

**COUNCIL ACTION FORM**

**SUBJECT: CHANGES TO THE AMES MUNICIPAL CODE – NET METERING**

**BACKGROUND:**

Appendix H of the Municipal Code includes rules and regulations pertaining to receiving electric service. With the introduction of customer-owned generation, Section 2.7 *Availability of Net Metering* was added to the Code.

Net metering applies to a customer-owned generating system that primarily offsets part or all of the customer's electric service energy requirements provided by City of Ames Electric Services. Net Metering is available to any retail customer receiving electric service under a City of Ames Electric Services rate schedule who owns and operates an approved on-site generating system powered by a renewable resource capable of producing not more than 500 kW of power, and who interconnects with Electric Services' electric distribution system.

The last time this section of the Code was updated was in the fall of 2015 when the maximum allowable size of facilities was increased from 10 kW to 500 kW.

**Over the past year, the number of new installations has grown significantly. In reviewing the new projects installed, staff has noted an emerging pattern where developers are oversizing the installations so that the total amount of energy produced by the solar system exceeds the total amount of energy consumed by the customer at certain times of the day.**

**The current design of the City's Net Metering language actually encourages this process of oversizing which creates three significant problems.**

First, when a solar array is oversized, the utility becomes a "storage medium" to which the customer can overproduce as much as it wants and then draw on that overproduction at a later time. This process creates a situation where the solar customers are using the City's electric grid without paying for the fixed costs associated with maintaining it, and these costs are transferred to the non-solar customers. Second, the utility does not store excess solar energy, so any overproduced energy is used by other customers at the time it is produced. Later, the utility must purchase the replacement energy and the result is an increased cost to non-solar producing customers for the betterment of the solar producing customers. Third, by using the excess energy when produced, the "cost" of the energy is at fully bundled retail rates. The City purchased less of the lower cost wholesale energy, which increases rates to all customers.

The City's Electric Utility Operations, Review and Advisory Board (EUORAB) held five public meetings on September 12<sup>th</sup>, October 6<sup>th</sup>, October 18<sup>th</sup> (two meetings), and November 1<sup>st</sup> to review the current process, listen to customers and vendors, and discuss alternative solutions. The options discussed included the following:

1. Purchase excess energy at Avoided Cost
2. Purchase excess energy at Fixed Cost
3. Require Storage to accompany a solar installation
4. Require future new solar installations to be westerly facing
5. Move the fixed costs to the Customer Charge
6. Develop a Demand Charge for Residential Solar customers
7. "Right Size" the solar panel

**Attached is a more detailed overview of these various options as presented to EUORAB.**

At the November 1, 2016 EUORAB meeting, the Board voted to support Option 2 and forward that to the City Council for its consideration.

**ALTERNATIVES:**

1. Accept the recommendation by EUORAB to purchase excess energy from customer generation using a "Fixed Cost" approach, and direct staff to draft the necessary changes to the Municipal Code for future City Council approval.
2. Accept one of the other options considered by EUORAB.
3. Reject the Code changes and continue to use the existing language.

**MANAGER'S RECOMMENDED ACTION:**

The current net metering language allows customers to produce energy at one period in time only to be able to use it at another time. The utility is used as a storage system with the potential to economically disadvantage one group of customers in order to benefit another group.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1 as stated above.

**It should be emphasized that future technology improvements related to storage capacity and/or solar panel realignment might yield benefits to the utility by helping reduce electric demand during our summer peak. Therefore, the staff is committed to working with interested parties to further study these possibilities which might lead to other future revisions to the net metering policy.**

## NET METERING

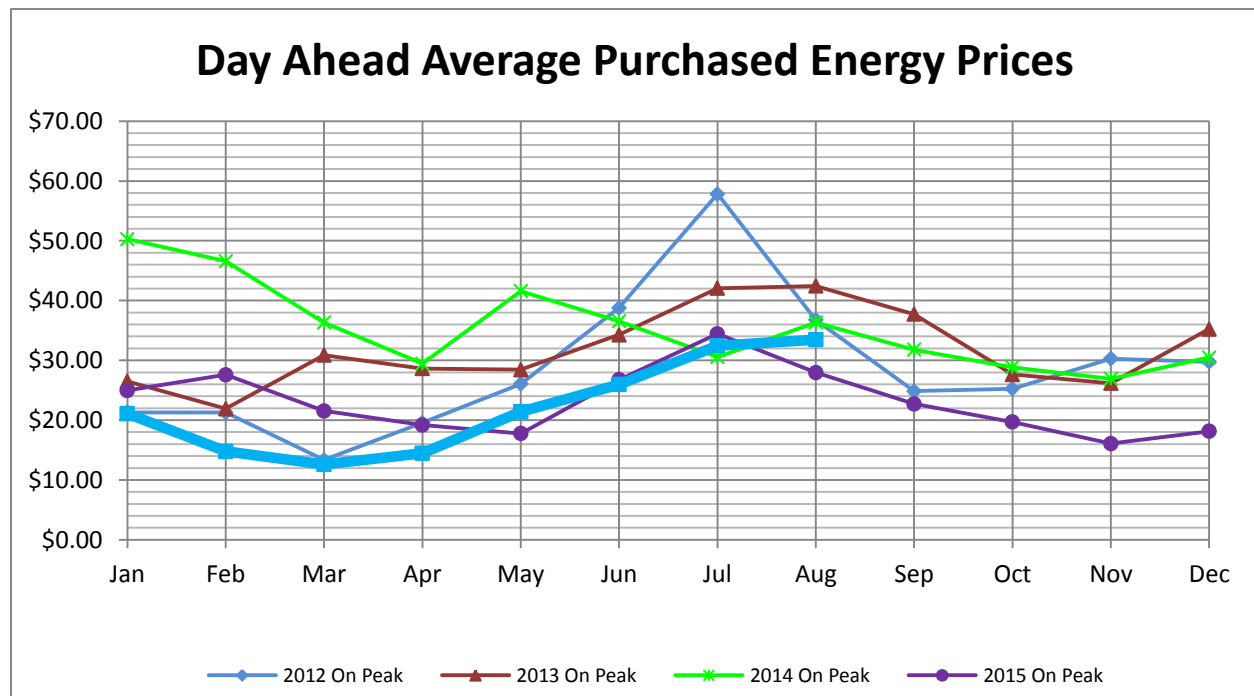
Net Metering is the most widely used billing method for customers with installed generation. Under the current Ames Municipal Code, excess energy produced by a solar customer is delivered to the utility at the time it's produced and later replaced "at cost" back to the customer. The rate structure encourages over production (oversizing) during the sunny part of the day for reuse by the customer in the evenings, at night, and when the sun isn't shining. Unintended consequences include:

- Use of the utility infrastructure as a storage device.
- Reduction/elimination of a solar customer's contribution to the fixed costs of the utility infrastructure when it's the infrastructure that allows the solar customer to bank the energy.
- Lost opportunity to purchase wholesale energy
- Cost shifting from solar customers to non-solar customers

Modifications are needed to the current Net Metering language.

### OPTION 1 – PURCHASE EXCESS ENERGY AT AVOIDED COST

The installed meter is able to measure the excess energy being delivered from the customer's solar array to the utility. This option uses the cost of energy being displaced by the excess output of the solar arrays. The "Avoided Cost" is the average monthly wholesale price paid by the utility for energy. The graph below shows the historical monthly price paid.



#### Plus/Delta

- + Best approximates the Avoided Cost of purchased energy
- + Fixed costs are recovered
- + Encourages alternatives to over sizing; battery storage, right-sizing

ΔPrice fluctuates

△Captures only current value of solar

△Difficult to consider value of “banked’ energy when determining payback

**OPTION 2 – PURCHASE EXCESS ENERGY AT FIXED COST**

In 2011, the City performed a Cost of Service study on its electric rates. The study examined the “unbundling” of electric rates into three components – Demand, Energy, and Customer Charge for each customer class. Dividing the "Energy" components by the "Total Cost" provides an approximation of the energy component of each rate.

	Residential	General Power	Large Power	Industrial
Energy Cost	\$6,074,919	\$1,984,596	\$8,759,027	\$5,437,433
Total Cost	\$15,563,782	\$4,848,958	\$17,822,475	\$8,662,840
Percentage of Energy to Total Cost	39%	41%	50%	63%
Summer/Winter Rate	11.66/9.66 cents per kWh	11.48/9.48 cents per kWh	6.19 cents per kWh	6.19 cents per kWh
Rate to Pay Customer for Excess Energy	4.55 / 3.77 cents per kWh	4.71 / 3.89 cents per kWh	3.10 cents per kWh	3.90 cents per kWh

\*Apply these rates for the next 3-5 years before moving to the "MISO Average On-peak Day Ahead Local Marginal Price". This will give vendors/customers price certainty for the near future and shouldn't "freeze" new installations.

\*There is basis for this design. These payments for excess energy approximately represent the energy part of the rate. Applying these rates to the excess energy would cause solar customers to continue to pay something towards the fixed costs.

\*We would continue to apply the Energy Rate Adjustment to these numbers just as we do today.

Plus/Delta

- + Most Fixed costs would be recovered
- + Will adjust with changing rates
- + Billing is consistent and straightforward; no need to hand bill anyone.

△ Is this a temporary or permanent alternative

**OPTION 3 – REQUIRE STORAGE TO ACCOMPANY A SOLAR INSTALLATION**

This concept is suggested by the Ames Progressive Alliance –

*Most oversized array investments produce large amounts of electricity at noon, due to the southern orientation, while the peak usage for the Ames community takes place later in the day. In addition, these arrays do not store electricity. If the City of Ames were to require oversized arrays to have battery storage, the benefit to the community could be greater, as array owners would not be selling electricity back at an over market rate, but be storing it for use during the community peak.*

Plus/Delta

- + Can incorporate a “sharing” of the stored energy between customers and the utility. Similar to the Prime Time Power switch program, the utility can draw on the stored energy at times of system peak or when prices are excessively high
- + Little/no use of the utility system for storage
- + Little/no cost shifting between customers because excess energy is not off-setting low cost wholesale energy purchases
- △ Presently cost prohibitive
- △ Still need to determine how to handle customers that do not install battery storage

#### **OPTION 4 – REQUIRE FUTURE NEW SOLAR INSTALLATIONS TO BE WESTERLY FACING**

This concept is suggested by the Ames Progressive Alliance –

*We ask investors in on site solar, to have their panels face west. This would reduce the overall output, decreasing the financial impact on the city, but it would also shift the maximum peak of the panel closer to our community peak of 3-5 PM. In this case you would not be storing as much electricity and you would be getting more when the community needs it. Here is a link on the concept from the New York Times. In this scenario, maybe oversizing would be a good thing?*

<http://www.nytimes.com/2014/12/02/upshot/why-more-solar-panels-should-be-pointing-west-not-south.html>

##### Plus/Delta

- + Output of the solar panel would better align with utility’s peak
- + Fixed costs for the use of the utility system would be offset by benefits to reducing utility peak.
- △Solar output of systems would be reduced.
- △Still need to determine how to handle customers that do not properly angle solar panels.

#### **OPTION 5 – MOVE THE FIXED COSTS TO THE CUSTOMER CHARGE**

Every customer’s bill includes two components, energy and a customer charge. Today the charge covers the metering and bill processing. This option would entail increasing the Customer Charge component to include more of the fixed charges associated with service for customers.

##### Plus/Delta

- + Fixed costs would be recovered
- △ Will likely require a Cost of Service Study
- △ Could cause unintended issues for non-solar customers if applied to all members of a customer class
- △ Moving fixed costs from the energy component to the Customer Charge would cause the energy component cost to decrease
- △ This approach is a “one size fits all” method. Does not consider the size difference between customers

#### **OPTION 6 – DEVELOP A DEMAND CHARGE FOR RESIDENTIAL SOLAR CUSTOMERS**

Every customer’s bill includes two components, energy and a customer charge. The larger customers also include a Demand Charge to recover some of the fixed costs. With solar customers that use the utility system to “bank”

excess energy, it is possible to measure the peak “use” of the utility system – either maximum flow to the utility or maximum flow to the customer. With this information, a usage rate could be applied to the kilowatt value and a Demand Charge could be applied to the solar customers bill.

Plus/Delta

- + Unlike Option 5 above, this approach considers the size difference between customers
- + Fixed costs would be recovered
- △ Will likely require a Cost of Service and Rate Study
- △ Moving fixed costs from the energy component to a new Demand Charge would cause the energy component cost to decrease
- △ A new Rate would be created and billing would be more complex
- △ New metering would be required

**OPTION 7 – “RIGHT SIZE” THE SOLAR PANEL**

Presently, the planning and design of a solar array are done without any input from the utility. It is possible to engage the utility earlier in the process with some pre-defined standards or limits. This could include concepts such as: *the total kWh output cannot be greater than the previous year’s lowest kWh consumption in a given month, or X% of the excess energy can be “banked” and the remaining energy is purchased by the utility, or excess energy may be used in the day it was produced* to name a few.

Plus/Delta

- + Would give the potential solar customer some defined parameters by which to size their system
- △ Appear restrictive
- △ does little/nothing to capture fixed costs.
- △ Appears restrictive
- △ Difficult to administer/bill
- △ Needs additional detail/definition