To: Mayor and City Council

From: Donald Kom, Electric Services Director

Date: October 14, 2016

Subject: Joint Meeting Item No. 2

Attached is the Action Form on this subject that was prepared for the September 12, 2016, EUORAB meeting. Please note that the draft ordinance language included with this report was not approved by the Board on September 12. The Board will continue to develop its recommendation on Tuesday at 5:00 p.m. prior to its Joint Meeting with the City Council.

Staff is endeavoring to prepare examples of how the net metering changes could affect various customers with solar generation. We will also send those out to your prior to the Joint Meeting.

DK/drv

ITEM # _____
DATE: 09-12-16

EUORAB ACTION FORM

SUBJECT: CHANGES TO THE AMES MUNICIPAL CODE - NET METERING

BACKGROUND:

Appendix H of the City of Ames Municipal Code outlines the 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 the City of Ames Electric Services' electric 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 last year, the number of new installations has grown significantly. In reviewing the new projects proposed, staff is seeing a pattern emerge where developers are oversizing the installation so that the total amount of energy produced by the solar system more closely matches the total amount of energy consumed by the customer. Of significant concern is that the profile of the energy production does come close to matching the profile of the customer's electrical usage. The current design of the City's Net Metering language actually supports this process of oversizing which creates two problems.

First, by oversizing the system, the utility becomes a "storage medium" to which the customer can overproduce as much as it wants and then draws on that overproduction at a later time. Second, the utility doesn't store energy, so any overproduced energy is used by other customers at the time it's produced. Later, the utility has to purchase the replacement energy and the result is an increased cost to non-solar producing customers for the betterment of the solar producing customers.

A fair solution to this cross-subsidization is to purchase excess energy produced at a cost comparable to the rate we would have otherwise paid. Attached is a red-lined copy of Section 2.7 with suggested changes to the Code.

ALTERNATIVES:

1. Accept the suggested changes to Appendix H pertaining to Electric Services Net Metering as presented and forward to City Council for approval.

2. Reject the Code changes and continue to use the existing language.

DIRECTOR'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 harm one group of customers in order to benefit another.

Therefore, it is the recommendation of the Electric Utility Director that the EUORAB adopt Alternative No. 1 as stated above.

Ames Municipal Code Appendix H

Ames Municipal Electric Utility Electric Tariff No. 5

Sec. 2.7 Availability of Net Metering

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 kVAW (kilovolt-amperes) of power, and who interconnects with the City of Ames Electric Services' electric system. In order to qualify for this tariff an applicant must first obtain approval to interconnect and meet the City of Ames requirements, as determined by the City of Ames Electric Services department.

Renewable energy technologies include those that rely on energy derived directly from the sun, on wind, geothermal, hydroelectric, wave, or tidal energy, or on biomass or biomass-based waste products, including landfill gas. A renewable energy technology does not rely on energy resources derived from fossil fuels, waste products from fossil fuels, or waste products from inorganic sources. 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.

The availability of this tariff is limited to the first 2,000 kW of qualified and interconnected generation (based on the aggregate sum of the individual system output ratings of all interconnected systems served under this tariff).

All of the requirements, benefits, terms and conditions of this tariff are subject to change. Customers receiving net-metered service under this tariff assume all risks associated with future changes to this tariff.

Sec. 2.7(1) Conditions of Service

a. All charges, character of service, and terms and conditions of the City of Ames Electric Services Rate Schedule under which the customer receives service apply except as expressly altered by this "Availability of Net Metering" rule.

b. The customer shall comply with the current City of Ames Electric Services' interconnection requirements for A Net-Metered Renewable Energy Generation Facility, 500 kVA~~W~~ and Smaller, and any revisions to the requirements.

c. The customer shall obtain approval to interconnect its proposed System from the City of Ames Electric Services Department before the customer purchases any equipment or concludes its design for an on-site generating system that is intended to interconnect with the City of Ames Electric Services' electric system.

d. The customer shall submit to City of Ames Electric Services a completed interconnection application form and signed agreement.

e. The customer is responsible for the costs of interconnecting with the City of Ames Electric Services' electric system, including administrative/engineering costs, transformers, service lines, or other equipment determined necessary by City of Ames Electric Services for safe installation and operation of the customer's equipment with the City's system.

f. The customer is responsible for any costs associated with required inspections and permits.

Sec. 2.7(2) Metering

Standard metering under this tariff shall be performed by a single meter capable of registering the flow of electricity in two directions (delivered and received) to determine the customer's net energy flow.

Sec. 2.7(3) Net Energy Usage and Net Energy Production

The net energy usage is the net energy flow in kilowatt-hours delivered to the customer. less any kilowatt-hours received from the customer for the billing period less any banked (see explanation of banked energy in 2.7(3)b, below) kilowatt-hours. The net energy production (aka negative kilowatt-hours or kilowatt-hours received) is the net energy flow in kilowatt-hours delivered to City of Ames Electric Services. Net energy usage and net energy production are separately metered for each billing period and are treated by different rates, as described in 2.7(4).

~~a. The monthly net energy usage billed to the customer shall not be less than zero (0).~~

~~b. If the calculated monthly net energy usage is less than zero (0), the negative kilowatt-hours received shall be banked (i.e. carried forward to the next billing period) and subtracted from the next billing period's net kilowatt-hour total, except for the annual settle up period covered in Section 2.7(5).~~

Sec. 2.7(4) Rate

Beginning in the billing month after a customer receives approval to interconnect the customer's on-site generating system from City of Ames Electric Services, net energy usage and net energy production will be billed as described below. ~~, if in any billing period the energy delivered by the customer's system to the City of Ames Electric Services' electric system exceeds the amount of energy delivered by City of Ames Electric Services to the customer, the City shall credit the customer's account for the energy generated as described below.~~

1. For each billing period, ~~the City of Ames will calculate the net energy usage to determine the number of kilowatt-hours to bill the customer.~~all kilowatt-hours billed as net energy usage (kilowatt-hours delivered) will be accounted for based on the appropriate electric rate schedule in affect at the time. All applicable state

and local taxes, and the current Energy Rate Adjustment (ERA) will be added.

2. For any billing period in-which net energy production is recorded, the kilowatt-hours received shall be converted to monetary credits calculated by multiplying the kilowatt-hours received by the Average On-Peak Day-Ahead MISO Locational Marginal Price for Ames; these monetary credits will be applied to the customer's account.

~~3. If the calculated net energy usage is less than zero (0), these kilowatt-hours will be banked and subtracted from the next billing period's net energy use except during the annual settle up period covered in Section 2.7(5).~~

~~4. All kilowatt-hours, whether billed or banked, will be accounted for based on the appropriate electric rate schedule in affect at the time. All applicable state and local taxes, and the current Energy Cost Adjustment (ECA) will be added.~~

~~5. Any existing energy credits on the customer's account shall be subtracted from subsequent monthly bills before determining the utility charges due from the customer to the City of Ames Electric Services.~~

~~6. City of Ames Electric Services will carry customer energy credits for a period not to exceed twelve (12) months.~~

~~7. Sec. 2.7(5) Settle Up~~

~~8. There will be an annual account settle up which will occur during the February billing period. During the settle up, a monetary credit will be applied to the customer account for all banked kilowatt-hours and the bank will be reset to zero (0).~~

~~9. In each February billing period the customer account will be settled and reset to zero (0).~~

~~10. If the February billing period calculated net energy usage is less than zero (0), these kilowatt-hours will be banked and then converted to monetary credits calculated by multiplying the kilowatt-hours by the current decremental base load resource cost.~~

~~11. Any monetary credits that exist on the customer account at the end of the February billing period settle up will be applied to the customer account.~~

12. ~~If the customer account is closed in any month other than February the settle up will occur in the month the account is closed using that month's current decremental load resource cost.~~

EUORAB /City Council: Net Metering 18 Oct 2016

Solar Installations in Ames

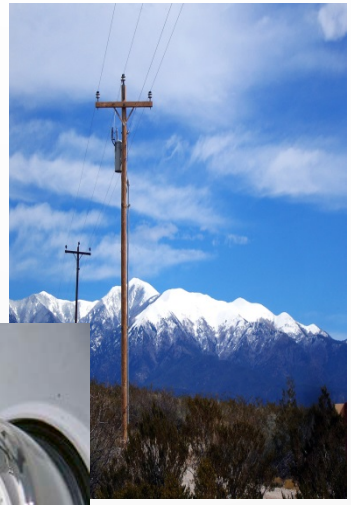
Systems In-service and/or or having Interconnection Agreements submitted as of 10/5/2016								
		# of systems	kW	% of total kW				
Residential		16	84	10%				
Commercial		115	728	90%				
	Totals	131	812					
* YTD increase		655%	495%	(compared to aggregate for all prior years)				
Notes:								
Additional Commercial is planned (expected to be more than 500kW)								
* On 12/31/2015 there were a total of 20 systems installed with an aggregate of 164 kW capacity								

Net Metering

* Allows customers to generate their own electricity in order to offset their electricity usage.
* Allows customers to receive credits for excess electricity generated but not used.

* Ames adopted Net Metering in August 2010:
  * Limited to 10kW
  * Unitarian Church was first customer
* Modified November 2015:
  * Increased limit to 500 kW
  * Capped at first 2,000 kW

Metering



Typical

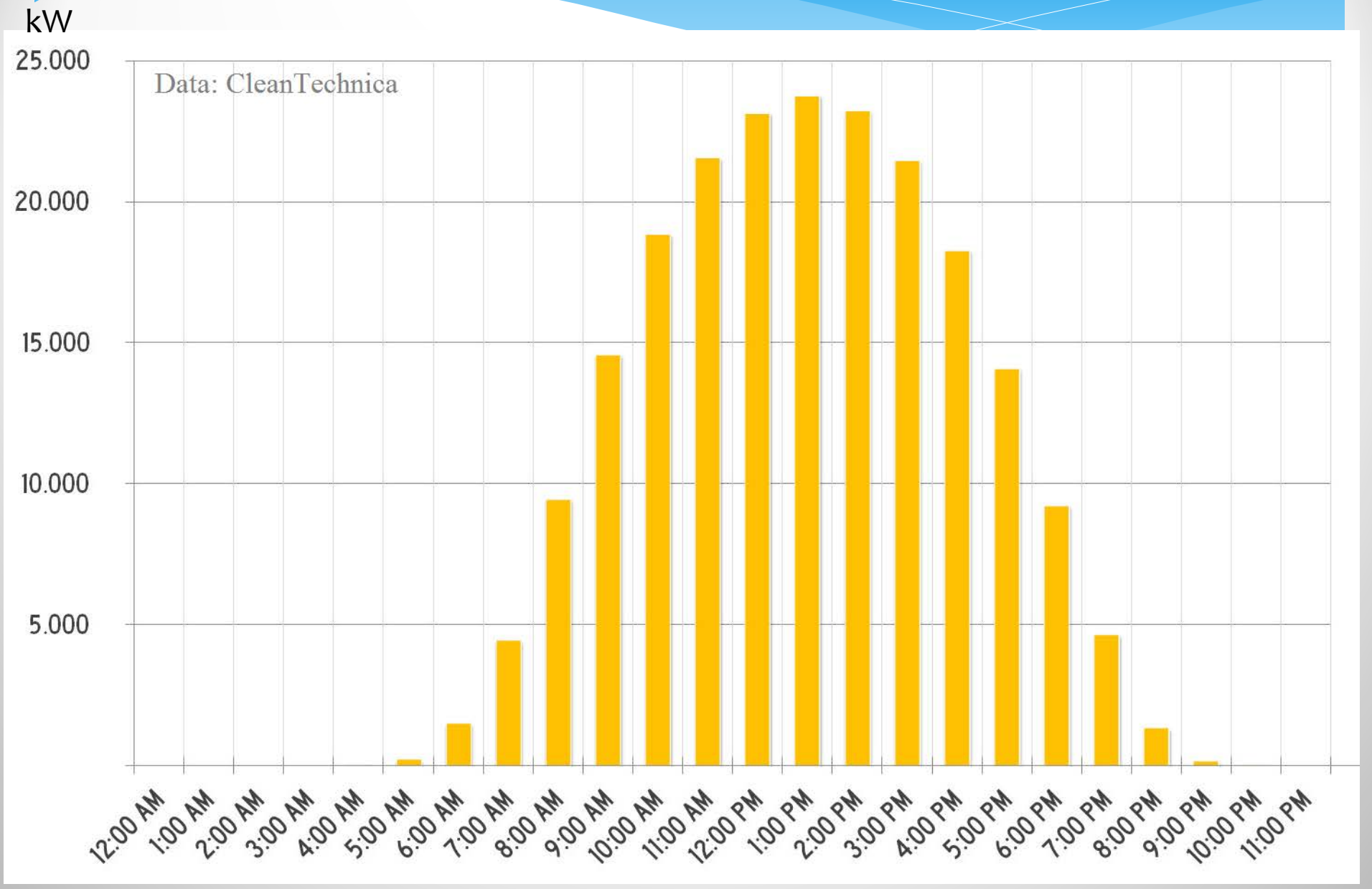
- Single direction meter
  - kWh x rate=bill

With solar

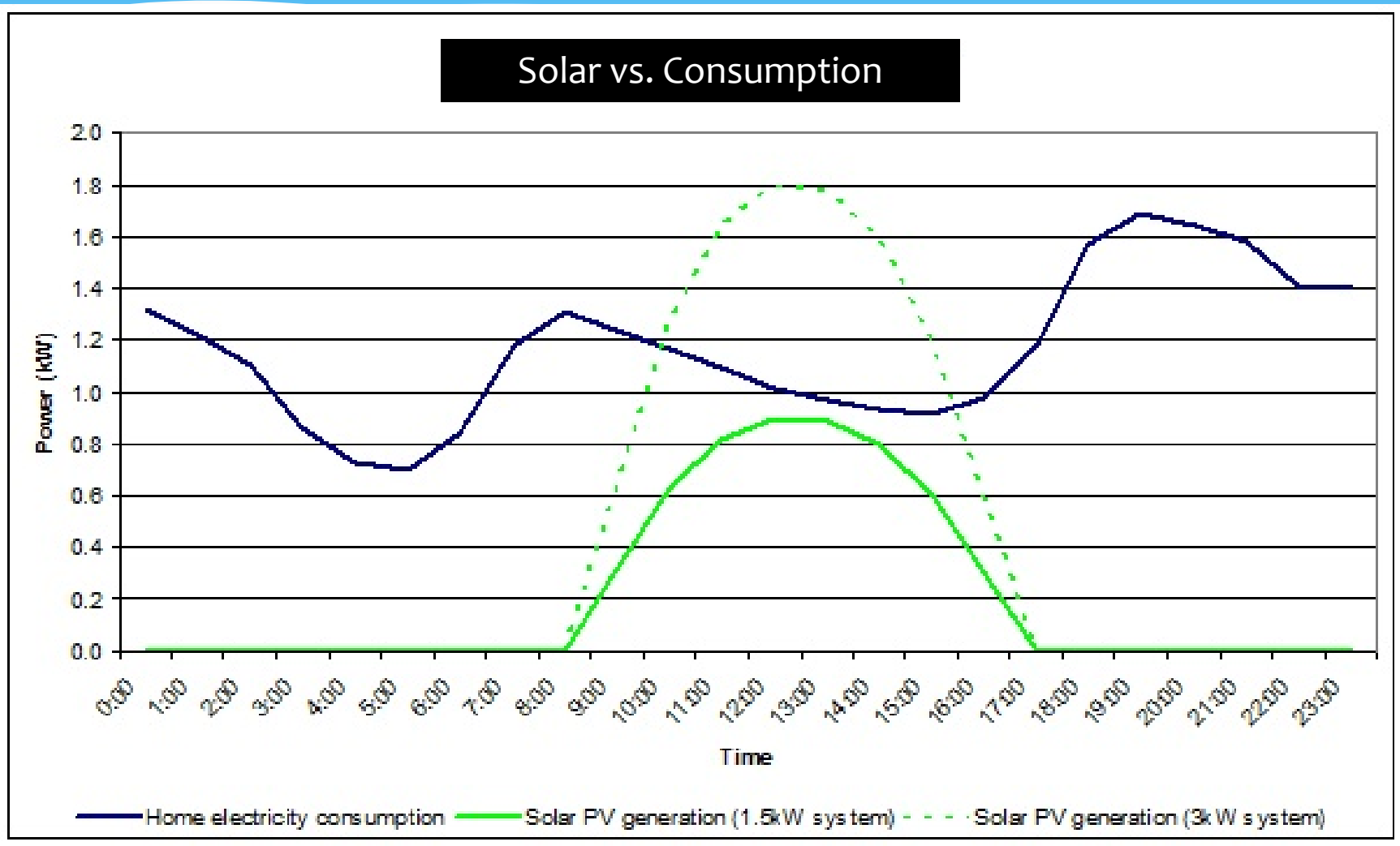
- Bi-directional meter
  - (kWh in – kWh out) x rate=bill

Neither meter collects "time stamped" information

Solar Output



Customer Usage vs. Solar Output



Net Metering Today

* Solar energy produced is used to meet the customers needs first
* Excess solar energy above the customer's load is delivered to the utility.
* The excess energy amount is recorded in a separate register in the meter
* At the time the bill is produced, the total kilowatt-hours (kWh) flowing to the utility is subtracted from the total kilowatt-hours flowing to the customer.

Account Statement

RATE CLASS: SERVICE PERIOD: RESIDENTIAL 08/04/2016 to 09/01/2016

DAYS IN SERVICE PERIOD: [redacted] 28

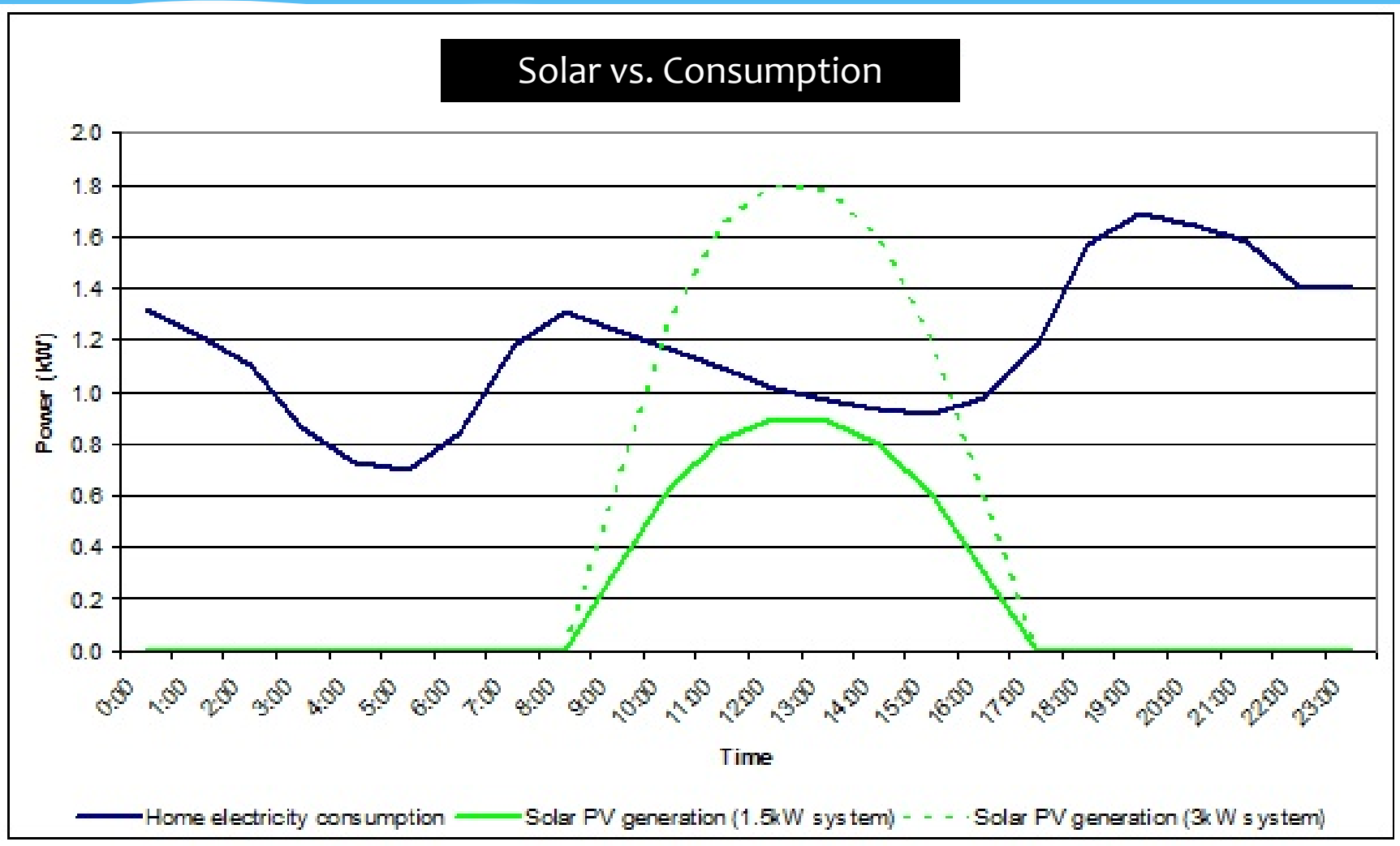
BILLING DATE: 09/13/2016

Units	Multiplier	Current	Previous	Usage
KWH	1.00	36729	36378	351
KWH	1.00	6048.00		-164.00
N				

Type	Multiplier	Current	Previous	Usage
WA	1.00	2949	2371	578

LAST BILL			112.91
TOTAL PAID SINCE LAST BILL LATE FEE/ADJUSTMENTS			112.91 CR 0.00
BALANCE FORWARD			**0.00**
EL ELECTRIC SERVICE		29.80	
EL ENERGY COST ADJUST		1.89 CR	
TOTAL ELECTRIC			27.91
WA WATER SERVICE SUMMER			23.41
SW SEWER			26.55
RW STORM WATER DRAINAGE			4.70
SALES TAX			1.91
TOTAL NEW CHARGES			**84.48**

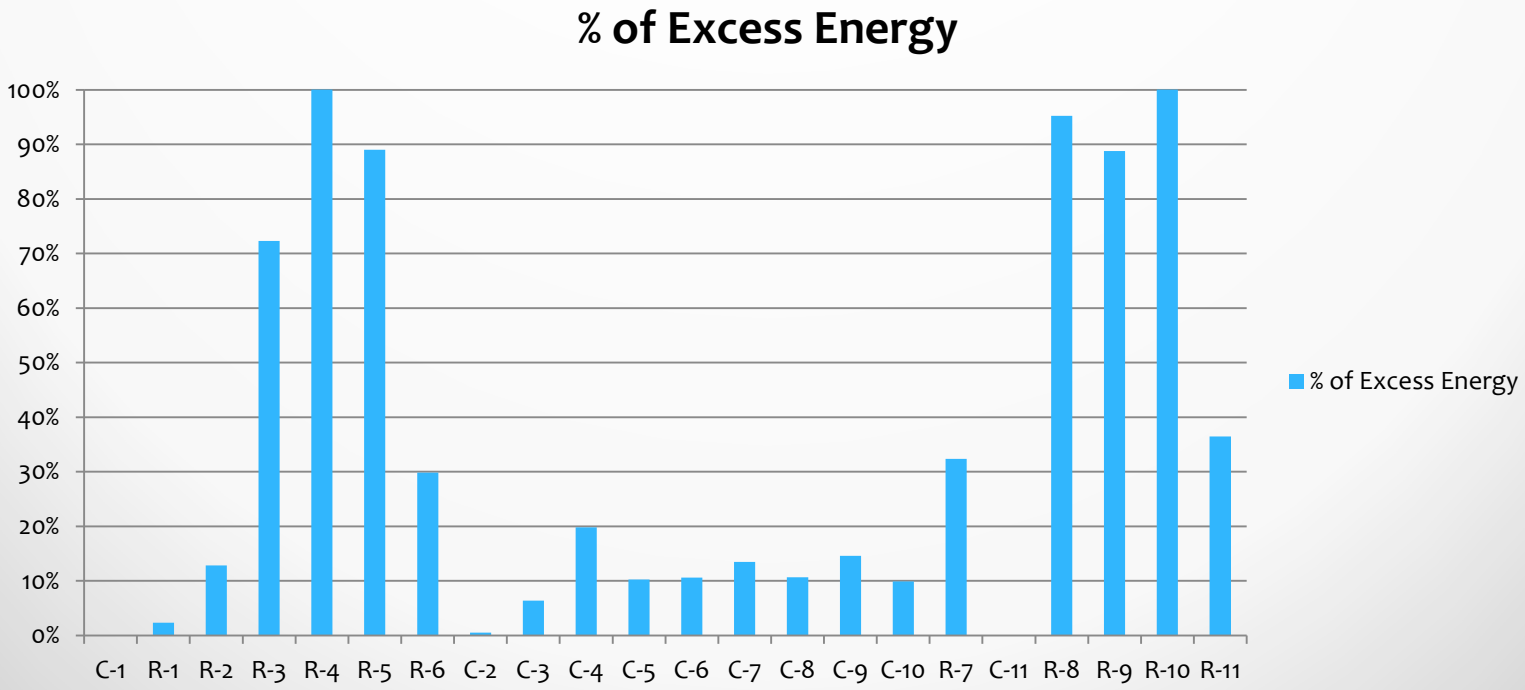
Customer Usage vs. Solar Output



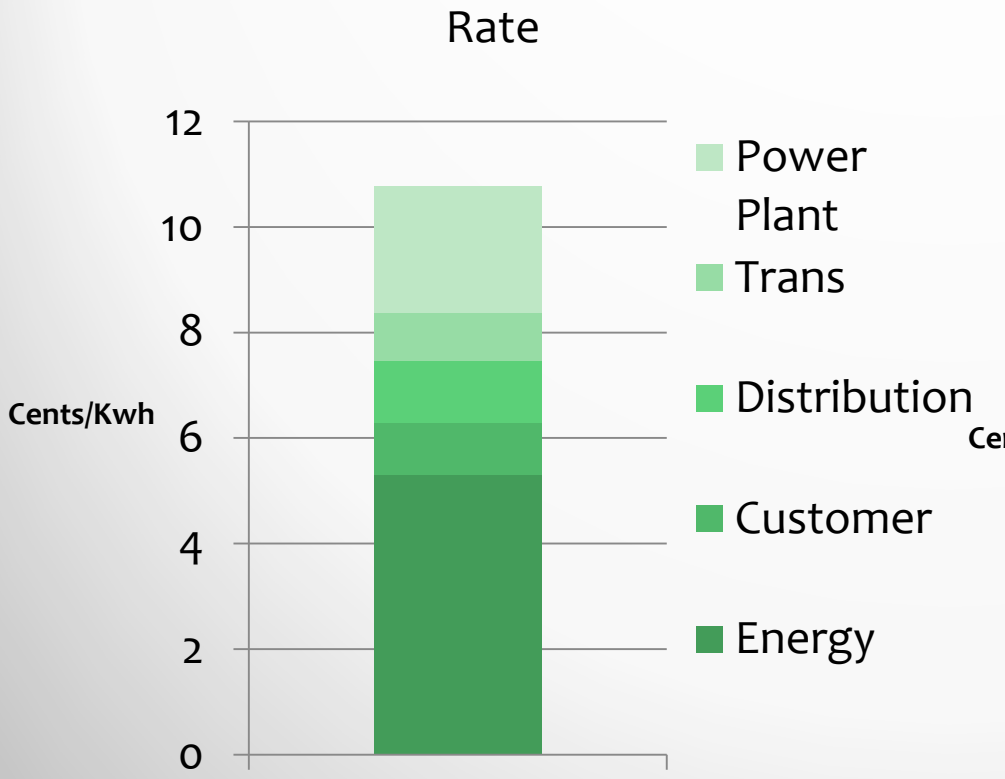
Utility Concerns

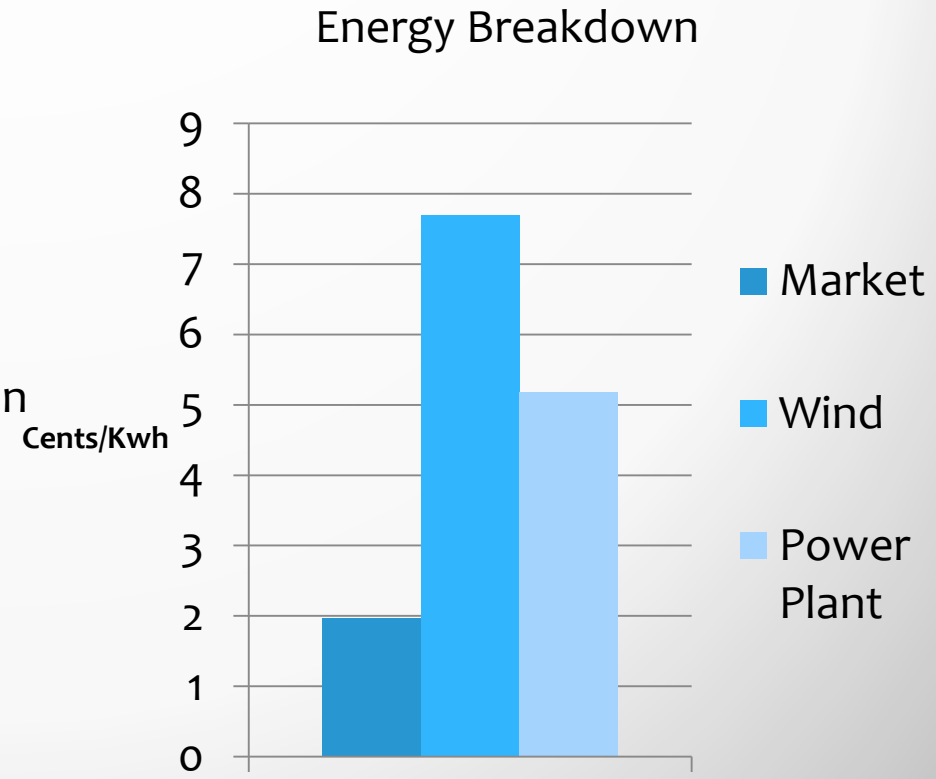
* The rate design "encourages" vendors to oversize the solar system:
  * Customer's Payback assumes utility will "bank" the energy
* Under recovery of utility's fixed costs:
  * Rebates, Transmission, Distribution, Generation Capacity and Labor
* Cross subsidization with other customers
* Utility is serving as an energy storage device:
  * 11 cent solar energy displaces 2.5 cent wholesale energy
* "Hand" billing
* Redesign Distribution system to accept energy rather than deliver

Sizing Systems



Cost Breakdown





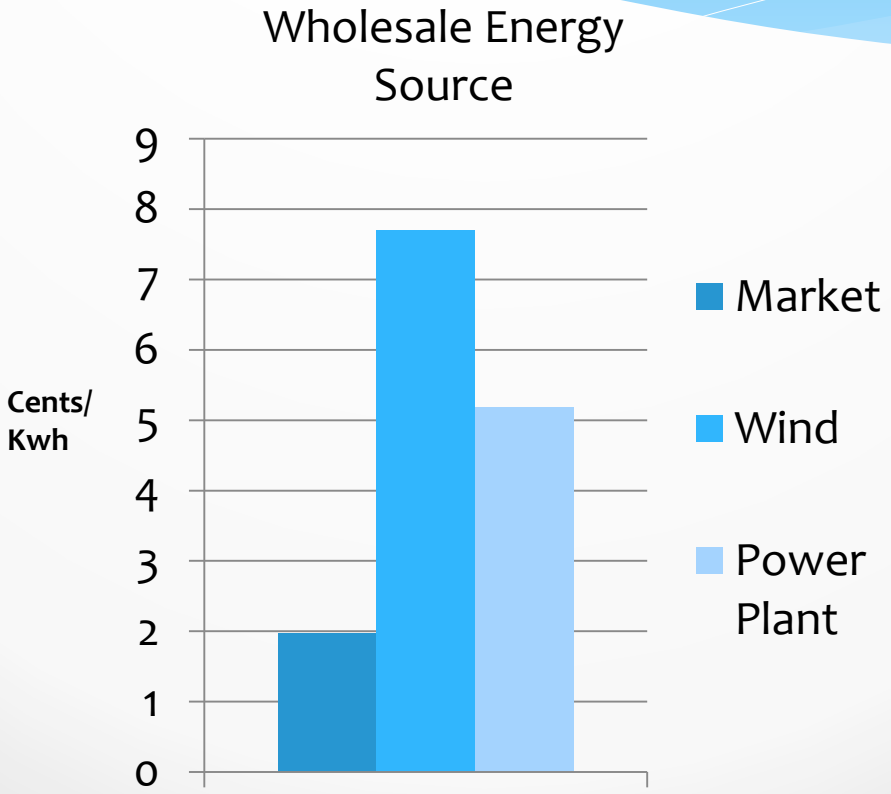
Options

1. **Take No Action**
   1. Concerns still exist but are limited due to 2,000 kW cap.
      * Design program for projects beyond 2,000 kW?
2. **Grandfather Existing**
   1. Determine cutoff date
      * April 11, 2016; Date City Council approves code change; Jan 1, 2017; when 2,000 kW is reached; other.
   2. Design program for projects not grandfathered?
3. **Modify Municipal Code**
   1. Eliminates Utility Concerns
   2. Places solar energy on par with other wholesale energy purchases
   3. Captures only the current "value" of solar
      * SMART Energy Solar rebate acknowledges capacity value
   4. Difficult to determine payback on oversized projects.

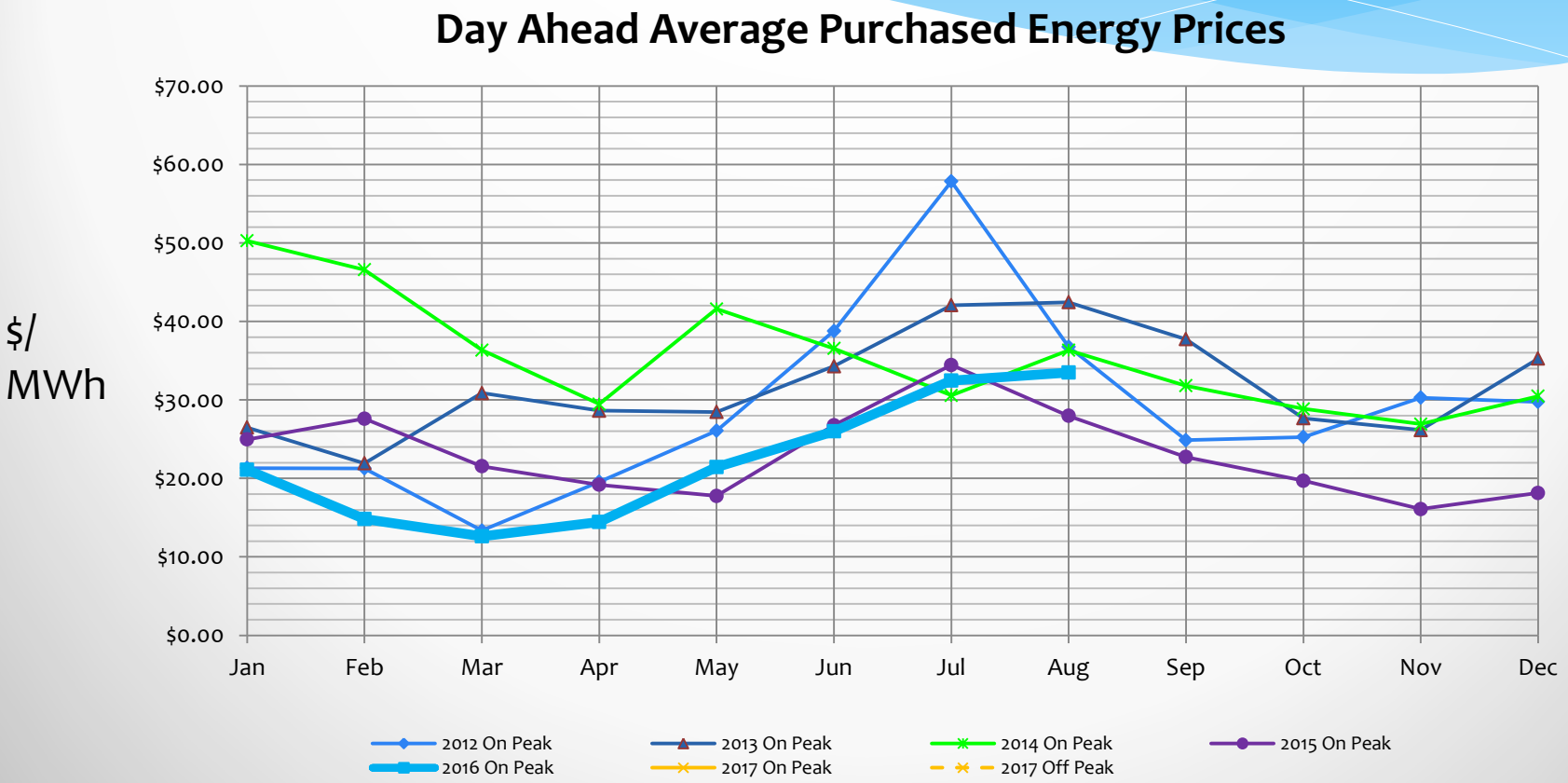
Next Steps

* Notify potential solar customers/vendors of probable change to tariff:
  * Began April 11, 2016
  * Interconnection Agreements
* Modify/simplify Municipal Code Appendix H language:
  * Eliminate “banking” of excess energy
  * Determine a rate to purchase excess energy
    * Recommend City’s On-peak Avoided Cost
    * Alternative - break out percentage of fixed costs

Energy Cost Breakdown



Wholesale Energy Price



Comments & Questions

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