energy storage deployment with similar results.

Q. Did the Company evaluate how customer demand would or might change in response to changes in rates?

A. No. The Company states that it has not performed any analysis of the impact of the proposed increased customer charge on customer investments, past and future, in energy efficiency, demand response, and distributed generation. (IPL Response to EI DR 34, attached as Ex. KR-13.) The Company has not produced a detailed bill impact analysis by consumption level. (IPL Response to EI DR 35, attached as Ex. KR-14.) The Company does not have customer usage information by household income for residential customers. (IPL Response to EI DR 40, attached as Ex. KR-15.) These admissions establish that the Company lacks a foundation on which to assert that its proposed rate design is just and reasonable, especially in light of an approach that relied more on volumetric charges for revenue recovery.

Q. Is the Company's proposed rate design justified as a mechanism to remedy unfairness in existing rate design?

A. No. No unfairness in existing rate design has been demonstrated or substantiated in the record in this case. The Company implies, but does not assert that existing residential and general service rate design currently reflects improper intra-class subsidies. (Vognsen at 14) The rate design proposed has not been demonstrated to be fairer than existing rate design. Indeed, at the heart of the proposed rate redesign is an effort that fails to properly recognize that customers with different usage patterns impose differing costs on the system. (Ex. KR-11) The Company has made no showing that the proposed rate redesign and resulting cost shifts to low users and low-income customers is fairer than the status quo or any other rate design alternative. There is no evidence that economic efficiency or fairness is increased by conflating demand-related fixed costs with the costs related to connecting a residential customer.

Q. Is the inclusion of distribution-related fixed costs *not* directly caused by the addition of new customers to the system (cost to connect) consistent with long-established principles of electric utility regulation and ratemaking?

A. No. For example, Bonbright defines the fixed customer charge on pages 347-349 as follows:

> *These are those operating and capital costs found to vary with the number of customers regardless, or almost regardless, of power consumption. Included as a minimum are costs of metering and billing along with whatever other expenses*

the company must incur in taking on another consumer.[6]

Simply stated, Bonbright's definition ensures that the charge for the customer connection to the grid is limited to the cost of connecting the customer to the grid. Adhering to this principle advances other rate making principles such as equity and cost-causation, because it preserves the power of volumetric charges as a price signal. Residential customers can see a direct correlation, both positive and negative, between their level of usage and their contributions to cost creation when energy- and demand-related costs are recovered through these volumetric charges. Allocating demand-related costs to the fixed customer charge eliminates, or at least severely weakens, the price signal impact.

Q. Are established practices for setting the customer charge better and fairer?

A. Yes. Best practices assign to the customer cost category only those costs that directly vary with the number of customers. Again, these costs would include a portion of the meter, service drop, meter reading, billing, and collection costs.

Q. How much cost does a new customer cause?

A. Costs directly related to new customers include a portion, but not all, of the cost of a meter, billing and metering services, and collection costs. These costs would likely sum to about $5-$10 per customer per month, depending on local costs, billing period used, and other factors.[7] New customers do not add all the costs that the Company proposes to assign to the customer component when those customers take service from the Company.

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[6] James Bonbright, "Principles of Public Utility Rates," available at: http://media.terry.uga.edu/documents/exec_ed/bonbright/principles_of_public_utility_rates.pdf.

[7] See Lazar & Gonzalez, "Smart Rate Design for a Smart Future," Regulatory Assistance Project (July 2015), at Appendix D. Available at: http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-gonzalez-smart-rate-design-july2015.pdf.

Q. Does limiting the customer charge to costs caused by new customer connections properly address fixed costs already incurred to build the distribution system that the customer connects to?

A. Yes. The volumetric charge can fully recover those sunk fixed costs, preserve cost-causation features, and send more rational price signals to residential customers. As stated by utility economist Severin Borenstein:

> *[T]he mere existence of systemwide fixed costs doesn't justify fixed charges. We should get marginal prices right, including the externalities associated with electricity production. We should use fixed charges to cover customer-specific fixed costs. Beyond that, we should think hard about balancing economic efficiency versus fairness when we use additional fixed charges to help address revenue shortfalls.*[8]

Q. Is the Company's approach the only one that it could have used to design residential charges?

A. No. Other methods are appropriate, and, in light of the unjust discrimination and economic inefficiency that results from the Company proposal and the existence of other reasonable approaches, the Company proposal is unreasonable. I will discuss these impacts and alternatives in more detail.

Q. In summary, does the Company's proposal to disproportionately increase fixed customer charges constitute sound economics, regulation, and policy?

A. No. Peter Kind, known as the author of the Edison Electric Institute's "Disruptive Challenges" paper, recognized in a paper published in November of 2015 that "many

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[8] Borenstein, "What's So Great about Fixed Charges," Nov. 3, 2014 blog post, available at: https://energyathaas.wordpress.com/2014/11/03/whats-so-great-about-fixed-charges/.

utilities have been seeking to increase fixed charges, while customers and policymakers are vehemently opposed to such action. An evolved approach would focus on common ground with win4 (i.e. beneficial to customers, policy, competitive providers, and utilities) perspective."[9] As Kind further explained:

> *Adopting meaningful monthly fixed or demand charges system-wide will reduce financial risk for utility revenue collections for the immediate future, but this approach has several flaws that need to be considered when assessing alternatives through a win4 lens, by which all principal stakeholders benefit. Fixed charges:*
>
> - *do not promote efficiency of energy resource demand and capital investment;*
> - *reduce customer control over energy costs;*
> - *have a negative impact on low- or fixed-income customers; and*
> - *impact all customers when select customers adopt [distributed energy resources] and potentially exit the system altogether, if high fixed charges are approved and the utility's cost of service increases.*[10]

The Company's proposed fixed per-customer charge proposal is bad for customers, policy, competitive providers, and even itself. As a recent report published by Consumers Union details, fixed charge proposals like the one put forth by the Company in this case harm customers in several ways, violate fundamental principles of rate design, are unsupported by sound argument, and are inconsistent with regulatory trends around the

[9] Peter Kind, "Pathway to a 21st Century Utility," CERES (Nov. 9, 2015), at p. 12.
[10] *Id.* at 30.

country.[11]

Q. Did the Company address these issues to ensure that the impacts of the proposed rate redesign would be just and reasonable?

A. The Company did not conduct any analysis or provide any evidence of consideration of the issues associated with the impacts of its proposed rate redesign on low use and low income customers. (IPL Response to EI DR 34 and EI DR 37, attached as Exhibit KR-13 and Exhibit KR-16.) Given the regressive impacts of the Company's proposal, the failure to consider these impacts is neither just nor reasonable.

Q. Did the Company provide any assessment of the number of low income customers that it serves?

A. No. The Company did not evaluate the impact of its proposed rate changes on low-income customers, although the disproportionate proposed increase to fixed customer charges would have a greater impact on low-income customers than more affluent customers. (IPL Response to EI DR 40, attached as Ex. KR-15.) According to Company witness Iano, about 200,000 of the Company's residential customers have household incomes below the Iowa median household income of $50,000. About 100,000 residential customers have household income below $25,000 per year. To address low income customer problems, the Company does propose an arrearage management program for some customers who have accrued past-due bills. The program creates a level-payment option with an opportunity for arrearage forgiveness. The Company believes that 953 customers would qualify for the pilot arrearage program and that enrollment would reach

[11] M. Whited, T. Woolf, J. Daniel, "Caught in a Fix: The Problem with Fixed Charges for Electricity," prepared for Consumers Union (Feb. 9, 2016), available at: http://www.synapse-energy.com/sites/default/files/Caught-in-a-Fix.pdf (submitted as workpaper).

between 95 and 238 of these customers.

Q. How does increasing fixed customer charges specifically impact customer investment in energy efficiency and conservation?

A. Increases in fixed customer charges create powerful price signals *against* investment in energy efficiency.

Q. Did the Company consider the impact of its proposed increase in the fixed customer charge on energy efficiency, conservation, and renewables?

A. No. (Ex. KR-13)

Q. Why should the IUB be concerned about approving a rate design that is detrimental to energy efficiency, conservation, and renewables?

A. Energy efficiency, conservation, and renewables offer many benefits to the people and State of Iowa. These benefits include resource diversification, grid resiliency, future cost reductions associated with increased volume of deployment (economies of scale), job creation, system-wide cost reductions, and leveraging of non-utility investment dollars, among others.

Q. How do energy efficiency and conservation, in particular, produce these benefits?

A. Energy efficiency and conservation generate benefits to the utility, ratepayers, and society in general in many ways, including lower cost than traditional generation and infrastructure investments, downward pressure on rates over the mid- and long-term, persistent and consistent savings, nearly endless resource potential due to economies of manufacturing scale and technological innovation, broad availability to all classes of customers, and significant externalized benefits often not accounted for in ratemaking.

Q. Can affected customers avoid fixed charges with more efficient energy use under the Company's proposal?

A. No. The proposed increase in fixed charges cannot be avoided by customers through reductions in energy use. The proposed increase in the fixed customer charge also makes it somewhat more difficult for the average residential customer to offset the bill increases with energy efficiency investments.

Q. Do these proposed changes impact customers who plan to invest in energy efficiency improvements?

A. Yes. Fixed charges are "unavoidable" and reduce the marginal value and the ultimate bill value to those customers who plan to take action to reduce their energy consumption. These changes will also have a chilling impact on customers who are contemplating such energy efficiency investments.

Q. How do higher fixed charges impact prior customer investments in energy efficiency?

A. Allocation of costs to fixed, non-bypassable charges imposes an extraordinary burden and destroys investment-backed savings expectations on energy users who have made significant prior investments in order to lower their bills. Customers and communities that invested in weatherization, equipment improvements, and building remodeling did so both to save money at the then-existing rates as well as to reduce exposure to future rate increases.

By breaking with best practices that have been long considered settled matters, the increased fixed charge is like a regulatory taking. Customers who have made good faith investments in greater efficiency based on established rates and ratemaking practices would experience significant and unfair bill increases under the Company's proposal.

The Company's proposal sends a price signal that customers who invested to reduce their use and the need for capital investments in the distribution system will be punished with charges that they can't even try to avoid. This is irreversible damage to the customers that could be avoided without harm to the Company by simply allocating the revenues associated with the fixed charge increase to volumetric rates.

Q. What is the ultimate impact of reduced energy efficiency, conservation, and development of renewable energy?

A. Inefficient use in society means uneconomically high levels of energy consumption. These in turn lead to more expensive infrastructure. The Company indicates that it has seen a relatively high correlation between high energy use and demand. (IPL Response to EI DR 15, attached as Ex. KR-17.) The costs of these infrastructure investments are levied on consumers and raise their rates. Following the Company's logic in this rate application, a significant share of these costs would be allocated to fixed charges, creating higher non-bypassable charges. And so on. The Company proposal seems likely to start and accelerate a death spiral of electric service unaffordability.

Q. Do IUB-approved rates have any potential impact, like price signals, on the Company?

A. Yes. Tariffed rates are a form of contractual relationship between a utility and its customers. As a result, rates induce behavioral responses by both parties. The proposal to disproportionately allocate distribution-related costs to the fixed customer charge will insulate the Company from the impact of variable and declining retail sales to residential customers resulting from the adoption of distributed energy resources such as energy efficiency and distributed generation. Customers seek to reduce their bills. Monopolists seek to increase their rents.

Q. Is there something wrong with a utility trying to insulate themselves from the consequences of declining sales?

A. It is rational for a monopoly utility to try to use the tools of regulation, including rate design, to protect its shareholder profits. Fixed charges are an increasingly popular approach among monopoly utilities for immunizing themselves from market forces. However, as explained in this testimony, increasing fixed charges are uneconomic, discriminatory, anti-competitive, and therefore inconsistent with 199 IAC 20.10 guidance. Moreover, they send the wrong signal to utilities.

Q. What "price signal" do fixed charges communicate to utilities?

A. Fixed prices for monopoly services communicate to the utility that regardless of the utility's spending levels, operational efficiency, or choice of resources for meeting load, they can pass costs on to customers that cannot be avoided by reductions or efficiency in use by those customers.

Q. What result would you expect from allowing a monopoly electric utility to use fixed charges to recover fixed cost investments?

A. In a competitive market, a service provider would meet customer efforts to reduce and increase control over service bills with service innovations, operational efficiency, and price reductions. The logical result of using rate design to insulate a monopoly from market forces that would otherwise drive such benefits is that the monopoly will resist innovation and increase prices. Higher fixed charges today could result in higher costs for all customers in the future.

III. COMPANY PROPOSAL TO CREATE NEW CUSTOMER CLASSES FOR DG CUSTOMERS

Q. What is the Company's proposal to create new customer classes for residential and general service DG customers?

A. In a highly unusual proposal, the Company proposes two new rate classes for what it calls "supplementary" or "partial-requirements" residential and general service customers. While the Company uses a generic term, the proposed rate is limited to customers who reduce their energy use through investment in and operation of distributed generation. What is unusual is that the Company proposes the new customer classes as part of its cost of service study ("COSS") included in this proceeding, but does not propose corresponding new tariffs for the IUB's consideration. What the Company does is create a new set of hypothetical costs within the framework of its COSS, and then blends those artificial costs into the overall residential rate proposal. (IPL Response to EI DR 39, attached as Ex. KR-18.)

Q. What else is unusual about the Company's proposed DG customer classes?

A. The Company proposal for new customer classes is completely out-of-sync with the process established by the IUB through its thoughtful and deliberate NOI-2014-0001 process. In its order issued on May 4, 2017, the Board approved the Company's compliance tariff filed as TF-2016-0321, launching a three-year net metering pilot and associated tariff, and requiring the gathering and submission of data relating to customer-owned DG facilities. The Company proposal to create new customer classes for DG customers is technically and substantively premature, and appears intended to circumvent the Board's explicit desire to base any rate changes for DG customers on actual and substantial data. The new proposed rate classes are a significant deviation from the Company's prior rate class change proposals, which have primarily involved the creation of new classes for very large use customers with relatively unique load characteristics, or the elimination of small use customer classes to consolidate rates for customers with relatively similar load characteristics. (IPL Response to EI DR 67, attached as Exhibit KR-19.)

Q. What relevant guidance and direction has the Board provided in Docket No. NOI-2014-0001 and related proceedings?

A. The Board's process regarding rates and tariffs relating to customer generation has been deliberate, responsible, and reasonable. The Board has wisely committed to a process of data-driven rate design. Practical experience and empirical data gained from the monitoring and measurement of the performance of actual DG installations resulting from ordinary market behavior and carefully structured pilot programs should be the foundation of any changes to rate making treatment of DG customers, including the foundational cost of service study development process. As I commented to the Board on Mar. 18, 2016, there are good reasons for this commitment to a data-driven approach:

> *These are data-driven issues. These are issues associated with actual measured costs and impacts, analysis of maximum demands, coincident and non-coincident peaks, and cost and benefit analysis, cost-causation, and fair cost allocation – all before you get to rate design. There are good reasons that we in the regulatory business amass so much data and experience and conduct so much analysis before we try to implement new rates. There are good reasons why we seek much real-world experience, at statistically significant levels, before we adopt or even pilot new rate structures. Those reasons include the very real risk of unintended and undesired consequences that attend to the promulgation of tariffed rates. Rates must be as fair as we can make them, as stable as we can make them, as clear as we can make them, and as economically efficient as we can make them. Badly done rates can be mere vehicles for the extraction of monopoly economic rates. They can kill a vital young industry or technology, and violate public policy goals associated with advancing those industries and technologies.*

The Board agreed with Staff that future changes to net metering policy should be implemented through a rule making and should be done once data are collected either through pilot projects or a study, and have been reviewed and analyzed. (NOI-2014-0001, Gold Memo Recommendation Regarding Net Metering at 22 (filed Oct. 30, 2015)

Recognizing that Iowa has very small numbers of distributed generators installed, the Board made it clear in Orders issued in Docket No. 2014-0001 on October 30, 2015, and July 19, 2016, that three-year pilot programs and tariffs were the appropriate vehicle for developing the data sets and understanding necessary to determine the appropriate rate making treatment for DG customers, and whether any changes to the net metering model in Iowa was appropriate.

Q. How does the Company's proposal to create new rate classes for residential and general service DG customers square with the decisions and direction from the Board?

A. The utilities' proposals to create a new rate class for customer-generators are premature. The Companies' proposals lack an adequate foundation in policy and data; they are not supported by the Board's Orders, the data, or the current record. Additional information is required before a permanent change in the COSS is made. The creation of new rate classes in the COSS, even if for "informational purposes" (IPL Response to EI DR 68, attached as Ex. KR-20), is unreasonable.

Q. How many DG customers does the Company serve?

A. The Company asserts that it has experienced "substantial growth in the amount of behind-the-meter generation" since its last litigated rate case. (Vognsen at 49) This assertion is specious and misleading. While the growth in DG customers has been quantitatively substantial as a percentage of growth from a very small number of installations, it does not appear to be sufficiently significant so as to justify new rate classes. That is, regardless of the historical growth *rate* in customer DG, the data submitted by the Company is that it serves 1,143 residential DG customers out of 397,521 residential customers, and that it serves 909 general service DG customers out of

82,111 total general service customers. (Vognsen at Sched. M) This means that the Company is proposing new rate classes in its COSS for DG customers that amount to less than 3/10th of 1 percent of total residential customers and about ¼ of 1 percent of total residential sales; and slightly more than 1% of general service customers and less than 2% of general service sales. (Vognsen at Sched. K) Creating new customer classes for such a tiny fraction of the customers and load served associated with customer-owned generation is administratively inefficient, statistically dubious, and ultimately unjustified. Moreover, the Company committed serious errors in its COSS method used to create the costs that it would assign to the DG classes.

Q. What errors appear in the Company's COSS method used for DG customer classes?

A. While I did not have sufficient time to review every aspect of the COSS submitted by the Company, I would point out five errors that are both substantial and significant.

- First, the Company allocates large amounts of costs (including generation, transmission, and distribution costs) based on the application of a non-coincident peak ("NCP") allocator. (Vognsen Sched. K) As demonstrated in witness Vognsen's workpapers, the Company finds that residential DG customers have a class NCP that occurs on January 17, at 8 pm. The residential customer class has an NCP that occurs on July 21, at 6 pm. (Vognsen at WP-K11a, K11b) The Company COSS reliance on the Average and Excess Demand ("AED") allocator and substantially similar NCP allocators for such a vastly different time of peak therefore assigns costs to the proposed residential DG class as if those customers were all physically located on a single island served by a single electric system. In reality, these customers are likely widely distributed throughout the residential customer geographic footprint, and rather than creating separate peak costs, are likely creating valuable load diversity that improves the utilization factor for the entire system. According to the Company COSS data, the average residential DG load at the residential class peak (which also happens to be the system peak in July) is 1.37 kW. The average residential DG load at the DG peak is 3.29 kW. The Company uses the higher number for its AED generation allocator and for the transmission and distribution NCP allocators. As a result, the load attributed to these DG customers is 2.33 times their contributions to class peak. Assigning costs to residential DG customers as if they were creating new costs and ignoring the load diversity they bring to the system inflates the sum of residential costs proposed for recovery by the Company and is not justified by principles of cost causation.

- These problems are a direct result of the Company's rubber stamp approach to using allocation methodologies applied to the residential class as a whole for a subset of geographically diverse residential customers who happen to reduce their consumption with distributed generation. (IPL Response to EI DR 38, attached as Ex. KR-21.)
- A second obvious problem is the failure of the Company to distinguish in the assignment of line losses to customers with DG. (Vognsen WP-K11c) Because DG operates to reduce electricity load at times closely coincident to class peak periods (solar output increases a sunshine creates the need for air conditioning), and because line losses increase as demand increases, customer classes for DG customers should reflect reduced line losses for DG customers. This is especially the case for residential DG customers whose NCP occurs in January.

- The third major problem with the Company's proposed DG customer classes is the decision to dramatically inflate the costs associated with metering for these customers. According to Company work papers (Vognsen WP-K6, K7), the Company assumed that all residential DG customers would require meters that cost $352.09, almost three times the cost of an ordinary residential meter. For general service customers, the Company assumes that DG customers require the most expensive "Triple Rate Register, Time of Day Polyphase Watthour" meter.
- Fourth, the Company proposal to create new classes of customers based on their installation and operation of DG appears to selectively discriminate against these customers as compared to any other customers who significantly reduce their energy use through installation of other energy technologies such as highly efficient air conditioning equipment. While the Company asserts that it is the differing load characteristics of partial requirements customers that justifies the new proposed rate classes (Vognsen at 49), the Company states that it has no meter-based data on the differences in load characteristics of other kinds of customers, such as between urban and rural customers, single-family and multi-family customers, and customers with refrigerated air conditioning systems and those without. (IPL Response to EI DR 65, attached as Ex. KR-11.) Singling out DG customers for separate treatment in the COSS is therefore unfairly discriminatory.
- Fifth, the Company has created the costs it would assign to DG customers from COSS data. The Company has provided no independent evaluation of what it costs to serve customers who install and operate DG systems. The example of the category error in the use of the DG customer NCP is one example. In addition, the Company

considers any evaluation of the benefits and avoided costs relating to DG installation and operation to be beyond the scope of this proceeding. (IPL Response to EI DR 44 and EI DR 60, attached as Exhibit KR-22 and Exhibit KR-23.) This position is at odds with the Company's assertions that it seeks to address the "cost shifting" that it assumes to exist between DG and non-DG customers. (IPL Response to EI DR 66, attached as Exhibit KR-24.)

Q. What steps should the Company have taken before proposing to create new customer classes, even if only in the COSS?

A. First, the Company should assess its proposal in light of the provisions of 199 IAC 20.10. Second, the Company should address how its proposal is consistent with Board guidance developed and issued in conjunction with Board Docket NOI-2014-0001 and subsequent proceedings. Third, the Company should account for the actual cost to serve DG customers through careful evaluation of the actual cost and avoided cost impacts associated with DG. This must include a fresh look at cost identification and characterization, cost allocation, and rate design. Fourth, the Company should disclose its analysis of DG costs and benefits to the Board and interested stakeholders for evaluation and examination in an open proceeding on the record. Finally, the Company should extensively model the impacts of any proposed new rate class, cost of service methods, and rates in order to evaluate and allow other parties to evaluate whether the proposed class treatment advances economic efficiency and is in the public interest.

Q. Did you find evidence of this kind of rigorous and fair process in the Company's proposal to create new customer classes for DG customers in the record in this proceeding?

A. No. The Company has not produced persuasive evidence and analysis to support its proposal.

Q. How does the Company justify its proposal to create new customer classes?

A. The Company asserts that it is establishing the new customer classes in its COSS in order to "begin the process of addressing the undue cost shifting to full requirements customers that would otherwise result as depicted in IPL Exhibit Vognsen Direct Schedule K." (IPL Response to EI DR 66, attached as Ex. KR-24.) In light of the errors identified by a quick review of the Company COSS, the existence of cost shifting between DG and non-DG customers has not been empirically demonstrated and a proposal for new rate classes is therefore unreasonable. Moreover, the Company has the process exactly backwards. Establishing new rate classes is the last step in addressing substantial and significant differences in cost-causation and usage between customers within a single class. The process should begin with honest evaluation of the actual costs associated with a statistically significant number of customers with identified usage similarities. The net metering pilots may create the data necessary to start that evaluation; it has not been credibly presented in this case.

Q. What do you conclude about the Company proposal to create new customer classes for residential and general service DG customers in this proceeding?

A. The Company proposal to create new customer classes for residential and general service DG customers is premature, deeply flawed, and not based on solid evidence of cost causation. Given lack of underlying data and the errors that I have identified, the new rate classes for DG customers proposed by the Company are not properly cost-based, are not adequately grounded in data and analysis, are inconsistent with Board policy, and are inconsistent with Iowa state policy as expressed in Iowa Code § 476.41.

IV. COMPANY PLANS REGARDING GRID MODERNIZATION

Q. What are the Company's plans regarding grid modernization?

A. Company witness McGovern generally describes a range of activities and investments that the Company is planning or initiating under the category of grid modernization. These activities involve foundational efforts that, if tied to a dynamic vision of an interactive grid, properly executed, and strongly focused on customer engagement, could become a comprehensive plan for a modern electric grid system that delivers reduced costs, increased reliability, and efficient markets for energy products and services. As proposed, the Company grid modernization efforts are primarily preparatory, and if executed as described would put the Company in a position to prepare to develop a full grid modernization strategy. Many other utilities across the United States are already moving ahead rapidly on such grid modernization strategies and efforts.

Q. In your opinion, what else should the Company grid modernization planning address?

A. Notably absent in the Company's discussion of grid modernization is any discussion of distribution automation and distribution management systems—technologies and systems that improve system visibility and responsiveness to outage or reliability events. Second, the Company does not address distributed energy storage at all. (IPL Response to EI DR 62, attached as Ex. KR-25.) Finally, the Company does not discuss how it will leverage the technological and customer engagement capabilities of advanced metering infrastructure ("AMI"). These gaps seem to result from a failure to adopt a comprehensive approach to grid modernization that includes full assessment of distributed energy resources.

Q. What kind of energy storage initiatives are appropriate in support of a sound grid modernization agenda?

A. The energy storage component of the Company's grid modernization plan should include several components. First, the Company should conduct or collaborate in a resource assessment and characterization study to under both the capabilities and costs of various energy storage technologies, but also the opportunities for demonstrations, pilots, deployment programs, and ultimately new rate designs. The State of Massachusetts' Energy Storage Initiative serves as an excellent example of a comprehensive state-level approach, and has produced an outstanding study called "State of Charge."[12] Second, the

[12] Massachusetts Executive Office of Energy and Environmental Affairs, Energy Storage Initiative. Web site at: http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/energy-storage-initiative/

Company should establish separate but coordinated research agendas focusing on mobile storage (electric vehicles and trailer-mounted storage), stationary behind the meter storage located on customer premises, stationary community storage models, and stationary utility grid-support storage. These agendas should embrace the wide range of energy storage technologies available. Third, the Company should evaluate the full range of costs and benefits of these various storage technologies over the life of the storage systems. Fourth, the Company should develop and launch demonstration and pilot projects to validate assumptions, gain experience, and create meaningful new market opportunities for storage technology and service providers. Finally, the Company should develop and propose rates and tariffs applicable to non-utility storage technology operations.

Q. How do the Company's grid modernization efforts impact DG opportunities in its service territories?

A. The Company is primarily studying and monitoring, and reviewing potential rules and procedures relating to integration of DG. Given the tiny number of DG systems in place in the Company's service territory, this is understandable, but is hardly consistent with progress made on DG integration in other parts of the United States. The Company approach to DG in the context of grid modernization is to view DG as a problem or set of problems to be avoided or solved. The Company evidences no real appreciation of the potential for DG and other distributed energy resources ("DER") to serve as cost-effective resource alternatives to more costly central station generation investments or transmission or distribution infrastructure. Notwithstanding extensive and growing experience with so-called “non-wires” or “non-transmission” alternatives to conventional investments, the Company has yet to identify any potential opportunities to defer or avoid capital investments through the deployment and operation of DG and DER.

Q. Given what the Company understands about the operation and impacts of DG and other DER, especially as it relates to system operational and infrastructure costs, what do the Company’s grid modernization plans say about its proposals to increase the fixed customer charge and create new COSS classes for DG customers?

A. Given how much the Company still needs to learn about the operational and cost impacts of higher penetrations of DG and other DER, the Company’s proposals to increase fixed customer charges and create new customer classes for DG customers are premature and based on inadequate understanding of critical cost and operational issues. The Company needs a great deal more experience with grid modernization before it should presume to characterize the costs and potential benefits of DG.

Q. What other gaps exist in the Company’s proposed grid modernization efforts?

A. A major shortcoming in the Company’s description of its proposed and on-going grid modernization efforts is any focus on customers and their engagement with an interactive, dynamic, information-rich electric grid that offers an increasing range of services and products to ensure energy service quality and affordability. While the Company describes a range of investments and studies it plans to undertake for itself, it offers no real discussion of how it plans to educate and engage customers in a modernized electric grid offering an increasingly diverse array of products and services.

The Company's utility-facing perspective and lack of customer-facing orientation is not surprising, but it is disappointing. The great potential of grid modernization is more intelligent and efficient operation and use of the grid and associated resources, and customers have a major role to play in realizing the savings associated with that efficiency. The process of building customer awareness and engagement will take time, and is already the focus of grid modernization efforts at many other electric utilities. The lack of customer focus casts a shadow on the merits of the Company's proposal to offer a demand charge rate pilot program.

V. COMPANY PROPOSAL TO CONDUCT A DEMAND CHARGE RATE PILOT

Q. What is the Company's proposal to conduct a demand charge rate pilot for residential and general service customers?

A. The Company proposes to offer an optional demand rate pilot for residential and general service customers. The proposed rates includes a customer charge discount as an inducement for participation (IPL Response to EI DR 25 and EI DR 51, attached as Exhibit KR-26 and Exhibit KR-27), and the overall rate is designed to achieve bill parity for residential customers with non-coincident load factors of 35% summer and 30% winter, and 40% load factors for general service customers, based on each customer's maximum hourly load in the month. (Vognsen at 19) It is not clear what assumptions the Company is making about on-peak and off-peak demand levels that participating customers must have to generate bill savings over current rates, and the calculations submitted by the Company for the "Small Demand Rate Development" for residential and general service customers do not inform these assumptions or whether the break-even targets of 35% and 30% used in designing the rates were based on any customer load analysis. (Vognsen Revised Sched. E, F) The Company proposes to limit the number of monthly sign-ups, but does not propose an overall cap on the pilot program enrollment. (Vognsen at 20) The Company offers little additional detail about the structure of the pilot program or its potential impacts on participating customers.

Q. What are your concerns with the demand rate pilots for residential and general service customers?

A. While it is intellectually interesting to learn whether there are residential and general service customers who would prefer a demand charge rate over their current rate, the proposal to offer the pilot rates is premature and not well-developed, and would not generate valuable information for the costs involved.

Q. What are your specific concerns about the proposed demand rate pilots?

A. My specific concerns include:

- The charge for billing demand "each month shall be the sum of the highest hourly demand during on-peak hours of the current month plus 50% of the amount by which the highest hourly demand during off-peak hours exceeds the highest on-peak demand." (Company TF-2017-0034 at Original Sheet 21.1) The lack of real time demand information will make it difficult for customers to manage their load against this pricing regime.
- The demand rate pilot uses on-peak hours that are extremely broad in temporal scope and potentially confusing and hard to remember. Peak hours are more than half of

each day, Monday through Friday, and run from 7 a.m. to 8 p.m. in standard time and from 8 a.m. to 9 p.m. during daylight savings time. The long peak hours mean that customers can reduce their billing demand by shifting and leveling load within the peak period, but this would not necessarily reduce the Company's costs. (Company TF2017-0034 at Original Sheet 21.1)

- The Company has not developed any metrics against which to evaluate the pilot rates. As a result, it does not know what its objectives are or how it will measure success. (IPL Response to EI DR 23 and EI DR 49, attached as Exhibit KR-28 and Exhibit KR-29.)
- The Company has not developed customer education or bill evaluation tools. (IPL Response to EI DR 19, 20, and 45, Attached as Exhibits KR-30, KR-31, and KR-32.)
- The Company does not plan to provide real time demand information to customers through any kind of behind-the-meter display devices or other customer communication channels. (IPL Response to EI DR 17, 18, 21, 45, and 46, attached as Exhibits KR-33, KR-34, KR-35, KR-32, and KR-36.)
- The Company has no plans to deploy or offer any real time customer control options for appliances or other high demand loads at their premises. (IPL Response to EI DR 21 and EI DR 47, attached as Exhibit KR-35 and Exhibit KR-37.)
- The Company offers no information on how it will engage with third-party service providers who might facilitate customer participation in the demand rate pilots. (IPL Response to EI DR 24, attached as Ex. KR-38.)
- The Company has not detailed all the terms of participation in the pilot rate programs, including how the one year minimum participation term operates, termination rights,

hold-harmless provisions, and other features of a pilot rate.

- The Company provided no evidence about the potential pilot rate program uptake or potential customer demographics. The Company offers a time of day rate that appears to be used by some 15,000 residential customers. (Vognsen Sched. C) A reasonable path to development of a demand rate pilot would involve careful analysis of the experience of those customers, something that the Company does not appear to have done. (IPL Response to EI DR 16, attached as Ex. KR-39.)
- The Company provided no proposal for targeting and engaging low- and moderate-income customers who could save on their customer bills through the pilot rate.

Q. Based on your review of the proposed demand rate pilots, what do you conclude?

A. The Company's proposed demand rate pilot may be new to the Company, but it has been tried in many places already. As witness Chernick points out, there is little to commend a legacy demand charge rate, even as a pilot program. The Company proposal is also inadequate in terms of program metrics, customer tools for assessing the potential benefits of the rate, and importantly, in customer tools for management of load and bills. Correcting these deficiencies would not rehabilitate the basic flaws in the Company's proposed rate design, but should be kept in mind for future pilot rates.

VI. CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize your conclusions based on your review of the Company's proposals.

A. I reviewed the Company's proposals in four areas, including the proposal for increases in the fixed customer charge for residential and general service customers, the proposal to create new customer classes in the COSS for residential and general service DG customers, the proposal to carry out various grid modernization activities, and the proposal to offer a voluntary demand rate pilot program for residential and general service customers.

Q. What are your recommendations based on your findings and these conclusions?

A. I recommend that:

- The IUB should reject the Company's proposal to increase the customer charge in this proceeding, and direct the Company to submit revised tariffs that allocate any authorized revenue recovery proposed for the fixed customer charge to residential and general service volumetric per-kWh charges instead.
- The IUB should direct the Company to review and revise its cost of service methodology to allocate to the customer charge only those costs that vary directly with customer count, and to ensure that demand- and energy-related costs are allocated only to the volumetric per-kWh charge.
- The IUB should reject the Company proposal to create new customer classes for residential and general service customers as well as the cost of service approach underlying the proposal.
- The IUB should direct the Company to revise and expand its current approach to grid modernization which is focused on seeing distributed generation ("DG") as a problem to be solved and which largely ignores other distributed energy resources ("DER"), and instead take a much more comprehensive and holistic view of grid modernization

that embraces a grid model based on two-way flows of energy, the avoidance or deferral of capital investments as a result of DER market growth, and the empowerment of customers to reduce their energy bills through increased reliance on DER and active engagement with a truly modern electric grid. The outline of a plan for addressing energy storage has been provided in this testimony as an example.

- The IUB should reject the Company proposal to offer a residential and general service demand charge rate pilot and direct the Company to first establish a comprehensive program of customer education, customer engagement tools, and performance metrics for evaluation of the program. In addition, the IUB should direct the Company to establish a cost based justification for any customer charge discounts or other incentives associated with the pilot program.

Q. Does this conclude your testimony?

A. Yes.