STATE OF IOWA

BEFORE THE IOWA UTILIITIES BOARD

IN RE:	)	DOCKET NO. EEP-2018-0003
INTERSTATE POWER AND LIGHT COMPANY ENERGY EFFICIENCY FIVE-YEAR PLAN	)	REBUTTAL TESTIMONY

REBUTTAL TESTIMONY
OF
KERRI JOHANNSEN

On Behalf of

Environmental Law & Policy Center
Iowa Environmental Council

October 2, 2018

I. INTRODUCTION

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

A. My name is Kerri R. Johannsen. I am the Energy Program Director with the Iowa Environmental Council, located at 505 Fifth Ave, Suite 850, in Des Moines, Iowa. I appear here in my capacity as a witness on behalf of the Environmental Law and Policy Center and the Iowa Environmental Council (collectively "Environmental Intervenors").

Q. Please describe your background.

A. I have a Bachelor of Arts degree from Gustavus Adolphus College in St. Peter, Minnesota and a Masters in Public Policy in Science, Technology, and Environmental Policy from the Hubert Humphrey Institute of Public Affairs at the University of Minnesota in Minneapolis, Minnesota. I have been working in the energy policy arena since 2007. I have worked for the Iowa Environmental Council (IEC) since 2016. The Iowa Environmental Council is a 501(c)(3) non-profit, member-based corporation that works to advance public policies that provide a safe, healthy environment and sustainable future for all Iowans. In my capacity at IEC, I have worked primarily on renewable energy and energy efficiency cases before the Iowa Utilities Board ("Board") and renewable energy and energy efficiency legislation at the Iowa Legislature.

Between 2007 and 2008 I worked to develop the Energy Title of the 2008 Farm Bill as part of the U.S. Senate Agriculture Committee Staff. From 2008-2010 I was employed by the Iowa Office of Energy Independence first as an emergency management specialist and data analyst and later as administrator of the Iowa Power Fund, evaluating cutting-edge energy projects for state funding. Between 2010 and 2016, I worked as legislative

liaison and policy specialist with the Iowa Utilities Board. My work included leadership of the Environmental Plan and Budget dockets, serving as Co-Chair of the Board's environmental team during development and implementation of the Clean Power Plan, and managing all state legislative activities for the Board. I also served as the Board's representative and lead staff during emergencies and natural disasters impacting utility service and infrastructure and recovery from such disasters.

Q. Have you testified with the Iowa Utilities Board before?

A. Yes. I provided testimony regarding MidAmerican Energy Company's (MidAmerican's) Five-Year Energy Efficiency Plan proposal in Docket No. EEP-2018-0002, MidAmerican's Wind XII proposal in Docket No. RPU-2018-0003 and Interstate Power and Light's (IPL's) Beyond Solar program proposal in Docket Nos. AEP-2017-0060, TF-2017-0289, and RN-2017-0002. In addition, I have drafted or assisted in drafting our organization's comments and joint comments in various dockets before the IUB, including TF-2016-0290, TF-2016-0294, RMU-2016-0019, DRU-2017-0001, and DRU-2017-0002.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to give a brief overview of IPL's proposed five-year energy efficiency plan compared to IPL's current 2014-2018 plan and make a recommendation to restore in-person assessments as part of the new plan. I also recommend that the Board require IPL to develop and implement a pilot project utilizing solar energy as part of IPL's demand response program.

Q: How does IPL's energy efficiency plan for 2019-2023 differ from its current plan?

A: I want to note a few key differences between IPL's current and proposed plans. Environmental Intervenor witness Grevatt addresses the differences in more depth in his testimony. The proposed plan, over five years, will save 25% fewer kWh of electricity and 79% fewer therms of natural gas than the current plan. The plan also eliminates some of the most fundamental energy efficiency programs including:

- In-person energy assessments for residential customers;
- Most insulation rebates for both residential and non-residential customers;
- Several important non-residential prescriptive rebates, including build shell improvements, water heaters, and kitchen/food service equipment;
- The new home construction programs;
- The quality installation and HVAC System Adjustment and Verified Efficiency (SAVE) requirements that ensure proper installation of systems to maximize efficiency;
- The Home Energy Savers Program which provided enhanced cost-share for low-income customers to make energy efficiency improvements.

These are only a few of the programs that have been completely eliminated. The programs that remain have budgets significantly below what was spent in previous years.

Q: Are there critical programs that have been eliminated that could and should receive funding?

A: There are many programs that have provided significant benefits in the past and would fall within this category. However, Senate File (SF) 2311 requires that the utility's portfolio as a whole score above one on the Ratepayer Impact Measure (RIM) test. If this

requirement is not met, a provision allowing any customer to opt-out is triggered, which could significantly erode efficiency savings and be administratively burdensome to implement. It is difficult to provide specific recommendations for reallocating resources from one plan element to another without causing the RIM test results to fall below one. However, Iowa Code § 476.6(15) reads:

> Energy efficiency programs for qualified low-income persons and for tree planting programs, educational programs, and assessments of consumers' needs for information to make effective choices regarding energy use and energy efficiency need not be cost-effective and shall not be considered in determining cost-effectiveness of plans as a whole.

Educational programs are exempt from the cost-effectiveness tests. Residential and some commercial energy assessments, which have been eliminated in IPL's proposed plan, could be provided through the education program and funding shifted to these programs without impacting the RIM test result.

Q: Are there other limitations in SF 2311 that impact IPL's budget?

A: The Board has little or no ability to increase budgets beyond what is required in Iowa Code § 476.6(15)(e)(2) as amended by SF 2311:

> ....the board shall not require a gas utility to adopt an energy efficiency plan that results in projected cumulative average annual costs that exceed one and one-half percent of the gas utility's expected annual Iowa retail rate revenue from retail customers in the state, shall not require an electric utility to adopt an energy efficiency plan that results in projected cumulative average annual costs that exceed two percent of the electric utility's expected annual Iowa retail rate revenue from retail customers in the state...

Iowa Code is clear that the Board may not require a utility to spend more than 1.5% of gas revenues and 2% of electric revenues for efficiency programs. In IPL's case, the company is spending well under these caps. IPL is proposing to under-spend the electric

cap by nearly [redacted] over the course of the 5-year plan and the gas cap by [redacted]. *See* Response to EI-DR 15 (Confidential) (attached as E.I. Johannsen Rebuttal Exhibit 1) and Application Exhibit 4 Budget Accounting for Costs. There is room here for the Board to require IPL to do more. Furthermore, the law does not prohibit the utilities from proposing and implementing plans that spend in excess of the caps. In-person assessments are one of the most fundamental programs in an energy efficiency portfolio – the roadmap necessary to achieve savings. The Board can require IPL to spend more and offer robust funding for assessments under its education program rather than eliminating in-person assessments. The Board should require IPL to reinstate in-person assessments as part of its education program.

Q. What has IPL proposed for demand response programs?

A. IPL has proposed a residential and non-residential demand response or curtailment program. Both of these proposed programs are focused on reducing summer peak loads. IPL states that its nonresidential interruptible program, "offers bill credits to C&I customers who, when requested, can curtail a minimum of 200 kW." Application Exhibit 1, Energy Efficiency Plan, at p. 135. Customers can reduce on-site demand when called by IPL by shedding load, shifting load to non-peak hours, or generating replacement power with on-site generators. Similarly, the Residential Direct Load Control (DLC) Program is provides a bill credit to customers who allow IPL to control their central air conditioner via a remote-control device during the summer peak season." Application Exhibit 1, Energy Efficiency Plan, at p.135.

Q. What concerns do you have regarding IPL's Nonresidential Interruptible Program?

With the continued development of the MISO market, the needs of utilities to utilize demand response programs have changed. As implemented in Iowa, these programs are expensive and rarely used – it is time to re-think them. Over the course of the most recent plan, IPL reported four nonresidential curtailment events that were actually intended to reduce load and not just implemented to test the system – two in 2016 and two in 2017. Table 1 below summarizes IPL's enrollment, spending, and use of its nonresidential interruptible program in the 2014-2017 timeframe of its current plan.

Table 1 – IPL Nonresidential Curtailment Events 2014-2017[1]

	MWs Enrolled	Date	Time	MWs Curtailed	Non-Residential DR Spending
2014	267-268	Tests Only	N/A	N/A	$23,654,285
2015	256	Tests Only	N/A	N/A	$23,065,820
2016	271	7/21/2016	2:00 p.m. - 7:00 p.m.	88	$22,894,740
	271	7/22/2016	2:00 p.m. - 6:00 p.m.	107	
2017	238	7/20/2017	2:00 p.m. - 7:00 p.m.	74	$22,609,148
	238	7/21/2017	2:00 p.m. - 6:00 p.m.	27	
Total Non-Residential DR Spending					**$92,223,993**
Total MWhs of Curtailment					**1,346**
Total Cost per MWh of Curtailment					**$68,517**

It is notable that for the $92.2M IPL expended over these 4 years in the nonresidential curtailment program, only 1,346 MWhs of curtailments occurred for an average cost of

[1] Data on interruptions from annual "Report on Interruption and Cycling Events" for 2014 – 2017 and DR spending data from Energy Efficiency Plan annual reports for 2014 – 2017, all filed with the IUB.

$68,517 per MWh. Viewed through a capacity lens, IPL paid an average of $88,782 per MW-year of capacity over this time period, as illustrated in Table 2.

Table 2 – Cost per MW-Year of Capacity Secured Through IPL Non-Residential Demand Response Program, 2014-2017[2]

	Average MWs Enrolled	Non-Residential DR Spending	Cost per MW-Year
2014	267.5	$23,654,285	$88,427
2015	256	$23,065,820	$90,101
2016	271	$22,894,740	$84,482
2017	238	$22,609,148	$94,996
Average 2014 - 2017			**$89,502**

That is outrageous considering the cost of capacity in the MISO market cleared at $10/MW-day (or $3,650 per MW-year) for 2018-2019.[3] Demand response can and should be an important element of a utility's portfolio of resources, but there is a need to evaluate and improve upon the current demand response programs to make them more cost-effective and add more value.

Q. What do you recommend to improve the effectiveness of the Nonresidential Interruptible Program?

A. One area to explore is strategic utilization of solar generation to manage peaks. IPL has stated that the goal of its load management programs is to reduce its peaks during summer months. Although solar PV is certainly not traditional demand response, it is a very effective technology for reducing IPL's peaks in this time period. Once installed, solar PV will reduce peaks during most days of the summer – not just during one or two brief curtailment events. In addition, the costs of solar PV have come down significantly

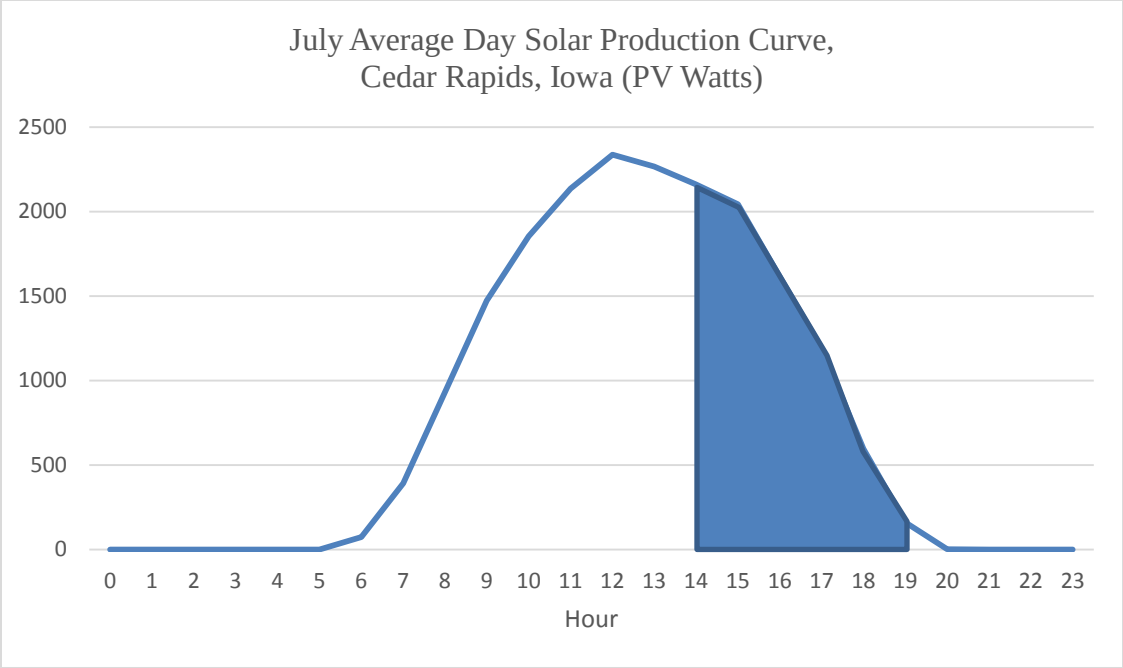
[2] Data from IPL Energy Efficiency Plan Annual Reports from 2014 – 2017.
[3] https://cdn.misoenergy.org/2018-19%20PRA%20Results173180.pdf

in recent years. The National Renewable Energy Lab's 2018 Annual Technology Baseline calculates a levelized cost of energy for utility-scale solar PV of between $45 and $81 per MWh without any tax incentives or other policies taken into account. With incentives, this drops to between $35 and $63 per MWh.[4] This is a highly cost-effective option for helping to reduce and manage peaks.

Solar in Iowa is already producing energy when it is needed. The four curtailments that IPL called in the 2014-2017 timeframe were all between the hours of 2:00 p.m. and either 6:00 p.m. or 7:00 p.m. in July when solar production would also occur. I have conducted modeling to illustrate how solar production corresponds to the timeframe when IPL has curtailed load with its Nonresidential Interruptible Program. Using PV Watts, I modeled a typical solar array on the average July day in Cedar Rapids, Iowa. This array is designed to maximize annual energy production, as most arrays have been designed. The results show the hourly production curve in Chart 1 below.

[4] Summary of NREL 2018 Annual Technology Baseline, Cost and Performance Summary Tables, https://atb.nrel.gov/electricity/2018/summary.html.

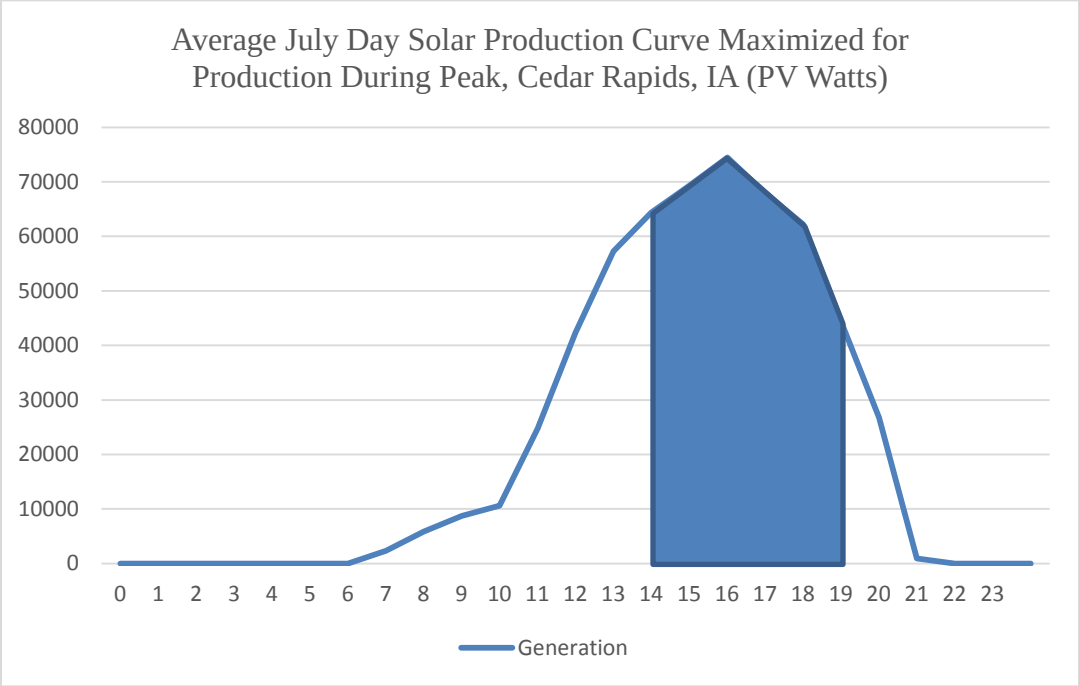
Chart 1 – July Average Day Solar Production Curve, Cedar Rapids, Iowa



Solar would be expected to be producing electricity between these peak hours of 2:00 and 7:00 p.m. according to the PV Watts modeling. This type of solar array, constructed to maximize overall annual energy generation, would contribute to reducing the peak on the large majority of hot summer days when demand is high.

However, a solar array can also be designed to maximize production during hours of afternoon peak demand by adjusting the orientation of the array further to the West and increasing the tilt. With such modifications, PV Watts shows a production curve for a solar array in Cedar Rapids, Iowa, on an average July day illustrated in Chart 2.

Chart 2 – July Average Day Solar Production Curve Maximizing Peak Production, Cedar Rapids, Iowa (PV Watts)



The adjustments move production into the peak afternoon hours. Although this type of configuration can have the impact of reducing the overall annual output of the array, moving the production into peak afternoon hours offers value because it can bolster reliability and provide significant benefits to all customers by reducing the need for expensive energy purchases during those peak hours, something that IPL's current demand response programs are intended to accomplish.

Q. What else have you evaluated to recommend that IPL deploy solar PV to address its peak?

A: I reviewed and analyzed IPL's load data, which further demonstrates that solar would be a good fit for meeting peak demand. Over the past five years, all of the top twenty IPL loads occurred during the months of July and August between the hours beginning with

1:00 p.m. and 6:00 p.m. Because 19 out of the 20 IPL peaks in past five years occurred in 2013, I looked at peak demand in 2014 – 2017 for reference. Each of the peak hours in these years occurred in July during the afternoon hours. IPL's peak demand in the months of June, July, and August fell, on average, in the 3:00 – 4:00 timeframe. *See* EI-DR-5 and EI-DR-5 Attachment A, attached as E.I. Johannsen Rebuttal Exhibit 2. As shown in Charts 1 and 2, Solar PV can generally be expected to generate energy during these times of high load, and solar PV systems can be designed specifically to target periods of high load.

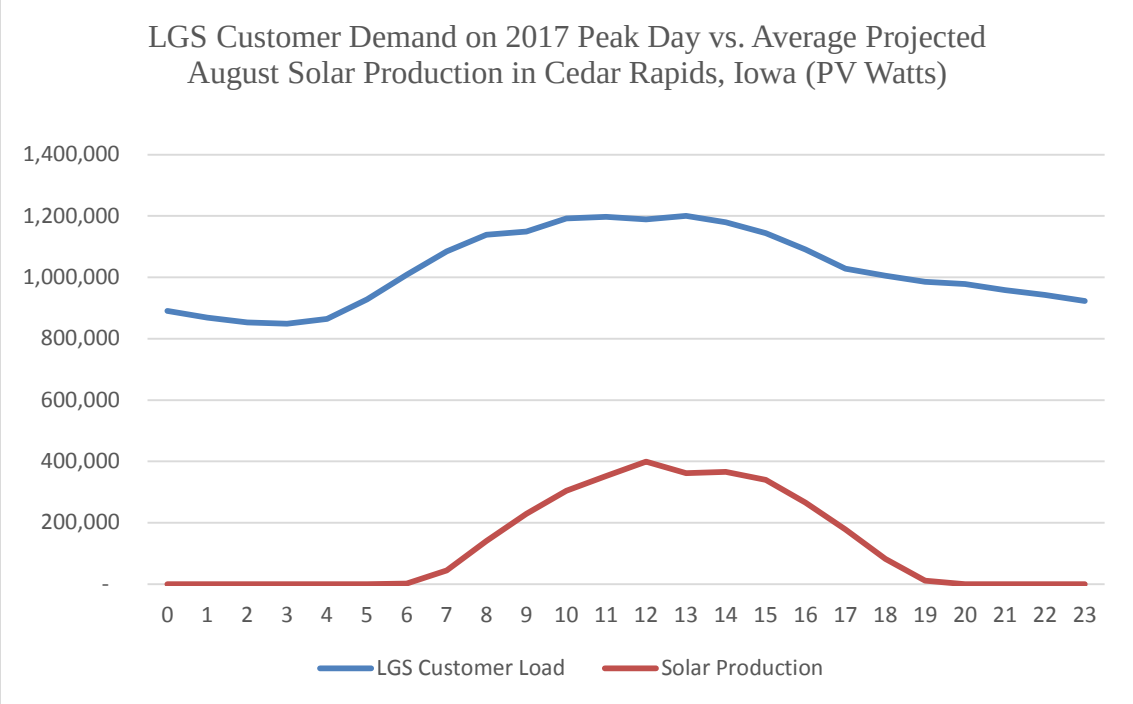
Given that this proposed pilot would fall within IPL's Demand Response portfolio, addressing peak is most critical. However, solar would provide benefits far more than the few peak hours per year that curtailments might occur. Information filed by IPL in this Docket lists monthly sales during 2017 and shows that the highest month for kWh sales was August. Four of the top five months are June, July, August, and September (December is the other month in the top 5). *See* EEP-2018-0003, Application Guelker 12.6, Additional Information for Electric Utilities at Page 8, Total Class Contribution to System Peak. Unlike the current demand response program, strategic solar installations would complement this seasonal pattern of sales and help meet high demand all across the months of June, July, August, and September.

In addition, IPL's system coincident peaks during the months of May, June, July, August and September occur between the hours of 4 pm and 6 pm. Again, these all occur during times when solar PV would be producing energy. *See* EEP-2018-0003, Application

Guelker 12.6, Additional Information for Electric Utilities at Page 8, Total Class Contribution to System Peak. If properly planned and constructed, solar resources could increase grid capacity at these peak times and reduce summer energy costs for all customers.

Finally, it is of note that the load shape of IPL's largest customers closely follow the production curve of a typical solar array in central Iowa, including on the coincident peak day, as demonstrated in Chart 3.

Chart 3 – LGS Coincident Peak Demand and Average August Solar Production



See Response to EI-DR 8 – Attachment A, Attached as E.I. Johannsen Rebuttal Exhibit 3. Rather than pay these customers to curtail for a few hours each year – if that – IPL could install solar PV on-site at these large customers. The demand curve of these large users is

very similar to the typical generation profile for solar, providing benefits to the grid and freeing up capacity every day the sun is shining.

Q. What type of pilot program are you recommending?

A. I recommend that the Board require IPL to develop a pilot program that uses strategic solar to meet the primary goal of reducing summer peaks in the proposed demand response programs. IPL should work with stakeholders to develop a program with sufficient scale to impact peaks and to collect data on how solar can reduce peaks during the times that curtailment programs are typically used, as well as other peak times and individual customer class peaks.

Q. How do you envision the pilot program as part of IPL's overall approach to load management?

The future of curtailment programs is broader than simply reducing peak loads for a few hours each summer. Curtailment or load management programs should allow for more flexibility and integration with renewables and other generation. In a flexible system, curtailments may occur outside of the typical peak hours to manage the grid. Solar would serve the primary function of reducing peak, allowing curtailment programs to focus on other critical hours or times of year. Storage could be brought into the program as well to stretch out the hours solar energy is available or bridge during times of low wind generation. If well planned, such strategic investments could also delay other infrastructure upgrades. The Board should direct IPL to include development of such a pilot as part of its demand response plan.

Q: Does this conclude your testimony?

A: Yes.

AFFADAVIT OF
KERRI R. JOHANNSEN

STATE OF IOWA)
COUNTY OF POLK) ss.

I, Kerri R. Johannsen, being first duly sworn on oath, state that I am the same Kerri R. Johannsen identified in the testimony being filed with this affidavit, that I have caused the testimony to be prepared and am familiar with its contents, and that the testimony is true and correct to the best of my knowledge and belief as of the date of this affidavit.

Oct 2, 2018
Kerri Johannsen

Subscribed and sworn before me the 2nd day of October, 2018.

Notary Public in and for the State of Iowa

NOTARIAL SEAL IOWA
ADAM G. LEWIS
COMMISSION NO. 806602
MY COMMISSION EXPIRES
9/22/2020