EDWARD J. JEWELL
DEPUTY ATTORNEY GENERAL
IDAHO PUBLIC UTILITIES COMMISSION
PO BOX 83720
BOISE, IDAHO 83720-0074
(208) 334-0314
IDAHO BAR NO. 10446

Street Address for Express Mail:
11331 W CHINDEN BLVD, BLDG 8, SUITE 201-A
BOISE, ID 83714

Attorney for the Commission Staff

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF IDAHO POWER COMPANY'S APPLICATION TO ESTABLISH TARIFF SCHEDULE 68 – INTERCONNECTIONS TO CUSTOMER DISTRIBUTED ENERGY RESOURCES	)	**CASE NO. IPC-E-20-30**
	)	**COMMENTS OF THE COMMISSION STAFF**

The Staff of the Idaho Public Utilities Commission comments as follows on Idaho Power Company's Application.

BACKGROUND

On July 20, 2020 the Company filed Case No. IPC-E-20-30, requesting permission to Establish Tariff Schedule 68, Interconnections to Customer Distributed Energy Resources. The Company states that "The proposed Schedule 68 is intended to comply with Commission Order Nos. 34046 and 34147 from Case No. IPC-E-17-13 which direct the Company to file smart inverter requirements within 60 days of the final adoption of Institute of Electrical and Electronics Engineers ("IEEE") standards 1547 and 1547.1, and to study the feasibility of a non-export option for Distributed Energy Resources ("DER" or "DERs") connecting to the Company's system." Application at 1.

The Company also filed a supplemental application on August 13, 2020 that included changes to Schedules 6, 8, and 84 associated with the Company's proposed Schedule 68.

The Company requests that Schedule 68 become effective 14 days after approval by the Commission. According to the Company, the 14-day implementation period is necessary to update its communication materials. Application at 12-13.

STAFF ANALYSIS

Summary

Based on the results of its investigation, Staff supports the Company's proposal. In its comments, Staff:

a. Supports the Company's proposal to establish a new Tariff Schedule 68, Interconnections to Customer Distributed Energy Resources, as well as associated changes to its Schedules 6, 8, 72, and 84 tariffs;
b. Supports the proposed Schedule 68 interconnection requirements for all new exporting Customer-Generators to use a smart inverter; however, Staff also advises that the proposed interconnection requirements and inverter settings may not provide all of the functionality stated by the Company in IPC-E-17-13;
c. Supports the proposed Schedule 68 interconnection requirements for non-exporting systems ("Non-Export Option");
d. Supports the proposed Schedule 68 interconnection requirements for customer-owned energy storage devices ("Energy Storage Option");
e. Supports the proposed Schedule 68 application and return-trip fees;
f. Supports the modified requirements in the unauthorized systems and expansion section; and
g. Supports the Company's proposal to eliminate the current triennial recertification requirement for DERs.

Schedule 68

Staff supports the Company's proposal to create a new interconnection tariff for DERs. Currently, interconnection requirements for both Public Utility Regulatory Policies Act of 1978 (PURPA) Qualifying Facilities ("QF" or "QFs") and DERs are found in Schedule 72, Interconnections to Non-Utility Generation. Staff notes that the application process for Schedule 6, 8, and 84 DERs is simpler than the application process for PURPA QFs. For example, Schedule 72 includes several pages related to the construction, transfer, vested interest, and

operations and maintenance charges related to PURPA QFs that are not relevant to the interconnection of most DERs.

According to Company witness Aschenbrenner, some DER customers confuse which sections of Schedule 72 apply to their applications. Aschenbrenner, Di at 13. Staff believes that creation of a new schedule specifically for DER customers will ameliorate this confusion. Furthermore, as stated by witness Aschenbrenner, establishing separate interconnection schedules for PURPA QFs and for DERs will reduce procedural confusion when parties are determining whether intervention and participation in a case is necessary to protect or advance their interests. *Id.*

The Company proposes removing all interconnection requirements related to Schedule 6, 8, and 84 retail customers from Schedule 72, but it is not proposing any changes to Schedule 72 that would affect PURPA QFs. Application at 2.

Most of the provisions and language of Schedule 68 would remain unchanged from the pertinent sections of Schedule 72 with the following important differences: 1) All new DER customers interconnecting to the Company's system would be required to use a smart inverter; 2) Schedule 1 (Residential) and Schedule 7 (Small General Service) customer-generators who do not wish to export their energy would be permitted to interconnect in parallel with the Company's system so long as they use a non-export control system; 3) Customers with batteries or other storage devices would be allowed to interconnect with the Company's system so long as the storage system is coupled with a generator; 4) The proposed schedule includes updated application, inspection, and return-trip procedures and fees; 5) The proposed schedule allows the Company to immediately inspect, and if necessary lock, unauthorized systems or expansions; and 6) The proposed schedule eliminates the current triennial inspection, and instead provides for the Company to inspect any net metering system any time the Company identifies a condition that presents an unsafe or adverse operating condition.

DERs with a nameplate capacity greater than 3 MVA would be required to follow a separate process that would include a Feasibility Study, System Impact Study, and Facility Study, after which the customer would be required to enter into a Customer Generator Interconnection Agreement prior to connection. The Customer would pay all costs of interconnection under Rule H and would pay a monthly charge of 0.59% times the investment in System Protection, DER Metering, and DER Communication Equipment.

Customer-Generator Interconnect Requirements (Smart Inverters)

Staff supports the proposed requirement for all new exporting Customer-Generators to use smart inverters. However, Staff also advises that because the Company does not intend to use the communications protocols specified by IEEE 1547-2018, smart inverters may not provide all the functionality stated by the Company in IPC-E-17-13.

In its findings in Final Order No. 34046, the Commission stated, "The Company believes that the benefits of smart inverters include providing important ancillary services such as: voltage control, system protection, scheduling, dispatching, load balancing, and forecasting." *Id.* at 20. Although the proposed smart inverter settings would provide voltage control and system protection, ancillary services such as scheduling, dispatching, load balancing, and forecasting are not possible without real-time or near real-time communications protocols. The Company proposes that for systems smaller than 3MVA, smart inverters be programmed so that they operate autonomously, and that IEEE 1547-2018 communications protocols not be enabled. Company Production Response to Staff Production Request No. 27. The Company only plans to implement communications protocols for DER systems that are 3 MVA or larger.

In the event that the Company were to implement protocols to enable communication with all DERs, the Company would likely require each smart inverter to be connected to the internet. *Id.* Each inverter would also need to be manually reprogrammed to enable communications protocols.

Reactive power

The reactive power settings specified by the Company will allow the inverter to control voltage and either supply or consume reactive power with little or no impact on either the power consumed on-site by the customer or exported to the Company's system. The Company proposes that smart inverters be set for IEEE 1547-2018 performance Category B with reactive power mode set to Voltage-Reactive power. Application Attachment 1, Table 1.

Staff explains that electric motors and certain other electrical devices can induce a mismatch between the phase angle of the alternating current and the alternating voltage of an AC power system. The effect of this mismatch extends far beyond the vicinity of the electromagnetic device causing the mismatch, and results in power that is unusable even though it is still present in the power grid. Electrical motors and similar devices are said to consume, or absorb, reactive power.

Spinning generation resources that produce alternating current can produce a phase angle mismatch that is opposite that produced by electrical motors, and thus spinning resources can counter the effects of electrical motors. Spinning generation resources are said to produce, or inject, reactive power. Absent a source of reactive power, a power grid can become unstable even though there is sufficient real power on the grid. Production of reactive power is an important ancillary service provided by hydro and thermal generation resources.

Direct current generators such as photo-voltaic cells and some wind turbine generators produce no reactive power, even when their output is converted to Alternating Current by a conventional inverter. Given that the preponderance of DERs derive their power from photo-voltaic cells, there is a justifiable concern that the grid could be destabilized by a sufficiently high density of DERs. IEEE 1547-2018 addresses this concern by requiring that DERs be able to both produce and consume reactive power. The Company's proposed inverter settings ensure that DERs are consuming sufficient reactive power for normal grid operations, even when DER penetration levels are relatively high.

IEEE 1547-2018 provides two different performance categories: A and B. Category B is more stringent than Category A, and requires the DER to be able to either absorb or inject more reactive power than Category A. Category B settings are intended to provide enough reactive power control to maintain grid stability, even when DER penetration is relatively high.

The Company proposes to use voltage deadband settings that differ slightly from those recommended in IEEE 1547-2018. The Company explains that this change is intended to align smart inverter parameters with the parameters used by the Company's existing infrastructure. Otherwise, the Company's proposed settings conform with IEEE 1547-2018 recommendations. Staff believes the Company's proposed modification of IEEE standards are reasonable.

The Company's proposal to require smart inverter default settings to be set for normal operating performance Category B has an additional benefit: By selectively producing or consuming reactive power, a smart inverter will be able to provide limited local voltage control. So long as a DER's smart inverter is properly sized to meet both its real and reactive power needs, the Company's proposed settings will allow the DER to provide voltage control without curtailing the quality or quantity of power available to the customer for use on-site or for export.

Ride-through and anti-islanding

Prior to the 2018 revision of IEEE 1547, inverters used by DERs were designed to shut off the DER within a few seconds of detecting an abnormal voltage fluctuation. It was recognized that with increasing DER penetration, it is possible for the voltage fluctuation caused by the shutdown of one DER to cause other DERs to shut down, resulting in a cascade of DERs being removed from service. This, in turn, could destabilize large portions of the grid. IEEE 1547-2018 addresses this problem by requiring DERs to respond to abnormal voltage fluctuations in a more nuanced way than simply shutting down. IEEE 1547-2018 requires DERs to respond proportionately to a wide range of abnormal operating conditions prior to shutting down. This is referred to as ride-through.

The Company proposes that smart inverters be set to use IEEE 1547-2018 Category III Voltage Ride-Through settings. These settings conform with industry best practice for DER systems operating without a communication interface that would allow the Company to detect and coordinate the responses of smart inverters to abnormal voltage deviations. Staff notes that settings similar to those proposed by the Company are currently in use in California. IEEE 1547-2018 at 101, and Rule 21 Tariffs for Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric. Staff agrees with the Company's proposed ride-through settings.

Grid-tied inverters use power provided by the grid for frequency and voltage control. In the event that power from the grid is interrupted for more than a few seconds, a grid-tied inverter will shut down. This mode of operation is a safety feature, since it assures that grid-tied systems can't be energized when power lines are shut down for maintenance.

Given a sufficiently high density of DERs without proper anti-islanding protocols, it is possible for DERs to continue to energize the grid even after grid power is interrupted. Without the grid power as a reference, voltage and frequency can change rapidly. This condition, called islanding, can preclude maintenance work in affected areas until Company staff can manually shut-down each DER.

The Company proposes using IEEE 1547-2018 protocols, which require that DERs use anti-islanding protocols based on the rapid frequency swings that are characteristic of islanding events. Staff agrees with the Company's anti-islanding proposal.

Existing systems

The Company proposes that new DERs be required to use smart inverters, and does not propose that existing, functional inverters be replaced. The Company proposes that as inverters break-down and need to be replaced, they be replaced with smart inverters. Staff concurs with this proposal. Currently, no portion of Idaho power's grid has a sufficiently high DER density to cause instability related to a deficiency of reactive power, and there have been no reports of islanding. Furthermore, Staff was unable to determine that smart inverters provide any quantifiable system-wide benefit when DER penetration rates are low. Staff believes that requiring existing customers to retrofit their systems with smart inverters would impose a costly and unnecessary expense.

Implementation and market availability

The Company plans to use Underwriters Laboratories ("UL") certification as the criteria for determining whether or not to approve a particular smart inverter (UL 1741 SB). Unfortunately, the UL has not yet issued a final, comprehensive list of approved inverters. In the interim, the Company plans to use a supplemental list, UL 1741 SA, to make its determination. Inverters not on UL 1741 SA will be vetted by the Company on a case-by-case basis. Company Production Response to Staff Production Request No. 5.

Through conversations with solar installers and industry representatives, Staff learned that sufficient quantities of UL 1741 SA compliant smart inverters are available to meet foreseeable demand.

Non-export option

In Case No. IPC-E-17-13, Vote Solar filed a Petition for Reconsideration of Order No. 34046 in which they asked the Commission to require the Company to revise the new Schedules 6 and 8 so that they apply only to customers who export electricity. In the Final Order on Reconsideration, the Commission ordered, "Consequently, alongside the parameters set forth in Order No. 34046, a non-export option should be studied for feasibility and vetted for safety and operational concerns by the Company and interested stakeholders in the forthcoming docket." Order No. 34147.

As discussed in Aschenbrenner's direct testimony, the Company subsequently filed docket No. IPC-E-18-15 which considered, among other things, interconnection requirements for non-exporting systems. Aschenbrenner, Di. at 10-12.

In the present case, the Company proposes that Schedule 1 and 7 Customer-Generators who do not export energy be permitted to remain on Schedules 1 and 7 so long as the total nameplate capacity of the DER is 25 kVA or less, and the DER uses a non-export control system.

The Company proposes that customers use one of three export control systems: 1) Advanced functionality, 2) Reverse power protection, or 3) Minimum power protection. The Company also proposes that all inverter-based DERs use option 1, advanced functionality, since the necessary functionality is already built into IEEE 1547-2018 compliant smart inverters.

The second and third options allow non-inverter based systems, such as run-of-river generators or generators using biomass, to interconnect with the Company's grid.

Schedule 68 defines unauthorized inadvertent export as export exceeding three hours of DER total nameplate capacity in any 30-day period. In the event of an unauthorized inadvertent export, the customer would be required to rectify the problem within 30 days of notification by the Company.

Staff believes that the Company's proposed Schedule 68 non-export option is reasonable, that it adequately protects the Company's system, and that it provides Customer-Generators a low-cost way to generate their own power while remaining on Schedules 1 and 7.

Energy storage option

Although not specifically ordered by the Commission, the proposed Schedule 68 also includes a mechanism for allowing DER customers using batteries and other storage devices to interconnect with the system. Under the Company's proposal, storage facilities must be coupled with a Schedule 6, 8, or 84 generator in order to export energy to Idaho Power's system.

Energy storage devices may either share an inverter with a generation facility ("DC Coupled") or use a separate stand-alone inverter ("AC Coupled"). Staff anticipates that most Customer-Generators using photo-voltaic and other inverter-based generation systems will opt to use a DC Coupled system; however, it is likely that Customer-Generators using run-of-river and biomass systems will use an AC Coupled configuration. Staff believes that both the DC Coupled and AC Coupled configurations will provide DER customers a means for storing the energy they produce while protecting the grid.

Application and return-trip fees

Staff recommends that the Commission approve the application fee and return trip charge proposed in Tariff Schedule 68.

The Company proposes that customers submit a $100.00 application fee with their completed application to interconnect their DER with the Company's system. Application at Attachment 1, Sheet 68-10. The Company explained that the $100.00 application fee was first approved as part of IPC-E-12-27. Aschenbrenner, Di. at 7. Using production requests and workpapers provided by the Company, Staff reviewed the $100.00 application fee, and concludes that it is reasonable.

As part of the application process, the Company will conduct an on-site inspection. In the event that the system does not pass its first inspection, customers will be charged an additional $61.00 fee for each trip needed to verify that the system conforms to the requirements of Schedule 68. Application at Attachment 1, Sheet 68-12. Staff reviewed Company workpapers and calculations and determined that the $61.00 charge is reasonable.

Unauthorized installations and expansions

Staff recommends that the Commission approve the modifications dealing with unauthorized installations and expansions that are proposed in Schedule 68.

Currently, under Schedule 72, unauthorized installations and expansions are subject to immediate Company inspection and disconnection without prior notice. If proper disconnection equipment is present, the Company will open the disconnect, lock the customer out of their system, and then notify the customer within 24 hours. If the proper disconnect equipment is not present, customers are required to disconnect their DER from the Company's system immediately by any means available. According to the Company, the proper disconnection equipment is usually present. Aschenbrenner, Di. at 21-22.

The Company proposes eliminating the current Schedule 72 requirement to lock the customer out of their system. Instead, the Company would rely on the Customer-Generator to remain disconnected while they either complete the full Customer Generator Interconnection process, or they permanently disable their DER's connection with the Company's system.

According to Company witness Aschenbrenner, the requirement to lock a system can require an Idaho Power employee to return to the DER to unlock the system any time the customer, installer, or state inspector is trying to bring the system into compliance. The Company

believes it reasonable to rely on the Customer-Generator or installer to keep the system disconnected, just as it does for new systems that are installed and awaiting inspection. Aschenbrenner, Di at 23.

Customer-Generators would be given 12 months to bring their systems into conformance with the Company's Schedule 68 interconnection requirements.

STAFF RECOMMENDATIONS

Staff recommends that the Commission allow the company to establish proposed Tariff Schedule 68, Interconnections to Customer Distributed Energy Resources.

Respectfully submitted this 13th day of January 2021.

Edward J. Jewell
Deputy Attorney General

Technical Staff: Mike Morrison
Travis Culbertson
Rachelle Farnsworth

i:umisc/comments/ipce20.30ejmmtncrf comments

CERTIFICATE OF SERVICE

I HEREBY CERTIFY THAT I HAVE THIS 13th DAY OF JANUARY 2021, SERVED THE FOREGOING **COMMENTS OF THE COMMISSION STAFF,** IN CASE NO. IPC-E-20-30, BY E-MAILING A COPY THEREOF, TO THE FOLLOWING:

LISA D NORDSTROM
REGULATORY DOCKETS
IDAHO POWER COMPANY
PO BOX 70
BOISE ID 83707-0070
E-MAIL: lnordstrom@idahopower.com
dockets@idahopower.com

CONNIE G ASCHENBRENNER
TIMOTHY E TATUM
IDAHO POWER COMPANY
PO BOX 70
BOISE ID 83707-0070
E-MAIL: caschenbrenner@idahopower.com
ttatum@idahopower.com

BENJAMIN J OTTO
ID CONSERVATION LEAGUE
710 N 6TH STREET
BOISE ID 83702
E-MAIL: botto@idahoconservation.org

PRESTON N CARTER
GIVENS PURSLEY LLP
601 W BANNOCK ST
BOISE ID 83702
E-MAIL: prestoncarter@givenspursley.com
kendrah@givenspursley.com

LISA YOUNG
MIKE HECKLER
IDAHO SIERRA CLUB
503 W FRANKLINE ST
BOISE ID 83702
E-MAIL: lisa.young@sierraclub.org
michael.p.heckler@gmail.com

KELSEY JAE
LAW FOR CONSCIOUS LEADERSHIP
920 N CLOVER DR
BOISE ID 83709
E-MAIL: kelsey@kelseyjaenunez.com

SECRETARY