DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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| IN THE MATTER OF NorthWestern Energy's Application for Interim and Final Approval of Revised Tariff No. QF-1, Qualifying Facility Power Purchase | REGULATORY DIVISION<br><br>Docket No. D2016.5.39 |

**PRE-FILED DIRECT ADDITIONAL ISSUES TESTIMONY OF**
**R. THOMAS BEACH ON BEHALF OF**
**VOTE SOLAR AND MONTANA ENVIRONMENTAL INFORMATION CENTER**

**PRE-FILED SUPPLEMENTAL TESTIMONY OF**

**R. THOMAS BEACH**

**ON BEHALF OF VOTE SOLAR AND MONTANA ENVIRONMENTAL INFORMATION CENTER**

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## Executive Summary

This testimony presents the position of Vote Solar and Montana Environmental Information Center (collectively, "Vote Solar") on the additional issues that the Commission has asked the parties to address in this case which is reviewing the proposal of NorthWestern Energy ("NWE") to revise its Schedule QF-1 avoided cost rate applicable to solar qualifying facilities ("QFs").

The utility's original application asserted that its present QF-1(a) avoided cost rate is now outdated, such that the rate exceeds its current avoided costs. Parties responded to NWE's claims in direct testimony served on October 14, 2016. Vote Solar's direct testimony used two different avoided cost methodologies to show that NWE's current avoided cost rates for solar QFs continue to reflect its avoided costs accurately, and therefore the utility's request to change these rates should be denied. Vote Solar also showed that utility-scale solar QF generation will provide NWE's ratepayers with other quantifiable net benefits that are not included in avoided cost rates, but that will result in ratepayers receiving a good deal if NWE contracts for new solar generation at its existing QF-1(a) avoided cost prices. Further, NWE has exaggerated the likely amounts of solar generation that would be added to its system, which would benefit significantly from the new, diversified, distributed renewable generating capacity that small solar QFs would provide.

The Commission has asked parties to address four additional issues in this docket:

1. The term of QF contracts
2. Performance standards for solar contracts
3. Levelization of QF contract prices
4. Timing of updates to QF avoided cost rates

The Commission requested supplemental testimony on the first two of these issues, and directed data requests to the parties on the second two issues. Vote Solar's position on levelization and avoided costs updates can be found in its responses to Commission requests PSC-033 and PSC-034. Vote Solar responds in this supplemental testimony to the contract term and performance standards issues. With respect to both issues, Vote Solar urges the Commission not to make any determinations in the context of this docket. Instead, the appropriate procedure for addressing these issues, if at all, is to respond to a specific proposal or proposals by NWE in a stand-alone proceeding. Nonetheless, Vote Solar offers its position on these issues, as summarized below.

**1. Contract term.** The Commission should maintain the present 25-year term for contracts with small renewable QFs up to 3 MW in size. Other western states have recently addressed this exact issue, and the Commission should follow the examples of Utah and Oregon in maintaining the availability of long-term contracts for small renewable QFs. Contracts with terms that are similar to the expected life of solar facilities are very important if such projects are to obtain the long-term financing that is necessary for successful development. These contracts are not riskier to ratepayers than other long-term resource additions available to the utility. In fact, they help to diversify the utility's portfolio and hedge against future volatility in fossil fuel prices.

**2. Performance standards.** Vote Solar would support reasonable performance standards in the contracts for solar QFs, provided they do not unlawfully discourage QF development. Such standards must recognize, at a minimum, the natural variability and typical operating circumstances of solar technologies and allow solar projects to obtain financing on reasonable terms.

## I. INTRODUCTION & BACKGROUND

**Q1: Please state your name, address, and business affiliation.**

A1: My name is R. Thomas Beach. I am principal consultant of the consulting firm Crossborder Energy. My business address is 2560 Ninth Street, Suite 213A, Berkeley, California 94710.

**Q2: Have you previously submitted testimony in this docket?**

A2: Yes. On October 14, 2016, I submitted direct testimony in this case on behalf of Vote Solar and the Montana Environmental Information Center (collectively, "Vote Solar"). This testimony addresses in detail NorthWestern Energy's ("NWE") proposal to revise its QF-1 avoided cost rate applicable to solar qualifying facilities ("QFs") who seek to provide new renewable generation to NWE. My experience and qualifications are presented in my CV which is Exhibit RTB-1 to my direct testimony.

**Q3: What is the purpose of this supplemental testimony?**

A3: On behalf of Vote Solar, this supplemental testimony addresses the two additional issues that the Commission added to this proceeding and on which the Commission requested testimony in its order dated October 26, 2016. These issues are: 1) the term of QF contracts; and 2) performance standards for solar contracts. I address each of these issues below.

## II. THE TERM OF QF CONTRACTS SHOULD REMAIN 25 YEARS

**Q4: Should the Commission adjust the term of QF contracts in this docket?**

A4: No. The Commission should not address the length of QF contracts. NWE has not proposed any reduction in contract terms, and interested persons that are not parties to this proceeding had no notice that contract terms would be at issue in this docket, and therefore lacked a reasonable opportunity to intervene to protect

their interest. If the Commission wishes to address the length of QF contracts, it should do so in a separate proceeding in response to an application by NWE.

**Q5: Do the Public Utilities Regulatory Policies Act of 1978 ("PURPA") or the Federal Energy Regulatory Commission's ("FERC") rules implementing PURPA explicitly require state regulators to set a certain term for QF contracts?**

A5: No, they do not. However, PURPA and the FERC rules do require the states to encourage the development of QFs, including the development of renewable QFs using hydro, solar, biomass, geothermal and wind resources. These renewable resources typically have low or zero fuel costs, but significant capital costs that must be financed over their expected useful life in order to be economic. In my experience, financing entities are not willing to lend money to renewable QF projects without a long-term contract at fixed prices that provides certainty that the renewable QF will be able to meet its debt repayment obligations if it operates as anticipated.

In addition, as discussed in my direct testimony,[1] in those markets where the FERC has provided utilities with relief from PURPA's "must purchase" obligation for QFs larger than 20 MW, the FERC has required a showing that QFs larger than 20 MW in those markets have access to sufficiently competitive wholesale markets for long-term sales of capacity and electric energy. This indicates the long-term nature of the markets for QF resources that the FERC expects the states to provide.

**Q6: What is the basis for your conclusion that long-term contracts are necessary for renewable QFs to obtain financing and to be developed successfully?**

A6: This conclusion is based both on (1) representations made to me in my role as a consultant by QF developers and by the financial community of potential lenders to QF projects and (2) my 35 years of experience as an observer of the patterns of

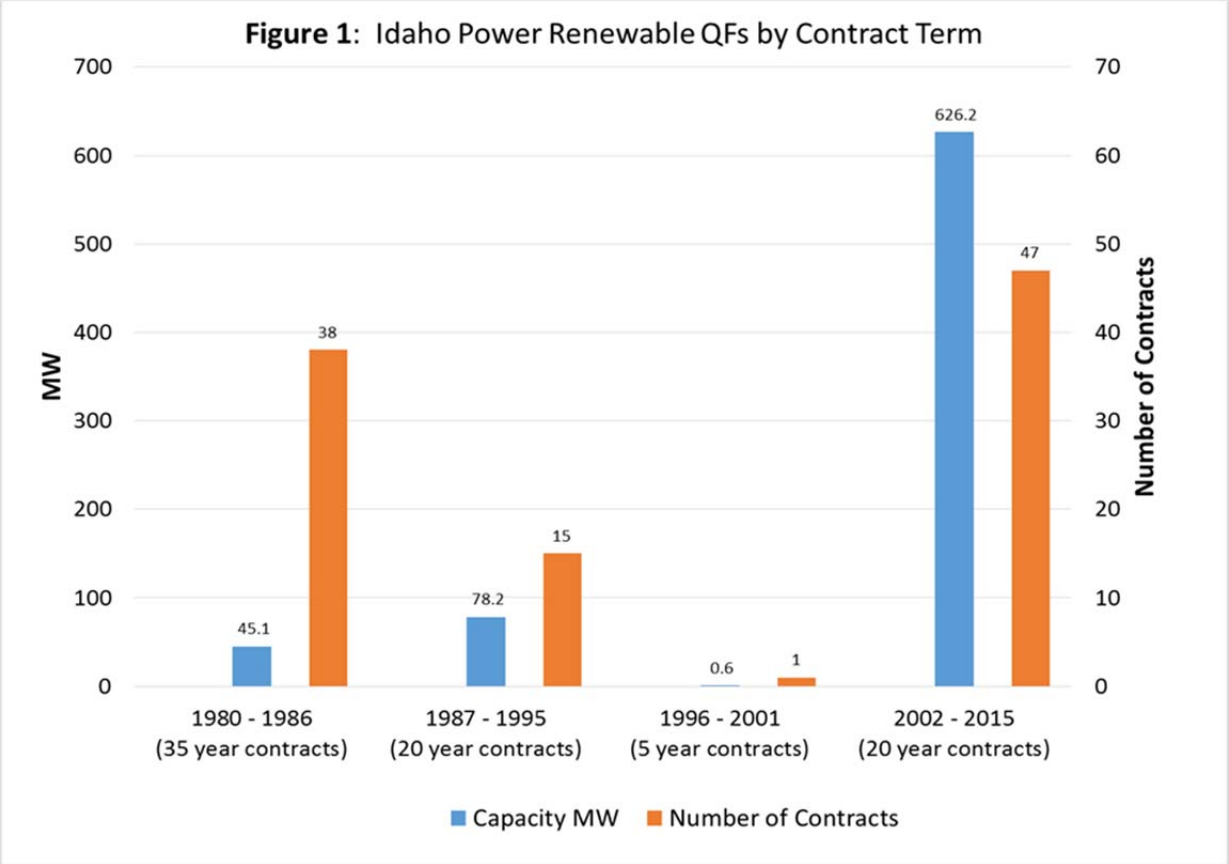
[1] Beach Direct Testimony for Vote Solar, at pp. 5-7.

QF development in multiple states in the western U.S., which over time have offered contracts with differing terms to renewable QFs. Generally, the development of renewable QFs has only occurred when states have provided access to long-term contracts with terms of 15 to 30 years and with fixed prices for all or a substantial portion of the contract terms, such that renewable QFs can secure long-term financing for the capital costs of their projects. In contrast, when only short-term (5 years or less) contracts have been available, very few QFs are developed. As noted in my direct testimony, this has been true in Montana, where the QF wind projects developed under Schedule QF-1 have obtained long-term, 25-year contracts with NWE, as have the nine solar QFs that have PPAs with NWE and that are still under development.[2]

**Q7: Has this been the pattern in other nearby states?**

A7: Yes. In Idaho, for example, virtually all of the QF projects successfully developed in that state have done so under power purchase contracts with terms of at least 20 years. This includes the small hydro projects developed in the 1980s and 1990s, the wind projects developed in 2010-2012, and the 461 MW of solar QF projects that the Idaho commission approved in 2014-2015. **Figure 1** illustrates this history for Idaho Power, showing the number and capacity of the QFs that have been successfully developed as a function of the available term of QF contracts.

[2] See NWE's *2015 Integrated Resource Plan (2015 IRP)*, at Volume 1, Table 8-6 for future QF wind resources under Schedule QF-1; for existing wind projects, see *2015 IRP*, Volume 2, page 35 of 2652 (titled "NWE Existing Energy Supply Resources as of February 11, 2015"). NWE Testimony (Hines), at pp. JDH-7 and JDH-12, supplemented by NWE response to PSC Data Request PSC-002, PSC-005, and NWE's current interconnection queue (for the project capacities).




PacifiCorp operates in six western states. Most of the renewable QF projects successfully developed in that utility's multi-state service territory have obtained power purchase contracts with terms of at least 15 years. Of PacifiCorp's 537 MW of existing renewable QF contracts that do not burn fossil fuels or biomass[3] and that were operational in 2015, the weighted average contract term is 19.7 years. Specifically, 91% of this capacity operates under contract terms of 10 years or longer. 100% of the 897 MW of wind and solar contracts that PacifiCorp has signed in the last several years have 20-year terms.[4]

**Q8: What other states provide similar histories?**

A8: California offered 20- to 30-year PURPA contracts in the 1980s, with renewable QFs provided fixed energy prices for up to the initial ten years of the contract, and

[3] In other words, QFs using all technologies except natural gas-fired cogeneration and biomass or biogas.

[4] Based on data provided by PacifiCorp to the Sierra Club in Utah Public Service Commission Docket No. 15-035-53. See *Direct Testimony of R. Thomas Beach* on behalf of the Sierra Club in that docket, at p. 12.

fixed capacity prices for the full term. About 5,000 MWs of renewable QF projects were developed in the state in the late 1980s; much of this capacity is still operating today and now is the lowest cost generation available to the state's RPS program. This development ceased when the long-term contracts were suspended in the late 1980s, and did not revive until after the enactment of the California RPS program in 2004, which again made available long-term contracts with terms of up to 25 years. As another example, the recent active development of small solar QFs in North Carolina is founded upon the availability of 15-year contracts at known, fixed prices. Thus, the history of QF development in the West and elsewhere in the U.S. shows that, without long-term 15- to 25-year contracts, few if any QFs will be developed.

**Q9: Is it surprising that history shows that the availability of long-term QF contracts is necessary for the development of renewable QFs?**

A9: No. This history is not surprising – renewable energy projects (except for biomass) have no fuel costs but are capital-intensive, and, in my decades of experience I have observed that long-term contracts are essential for such projects to access financing on reasonable terms. This need for long-term assurance of capital recovery is the same for QFs as it is for a utility that proposes to build a new power plant and seeks commission approval for long-term recovery of the plant's costs by including them in rate base. A utility would not build a new generating plant if it were only assured of cost recovery through rate base for a short period, had to re-justify the plant's cost-effectiveness in each rate case or biennial integrated resource plan ("IRP") proceeding, or was limited to cost recovery based on revenues from short-term energy markets.

**Q10: Are there recent examples of other state commissions that have considered utility requests to reduce the term of PURPA contracts?**

A10: Yes. To my knowledge, there are four – North Carolina, Idaho, Utah, and Oregon. In only one state (Idaho) did the commission reduce the contract term to less than 15 years, and the circumstances in Idaho are clearly distinguishable from

those that NWE now faces in Montana.

**North Carolina.** In 2014, the utilities in North Carolina asked the commission in that state to shorten the term of PURPA contracts to a maximum of 10 years, a reduction of 5 years from the maximum 15-year term that in recent years has resulted in significant development of small solar QFs in that state. The North Carolina Utilities Commission rejected this request, finding that the term of QF contracts should be long enough to enable QF projects to be financed:

> While the Commission initiated this docket to investigate the need to alter avoided costs determinations, the evidence presented by the buyers and sellers of QF power fail to justify altering the Commission's earlier decisions on term length and related provisions. As discussed earlier, a QF's legal right to long-term fixed rates under Section 210 of PURPA is well established as a result of the FERC's *J.D. Wind* Orders. The FERC has made clear that its intention in Order No. 69 was to enable a QF to establish a fixed contract price for its energy and capacity at the outset of its obligation because fixed prices were necessary for an investor to be able to estimate with reasonable certainty the expected return on a potential investment, and therefore its financial feasibility, before beginning the construction of a facility. In her responses to cross-examination questions about various Duke Energy Renewables projects, DEC/DEP witness Bowman acknowledged the foregoing by stating that PURPA does not require the best financing, just the ability to secure it.[5]

**Utah.** In 2015, PacifiCorp asked the Utah commission to reduce the term of QF contracts in Utah from 20 years to three years, based on an assertion that the utility faced the prospect of contracting with 3,692 MW of proposed new QF contracts in its six-state service territory (including 2.253 MW in Utah alone), mostly with solar resources, whose power PacifiCorp did not need for many years.[6] The clean energy advocates and QF developers who opposed this request noted that it was highly unlikely that this amount of new QF resources could be developed economically, as PacifiCorp's indicative long-term pricing would decline as more new QFs pushed the utility's resource deficiency date even

[5] North Carolina Utilities Commission, *Order Setting Avoided Cost Input Parameters* (Docket No. E-100 Sub-140, issued December 31, 2014), at pp. 19-20. Hereafter, "North Carolina Avoided Cost Order."

[6] See *Direct Testimony of Paul H. Clements* on behalf of PacifiCorp in Utah Public Service Commission Docket No. 15-035-53, at pp. 2-3.

further into the future, thus reducing avoided cost prices to below the cost of new solar generation. These parties also argued that long-term contracts are necessary for QFs to obtain viable financing. The Utah commission decided to reduce the QF contract term from 20 years to 15 years, finding that this term was an appropriately "measured response" that balances mitigating risks to ratepayers and continuing to provide a viable long-term contracting option for QFs.[7] Notably, the deluge of QF contracts that PacifiCorp feared in 2015 has not materialized, even though long-term contracts remain available in Utah and Oregon. A recent PacifiCorp "kick-off" presentation for its 2017 IRP shows that the utility expects its portfolio of wind and solar QFs to increase by 411 MW of nameplate capacity (representing 177 MW of firm capacity) by the end of 2017.[8] This is far less than the 3,692 MW of QF projects that the utility feared in 2015 that it would have to sign in this time frame.

**Oregon.** In 2015, both PacifiCorp and Idaho Power asked the Oregon commission to reduce the term of QF contracts over 100 kW in size in that state from 20 years to three years (PacifiCorp) or two years (Idaho Power), on the same grounds as their requests in Utah and Idaho. In March 2016, the Oregon commission denied these requests, although Oregon did reduce the maximum size of solar QFs who could qualify for the 20-year standard QF contract from 10 MW to 3 MW, which is the same size limit that presently applies in Montana. With respect to shortening the contract term, the Oregon commission stated:

> We recognize the benefits and risks associated with longer QF contract terms. Longer term contracts help align the financing period with an asset's useful life, making the investment less risky and likelier to obtain far more reasonable financing terms. On the other hand, longer term contracts increase the likelihood of forecasting errors in developing QF avoided prices, thus potentially subjecting ratepayers to costs that exceed the utility's actual avoided costs.

[7] Utah Public Service Commission, Order dated January 7, 2016 in Docket No. 15-035-53, at pp. 19-20.

[8] 411 MW is the increase in PacifiCorp's QF portfolio expected by the end of 2017 compared to the QF portfolio shown in the utility's 2015 IRP. See PacifiCorp, *2017 IRP Kick-off Meeting* (June 21, 2016), at Slide 13. Available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2017_IRP/PacifiCorp_2017_IRP_PIM01_6-21-2016.pdf.

> After further consideration in this docket, we conclude that our current policy appropriately balances these interests. That policy provides for 20-year contracts, with prices fixed at avoided cost rates in place at the time of signing remaining in effect for a 15-year period, and indexed pricing for the remaining five years, continues to have merit. By specifying index-based rates for the final five years, QF developers will be given an incentive to realistically address future projects and manage their operations in ways that will maximize efficiency. These factors bring down the cost of renewable energy, making it more competitive with less environmentally-friendly alternatives and thereby further the public interest.[9]

**Idaho** is the only state with significant QF development that has substantially shortened the term of QF contracts, from 20 year to two years.[10] The Idaho commission found that shorter contracts would benefit both QFs and ratepayers, by allowing QF rates to more accurately reflect the costs avoided by the utility, with both QFs and ratepayers benefitting from "normal fluctuations in the market."[11] However, there are several important caveats to the Idaho commission's decision. First, QFs seeking a longer-term market were allowed to contract for a series of two-year contracts, and the Idaho commission allowed such QFs to receive capacity payments based on the resource deficiency year in place when the QF signs its first contract. This addressed the issue that a QF under a series of two-year contracts might never receive capacity payments if the resource deficiency year is always more than two years in the future.[12] This provision appears to have the effect of allowing QFs in Idaho to receive a capacity payment for as long as the QF is able to continue re-contracting every two years, with the contract re-priced every two years. Second, in terms of encouraging QF development, the Idaho commission noted the large portfolio of QF projects supplying or under contract to Idaho Power, including 461 MW of new, 20-year solar QF contracts that Idaho Power signed and the Idaho commission approved in late 2014 and early 2015, prior to the reduction in the contract term to two

[9] Oregon Public Utilities Commission, Order 16-129, dated March 29, 2016 in Docket UM 1725, at p. 8; see also Order 16-130, dated March 29, 2016 in Docket UM 1734.
[10] Idaho Public Utilities Commission, Order 33357, dated August 20, 2015 in Dockets IPC-E-15-01 *et al.*
[11] *Ibid.*, at p. 23.
[12] *Ibid.*, at pp. 23-26.

years.[13]

**Q11: Are the circumstances in Idaho in 2014-2015 distinguishable from those that face NWE today?**

A11: Yes. First, as noted above, in 2014 Idaho Power signed, and the Idaho commission approved, 461 MW of new solar contracts, which was a significant addition of renewable capacity and which extended the utility's resource deficiency year by at least three years further into the future, to July 2025.[14] Thus, when the contract term was debated in mid-2015, Idaho Power had added significant new solar capacity under PURPA equal to about three years of load growth, or approximately 7.4% of the utility's 2014 peak demand on the basis of firm capacity and about 7.1% of the utility's 2014 annual energy requirements.[15] As a result, Idaho Power no longer had a near-term need for new generating capacity. This is substantially different than the circumstances now facing NWE, which has an immediate and substantial need for capacity to become resource sufficient. Further, the 26 MWs of small solar PPAs (9.9 MW of firm capacity[16]) that NWE has signed to date represent about ten months of load growth, just 0.8% of NWE's 2014 peak demand and 0.8% of its energy requirements.[17] Thus, by these metrics, Idaho Power has done far more than NWE to carry out the intent of PURPA to encourage renewable QF development.

**Q12: Mr. Beach, did you testify in the Idaho Public Utilities Commission's proceeding in 2015 to shorten the QF contract term in Idaho, and what was**

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[13] *Ibid.*, at pp. 22 and 24.

[14] Idaho Power's *2015 IRP*, at p. 128 (Table 9.5) shows that the effect of terminating 141 MW of these solar contracts was to change Idaho Power's capacity deficiency date by one year, in the status quo case. Thus, the full 461 MW of solar contracts would shift the utility's resource deficiency year by more than three years. See https://www.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2015/2015IRP.pdf.

[15] This assumes that the new solar QFs in Idaho have an annual capacity factor of 26.8% and a firm capacity value of 51.3% of nameplate, based on Idaho Power's method for valuing solar capacity, as discussed in its *2015 IRP*, at pp. 49-51. The 2014 system peak and average load data used to calculate solar penetration is from the Idaho Power *2015 IRP*, at p. 24, Table 3.1.

[16] Based on Vote Solar's recommendation that solar capacity on NWE's system should be have a firm capacity value of 38% of nameplate.

[17] Peak and average load data used for these penetration calculations are from NWE's *2015 IRP*, at Tables 2-1 and 2-2 and Figure 2-3.

**your position?**

A12: Yes, I testified in that case on behalf of the Idaho Conservation League and the Sierra Club. I testified then – and continue to believe today – that the Idaho commission's decision to shorten the QF contract term to just two years was unnecessary and probably contrary to the intent of PURPA. The change was not necessary because the addition of the initial 461 MW of solar PPAs pushed out Idaho Power's deficiency year significantly, thus reducing its indicative prices for solar QFs to the point that further solar QF development in Idaho was unlikely. The intent of PURPA is to allow the price signal of avoided cost pricing to determine the demand for new QF capacity in a state. In terms of encouraging QF generation, it is far preferable to use the avoided cost price signal, regularly updated, in preference to regulatory interventions that attempt to slow QF development by reducing the contract term and thus making it difficult or impossible to finance new projects.

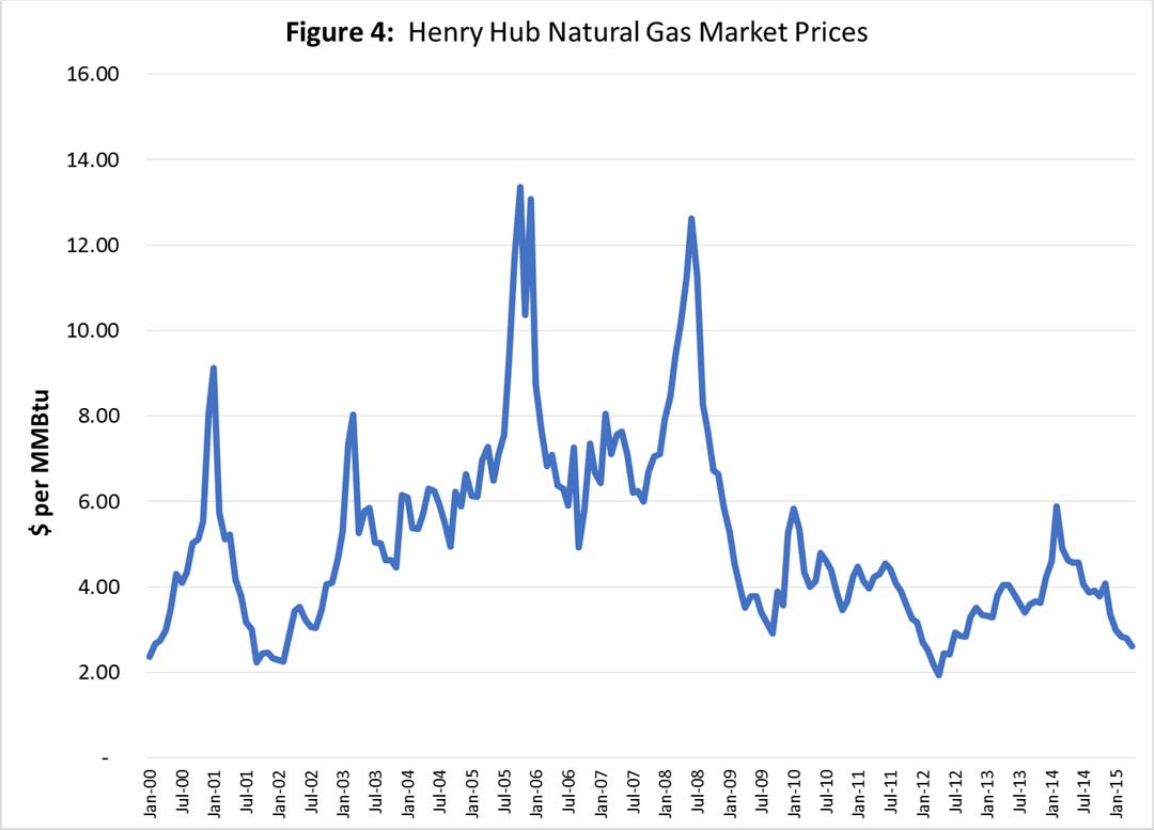
**Q13: What is the recent history of solar QF development in Utah and Oregon, where long-term contracts remain available to solar QFs?**

A13: Development has slowed in both states since 2014-2015, as a result of lower avoided cost prices, even though both states have maintained the availability of QF contract terms of at least 15 years. As noted above, PacifiCorp's portfolio of wind and solar QF projects that are expected online by the end of 2017 has increased by just 411 MW since its *2015 IRP*, just 11% of the 3,692 MW that the utility told the Utah commission in 2015 that it feared it would have to sign. This strongly suggests that Idaho's action to shorten its QF contract term to two years was unnecessary as a way to slow the further development of solar QFs in Idaho, as development would have decreased due to economics alone, as has happened in PacifiCorp's Utah and Oregon service territories.

**Q14: Are there greater risks to ratepayers from long-term QF contracts than from shorter-term contracts reflecting avoided cost prices that more closely follow what the Idaho commission characterized as "normal fluctuations in the**

**market"?**

A14: No. A fixed price contract is not more risky than one in which prices are adjusted frequently. The standard definition of "risk" is exposure to the chance of loss. A contract whose price adjusts frequently may produce the result that the ratepayer receives a price close to the prevailing market price. In this respect, such a contract may reduce the risk that the ratepayer will pay a price different than the market price. However, this is not what the ratepayer desires, particularly if there is substantial volatility in the market price, as there is in the natural gas market, as illustrated in **Figure 4** in my direct testimony, reproduced below.




Most important, there is a significant risk of periodic "abnormal" fluctuations in market prices, as a result of weather events such as polar vortices and major Gulf Coast hurricanes or of market disruptions such as the 2000-2001 California energy crisis – all of which are evident in the price spikes in Figure 4. Such volatility is not a rare occurrence, as the above figure illustrates.

**Q15: How do long-term QF contracts benefit ratepayers?**

A15: Ratepayers benefit most from a low, stable price. This is not always a price that simply equals the market price. Ratepayers can be substantially harmed if their costs for energy at times are very high due to volatility in energy market prices. As a result, consumers generally are willing to pay a premium to expected market prices in order to eliminate the future volatility in those prices. In essence, this premium represents insurance that consumers are willing to buy against the high costs of periodic spikes in market prices.

**Q16: Does the economic literature commonly ascribe a risk reduction benefit to fixed price contracts?**

A16: Yes. There are numerous examples and studies that demonstrate that consumers are willing to pay a premium to fix the price of a commodity, including energy commodities.

- Perhaps the most familiar is the **fixed-rate home mortgage**, which typically carries a higher interest rate than an adjustable rate mortgage as the premium required to eliminate the risk of future interest rate fluctuations.
- The **natural gas forward market** provides consumers with a means to buy future supplies of natural gas at a price known today. Comparisons between forward gas market prices and contemporaneous fundamentals-based forecasts of gas prices reveal a consistent premium in the forward prices, perhaps associated with the "risk premium" that sellers in the forward markets require, and that buyers are willing to pay, in order to fix future prices.[18]
- **Long-term contracts for natural gas**, at publicly-known prices, are not common today. However, such contracts typically show a premium to current price forecasts. For example, in 2011 Public Service of Colorado (PSCo) signed a ten-year gas supply contract with Anadarko Petroleum to support the replacement of a portion of PSCo's coal-fired generation with gas generation, at a fixed price that was $1.38 per MMBtu higher than the Energy Information

[18] Bolinger, Mark, *Revisiting the Long-term Hedge Value of Wind Power in an Era of Low Natural Gas Prices* (Lawrence Berkeley National Lab, LBNL-6103E, March 2013), available at http://emp.lbl.gov/sites/all/files/lbnl-6103e.pdf.

Administration's contemporaneous forecast of prices in PSCo's market.[19]

- Many utilities, including NWE, conduct **risk management programs** that include hedging and that are intended primarily to reduce the near-term volatility in their fuel and purchased power expenses. Generally, these programs focus on reducing volatility only in the next one to three years, as the forward markets are most liquid in the near-term and there are substantial transaction costs associated with long-term hedges in financial markets. Significantly, PacifiCorp's discussion of its hedging program in its *2015 IRP* emphasizes how its long position in the power market functions as a hedge against its short position in natural gas. PacifiCorp concludes that "[t]his has the effect of reducing the amount of natural gas hedging that the Company would otherwise pursue."[20] This is exactly the hedge represented by fixed-price solar contracts. In addition, other observers have noted that long-term, fixed-price contracts for renewable generation provide utilities with a means not available in the financial markets to hedge their long-term exposure to gas and power markets, and could thus replace a portion of their current budgets for risk management.[21]

**Q17: Isn't there a risk for ratepayers that future avoided costs will be lower than forecasted in a long-term PPA?**

A17: Obviously, there is a risk that consumers may not benefit if future prices turn out to be lower than anticipated, but, if that happens, consumers will enjoy the low prices for the portion of their needs that is not hedged.

**Q18: Do ratepayers bear more operational risks with renewable QF PPAs than with utility-owned fossil generation?**

A18: No. As I have discussed above, ratepayers are subject to significant price risk for

[19] Lisa Huber, *Utility-scale Wind and Natural Gas Volatility: Unlocking the Hedge Value of Wind for Utilities and Their Customers* (Rocky Mountain Institute, July 2012), at p. 13, available at http://www.rmi.org/Knowledge-Center/Library/2012-07_WindNaturalGasVolatility.

[20] See PacifiCorp *2015 IRP*, at pp. 246-247. The PacifiCorp *2015 IRP* is available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2015IRP/PacifiCorp_2015IRP-Vol1-MainDocument.pdf.

[21] See Huber, at p. 15.

the cost of fuel for utility-owned fossil resources and must commit to support the pipeline or transportation infrastructure needed to assure the long-term delivery of fuel supplies. In addition, ratepayers bear fewer operational risks with QF resources, as such risks are borne primarily by the QFs themselves. The performance requirements of QF PPAs typically require QFs to deliver energy within the performance bounds in the contracts to receive any payments. They are not paid if the QF project is never built or fails to operate correctly. They can be penalized for under delivery. The only element of the contractual payment which is guaranteed for the QF is the rate. Thus, while the ratepayers are shielded from these risks, for the QF, this is substantially riskier than a utility's investment in generation assets. Once such an asset is approved for rate recovery through the utility's rate base, the utility will recover its costs, including necessary fuel, and earn a return, even if the plant is out of service or does not perform with the efficiency originally advertised. The only circumstance in which this assured return will change is the rare event that the state commission finds, typically after a lengthy regulatory process, that the utility's operation of the plant was imprudent. No such finding is required to deny payment to a QF project: if the QF fails to deliver per the contract, it is not paid. This represents an appreciable reduction in operating risk for ratepayers in comparison to the avoided fossil resource.

**Q19: Would it be reasonable to limit the time period in a long-term contract during which fixed rates are paid, with market index-based payments thereafter?**

A19: Such a structure is used today in the standard QF contracts in Oregon, where the initial 15 years of the contract has fixed prices, with market-indexed prices for the final 5 years. The reasons that Oregon adopted this structure are noted in the quote from the Oregon commission's Order 16-129 that is cited above. Vote Solar would support such a structure in Montana, with an important clarification: the portion of the avoided cost rate that covers avoided capacity costs should be

fixed for the entire 25-year term.[22] A QF avoids capacity-related costs when it is built, by deferring a certain resource that would be built in the resource deficiency year. Thus, avoided capacity costs are reasonably determined when the QF contract is signed and approved, and for that reason should be fixed for the entire contract term. It is only the avoided energy cost portion of the long-term avoided cost rate that is based on forecasts of future market prices for natural gas and electricity that are uncertain in the final years of a long-term contract. As a result, only the avoided energy cost portion of the long-term avoided cost rate should be re-set to a market index in the final five years of the contract.

## III. PERFORMANCE STANDARDS FOR SOLAR CONTRACTS

**Q20: Should the Commission authorize performance standards applicable to QF contracts in this docket?**

A20: No. The Commission should not address potential performance standards. NWE has not proposed any such standards. Interested persons that are not parties to this proceeding had no notice that performance standards would be at issue in this docket, and therefore lack a reasonable opportunity to intervene to protect their interests. If the Commission wishes to address performance standards applicable to QF contracts, it should do so in a separate proceeding in response to an application by NWE.

**Q21: What is Vote Solar's general position regarding performance standards for solar QF contracts?**

A21: Vote Solar believes that reasonable performance standards may be appropriate, and would evaluate any proposed standards on a case-by-case basis to determine whether they provide appropriate and lawful incentives to project owners to

[22] This appears to be the way in which the 20-year Oregon PPAs for solar QFs (Schedule 85) work. On-peak capacity payments continue after year 15, while only the energy portion of the price is re-indexed to natural gas market prices for years 16-20. See, for example, Idaho Power's Schedule 85 for its Oregon service territory, available at https://www.idahopower.com/AboutUs/RatesRegulatory/Tariffs/tariffPDF.cfm?id=269.

maintain and operate their projects in a reasonable manner over the long-term. Among other things, Vote Solar would evaluate whether proposed performance standards unlawfully discourage renewable energy production, whether they accommodate the natural variability and typical operating circumstances of solar technologies, and whether they allow solar projects to obtain financing on reasonable terms.

**Q22: In your opinion, are there certain aspects of performance standards that are essential?**

A22: Yes. Contractual performance standards for solar QFs at a minimum must include:

- **Degradation.** Any performance standards should include an allowance for the normal and expected degradation in solar panel output.

- **No penalties within normal variability due to weather.** Any performance standards should recognize the normal variability in solar insolation at ground level, and should not penalize projects if a period of cloudy weather reduces output.

- **Allowances for forced outages and scheduled maintenance.** Solar photovoltaic facilities have few moving parts, are very reliable, and require little maintenance. Nonetheless, as with similar provisions in other types of unit-contingent power purchase agreements, any performance standards in solar QF contracts should include reasonable allowances for forced outages and scheduled maintenance that are based on industry-standard performance for comparable solar generating facilities.

**Q23: Does this complete your supplemental testimony?**

A23: Yes, it does.

**CERTIFICATE OF SERVICE**

I hereby certify that on the 9th day of November, 2016, I served the foregoing by first-class mail, postage prepaid, and electronic mail on the following:

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