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IDAHO PUBLIC
UTILITIES COMMISSION

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION)
OF IDAHO POWER COMPANY FOR)
AUTHORITY TO ESTABLISH NEW) CASE NO. IPC-E-17-13
SCHEDULES FOR RESIDENTIAL AND)
SMALL GENERAL SERVICE CUSTOMERS)
WITH ON-SITE GENERATION.)

IDAHO POWER COMPANY

SURREBUTTAL TESTIMONY

OF

DAVID M. ANGELL

1 Q. Please state your name.

2 A. My name is David M. Angell.

3 Q. Are you the same David M. Angell that
4 previously presented direct and rebuttal testimony?

5 A. Yes.

6 Q. What is the purpose of your surrebuttal
7 testimony?

8 A. The purpose of my surrebuttal testimony is to
9 respond to Idaho Clean Energy Association's witness Kevin
10 King's recommendation to wait to make changes to the net
11 metering service until the total nameplate capacity of
12 residential solar net metering reaches 60 megawatts ("MW").

13 Q. Please summarize the recommendation made by
14 Mr. King related to the 60 MW nameplate capacity of
15 residential solar net metering.

16 A. In his rebuttal testimony, Mr. King
17 recommends, "That any changes to net metering rate policy
18 should not go into effect until after the total nameplate
19 capacity of net metering residential solar reaches a
20 benchmark level of 60MW."¹

21 Q. When would you estimate that Idaho Power
22 Company ("Idaho Power" or "Company") would reach a total
23 nameplate capacity of 60 MW for residential solar net
24 metering?

¹ King DI, p. 10, 11. 11-12

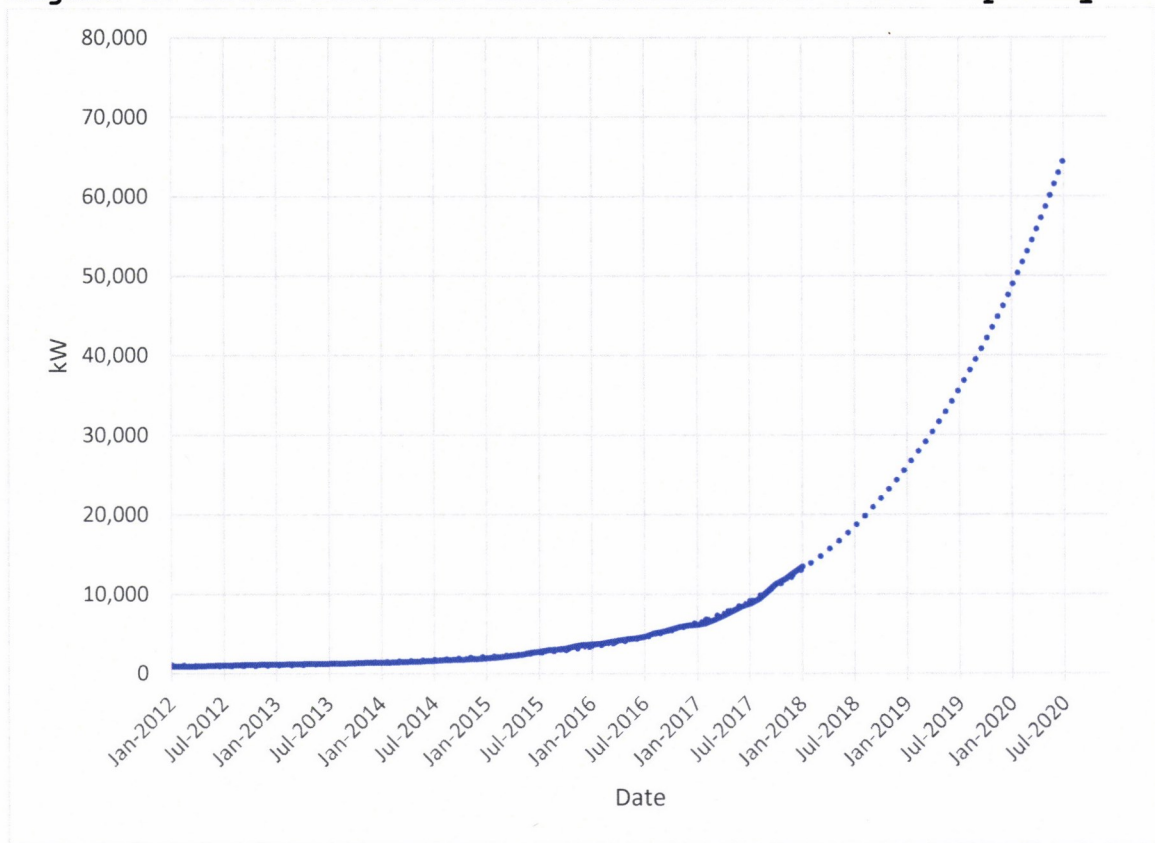
1 A. I believe that Idaho Power will reach a total
2 nameplate capacity of 60 MW for residential solar net
3 metering in 2020. When considering the likely year or more
4 it would take for multiple utilities and stakeholders to
5 coalesce on the costs and benefits of distributed
6 generation ("DG") in a general docket, I believe that by
7 the time this case and a general docket are concluded and
8 implemented, the Company will be nearing a cumulative 60 MW
9 of residential solar net metering installations and
10 applications.

11 Q. How were you able to conclude that the total
12 nameplate capacity for residential solar net metering will
13 reach 60 MW in 2020?

14 A. To estimate when the installed capacity for
15 residential solar net metering might reach 60 MW, the
16 Company applied a fourth order polynomial curve fit to the
17 cumulative installed capacity of active and pending
18 residential solar installations from 2012 to January 31,
19 2018. As shown in Figure 1, the trend line reached 60 MW
20 after January 2020 but before July 2020.

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1 **Figure 1. Trend Line for Idaho Residential Solar Capacity**



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3 Q. Do you agree with Mr. King's recommendation to
4 wait to make changes to the net metering rate policy,
5 including the requirement for smart inverters, until the
6 total nameplate capacity of net metering residential solar
7 reaches 60 MW?

8 A. No. There is no need to set an arbitrary
9 capacity threshold. I believe that by the time this case
10 and a general docket would be concluded and implemented,
11 the Company will be nearing a cumulative 60 MW of
12 residential solar net metering installations and
13 applications.

1 Q. What would the operational consequences be of
2 waiting to make changes to the requirement for smart
3 inverters until the total nameplate capacity of net
4 metering residential solar reaches 60 MW?

5 A. The Company has determined that, without the
6 smart inverter requirement, voltage impacts may result on
7 certain distribution circuits due to distribution circuit
8 DG penetration prior to reaching 60 MW of net metering
9 residential solar. Voltage impacts would be identified
10 during the study of additional DG installation and would
11 require customer-funded mitigation before the DG could be
12 installed and operated.

13 Q. How did the Company determine that there would
14 be voltage impacts on certain circuits without the smart
15 inverter requirement?

16 A. A hosting capacity calculation program
17 developed by Electric Power Research Institute ("EPRI") and
18 named Distribution Resource Integration and Value
19 Estimation Tool ("DRIVE") was used for this analysis. Six
20 high DG penetration distribution circuits were modeled in
21 DRIVE. These models included customer load, customer
22 generation, and Idaho Power voltage management devices.
23 The voltage thresholds were set at American National
24 Standard Institute (ANSI) C84.1, *Electric Power Systems and*
25 *Equipment-Voltage Ranges*, Range A tolerances of plus or

1 minus 5 percent. The program identified the DG capacity
2 which caused a voltage threshold to be exceeded due to
3 addition of DG on the circuit. Simulations were run with
4 standard inverters and with smart inverters, conforming to
5 the proposed IEEE-1547 standard, to determine the remaining
6 hosting capacity under each scenario.

7 Q. What were the results from the analysis of the
8 two cases?

9 A. Two-thirds of the distribution circuits
10 analyzed would be able to host more DG if smart inverters
11 are installed with reactive support capability enabled.
12 Without the aid of smart inverters and assuming the high DG
13 penetration circuits continue to maintain their high ratio
14 of installations relative to other circuits, four of the
15 six circuits would be limited before the proposed 60 MW
16 system threshold is reached.

17 Q. What was the condition that limited the
18 hosting capacity on these distribution circuits?

19 A. The condition was that the localized high
20 voltage conditions exceeded 105 percent of nominal voltage.
21 This condition occurs when one or more inverters are
22 sourcing power into the distribution circuit during periods
23 of low customer energy usage.

24 Q. How will the requirement of smart inverters
25 mitigate these impacts to the grid?

1 A. The smart inverters with voltage control
2 enabled would mitigate these localized high voltage
3 conditions as described on page 23 of my direct testimony.

4 Q. In your direct testimony, you stated that the
5 cost differential between a smart inverter and a standard
6 inverter for a 6,000 watt system was \$720.² Is that still
7 true today?

8 A. Research performed by the Company suggests
9 that it is no longer accurate. The Company's research
10 shows that smart inverters are becoming prevalent and most
11 solar inverter manufacturers only offer smart inverter
12 functionality. Of net metering applications received by
13 the Company during the last year, 98 percent of the
14 applications identified inverter manufacturers which offer
15 smart inverter functionality as a standard feature of their
16 product. This would suggest that there is not necessarily
17 an "additional" cost for a smart inverter, but rather the
18 smart inverter is commonly included as a standard feature.

19 Q. Why is it necessary to have a tariff
20 requirement for smart inverter functionality if most
21 manufacturers only offer smart inverters functionality?

22 A. When a smart inverter is installed, the smart
23 inverter functionality can be disabled. A tariff

² Angell DI, p. 24, ll. 5-24.

1 requirement would ensure that smart inverter functionality
2 is enabled for all installations.

3 Q. Please summarize your surrebuttal testimony.

4 A. The Company has demonstrated that delaying
5 changes to the net metering rate policy, including the
6 implementation of the requirement for smart inverters,
7 based on an arbitrary capacity threshold will negatively
8 impact customers' ability to install DG on the distribution
9 circuits where their neighbors have already installed DG.

10 Q. Does this conclude your testimony?

11 A. Yes, it does.

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ATTESTATION OF TESTIMONY

STATE OF IDAHO)
) ss.
County of Ada)

I, David M. Angell, having been duly sworn to
testify truthfully, and based upon my personal knowledge,
state the following:

I am employed by Idaho Power Company as the Senior
Manager of T&D Engineering and Construction and am
competent to be a witness in this proceeding.

I declare under penalty of perjury of the laws of
the state of Idaho that the foregoing surrebuttal testimony
is true and correct to the best of my information and
belief.

DATED this 23rd day of February, 2018.

David M. Angell

David M. Angell

SUBSCRIBED AND SWORN to before me this 23rd day of
February, 2018.



Kimberly K. Towell

Notary Public for Idaho
Residing at Boise, Idaho
My commission expires: 12/20/20



CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the 23rd day of February 2018 I served a true and correct copy of SURREBUTTAL TESTIMONY OF DAVID M. ANGELL upon the following named parties by the method indicated below, and addressed to the following:

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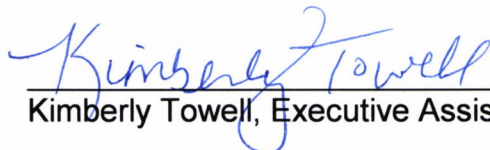
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