

**AGENDA**  
**SPECIAL MEETING OF THE AMES CITY COUNCIL AND**  
**SPECIAL JOINT MEETING OF THE AMES CITY COUNCIL AND ELECTRIC**  
**UTILITY OPERATIONS REVIEW AND ADVISORY BOARD (EUORAB)**  
**COUNCIL CHAMBERS - CITY HALL**  
**OCTOBER 18, 2016**

**SPECIAL MEETING OF THE AMES CITY COUNCIL**

**CALL TO ORDER:** 6:00 p.m.

1. Resolution approving Plat of Survey for 301 S. 4<sup>th</sup> Street

**CITY COUNCIL COMMENTS:**

**ADJOURNMENT:**

**SPECIAL JOINT MEETING OF THE AMES CITY COUNCIL AND**  
**ELECTRIC UTILITY OPERATIONS REVIEW AND ADVISORY BOARD\***

\*The Special Joint Meeting of the Ames City Council and the EUORAB will immediately follow the Special Meeting of the Ames City Council.

1. Evaluation of Community Solar Power Options
2. Discussion of Potential Changes to Net Electric Metering

**EUORAB AND CITY COUNCIL COMMENTS:**

**ADJOURNMENT:**

**COUNCIL ACTION FORM**

**SUBJECT: PLAT OF SURVEY FOR 301 S. 4<sup>th</sup> STREET**

**BACKGROUND:**

The City's subdivision regulations are found in Chapter 23 of the *Municipal Code*. These regulations include the process for creating or modifying property boundaries and for determining if any improvements are required in conjunction with the platting of property. Review procedures for conveyance parcels are found in Section 23.307. A "conveyance parcel" is any parcel created by the division of land through a deed or contract conveyance. Unless it is determined that the parcel is a pre-platted, or a pre-established conveyance parcel, approval of a Plat of Survey is required to establish it as a valid parcel for permitting purposes.

**This Plat of Survey is for the purpose of establishing a valid parcel to permit the rebuilding of an apartment building located at 301 E. 4<sup>th</sup> Street** in the "RH" (High Density Residential) zoning district (*See Attachment A: Location & Zoning Map*). The size and dimensions of the proposed parcel are identical to the existing parcel, which includes 38,857.98 sq. ft. (0.89 acres) (*See Attachment B: Plat of Survey*). **The previous apartment building was a nonconforming structure with 33 units that was destroyed by fire on June 6, 2016. Rebuilding of a damaged nonconforming structure requires approval of a Special Use Permit if damaged to the extent of more than 70% of its assessed value.** The proposed apartment building includes 24 units, and is planned for construction on the foundation of the building that was destroyed.

***On October 12, 2016, the Zoning Board of Adjustment approved the request for a Special Use Permit to allow rebuilding of the damaged nonconforming structure, with a condition that addresses the requirement for a Plat of Survey, and reads as follows:***

- ***That a Plat of Survey be approved by the City Council, and copies of the recorded documents be received by the City Clerk's Office, prior to approval of the Minor Site Development Plan.***

Plats of Survey are to comply with all Design and Improvement Standards in the Subdivision Ordinance. South 4<sup>th</sup> Street is a dead end street that terminates at the west property line of 301 S. 4<sup>th</sup> Street. The Public Works Department has not identified a need to establish a cul-de-sac at the end of S. 4<sup>th</sup> Street, at this time. The proposed parcel meets the requirements of having complete infrastructure, as outlined in the Subdivision Code, with the exception of the cul-de-sac at the end of S. 4<sup>th</sup> Street, and does not trigger further extension of infrastructure.

New utility easements have been included on the Plat to address staff's request for

easements over existing infrastructure, including storm sewer, sanitary sewer, and electric. No additional easements are included, as part of the Plat of Survey.

Approval will allow the applicant to prepare the official Plat of Survey and submit it to the Planning and Housing Director for review. The Director will sign the Plat of Survey, confirming that it fully conforms to all conditions of approval. The prepared Plat of Survey may then be signed by the surveyor, who will submit it for recording in the office of the Story County Recorder.

The surveyor is in the process of revising the proposed Plat of Survey to include public easements for storm sewer, sanitary sewer and electric utilities. The Plat of Survey included in this report does not yet show those easements.

**ALTERNATIVES:**

1. The City Council can adopt the resolution approving the proposed Plat of Survey, with the following condition:
  - A. That the Plat of Survey be revised to include public easements for storm sewer, sanitary sewer and electric facilities on the site, prior to signature by the Planning & Housing Director.
2. The City Council can deny the proposed Plat of Survey if the City Council finds that the requirements for Plats of Survey, as described in Section 23.308, have not been satisfied.
3. The City Council can refer this back to staff and/or the owner for additional information.

**MANAGER'S RECOMMENDED ACTION:**

Staff has determined that the proposed Plat of Survey satisfies all code requirements for approval.

Therefore, it is the recommendation of the City Manager that the City Council accept Alternative #1, thereby adopting the resolution approving the proposed Plat of Survey with the condition specified above.

**ADDENDUM  
PLAT OF SURVEY FOR 301 S. 4<sup>TH</sup> STREET**

**Application for a proposed Plat of Survey has been submitted for:**

- Conveyance parcel (per Section 23.307)
- Boundary line adjustment (per Section 23.309)
- Re-plat to correct error (per Section 23.310)
- Auditor's plat (per Code of Iowa Section 354.15)

**The site is located at:**

Owners: A & B Partnership

Existing Street Addresses: 301 S. 4<sup>th</sup> Street

Assessor's Parcel #: 0911175070

New Legal Description: See Attachment C: Survey Description

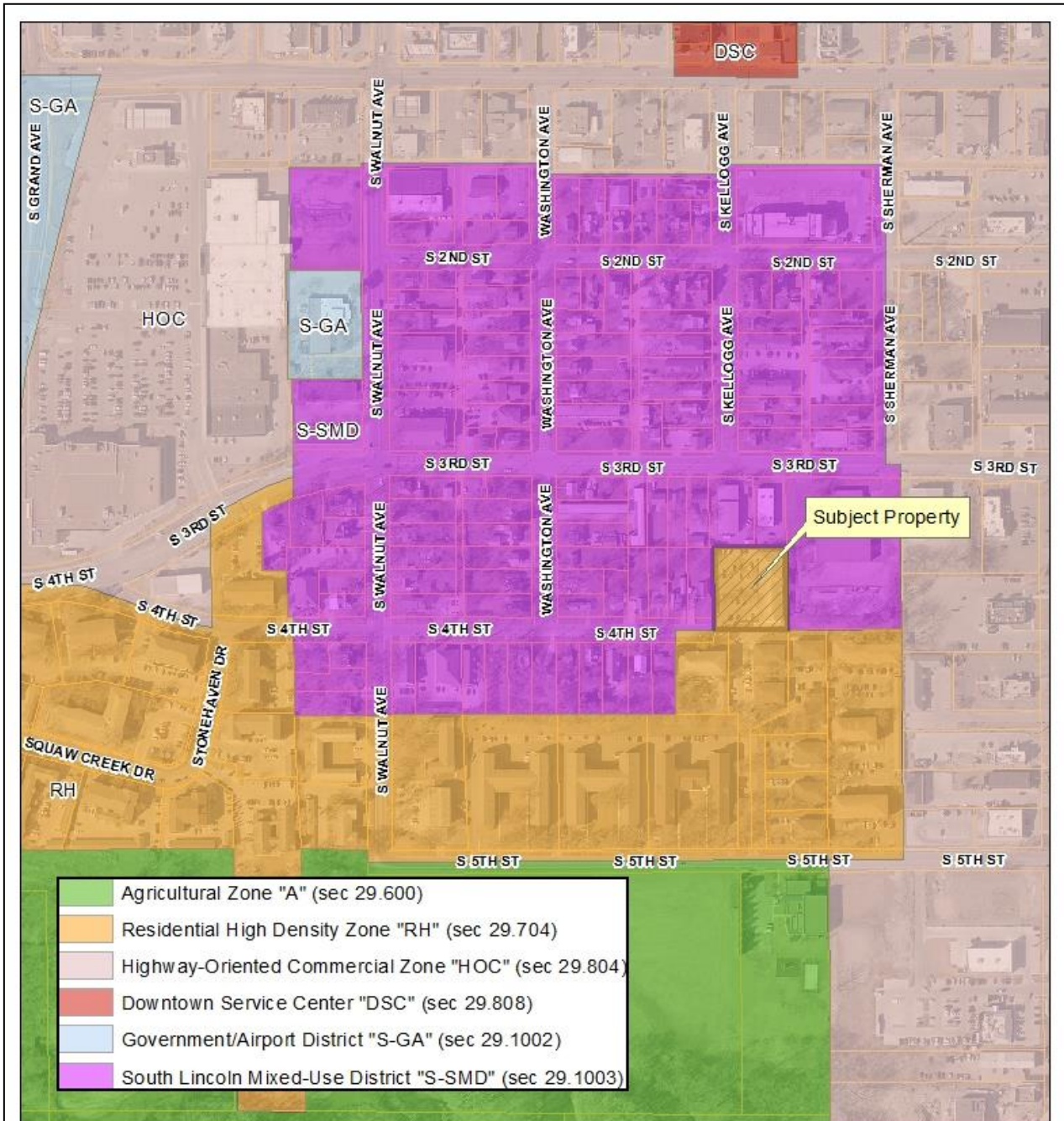
**Public Improvements:**

The preliminary decision of the Planning Director finds that approval requires all public improvements associated with and required for the proposed plat of survey be:

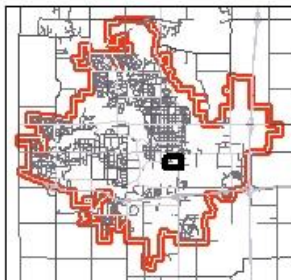
- Installed prior to creation and recordation of the official plat of survey and prior to issuance of zoning or building permits.
- Delayed, subject to an improvement guarantee as described in Section 23.409.
- Not Applicable.

**Note:** The official Plat of Survey is not recognized as a binding Plat of Survey for permitting purposes until a copy of the signed and recorded Plat of Survey is filed with the Ames City Clerk's office and a digital image in Adobe PDF format has been submitted to the Planning & Housing Department.

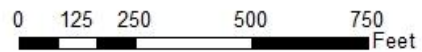
# ATTACHMENT A: LOCATION & ZONING MAP



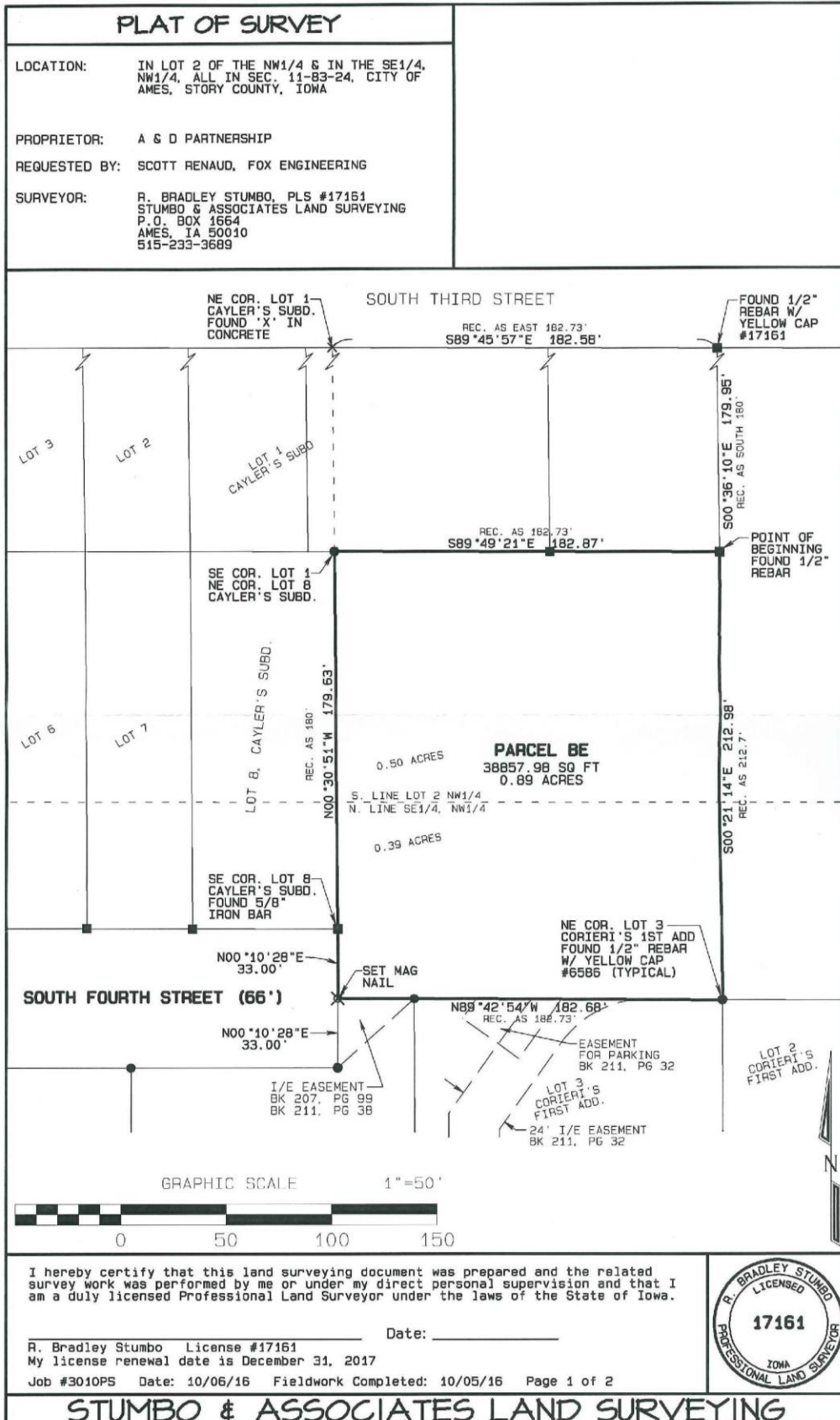
- Agricultural Zone "A" (sec 29.600)
- Residential High Density Zone "RH" (sec 29.704)
- Highway-Oriented Commercial Zone "HOC" (sec 29.804)
- Downtown Service Center "DSC" (sec 29.808)
- Government/Airport District "S-GA" (sec 29.1002)
- South Lincoln Mixed-Use District "S-SMD" (sec 29.1003)



## Location & Zoning Map 301 S. 4th Street



## ATTACHMENT B: PROPOSED PLAT OF SURVEY



**ATTACHMENT C: SURVEY DESCRIPTION**

Page 2 of 2  
Job# 3010PS

Parcel Description from Warranty Deed filed at Inst. No. 95-11439:

A parcel of land in the NE 1/4 of the NW 1/4 of Section 11, Township 83 North, Range 24 West of the 5th P.M., Iowa, described as follows: Commencing at the NE Corner of Lot 1, Cayler's Subdivision to Ames, Iowa; thence East 182.73 feet along the South line of South 3rd Street; thence South 180 feet to the point of beginning; from the point of beginning, thence South 212.7 feet; thence West 182.73 feet; thence North 212.7 feet, thence East 182.73 feet to the point of beginning; also described as: A part of Lot 2 in the NW1/4 and a part of the SE1/4 of the NW1/4, all in Section 11, Township 83 North, Range 24 West of the 5th P.M., in the City of Ames, Story County, Iowa, described as follows: Commencing at the NE Corner of Lot 1, Cayler's Subdivision, in the City of Ames, Story County, Iowa, thence East 182.73 feet along the South line of South Third Street, thence South 180 feet to the point of beginning, thence continuing South 212.7 feet, thence West 182.73 feet, thence North 212.7 feet, thence East 182.73 feet to the point of beginning, locally known as Oakridge Apartments, 301 South Fourth, Ames, Iowa.

The above-described tract is currently being described as follows:

Survey Description – Parcel 'BE':

A part of Lot 2 in the Northwest Quarter; and a part of the Southeast Quarter of the Northwest Quarter, all in Section 11, Township 83 North, Range 24 West of the 5<sup>th</sup> P.M., City of Ames, Story County, Iowa, and being more particularly described as follows: Commencing at the Northeast Corner of Lot 1 in Cayler's Subdivision, City of Ames, Story County, Iowa; thence S89°45'57"E, 182.58 feet along the South line of South Third Street; thence S00°36'10"E, 179.95 feet to the point of beginning; thence S00°21'14"E, 212.98 feet to the Northeast Corner of Lot 3 in Corieri's First Addition to Ames, Story County, Iowa; thence N89°42'54"W, 182.68 feet along the North line of said Lot 3, Corieri's First Addition, and said line extended westerly to the East end of South Fourth Street; thence N00°10'28"E, 33.00 feet to the Southeast Corner of Lot 8 in said Cayler's Subdivision; thence N00°30'51"W, 179.63 feet to the Northeast Corner of said Lot 8, Cayler's Subdivision; thence S89°49'21"E, 182.87 feet to the point of beginning, containing 0.89 acres.

The Ames City Council approved this Plat of Survey on \_\_\_\_\_, 20\_\_\_\_, with Resolution No. \_\_\_\_\_. I certify that it conforms to all conditions of approval.

\_\_\_\_\_  
Planning & Housing Director

## **Evaluation of Solar Power Options for the City of Ames**

Some Ames electric customers have shown an interest in the development of a community solar photovoltaic (PV) power project in Ames. A community solar project allows electric customers the opportunity to share some of the benefits of solar power, even if they cannot or prefer not to install solar panels on their home, business, or property. Participating electric customers make contributions to support the development and construction of a larger and more economical solar power project, and in return they may receive financial benefits. Some customers with an interest in solar power may not be able to install or own their own solar array for various reasons, such as: 1) they are renters, 2) their roof or property is not suitable for a solar array, 3) they don't want the hassle of doing their own solar array, or 4) their electricity usage is too low to make a small solar array economically viable. The participating customers in most community solar projects are not considered to be investors, so that any electric bill savings they receive is not considered to be income. Typically, participating customers are limited to shares that do not exceed their annual electricity usage.

In response to this interest in a community solar project, the City of Ames (City) has contracted with Wind Utility Consulting, PC (Consultant) to evaluate options for the development of a large community solar project in Ames. Three basic options were evaluated. Option 1 is for the City of Ames (City) to develop, finance, and own the solar project. All costs would be essentially socialized or spread over all customers, just like the costs for the City's coal-fired power plant. In essence all customers would participate in the project.

The actual delivered cost of the solar power will be higher than the cost of the City's other sources of power, and there is no assurance that this solar power will ever be less expensive. Since adding the solar project will tend to raise the average cost of the City's power, a second option (Option 2) was evaluated. In Option 2 the City's electric customers would have an option to contribute financially to help offset the higher cost of power, so that other customers would have some protection from potentially higher power costs.

Since the City is a non-profit entity, it cannot take advantage of the federal income tax benefits available for solar projects. Therefore, a third option (Option 3) was evaluated; wherein a for-profit company would build and initially own the solar project, and sell the City the solar power. After six years of operation, the City would have the option of purchasing the solar project from the for-profit company at a greatly reduced cost. By initially taking advantage of the income tax credits then subsequently taking advantage of the City's low cost financing, the cost of the solar power would most likely be less than for Options 1 or 2.

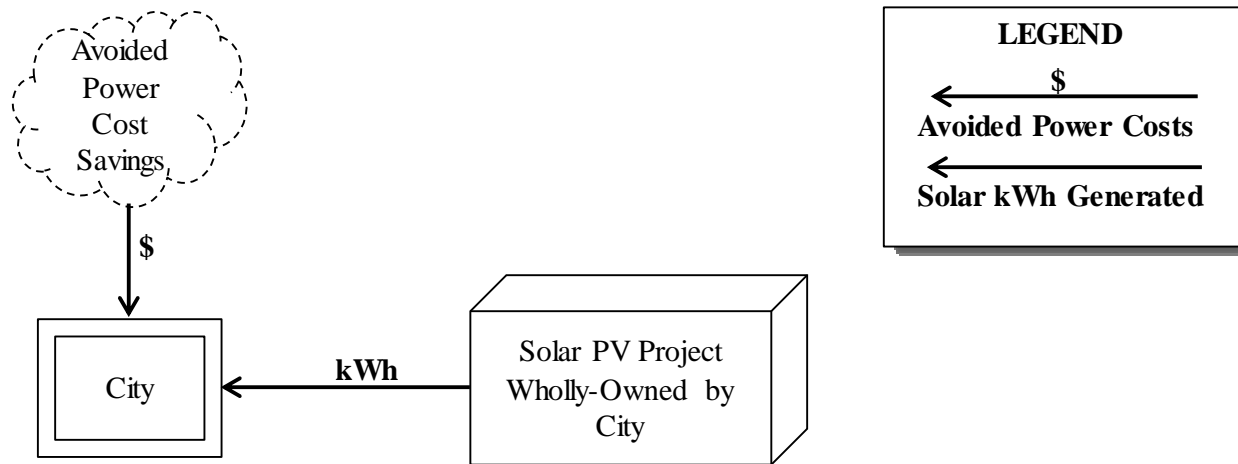
Each of the three options is discussed in more detail below, along with their advantages and disadvantages.



**Option 1: City-Built and City-Owned Project with All Costs Socialized**

Under this option the City would build and own the project and would contract with a solar power company to construct the solar array. Since the City would own and operate the project, the capital and operating costs would be socialized, or borne by all of the City’s electric customers. The City would use the state tax credits that have already been approved for this project. This 1.5¢ per kWh 10-year tax credit would be used to offset the state sales tax that the City pays to the state. Figure 1 provides an overview diagram of this option and Table 1 lists the advantages and disadvantages of this option.

**FIGURE 1 - OPTION 1**



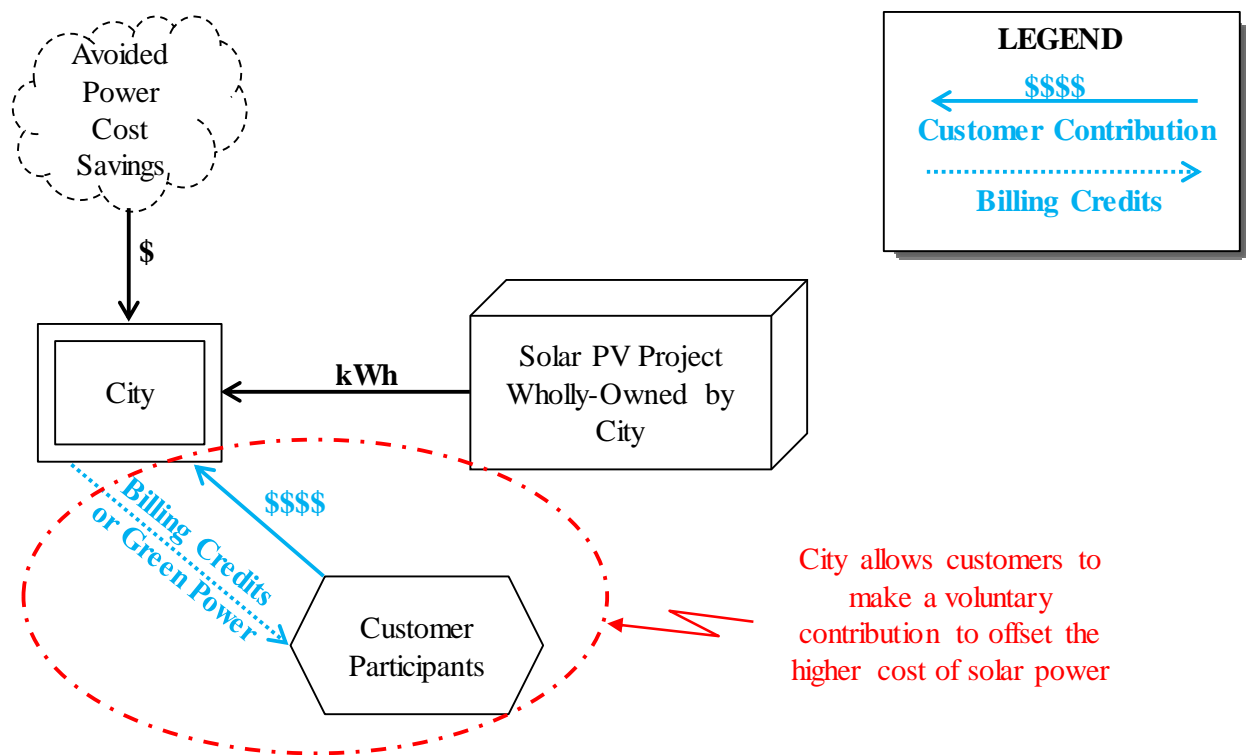
**TABLE 1**

Advantages	Disadvantages
Very simple structure due to City ownership.	Staff has responsibility for developing, building, and operating the project.
Simple for customers, since they have no decisions to make. All customers participate, because they all pay the cost of the solar project.	Cost of solar power will be a little higher than the other solar options, since the City cannot use the federal income tax benefits.
	Does not provide customers an option to contribute to the project and “use” solar power to meet their own energy needs.

**Option 2: City-Built and City-Owned Project with Voluntary Customer Contributions**

This option is very similar to Option 1 in that the City develops and owns the project. However, the City would take voluntary customer contributions to help offset the higher cost of the solar power. The contribution program could be a one-time up-front payment, which would provide the participants with the possibility of some type of monthly credit on their electric bills. An alternative contribution program could simply be a higher electric rate, which would result in monthly contributions toward the solar project. The City would use the state tax credits that have already been approved for this project. Figure 2 is an overview diagram of Option 2, and Table 2 lists the advantages and disadvantages of this option.

**FIGURE 2 – OPTION 2**



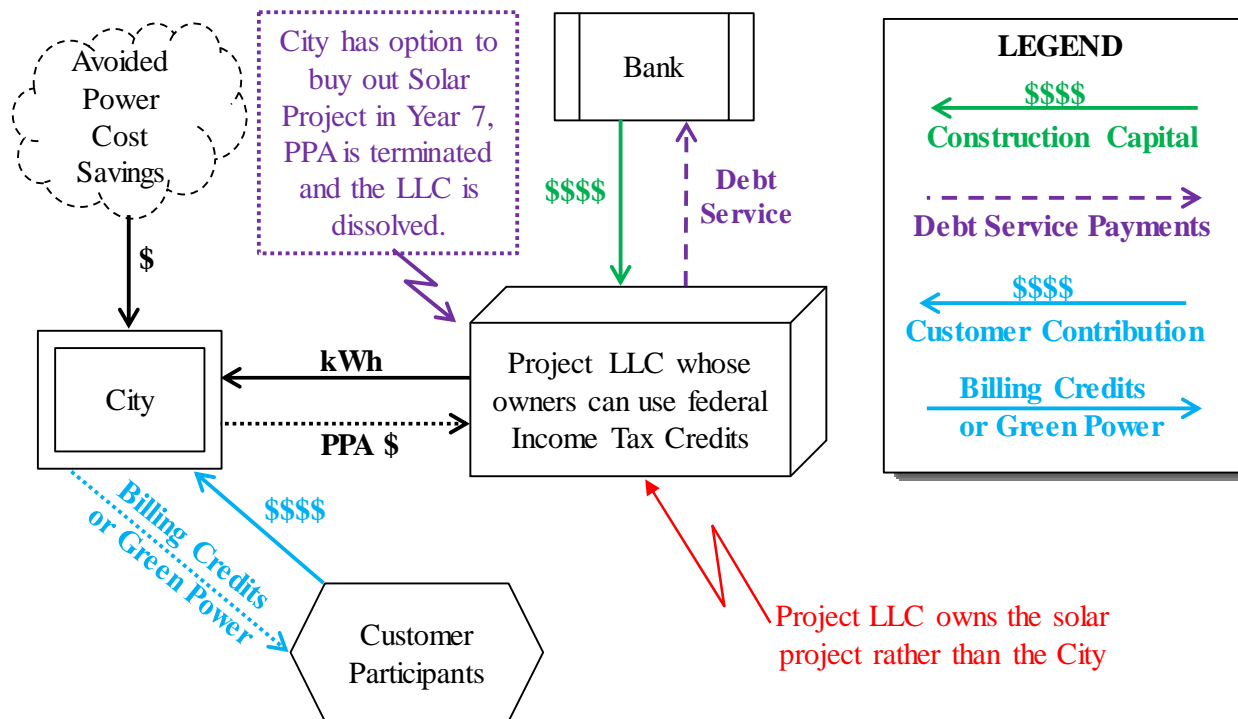
**TABLE 2**

Advantages	Disadvantages
Voluntary customer contributions help shield non-participating customers from the higher initial cost of solar power.	City needs enough volunteers to support the project or the project is not built.
Participants get satisfaction of contributing to solar project and using green energy.	Staff has responsibility for developing, building, and operating the project. Cost of solar power will be a little higher than other solar options, since the City cannot use the federal income tax benefits.
	Staff must keep track of participants and billing credits.

**Option 3: Non-City Developed and Owned Project with Voluntary Customer Contributions**

With this option, the City would request proposals to buy power using a Power Purchase Agreement (PPA) from a new solar array installed in or near the city. A for-profit company would develop, finance, and own the solar project, so that it could receive the federal income tax benefits provided to solar projects. The for-profit company could be an outside solar related company, or it could be an LLC formed, owned, and funded by a group of Ames electric customers not exceeding 34 customer-owners. This group of customers would own the solar project and would receive the federal income tax benefits. The City would allow additional customers to participate in a voluntary program to help offset the higher cost of the solar power. As in Option 2, the contribution program could be a one-time up-front payment, which would provide the participants with the possibility of some type of monthly credit on their electric bills. An alternative contribution program could again simply be a higher electric rate, which would result in monthly contributions toward the solar project. With Option 3, the City would have the option to purchase the solar project after the for-profit company fully depreciates the solar project over the course of six years. After the sixth year the purchase price would be at a greatly discounted cost. This purchase would most likely reduce the cost premium of the solar power from that point forward. As before, the City would use the state tax credits that have already been approved for this project. Figure 3 is an overview diagram of Option 3, while Table 3 shows the advantages and disadvantages.

**FIGURE 3 – OPTION 3**



**TABLE 3**

<b>Advantages</b>	<b>Disadvantages</b>
Staff has no responsibility for developing, building, or initially operating the project.	Requires a Power Purchase Agreement (PPA) and an interconnection agreement.
Voluntary customer contributions help shield non-participating customers from the higher initial cost of solar power.	Staff must keep track of participants and billing credits.
Participants get satisfaction of contributing to solar project and using green energy.	If the City buys out the project, then the staff must operate it or the City could contract for this service out.
City has the option to purchase the project at a discounted cost in year 7, which would likely reduce the cost premium of the solar power.	

**Financial Analysis**

A simple financial analysis was done for the three basic options, based on these general assumptions:

- 1) The solar project would have an alternating current (AC) rating of 1.5 megawatt (MW). It would use solar panels having a cumulative rating of 1.95 MW direct current (DC). It would cost about \$3.9 million, or \$2.00 per watt DC.
- 2) The project would initially generate 2.7 million kWh with the output declining about 0.5% per year due to cell degradation.
- 3) The operating cost would initially be about \$45,000 per year.
- 4) The state sales tax credit would initially be about \$40,000 per year.
- 5) The solar power would have an initial estimated energy value to the City of 5.0¢ per kWh. A firm capacity value of 40% of the AC nameplate rating times \$72 per MW-Day in capacity value in MISO gives an additional value of 0.6 ¢ per kWh, for an initial total value of 5.6¢ per kWh. This was assumed to escalate 3% per year.
- 6) A for-profit company owning the solar project would receive a 30% federal investment tax credit and would use a five-year accelerated tax depreciation schedule. Bonus depreciation was assumed.
- 7) If the City opts to purchase the project after the sixth year, the buyout price was estimated to be 40% of the original cost of the project.
- 8) It was assumed that the customer contributions allowed in Options 2 and 3 would generate billing credits over a 20-year period. In this analysis, it was assumed that contributors would break even or get their original investment back in 15 years. With the additional credits received in years 16 through 20, the customers essentially earn 2.9% on their original investment over the 20-year period. This return was considered by the Consultant to be the minimum rate of return that would attract customer participation. It should be noted that even with an upfront payment along with the assumed level of billing credits, the solar project would still likely result in a net increase in cost to the City’s rate payers or a higher initial investment by the participating customers.

The results of this simple cash flow analysis are shown in the bottom two rows of Table 4 on the following page.

**Comparison of the Three Options**

Table 4 compares the key aspects of each of the three options.

**TABLE 4**

<b>Comparison of Key Aspects of the Three Options</b>			
	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>
	City-Owned	City-Owned with Customer Contributions	Non-City-Owned with Customer Contributions & Buyout
City Staff Resources Needed to Develop Project	Lowest	Highest	Medium
Ongoing City Management Needed	Operate Project	Operate Project, manage billing credits	Manage agreements and billing credits and eventually operate project
<u>Project Risks to City</u> Cost Overruns Poor Production	Highest Highest	Highest Highest	Lowest Lowest
<u>Use of Federal Income Tax Benefits</u>	None	None	Yes
<u>Customer Involvement</u>	None	Voluntary	Voluntary
Keeping \$ in the Community	Lowest	Medium	Highest if locally owned
25-Year Levelized Cost of Solar Power	9.5 to 11.0¢ per kWh	9.5 to 11.0¢ per kWh	7.0 to 8.0¢ per kWh
Present Value of Cost Increase to City Over 25 Years (in \$1,000,000's)	\$0.5 to \$2.0 Increase	\$0.5 to \$2.0 Increase	\$0.8 Savings to \$0.5 Increase
Notes: - The ranges shown in the costs in the last two rows of the table reflect the uncertainties in the many assumptions used in this simple cash flow analysis. - A 25-year levelizing period was used because the solar project will very likely have a lifetime of 25 years. Furthermore, PPAs often have 25-year terms. Customer billing credits were limited to 20 years, since few customers will likely take electric service longer than 20 years.			

The 25-year levelized cost of solar power may be about the same whether voluntary customer contributions are taken or not (Option 1 compared to Option 2). This is because their contributions were assumed to be returned over time, just like bond payments would be. If the

City extends the break-even period to 20 years, then it would lower the levelized cost of solar power and would reduce the cost increase to the City. The City does have some discretion on how to calculate how much is returned each year to the contributors. However, as mentioned before, if the break-even period is too long, then participation may be too low to justify building the solar project.

All three options may result in some increase in costs to the City's rate payers compared to not building a solar project, since the last row in the table usually shows an increase in the present value of the City's cost. This is often typical for solar power projects in the upper Midwest where wholesale grid prices are fairly low at this time.

Option 3 appears to be the most cost effective, based on the simple cash flow analysis. The cost effectiveness stems almost entirely from the buyout opportunity for the City. For example, the city would pay only 40% of the original cost in year seven, but the solar project would have 75% of its life remaining. This is somewhat equivalent to getting the project at roughly half price considering the remaining life of the solar project. The buyout option is driven by the ability of the for-profit company to take all of the income tax benefits over the course of six years.

### **Other Considerations**

#### **Ownership of Land**

In all three options the land could be owned by the City, and simply leased to whoever owns the solar array project. It would take about 10 acres of land for the proposed solar project.

#### **Emission Reduction Credits or Renewable Energy Credits**

The emission reduction credits (ERCs) or renewable energy credits (RECs) should be retained in the long term by the City, regardless of the ownership of the array. Since there are currently no legal requirements for having ERCs, they have little value at this time. No value was given in the simple financial analysis.

#### **Ensuring kWh Production Performance**

If there will be a third-party owner, then the PPA can include penalties if the kWh production falls below target levels. The target level can be adjusted for the actual solar insolation received at the site, so it would not penalize the owner for overly cloudy weather. This penalty would provide an incentive for the owners to keep the project well maintained and to fix problems quickly.

#### **Ensuring Quality Materials and Construction**

If the City simply requests proposals for the construction of the project, it may not have much say about the quality and warranty of the equipment, or the robustness of the array's panel mounting design and system. Therefore, the City should specify the quality of solar panels, their warranty terms, and overall mechanical design standards in the request for proposals. This will help insure higher production and reliability.

#### **Purchasing the Solar Array Project from Other Owners**

If the City purchases the solar array after the majority of the tax benefits are captured by the initial owners (after six years), then it will most likely be able to reduce the levelized cost of the

solar array power. Of course, all of this depends upon the buyout purchase price of the solar array, the PPA rate in the initial contract, and the City's cost of money. Since all of these factors will not be known initially, the City should require the initial owner of the solar array to provide a buyout option at one or two specific times, such as after 6 years, or after 10 years. The Internal Revenue Service states that the buyout purchase price must be at the fair market value (FMV) as measured at the time of purchase. A calculation methodology for the FMV, such as a discounted future cash flow model, can be specified in the PPA contract. The Consultant estimates that the purchase price might be in the range of 35% to 45% of the original cost of the project at the beginning of year 7, with lower buyout costs thereafter. Given a minimum 25-year life, the solar array will have 75% of its projected lifetime MWh remaining at the end of six years. A buyout price of 40% represents a bargain, assuming the solar array is performing well. The City can make the determination at the time of the buyout when the purchase price is known, and there is less uncertainty about future generation costs. A buyout price of 40% was assumed in the simple financial analysis in the appendix.

### **Conclusions**

The analysis shows that there are relative advantages for each of the options and all are feasible. If the City exclusively owns the solar project, the overall cost to the city or to the participants will most likely be higher than not having the solar project. The financial analysis shows that there may be some advantage for having a non-city for-profit entity develop and initially own the project, followed by a sale of the project to the City. However, the solar project may still increase the cost to the City's rate payers. If the City's costs increase, then electric rates would be a little higher, or the participants would not get all of their initial contributions back in the form of billing credits. The participating customers should not assume that the bill credits will provide a suitable rate of return for any of the options.

Thomas A. Wind, PE  
Wind Utility Consulting, PC  
October 13, 2016

**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 you prior to the Joint Meeting.

DK/drv



**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 kVAW 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				
<b>Residential</b>		16	84	10%				
<b>Commercial</b>		115	728	90%				
	<b>Totals</b>	131	812					
<b>* YTD increase</b>		655%	495%	(compared to aggregate for all prior years)				
<b>Notes:</b>								

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
    - $\text{kWh} \times \text{rate} = \text{bill}$
- With solar
  - Bi-directional meter
    - $(\text{kWh in} - \text{kWh out}) \times \text{rate} = \text{bill}$

Neither meter collects  
“time stamped”  
information

# Solar Output

kW

25.000

20.000

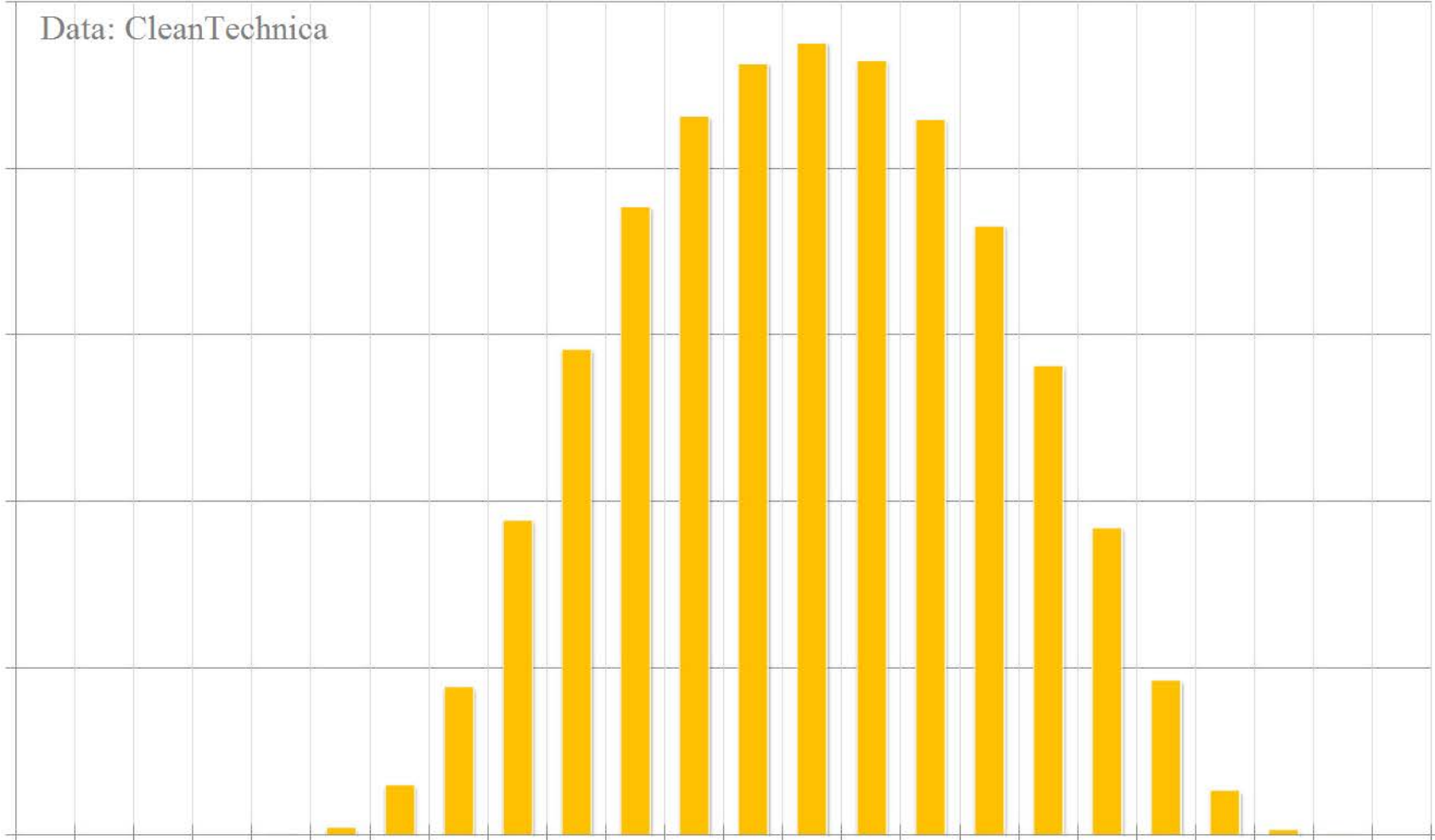
15.000

10.000

5.000

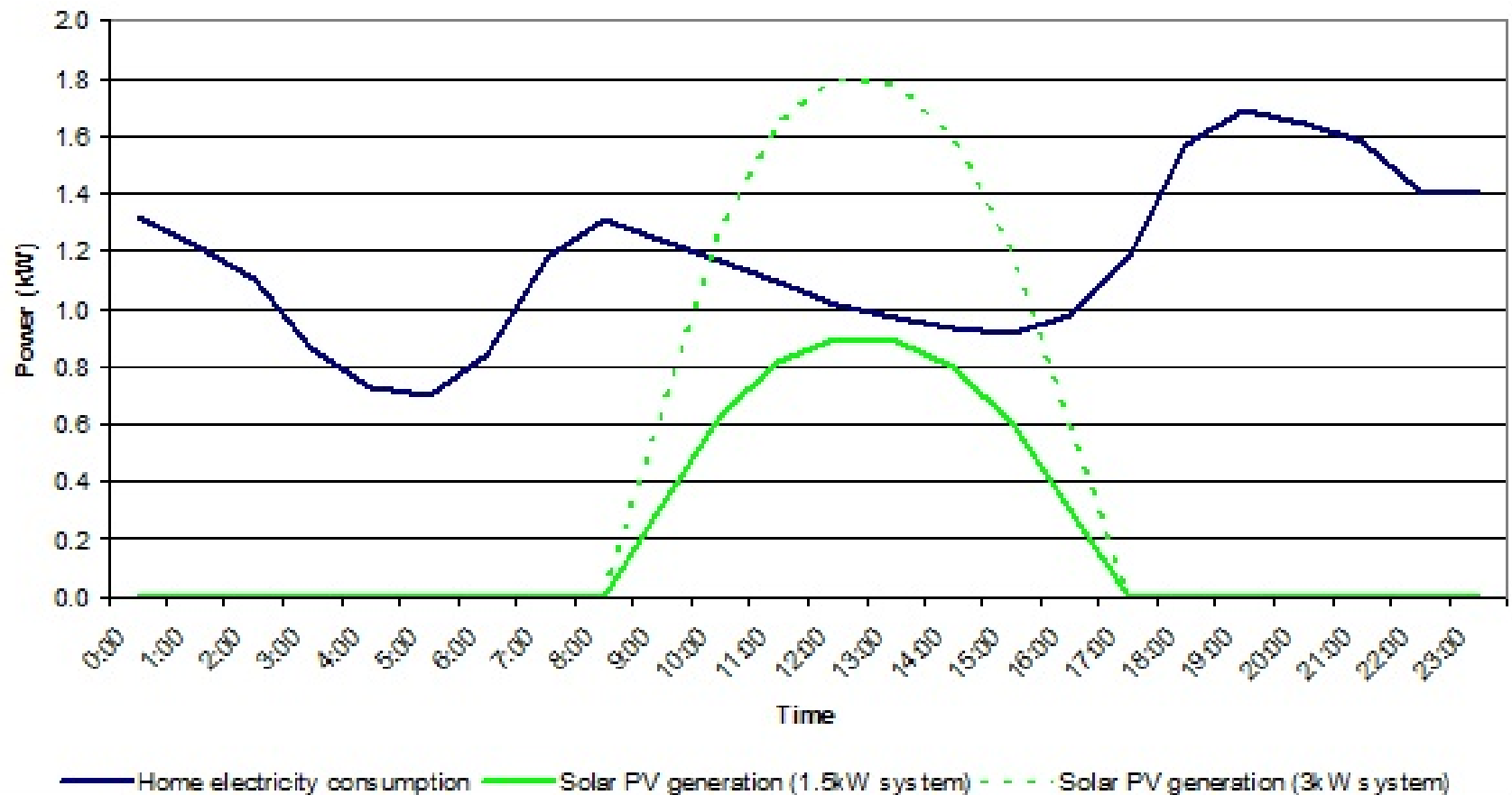
Data: CleanTechnica

12:00 AM  
1:00 AM  
2:00 AM  
3:00 AM  
4:00 AM  
5:00 AM  
6:00 AM  
7:00 AM  
8:00 AM  
9:00 AM  
10:00 AM  
11:00 AM  
12:00 PM  
1:00 PM  
2:00 PM  
3:00 PM  
4:00 PM  
5:00 PM  
6:00 PM  
7:00 PM  
8:00 PM  
9:00 PM  
10:00 PM  
11:00 PM



# Customer Usage vs. Solar Output

Solar vs. Consumption



# Net Metering Today

- \* Solar energy produced is used to meet the customer's 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:

DAYS IN SERVICE PERIOD: BILLING

DATE:

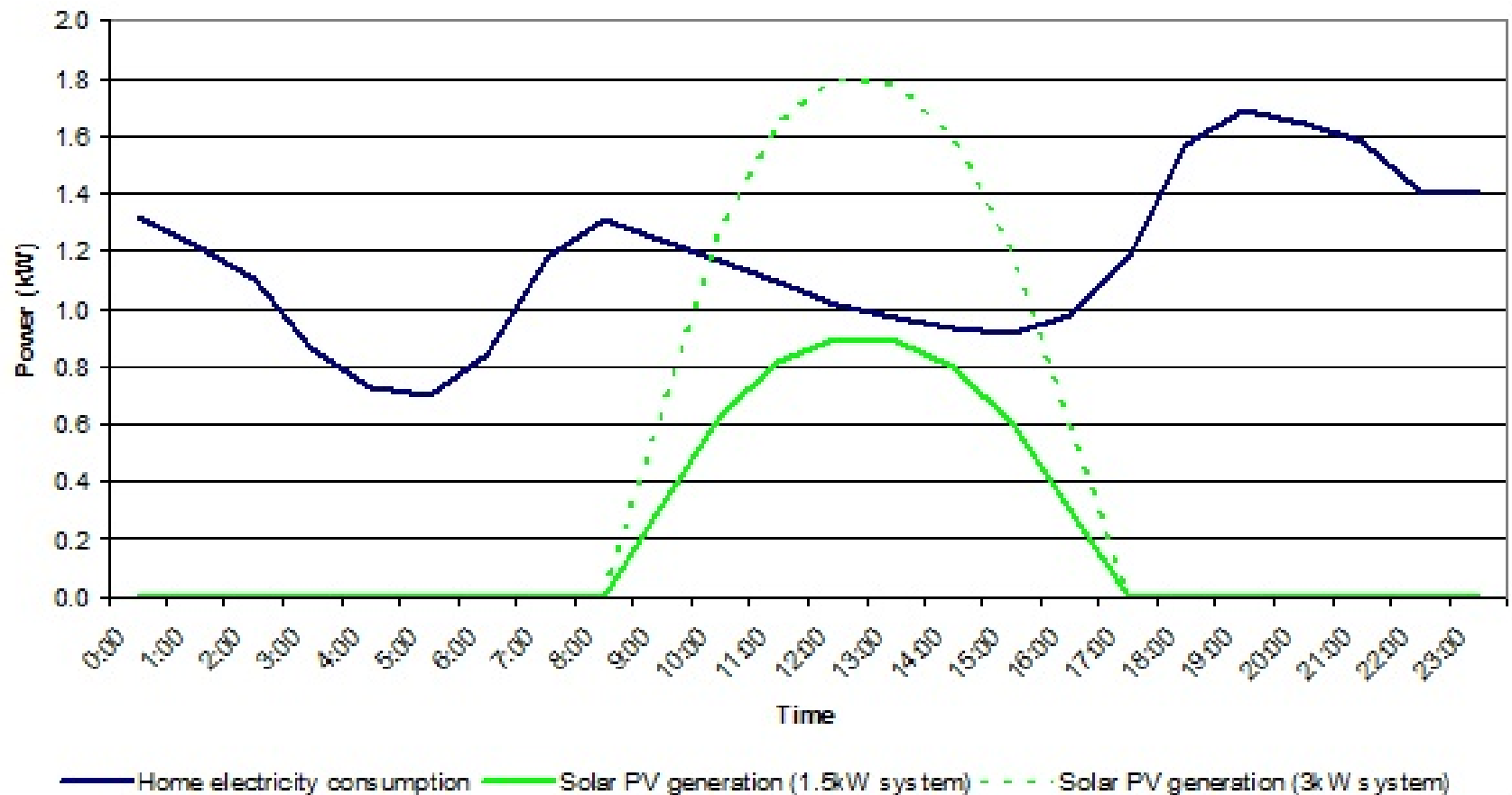
RESIDENTIAL  
08/04/2016 to 09/01/2016  
28  
09/13/2016

<u>Units</u>	<u>Multiplier</u>	<u>Current</u>	<u>Previous</u>	<u>Usage</u>
KWH	1.00	36729	36378	351
KWH	1.00	6048.00		-164.00
N				
<u>Type</u>	<u>Multiplier</u>	<u>Current</u>	<u>Previous</u>	<u>Usage</u>
WA	1.00	2949	2371	578

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

# Customer Usage vs. Solar Output

Solar vs. Consumption



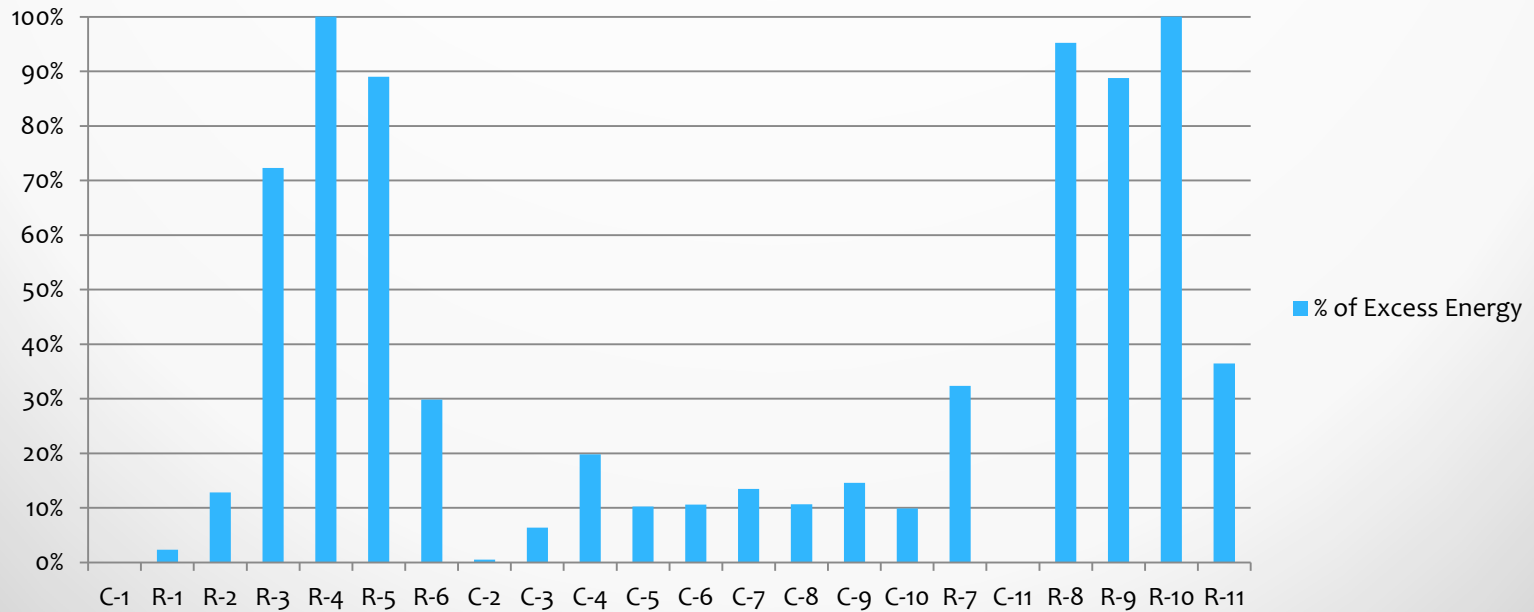
# Utility Concerns

- \* 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



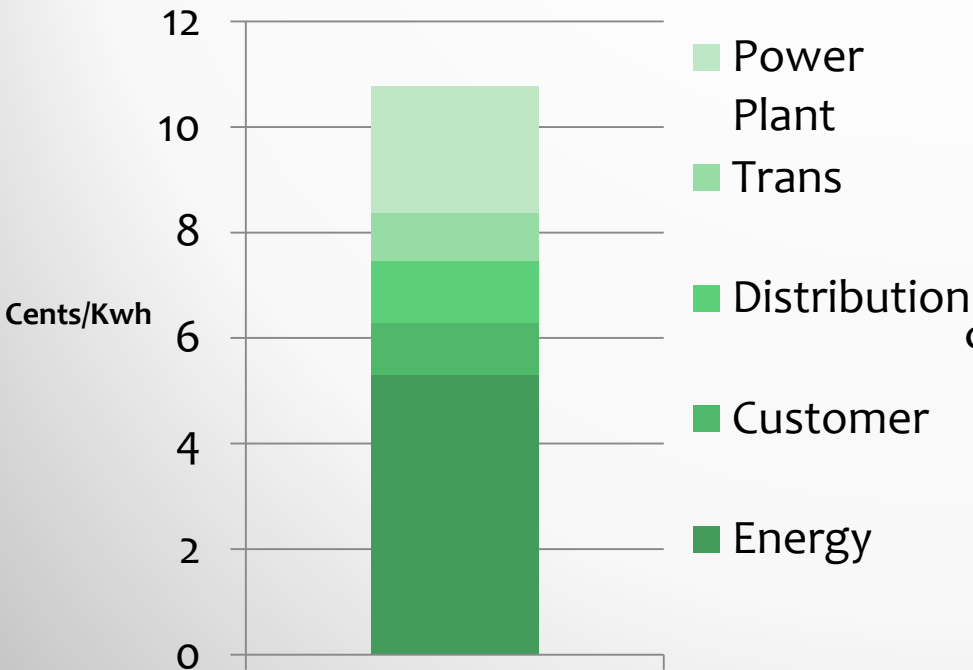
# Sizing Systems

**% of Excess Energy**

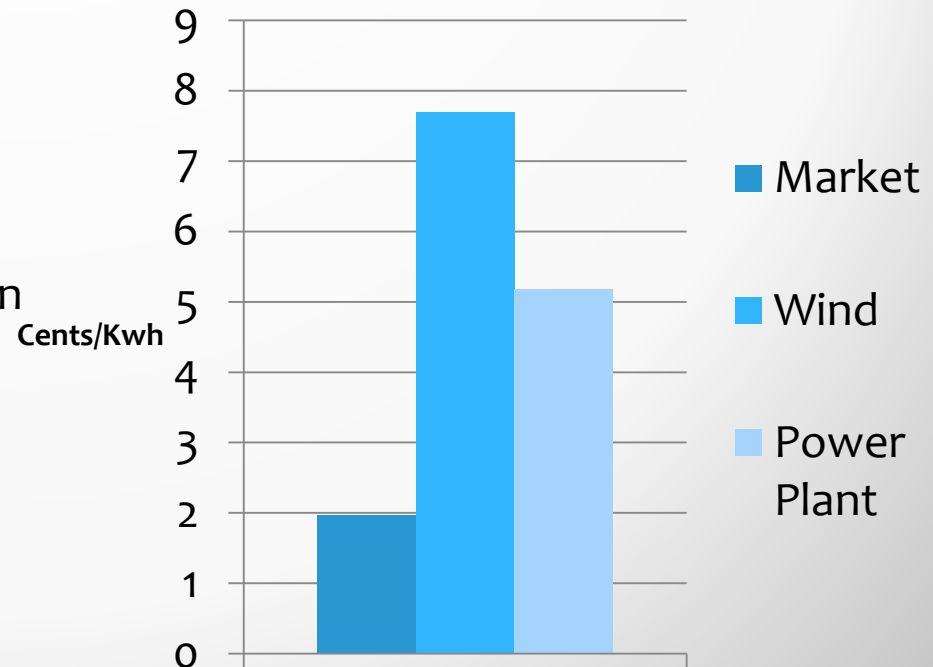


# Cost Breakdown

Rate



Energy 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?

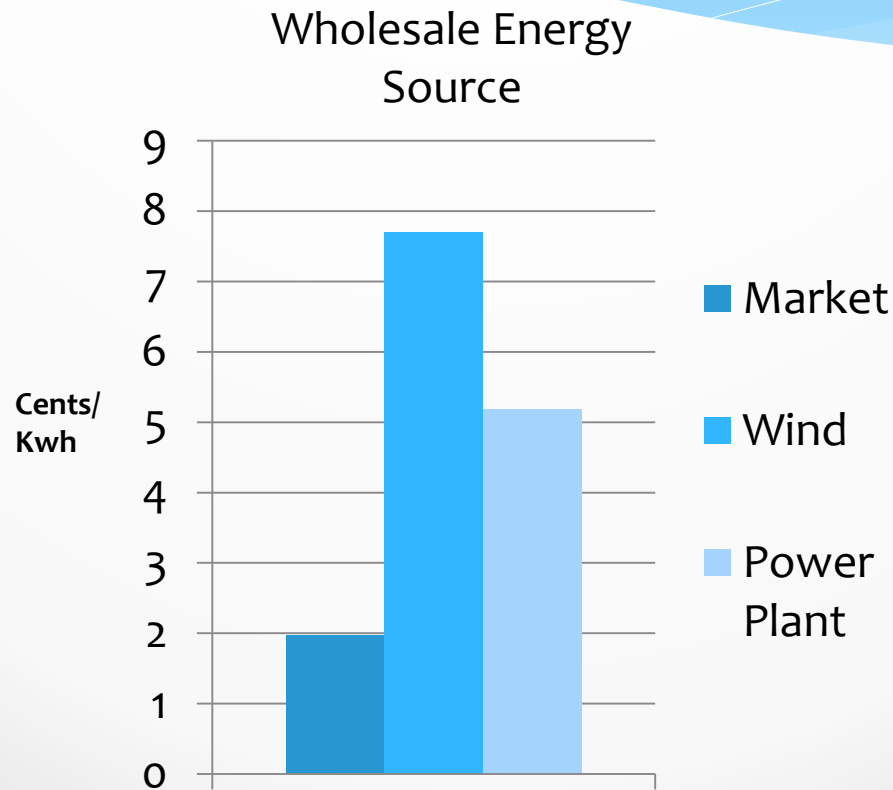
## 3. Modify Municipal Code

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

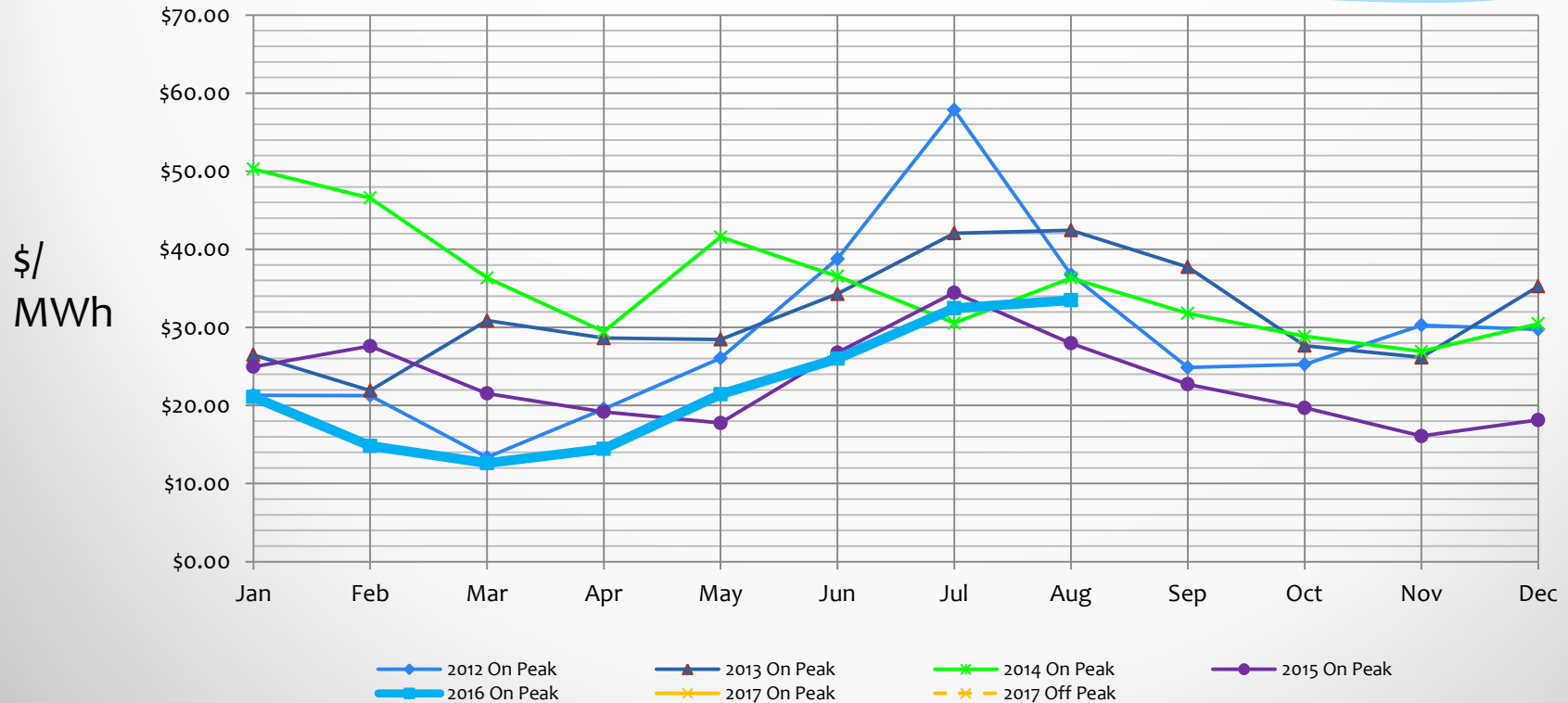
- \* Notify potential solar customers/vendors of probable change to tariff:
  - \* Began April 11, 2016
  - \* Interconnection Agreements
- \* Modify/simplify Municipal Code Appendix H language:
  - \* Eliminate “banking” of excess energy
  - \* Determine a rate to purchase excess energy
    - \* Recommend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

# Energy Cost Breakdown



# Wholesale Energy Price

## Day Ahead Average Purchased Energy Prices



# Comments & Questions

Contact Information:

Donald Kom

Director, Electric Services

[dkom@city.ames.ia.us](mailto:dkom@city.ames.ia.us)

515.239.5171