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February 13, 2013

VIA E-FILING

Dr. Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Re: In the Matter of Establishing a Distributed
Solar Value Methodology Under
Min. Stat. §216B.164, subd. 10 (e) and (f)
Docket No, E999/M-14-65

Dear Dr. Haar:

The Minnesota Public Utilities Commission (“Commission”) issued a Notice of Expedited Comment Period on Distributed Solar Value Methodology Proposal (“Notice”) on January 31, 2014, in the above referenced docket. Minnesota Power respectfully submits its Comments in response to the Notice.

Please contact me at the number provided above with any questions or concerns.

Yours truly,

Marcia A. Podratz

**STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION**

In the Matter of Establishing a Distributed
Solar Value Methodology under
Min. Stat. §216B.164, subd. 10 (e) and (f)

Docket No, E999/M-14-65
**MINNESOTA POWER'S
COMMENTS**

I. Introduction

Minnesota Power appreciates the opportunity to submit Comments to the Minnesota Public Utilities Commission (“Commission”) in response to the January 31, 2014 Notice of Expedited Comment Period on Distributed Solar Value Methodology Proposal (“Notice”). The Notice requests Comments on the Minnesota Department of Commerce – Division of Energy Resources’ (“Department”) proposed Value of Solar (“VOS”) Methodology.

On August 9, 2013, the Department issued a memo outlining a schedule for the stakeholder engagement process for the methodology development of the VOS tariff. Minnesota Power fully participated in this process and submitted multiple rounds of comments as a stakeholder. Minnesota Power’s final comments on the Departments’ proposed methodology from the stakeholder process can be found in Attachment A. Minnesota Power has included the attachment and an Executive Summary in these Comments, with additional detail incorporated where needed, given that a majority of the same principles and concerns still apply.

II. General Comments

The VOS legislation¹ was enacted in order to bolster the growth of solar photovoltaic (“PV”) systems in the State of Minnesota. This legislation was also partly crafted as assurance that there would be a true representation of the costs and benefits associated with solar PV

¹ Minn. Stat. § 216B.164, Subd. 10

adoption. According to Subd. 10 (f) of the VOS statute, the resulting VOS Tariff methodology must include certain specified components and may also, based on known and measurable components, incorporate other values. This is best accomplished by employing a balanced and transparent approach to the methodology that is cognizant of multiple stakeholders and their varying perspectives, all while maintaining focus on the ultimate impact to customers. Minnesota Power hopes that the Commission will approve a VOS methodology that can be utilized as a practicable alternative to net metering without adversely impacting its efforts to secure least-cost electric supply for its customers. Minnesota Power is hopeful that the outcome of this process will be a successful VOS rate methodology and looks forward to the possibility of implementing a new VOS tariff. Correspondingly, in the interest of transparency and to simplify the calculation and administrative process as much as possible, Minnesota Power recommends that the Department makes its VOS methodology calculation spreadsheet models available to all stakeholders who participated in the VOS process.

Entering into a long-term contract with an owner of a solar PV device entails significant risk for utilities and their customers. The VOS rate will be based on current assumptions that could change significantly over time. If the rate is set too high, it may not be prudent for utilities to enter into contracts with solar PV owners because that could result in utility customers overpaying for their electric service. For this reason, Minnesota Power urges the Commission to be conservative in considering the VOS methodology and use known and measurable costs that are truly avoidable as a result of solar PV systems being added onto the system. As discussed further below, such avoided costs can potentially include reductions in fixed costs (e.g., generation, transmission, and distribution capacity) that the utility may avoid or defer because of the presence of a solar generator in a specific location on its system. It also can include reductions in variable costs (e.g., fuel, variable O&M, and variable environmental costs).

III. Executive Summary of Comments from Department Stakeholder Process

Value Component: Avoided Fuel Cost

Minnesota Power understands the Department's effort to simplify the avoided fuel cost component of the methodology by basing the value solely on displaced natural gas generation. Minnesota Power is supportive of the high level concept of an avoided fuel cost based on the marginal fuel, but it has concerns with the assumption that a natural gas resource is and will remain on the margin as the basis for calculating the Solar Weighted Heat Rate.

Fuel Price Guarantee:

The Department's proposed methodology for calculating the Avoided Fuel Cost component includes a fuel price guarantee adder that removes long-term uncertainty in natural gas prices. The forward natural gas price is inflated to take into consideration an assumed fuel price risk that is eliminated over the 25-year life of the photovoltaic ("PV") panel being added to the system. Minnesota Power has two concerns with this approach. First is making the base assumption that a fuel price guarantee adder should be included in the VOS rate, and second is that the proposed 4.75 percent escalation rate for natural gas prices beyond the 12-year trading period on NYMEX² is a higher rate than utility planning practice.

Inclusion of a fuel price guarantee component in the VOS goes beyond what the statute requires or contemplates. Although the Department's stated intent of the guaranteed fuel price is to be "risk-free," locking in a fuel price for 25 years would actually be very risky for customers due to the many uncertain assumptions in determining such a price and the likelihood of significant changes during the term. Eliminating price volatility is not the same as eliminating risk.

² New York Mercantile Exchange – a commodity futures exchange

Using the NYMEX futures or any other guaranteed fuel price to determine the value of avoided fuel for a 25-year period is significantly outside utility practice for considering long-term contracts for power supply and could well result in utilities not offering the VOS tariff rate in order to protect ratepayers from significantly overpaying for solar energy in this category.

Value Component: Avoided Plant Operations and Maintenance (“O&M”) Cost

Minnesota Power generally agrees with the Department’s approach to calculating the Avoided Plant O&M (fixed and variable). It is, however, unclear to Minnesota Power what type of generation plant is used to calculate the \$/kW and \$/kWh values (e.g., a combustion turbine, combined cycle turbine, or a combination of both).

Value Component: Avoided Generation Capacity Cost

Minnesota Power agrees with the Department’s high level approach that the avoided capacity should be based on the next natural gas resource addition at this time and the capacity value should start in the year of the first resource need for its customers. It is Minnesota Power’s preference to calculate this component with the capital cost based on a combustion turbine because that is its next planned natural gas resource addition.

Value Component: Avoided Transmission Capacity Cost

On page 30 of the “Minnesota Value of Solar: Methodology” report (“VOS Report”) , there is a short paragraph which recommends that avoided transmission capacity costs be calculated “based on the utility’s 5-year average Midcontinent Independent System Operator (“MISO”) Open Access Transmission Tariff (“OATT”) Schedule 9 charge.” MISO Schedule 9 relates to Network Integration Transmission Service. Minnesota Power updates its Schedule 9 rate annually based on system average embedded transmission costs. It is not clear from the Department’s brief description whether the Department is recommending a five-year historical average, a five-year forward-looking average, or some other five-year period for the calculations. Historical average costs clearly do not represent transmission costs that can be avoided.

Forward-looking estimates of the Schedule 9 rate may include some components of avoidable transmission costs, but they primarily reflect “sunk” costs of the existing transmission system. If avoided transmission capacity costs are to be included in the methodology, it would be preferable to base them on the cost of future transmission investments that could be avoided by solar PV resources. In addition, including an avoided transmission cost component is reasonable only if the peak output of distributed solar resources on a distribution feeder does not exceed the peak load of the distribution substation and result in feeding energy back onto the transmission system.

Value Component: Avoided Environmental Cost

The VOS Report states that the alternative tariff should include compensation to customers for the value to society for operating a distributed solar PV resource. As Minnesota Power stated in its Comments in the previous Department-led stakeholder process, the components of the VOS tariff should be based upon known and measurable components of today while maintaining the flexibility for addressing the unknowns of tomorrow. Minnesota Power believes the proposed Department components of the Avoided Environmental Cost do not meet these standards and, furthermore, go beyond what is required by the statute. Minnesota Power opposes the use of speculative environmental externality values that were developed for purposes such as long-term resource planning and not intended for ratemaking purposes.

The Department’s proposed value for carbon dioxide (“CO₂”) does not even meet the Commission-established standard of the other proposed components of Avoided Environmental Cost. The proposed CO₂ value is not based upon a Commission-established amount for resource decision-making purposes or upon any other Commission proceeding to establish that value. Using the unresolved and still pending United States Environmental Protection Agency (“EPA”) Societal Cost of Carbon (“SCC”) value as the Department has done in its proposal is problematic by definition. Minnesota Power believes it is important for the Commission to recognize that the EPA SCC is far from being an established authoritative standard for measuring the societal benefits of reducing CO₂ and is being reviewed by the federal government. It is also yet to

become a Commission-established value by which to measure those benefits for either resource decision purposes or for ratemaking.

Distribution- and Transmission-related Components:

The Department's proposed VOS calculation includes a number of distribution related components. Avoided Distribution Capacity Cost is a direct input; Peak Load Reduction ("PLR") and Avoided Distribution Line Losses are multipliers; Fleet Production Shape is a tool for estimating system solar capabilities; and Voltage Control and Integration Costs are placeholders for future consideration.

Within the Department's Report, there is an assertion that the rate derived from the VOS calculation will have no negative impact on Minnesota Power ratepayers. If the VOS methodology is used to develop rates applicable to solar energy purchases, and the costs of those purchases are then paid for by ratepayers, that statement is not accurate. In general, the distribution inputs/benefits are overstated and the costs of implementation are not considered. This is primarily due to the fact that, as the PLR will indicate, there is very little overlap between peak solar production and peak system usage on a site-by-site basis.

- Unless cost effective methods of storing and dispatching the energy are introduced, savings from Avoided Distribution Capacity Cost and Avoided Distribution Line Losses will not materialize. In fact, they may very well turn out to be increases rather than reductions. This is primarily due to the fact that sizing the solar generation to the on-site load based on total monthly energy rather than capacity will likely result in peak generation capacity at each site that is two to three times the peak usage. That excess energy needs to be distributed throughout the system the same as energy from conventional generation (distribution substations from a distribution perspective). The line losses will remain as will the very real potential for system capacity increases, rather than decreases, on a site specific basis.

- General administrative and engineering expenses associated with creating and maintaining the studies and databases related to PLR, Fleet Shape, mapping and tracking within the GIS, and either the System-wide or Location-specific Avoided Distribution Capacity Cost studies, although currently unidentified, will likely be substantial and the costs will be spread over all other ratepayers.
- The proliferation of “foreign feeds” on a utility’s distribution system has the potential of negative impacts in the areas of:
 - Increased SAIDI (outage duration) associated with switching, and
 - Increased safety concerns for line personnel associated with potential back feed onto the system.

Avoided Transmission Line Losses

On Page 19 of the VOS Report, the Department recommends that avoided transmission and distribution loss savings be considered in the avoided energy costs. Minnesota Power disagrees with including avoided transmission losses as a separate component. MISO market Locational Marginal Prices (“LMP”) for energy include a marginal transmission loss component. Therefore, if the VOS methodology for avoided energy/fuel costs is based on the marginal generating unit in the MISO market as suggested by the Department, the marginal energy price already includes marginal transmission losses, and they therefore do not need to be quantified separately.

IV. Other Considerations

Resource Planning, Power Supply and Power Purchases

In the course of utility resource planning and power supply procurement processes there are many aspects that are considered to determine if a power supply option is in the best interest of customers. The overall impact of the potential power supply and its unique attributes are

included in a least-cost evaluation to determine if there is potential for long-term customer benefit. The resources determined to be least cost for customer power supply are those that utility resource plans identify as being part of a “Preferred Plan” or are incorporated into the near-and-long-term action steps of the resource plan. The components proposed in the VOS methodology reflect the same resource planning attributes. Current resource planning supports that solar generation can provide benefit to customer power supply in the long term if certain economic conditions are realized (typically under heavy environmental regulation). In other scenarios, the solar technology is higher cost than other renewable alternatives. With the implementation of the Minnesota Solar Energy Standard, utilities are now required to identify a method for meeting the associated solar requirements by year 2020. The resulting method will be incorporated into future resource planning evaluations.

In contrast to this, as in the proposed VOS methodology, when a utility is negotiating with a counterparty to determine the specific terms of payment for a power supply alternative, it is not utility best practice to include clauses in the contract that require its customers pay upfront for costs that may occur in the future and are not currently being realized. The proposed contracting practice is economically unsound and burdens electric customers with unneeded costs in the near term that are speculative in the future. Typically, a contract will instead have a separate provision that compels the utility to compensate the power supply provider at the time a new economic cost or benefit occurs. For example, in the proposed VOS methodology there is the inclusion of an upfront payment for the environmental benefits prior to carbon regulation being enacted or monetized. Minnesota Power recommends that provisions such as this be invoked under defined future conditions, not speculatively upon initial implementation of a solar project.

Contract Term

The Department recommends a 25-year contract term and calculation period for the VOS calculations, based on the assumed service life of solar PV. Entering into a 25-year contract with an owner of a solar PV system entails significant risk for utilities and their customers alike. The typical life of a solar PPA is 20 years and this is also the statutory minimum set forth in the VOS

legislation. Minnesota Power urges the use of the shortest term contract permissible. Because the VOS methodology is new and fraught with uncertainty in the inputs, calculations, and impacts on non-participating customers, Minnesota Power recommends using the statutory minimum period of 20 years instead of 25 years. The VOS rate will be based on current assumptions that could change significantly over time.

VOS Example Calculation

On page 42 of the Report, Figure 3 includes a VOS Levelized Calculation Chart that incorporates the assumed values used in the example calculation. Minnesota Power is concerned that if the actual values are anywhere close to the example values, they would be much higher than the Company's current avoided costs. Table 1 reproduces the example VOS calculations from Figure 3 of the Report and then uses the same Gross Starting Value assumptions (which should be similar for all resource types) but substitutes Load Match Factors and Loss Savings Factors that would be applicable to a centralized dispatchable non-renewable resource to estimate that resource's value. It is assumed that a centralized non-renewable resource would not result in delivery system loss savings (i.e., Loss Savings Factors equal zero), and it also would not avoid transmission capacity, distribution capacity, or environmental costs. Because it is dispatchable, it would have a 100 percent load match factor for avoided fuel, O&M, generation capacity, and reserve capacity costs. As can be seen in Table 1, the total example "value" of a centralized dispatchable non-renewable resource using the Department's proposed VOS methodology would be \$0.120 per kWh. This value is significantly higher than Minnesota Power's current avoided cost-based Energy and Firm Power Capacity Credit of \$0.0293 per kWh in the Company's Rider for Parallel Generation, which is applicable to cogenerators and small power producers rated at 100 kW or less.³ Minnesota Power doesn't believe that solar PV generators should be compensated at a significantly higher rate for the avoided capacity and energy cost components than other customer-owned generation.

³ Minnesota Power Electric Rate Book – Volume I, Section V, Page No. 60.1, Rider for Parallel Generation (effective January 1, 2014), Section I.B, Simultaneous Purchase and Sale Rate.

	Solar (DOC/CPR Example)				Dispatchable Non-renewable		
	Gross Starting Value (\$/kWh)	Load Match Factor (%)	Loss Savings Factor (%)	Distributed PV Value (\$/kWh)	Load Match Factor (%)	Loss Savings Factor (%)	Centralized Non-renewable Value
Avoided Fuel Cost	\$0.061	100%	8%	\$0.066	100%	0%	\$0.061
Avoided Plant O&M-Fixed	\$0.003	40%	9%	\$0.001	100%	0%	\$0.003
Avoided Plant O&M-Variable	\$0.001	100%	8%	\$0.001	100%	0%	\$0.001
Avoided Gen. Capacity Cost	\$0.048	40%	9%	\$0.021	100%	0%	\$0.048
Avoided Reserve Cap. Cost	\$0.007	40%	9%	\$0.003	100%	0%	\$0.007
Avoided Trans. Capacity Cost	\$0.018	40%	9%	\$0.008			
Avoided Dist. Capacity Cost	\$0.008	30%	5%	\$0.003			
Avoided Environmental Cost	\$0.029	100%	8%	\$0.031			
Avoided Voltage Control							
Solar Integration Cost							
		Total \$/kWh:		\$0.134	Total \$/kWh:		\$0.120

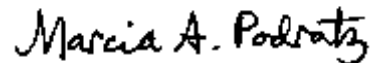
Table 1: Example Calculation – Solar vs. Dispatchable Non-renewable Resource

V. Conclusion

Minnesota Power appreciates the opportunity to provide feedback to the Commission on the Department's proposed VOS methodology and to voice its concerns on behalf of the Company and its customers. The Company reaffirms its belief that the VOS tariff should focus on known and measurable inputs and transparency which will result in proper price signals. The outcome of this process holds significant impact for both the utility and its customers. Minnesota Power looks forward to helping shape a VOS tariff that is equitable and in the best interest of all stakeholders.

Dated: February 13, 2014

Respectfully submitted,



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**STATE OF MINNESOTA
BEFORE THE
MINNESOTA DEPARTMENT OF COMMERCE
DIVISION OF ENERGY RESOURCES**

Value of Solar Proposed Methodology

**MINNESOTA POWER'S
COMMENTS**

I. Introduction

On November 19, 2013 the Department of Commerce – Division of Energy Resources (“Department”), in conjunction with Clean Power Research (“CPR”), released its draft proposed Value of Solar (“VOS”) tariff methodology. This methodology will be submitted to the Minnesota Public Utilities Commission (“Commission”) by January 31, 2014 for consideration and possible use by public utilities as an alternative to net metering.¹ Minnesota Power (or “the Company”) has evaluated the proposed methodology and offers its Comments.

II. General Comments

The Department proposed a methodology for the VOS that deviates from the utility’s traditional utility method for both evaluating the value of new power supply resources and the method for establishing customer costs for those resources. A long-standing requirement for utilities in the State of Minnesota’s integrated resource planning must, in balance, must maintain or improve reliable service, keep customers’ bills as low as possible, minimize adverse socioeconomic effects, minimize adverse environmental effects, enhance the utility’s ability to respond to changes impacting its operations and limit risks of adverse effects on customers and the utility that are beyond the utility’s control. Minnesota Power believes any new resource addition and associated ratemaking consider these overarching planning principles. While the

¹ Minn. Stat. § 216B.164, subd. 10(e).

VOS is a legislatively mandated methodology to establish, the legislation does not expressly require departure from well-developed Minnesota resource planning components.

Minnesota Power appreciates the Departments effort to simplify the VOS rate calculation, however, the proposed VOS methodology does not reflect the operation and cost of the utility power supply where a solar addition will be made. The methodology makes broad assumptions about the power system including that natural gas generation is and will continue to be the resource alternative to distributed solar for the next 25 years. It is important to recognize that from a traditional resource value assessment the proposed VOS rate will not accurately represent true avoided power supply costs for customers and that it will create cost subsidization that will need to be covered by all non-exempt power supply customers.

The Company also disagrees with the Department's statement that separation of usage charges from production credits "will ensure that utility infrastructure costs will be recovered by the utilities as anticipated in the design of the usage rate."² This is true only if the hourly solar delivery quantity does not exceed the maximum hourly energy usage at the customer site. If the hourly solar quantity exceeds customer energy usage delivered over the utility's distribution system, it could result in the need for additional distribution system capacity beyond what is reflected in existing electric usage rates.

At the November 19, 2013 Department-sponsored workshop it was communicated that stakeholders would prefer that all data included in the VOSs calculation be made public for transparency purposes. This request is challenging to meet given the forward looking nature of the proposed process and use of competitive data sets such as future fuel prices. Minnesota Power purchases proprietary third party outlooks for fuel prices, energy market outlooks and new gas generation project costs for conducting least-cost, long-term resource planning and resource assessment. The Company understands the desire to have the VOS process be as transparent as possible, however, given the information required to calculate VOS rate components per the

² Minnesota Value of Solar Methodology, Draft 11/19/13, Clean Power Research, Page 7.

proposed methodology, and consistent with past practices for calculating avoided costs, there would be several components of the VOST calculation that would not be shared publicly.

III. Comments on Proposed VOS Methodology

The seven value components required by legislation and two future components included in the proposed methodology were publicized in the Department's November 19, 2013 presentation. Through these Comments, the Company summarizes its concerns regarding the proposed methodology and provides feedback on the components.

Value Component: Avoided Fuel Cost

Minnesota Power understands the Department's effort to simplify the avoided fuel cost component of the methodology by basing the value solely on displaced natural gas generation. Minnesota Power is supportive of the high level concept of an avoided fuel cost based on the marginal fuel, but it has concerns with the assumption that a natural gas resource is and will remain on the margin as the basis for calculating the Solar Weighted Heat Rate. Minnesota Power does not have a combined cycle or combustion turbine as part of its power supply mix in the near term. Therefore, the Company would not have a utility-specific gas-fired generation heat rate for use in the calculations. In its recently approved 2013 Integrated Resource Plan ("IRP"), Minnesota Power's long-term action plan indicated the need for a combined cycle natural gas generator in the post 2020 time period. Based on the proposed calculation for the Solar Weighted Heat Rate, Minnesota Power's VOS avoided fuel cost component would be zero until Minnesota Power augments its power supply with a combined cycle generator in the post-2020 period. Minnesota Power is willing to work with the Department on an alternative methodology that better captures the diverse power supply attributes existing in Minnesota and truly captures the avoided fuel cost.

Fuel Price Guarantee:

The Department's proposed methodology for calculating the Avoided Fuel Cost component includes a fuel price guarantee adder that removes long-term uncertainty in natural gas prices. The forward natural gas price is inflated to take into consideration an assumed fuel price risk that is eliminated over the 25-year life of the photovoltaic ("PV") panel being added to the system. Minnesota Power has two concerns with this approach. First is making the base assumption that a fuel price guarantee adder should be included in the VOS rate and second is that the proposed 4.75 percent escalation rate for natural gas prices beyond the 12-year trading period on NYMEX³ is a higher rate than utility planning practice.

Inclusion of a fuel price guarantee component in the VOS is not required by statute, nor is it specifically listed as one of the optional components in statute. Utilities do not typically utilize an assumption of a guaranteed future fuel price during contracting or resource decisions, nor are customers commonly burdened with the risk of being locked into a price for 25 years. Typically the fuel prices for resources or in power supply contracts are based on an index and fluctuate with market conditions over time, so as not to make consequential long-term bets that could be imprudent for customers. In practice, Minnesota Power and other utilities work to purchase fuel at least cost on an ongoing basis, which generally does not eliminate all fuel price risk. Typically utilities use a series of purchases of varying terms and sources to serve its fuel needs to manage risk and keep costs as low as possible. If the VOST methodology requires a guaranteed fuel price component to be locked in, it will elevate the cost to customers and not represent the actual fuel costs that the solar energy would be avoiding on the power system. The inclusion of a fuel price guarantee would result in utility VOS payments to solar customers that would deviate significantly from utility best practices and would also require other customers to pay unnecessary increased costs where it is not necessary.

Three options, each inclusive of the guaranteed fuel price adder, were proposed by the Department for determining the natural gas price that would be utilized for the VOS avoided fuel

³ New York Mercantile Exchange – a commodity futures exchange

calculation. The only option that Minnesota Power viewed as having merit was the Future Market option, with the caveat that it makes an unrealistic assumption of future fuel price escalation. The proposed Future Market option is based on the value of natural gas on the NYMEX NG⁴ futures and the price then escalates at 4.75 percent beyond the twelve-year trading period. It is imprudent on behalf of customers to base the avoided fuel price for a twenty-five year period on a forward market price that has been proven to be volatile over the long term. The volatility experienced in the past has been driven by near term events and reactions and did not necessarily reflect the real value of natural gas based on long-term economic principles. Furthermore, there is little to no liquidity beyond about two years for natural gas forward prices, which decreases the validity of this type of forecast. The proposed starting point for the fuel price estimate is problematic, and the ongoing 4.75 percent escalation rate is equally concerning. The principal utility industry forecasts for long-term fuel price indications, such as those purchased and relied upon by Minnesota Power and used for resource planning and long-term contracting decisions, have annual escalators closer to 3 percent, not the elevated 4.75 percent proposed by the Department. Minnesota Power is opposed to using an escalation rate that significantly exceeds what is traditionally utilized for resource planning purposes in Minnesota.

Using the NYMEX futures or any other guaranteed fuel price to determine the value of avoided fuel for a 25-year period is significantly outside utility practice for considering long-term contracts for power supply and could well result in utilities not offering the VOST rate in order to protect ratepayers from significantly overpaying for solar energy in this category. Minnesota Power suggests the Department and CPR work with stakeholders to find an alternative methodology for determining the value of natural gas to be used in the avoided fuel calculation that is closer to actual utility practice and market experiences.

⁴ New York Mercantile Exchange -natural gas futures.

Value Component: Avoided Plant Operations and Maintenance (“O&M”) Cost

Avoided Fixed O&M:

Minnesota Power generally agrees with the Department’s approach to calculating the Avoided Fixed O&M. It is, however, unclear to Minnesota Power what the \$/kW value of the Avoided Fixed O&M is based on, i.e., a combustion turbine, combined cycle turbine, or a combination of both. It would be beneficial for the Department to clarify this in their proposed methodology. For purposes of these Comments, Minnesota Power is assuming it will be left to each utility how best to determine the \$/kW value of the Avoided Fixed O&M, which is representative of its current power system. Minnesota Power does not have a combined cycle or combustion turbine as part of its power supply until the post 2020 timeframe; therefore, the Avoided Variable O&M would be zero until a combined cycle turbine is added to the power supply per the most recent IRP.

Avoided Variable O&M:

Minnesota Power generally agrees with the Department’s approach to calculating the Avoided Variable O&M. However, it is once again unclear to Minnesota Power what the \$/kWh value of the Avoided Variable O&M is based on, i.e., a combustion turbine, combined cycle or a combination of both. It would be beneficial for the Department to clarify this in their proposed methodology. For purposes of these Comments, Minnesota Power is assuming it will be left to each utility’s discretion how best to determine the \$/kWh value of the Avoided Variable O&M, which is representative of its current power system. Minnesota Power does not have a combined cycle or combustion turbine as part of its power supply until the post 2020 timeframe; therefore, the Avoided Variable O&M would be zero until a combined cycle turbine is added to the power supply per the most recent IRP.

Value Component: Avoided Generation Capacity Cost

Minnesota Power agrees with the Department's high level approach that the avoided capacity should be based on the next natural gas resource addition at this time and the capacity value should start in the year of the first resource need for its customers. Minnesota Power has some reservations about using the Solar Weighted Heat Rate for determining the capacity cost used in the avoided capacity value. The Department stated that the displaced capacity must be consistent with the displaced fuel, but in regard to resource planning, the next capacity addition does not always reflect the marginal fuel. Minnesota Power's preference for calculating this component is to have the capital cost be based on a combustion turbine. In the Midcontinent Independent System Operator's ("MISO") Resource Adequacy Program, the penalty for a capacity deficiency is based on the Cost of New Entry ("CONE"), which is defined as a combustion turbine and typically represents the marginal capacity addition in MISO for capacity planning purposes.

Value Component: Avoided Transmission Capacity Cost

The addition of distributed generation resources on the distribution system has the potential to defer future investment in transmission lines in theory since the generation is at or closer to the point of utilization. However, this theory does not hold true in the following scenarios:

- The peak output of the distributed resource exceeds the peak load of the distribution substation and results in pushing the energy back onto the transmission system.
- The distributed resource is interconnected to the transmission system.

The Department's proposal does not go into sufficient detail for Minnesota Power to determine if the inputs to the proposed formulas are acceptable for use in the VOS calculations.

Value Component: Avoided Distribution Capacity Cost

The Department included two options for the calculation of the avoided distribution capacity input; System-wide Avoided Costs and Location-specific Avoided Costs. The general concept behind both is that the distribution capacity value equals the total long-term investment cost, divided by load growth, times a financial term, times the peak load reduction capability. The System-wide approach has the advantage of providing a single result that is used for all customers and it is simpler to calculate and apply to the VOS process. The shortcoming is that the result does not necessarily have a strong correlation to any potential deferral of distribution investment. The Location-specific approach attempts to connect the deferred investment to a specific location and need for expanded capacity. The disadvantage in this calculation is that there are numerous calculated values, each of which applies to a specific area. This takes an already complicated rate issue and makes it even more complex.

The Department's proposal does not disclose the actual formulas to be used in the calculations of either method; consequently, it is very difficult to comment on the specifics. Some areas that would require clarification prior to implementation are as follows:

- How the \$/kW cost of distribution capacity is calculated. It is not clear if the calculation is company specific, if it is based on incremental increases, or total capacity construction. Many construction projects are driven largely by age and condition of the facility in question, or possibly by some other external driver such as rebuilds associated with road construction. These projects will often include capacity increases as current standard construction material may be of higher ampacity than the old materials being replaced.
- Whether the methodology takes into consideration the differences in capacity costs based on the type of service area (i.e., urban vs. rural).
- How, and where in the formula, the FERC account information is incorporated. Does it apply to both the system-wide and the location-specific methods? How are the prorated percentages shown in the examples calculated?

As pointed out by CPR in their presentations, the credit associated with avoided distribution capacity is controversial. From a utility's viewpoint, it is difficult to support this

credit from both a theoretical and a practical perspective. Although the contribution to the final VOS total may be very small, the overall concept of the distribution capacity cost savings is questionable enough that the Department should consider its exclusion from the VOS rate calculation.

Value Component: Avoided Environmental Cost

The VOS tariff states that the alternative tariff should include compensation to customers for the value to society for operating a distributed solar photovoltaic resource. It goes on to state that the Department-developed methodology for the VOS must at a minimum include certain values including one for environmental benefits. This is a brand new component of value to be treated in the cost equation for establishing rates in Minnesota and one that Minnesota regulatory processes have never quantified before for rate application. Environmental benefits for implementing a State energy policy have, up until this legislation, been considered a benefit shared by society as a whole for implementing such efforts as environmental retrofits of generating facilities or for implementing the State's renewable energy standard. They have not been quantified or itemized as a ratemaking component. To the extent these values can be reasonably established and measured in regulatory processes to date such as project approval or resource plans, they have always accrued to the benefit of all Minnesotans not just the implementers of the policy. The effort to quantify and apply these values for rate making purposes is a new undertaking within the rate making equation and it is one that should receive thoughtful due diligence and assessment by all stakeholders and particularly the Commission before arriving at a final conclusion for application.

As Minnesota Power stated in its September 20, 2013 Initial Comments in this Department-led process, the components of the VOS tariff should be based upon known and measurable components of today while maintaining the flexibility for addressing the unknowns of tomorrow. Minnesota Power believes the proposed Department components of the Avoided Environmental Costs do not meet these standards. For PM10, CO, NOx and Pb, Minnesota Power appreciates the Department considering use of PUC-established externality costs, though

we also think it is important to recognize that these values were not developed for and are currently not used for rate making. These values are in fact generally accepted and considered appropriate for non-rate making resource planning and resource addition decision making activities. And while they were not derived in a rate making proceeding, these externality values at the least were developed in a transparent regulatory process with stakeholder involvement that utilized regulatory experience, guidance and authority to establish these figures distinctly for resource decision purposes. Since the VOS tariff must contain avoided environmental cost values, Minnesota Power believes the Commission should, through a generic docket or rulemaking, deliberately establish values to account for these societal benefits in ratemaking rather than utilizing externality values created for resource planning which is not a rate making process. This would help to ensure the consistency and transparency of the rate making process to support arriving at a vetted conclusion about what numbers to use

The Department proposed value for carbon dioxide (“CO₂”) does not even meet the Commission-established standard of the other proposed components of Avoided Environmental Costs. The proposed CO₂ value is not based upon a Commission-established amount for resource decision-making purposes or upon any other Commission proceeding to establish that value. Using the unresolved and still pending United States Environmental Protection Agency (“EPA”) Societal Cost of Carbon (“SCC”) value as the Department has done in its proposal is problematic by definition. Without getting into all of the details arguing the credibility behind the EPA-established SCC in this current submission, Minnesota Power believes it is important for the Department to acknowledge that the EPA SCC is far from being an established authoritative standard for measuring the societal benefits of reducing CO₂ and is being reviewed by the federal government. It is also yet to become a Commission-established value by which to measure those benefits for either resource decision purposes or for ratemaking.

Minnesota Power appreciates that the Department has been required in this statutory-driven process to propose a component to the VOS tariff that must at a minimum include certain values including an environmental value. The non-environmental components in the Department proposed VOS, while still open for discussion on their merits, at least appear to meet a regulatory prudence standard of being known and measurable. The Department proposed component of the

VOS for Avoided Environmental Costs does not meet this essential standard nor is it derived from any process or mechanism used by the Commission to set customer rates. To the extent these costs are considered to be charged to customers, Minnesota Power believes they should be amounts established by the Commission in a regulatory process specifically for ratemaking purposes, versus being appropriated from resource planning and resource addition decision making applications and summarily applied to the VOS tariff rate.

IV. Comments on Economic Factors and Technical Analysis

Discount Rates

The Department proposed three discount rates to be used in the VOS rate methodology: risk-free discount rate, environmental discount rate and utility discount rate. The choice of discount rates has an impact on the total VOS rate and needs to be carefully considered. Minnesota Power believes only the utility discount rate is appropriate for use in the VOS methodology.

Minnesota Power believes it is incorrect to use the risk-free discount rate when discounting and levelizing avoided fuel costs. According to CPR, the risk-free discount rate was chosen because there is no risk to the natural gas price due to the fact that it is locked in for a twenty five-year period (which Minnesota Power disputes for the reasons described above). What was not considered is the risk to the ratepayer that the customer owned solar unit could underperform over the twenty-five-year period for which it is contracted. There is risk to the utility ratepayer if annual solar generation is underestimated or in the worst case, the solar generation does not remain operational over the twenty-five-year contract period. Minnesota Power believes the utility discount rate should be utilized when discounting and levelizing avoided fuel costs because of the uncertainty about operational period and output levels associated with customer sited solar generation. Minnesota Power could give more consideration to using a lower discount rate for the avoided fuel calculation if customers install solar panels that come with a twenty five-year warranty from the manufacturer and the performance could be

guaranteed to remove the risk of contracting with the resource. In addition, Minnesota Power does not understand the rationale for using a separate environmental discount rate.

Fleet Production Shape:

The Department proposed three different options to obtain the fleet production shape: Actual Fleet - Metered Production, Actual Fleet - Simulated Production, and Load-based Fleet - Simulated Production. The metered production option will not be available to Minnesota Power since the Company's standard metering installation does not include a meter on the generator. The Company is able to ascertain the amount of excess energy sold back to the Company but not the total amount of energy generated.

Minnesota Power does have the locations of all of the solar installations in its service territory mapped within its Geographical Information System ("GIS"). The Company can use the Actual Fleet - Simulated Production option as long as records include the site-specific information for each installation. At a minimum, system specifications must include:

1. Location (either exact street address or latitude and longitude)
2. For each array in the system
 - Total Array rating (kW-AC) using the rating conventions described in this document *or* Module CEC-PTC rating, Module Quantity, Inverter CEC Efficiency rating, Inverter AC Power rating
 - Array Tracking
 - Array Tilt
 - Array Azimuth

In the event that Minnesota Power does not have access to the critical information above, the Company will need to utilize the Load-based Fleet - Simulated Production option.

Load Match Analysis

Effective Load Carrying Capability (“ELCC”) Calculation for Solar Capacity Value

Minnesota Power agrees with the Department that the ELCC calculation should be used when calculating the capacity value of solar. Minnesota Power would like to note that this is a complex calculation, which will take significant resources to complete and should align with regional best practices. Ideally each utility would use a central source for this calculation that would also provide multiple values that differentiate based on the various geographic and solar attributes of the regions in Minnesota.

Peak Load Reduction

The concept of Peak Load Reduction as stated in that the methodology is if PV is not producing on the peak hour, it gets no credit. The general concept makes sense and seems at the surface to be acceptable, however the methodology is unclear. Without reviewing the actual formula being used it is difficult to determine if the methodology is ultimately satisfactory.

Avoided Distribution Line Losses

Inclusion of the line loss percentages in the VOS calculation is based on the assumption that the generation of energy at the utilization site eliminates the need for use of the utility system for delivery of the energy to that site. This statement is true for the distribution system only if the individual distributed generation (“DG”) systems (in this case, solar) are sized to the peak load (demand) coincidental to the peak solar generation. Since the daily system load peak typically occurs at a different time than the solar peak, sizing to the overall peak load for the customer will result in excess generation at the time of the solar peak, and therefore use of the distribution system for delivery of energy to the utilization site. Sizing based on energy, as is the case with the VOS and solar net metering in Minnesota, results in even greater excess generation

during the solar peak, and significant use of the distribution system. Use of the distribution system should negate the inclusion of distribution line loss savings as a multiplier in the VOS formula. In many instances, the generation level at solar peak will be up to three times greater than the peak load or demand. This is simply a reflection of the fact that the daily solar energy generation needs to take place in a much shorter time frame than the daily energy usage which occurs over the entire 24-hour period. The end result will be that the size or capacity of the equipment needed to serve the customer will be determined by the amount of solar generation present rather than customer energy usage. Although the incremental cost of the increased transformer and service required in these situations will/should be paid by the distributed generation customer, there are other cost-inducing aspects that are ongoing, and their cost recovery will be passed on to the rest of the customer base. One example is the “no load” losses of the transformer. Larger transformers will have higher no load losses which will result in distribution line losses increasing rather than decreasing with the addition of solar customers.

Overall, distribution line losses will not decrease by the levels suggested in the VOS methodology, and could very well increase with the addition of solar customers to the system. In addition, the loss analysis methodology proposed by the Department appears to be very complex, involving hourly marginal loss calculations which may be infeasible. Therefore, Minnesota Power believes that distribution line losses should not be included in the VOS calculation.

Avoided Transmission Line Loss Savings

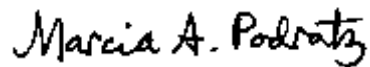
As with the Avoided Transmission Capacity Cost Savings, the theory behind the line loss savings makes sense. The same caveats apply in terms of size and interconnection point (i.e., only if the individual distributed DG systems are sized to the peak load (demand) coincidental to the peak solar generation). Also, as with the capacity issue, the Department’s proposal does not provide sufficient detail in terms of calculation of the inputs to determine if the assumptions are acceptable.

V. Conclusion

Minnesota Power appreciates the opportunity to provide input into the Department's proposed VOS methodology that will be submitted to the Commission and to express its concerns with certain aspects of the methodology on behalf of the Company and its customers. While it has concerns, the Company continues to be an engaged and willing participant in the VOS development process. The policy and practical implementation implications of this innovative rate are very consequential and a strong stakeholder dialogue should help to create a solution that is appropriately considerate of the interests of all stakeholders.

Dated: December 10, 2013

Respectfully submitted,



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AFFIDAVIT OF SERVICE VIA
ELECTRONIC FILING

Kristie Lindstrom of the City of Duluth, County of St. Louis, State of Minnesota, says that on the 13th day of February, 2014, she served Minnesota Power's Comments in Docket No. E999/CI-14-65 to the Minnesota Public Utilities Commission and the Energy Resources Division of the Minnesota Department of Commerce via electronic filing. The remaining parties on the attached service list were served as so indicated on the list.

/s/ Kristie Lindstrom

Subscribed and sworn to before
me this 13th day of February, 2014.

/s/ Jodi Nash

Notary Public - Minnesota
My Commission Expires January 31, 2015

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Michael	Kampmeyer	mkampmeyer@a-e-group.com	AEG Group, LLC	260 Salem Church Road Sunfish Lake, Minnesota 55118	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mark J.	Kaufman	mkaufman@ibewlocal949.org	IBEW Local Union 949	12908 Nicollet Avenue South Burnsville, MN 55337	Electronic Service	No	SPL_SL_14-65_Interested Parties
Nancy	Kelly	bademailnancyk@eurekarecycling.org	Eureka Recycling	2828 Kennedy Street NE Minneapolis, MN 55413	Paper Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Julie	Ketchum	N/A	Waste Management	20520 Keokuk Ave Lakeville, MN 55044	Paper Service	No	SPL_SL_14-65_Interested Parties
Kerry	Klemm	kerry.r.klemm@xcelenergy.com	Xcel Energy Services, Inc	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
John	Kluempke	jkluempke@winlectric.com	Elk River Winlectric	12777 Meadowvale Rd Elk River, MN 55330	Electronic Service	No	SPL_SL_14-65_Interested Parties
Thomas G.	Koehler	N/A	Local Union #160, IBEW	2909 Anthony Ln Minneapolis, MN 55418-3238	Paper Service	No	SPL_SL_14-65_Interested Parties
Mara	Koeller	mara.n.koeller@xcelenergy.com	Xcel Energy	414 Nicollet Mall 5th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jon	Kramer	jk2surf@aol.com	Sundial Solar	4708 york ave. S Minneapolis, MN 55410	Electronic Service	No	SPL_SL_14-65_Interested Parties
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Allen	Krug	allen.krug@xcelenergy.com	Xcel Energy	414 Nicollet Mall-7th fl Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Scott	Kurtz	Scott.J.Kurtz@xcelenergy.com	Xcel Energy	825 Rice Street St. Paul, MN 55117	Electronic Service	No	SPL_SL_14-65_Interested Parties
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Deborah Fohr	Levchak	dlevchak@bepc.com	Basin Electric Power Cooperative	1717 East Interstate Avenue Bismarck, ND 585030564	Paper Service	No	SPL_SL_14-65_Interested Parties
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John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	SPL_SL_14-65_Interested Parties
Mark	Lindquist	N/A	The Minnesota Project	57107 422nd St New Ulm, MN 56073-4321	Paper Service	No	SPL_SL_14-65_Interested Parties
Matthew P	Loftus	matthew.p.loftus@xcenergy.com	Xcel Energy	414 Nicollet Mall FL 5 Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Bob	Long	rlong@larkinhoffman.com	Larkin Hoffman (Silicon Energy)	1500 Wells Fargo Plaza 7900 Xerxes Ave S Bloomington, MN 55431	Paper Service	No	SPL_SL_14-65_Interested Parties
Rebecca	Lundberg	rebecca.lundberg@powerfullygreen.com	Powerfully Green	11451 Oregon Ave N Champlin, MN 55316	Electronic Service	No	SPL_SL_14-65_Interested Parties
Paula	Maccabee	Pmaccabee@justchangelaw.com	Just Change Law Offices	1961 Selby Avenue St. Paul, MN 55104	Paper Service	No	SPL_SL_14-65_Interested Parties
Casey	Maccullum	casey@appliedenergyinnovations.org	Applied Energy Innovations	4000 Minnehaha Ave S Minneapolis, MN 55406	Paper Service	No	SPL_SL_14-65_Interested Parties
Susan	Mackenzie	susan.mackenzie@state.mn.us	Public Utilities Commission	Suite 350121 7th Place East St. Paul, MN 551012147	Electronic Service	No	SPL_SL_14-65_Interested Parties

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Kavita	Maini	kmaini@wi.rr.com	KM Energy Consulting LLC	961 N Lost Woods Rd Oconomowoc, WI 53066	Electronic Service	No	SPL_SL_14-65_Interested Parties
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E St. Paul, MN 55106	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mary	Martinka	mary.a.martinka@xcelenergy.com	Xcel Energy Inc	414 Nicollet Mall 7th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mike	McDowell		Heartland Consumers Power District	PO Box 248 Madison, SD 570420248	Paper Service	No	SPL_SL_14-65_Interested Parties
Natalie	McIntire	natalie.mcintire@gmail.com	Wind on the Wires	570 Asbury St Ste 201 St. Paul, MN 55104-1850	Paper Service	No	SPL_SL_14-65_Interested Parties
Dave	McNary	N/A	Hennepin County DES	701 Fourth Avenue South suite 700 Minneapolis, MN 55415-1842	Paper Service	No	SPL_SL_14-65_Interested Parties
John	McWilliams	jmm@dairy.net	Dairyland Power Cooperative	3200 East Ave SPO Box 817 La Crosse, WI 54601-7227	Electronic Service	No	SPL_SL_14-65_Interested Parties
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Brian	Millberg	Brian.Millberg@minneapolismn.gov	City of Minneapolis	350 South 5th St, #315 Minneapolis, MN 55415	Paper Service	No	SPL_SL_14-65_Interested Parties
Stacy	Miller	stacy.miller@state.mn.us	Department of Commerce	State Energy Office 85 7th Place East, Suite 500 St. Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties

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David	Moeller	dmoeller@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022093	Electronic Service	No	SPL_SL_14-65_Interested Parties
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Martin	Morud	mmorud@trunorthsolar.com	Tru North Solar	5115 45th Ave S Minneapolis, MN 55417	Electronic Service	No	SPL_SL_14-65_Interested Parties
Ben	Nelson		CMMPA	459 South Grove Street Blue Earth, MN 56013	Paper Service	No	SPL_SL_14-65_Interested Parties
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Charlie	Pickard	cpickard@aladdinsolar.com	Aladdin Solar	1215 Lilac Lane Excelsior, MN 55331	Electronic Service	No	SPL_SL_14-65_Interested Parties
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Doug	Shoemaker	dougs@mnRenewables.org	MRES	2928 5th Avenue South Minneapolis, MN 55408	Paper Service	No	SPL_SL_14-65_Interested Parties
Mrg	Simon	mrgsimon@mrenergy.com	Missouri River Energy Services	3724 W. Avera Drive P.O. Box 88920 Sioux Falls, SD 571098920	Electronic Service	No	SPL_SL_14-65_Interested Parties
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Chanti	Sourignavong	chantipal.sourignavong@honeywell.com	Honeywell	1985 Douglas Drive North MN10-111A Golden Valley, MN 55422-3992	Paper Service	No	SPL_SL_14-65_Interested Parties
Ron	Spangler, Jr.	rlspangler@otpc.com	Otter Tail Power Company	215 So. Cascade St. PO Box 496 Fergus Falls, MN 565380496	Electronic Service	No	SPL_SL_14-65_Interested Parties
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Thomas P.	Sweeney III	tom.sweeney@easycleanenergy.com	Clean Energy Collective	P O Box 1828 Boulder, CO 80306-1828	Paper Service	No	SPL_SL_14-65_Interested Parties
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Lise	Trudeau	lise.trudeau@state.mn.us	Department of Commerce	85 7th Place East Suite 500 Saint Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Darryl	Tveitbakk		Northern Municipal Power Agency	123 Second Street West Thief River Falls, MN 56701	Paper Service	No	SPL_SL_14-65_Interested Parties

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