



Meeting Agenda

4:30 – 6:00 PM, Wednesday, Nov 2nd, 2016

Lyons Town Hall

I. Roll Call, Agenda, Minutes

- Amendments to Agenda
- Approve Minutes from Oct 19th
- UEB Officers and Member Lead Areas
- Upcoming Meetings - Nov 12, 2016 9 AM or 1 PM - Lyons Boards and Commissions Training - Lyons
Nov 9. 8 AM - Northern Water Fall Water Users Meeting - Longmont, Best Western 1850 Industrial Cir.
Dec 2nd - CAMU Fall Meeting - Fairfield & Woods in Denver, CO

II. Audience Business

III. Liaison Updates

- Board of Trustees Update - MEAN meeting Report
- Staff, Engineering Update - Honeywell Savings Gaurantee

IV. Continued Business

- Town Utility Account tracking

V. New Business

- Water/Wastewater Rate and CIP Study Presentation RG & Assoc.

VI. Parking Lot

- 2017 Utility FUnd Budget, Pipe Water rates for 2017 Budget,
- Reserve/Rate Stabilization Funds
- Wastewater Pretreatment Policy
- LRAP INF 2.2.1
- Municipal Code Corrections



UEB Meeting Minutes, 19 Oct 2016

Meeting Time and Location: Began at 4:30 at Town Hall.

Attendance:, Aaron Caplan, Lee Hall, Coco Gordon, John Cowdry, Chuck Keim, Dan Reitz, Jay Stott

Staff: Kyle Miller **Liaisons:** **Guests:**

Amendments to Agenda: Welcomed Jay Stott as the newest member of the UEB.

Previous Minutes: . Reviewed and modified Oct 5th Minutes under Water Wastewater CIP to add “Areas where there is no looping of the water mains need looping. It was emphasized to try and coordinate getting water, and wastewater done first in areas that need paving.” **Aaron had not followed up with Parks and Rec to find out if they were budgeting for water usage. He would do so.** Then approved minutes.

Staff Update: **It was asked where the Storm Drainage Study was and if there wasn't some deadline? It was also mentioned that the BoT had wondered where the Water and Wastewater Rate and CIP Study was at their Utility Fund Budget workshop.**

Public Works has begun work to replace the 4 inch water pipe at Seward and 2nd Ave with 8 inch pipe. This is one location with no looping and part of the project will be to connect it into other water pipe for looping. They will then be cutting in a new fire hydrant. It was also noted the computer system at the WWTP crashed and the town was flying someone in to take a look at it.

We then went into some discussion on streets and **it was asked what the town paving schedule is. It was also mentioned that the UEB should probably be looking at the streets portion of the budget.**

2017 Utility Fund Budgets: We started with the electric fund and discussion on reserves. The UEB feels the funds restricted for bonds could be part of the overall 3 months operating expense reserve fund. What are operating expenses? Staff never did find an actual ordinance or resolution saying the electric fund should have 3 month operating expenses. The UEB thought we should be looking at what expenses there are if we have no revenue coming in. There is the Fixed Cost Recovery charge, about \$35,000 a month and the bond payments or requirements.

We noted the restricted investment fee for Capital Improvement (CI) on the electric fund and wanted to verify this was the official recommendation of the BoT last year? If so then all the investment fee revenue budgeted for 2017 should be placed in this line for the 2017 budget. The \$100,000 budgeted last year for the new electric meters that were not purchased could be moved to the CI restriction for 2017. Shouldn't budgeting for CI then come from this restricted line or maybe we should have a separate budget document for CI with revenue, balance and expenses. It was also mentioned that the 6 new Habitat for Humanity houses will be paying the Investment fee and if we think they are going in in 2017 should be added to that revenue line.

The MEAN refund from 2016 was mentioned and noted that it will show up as a decrease in our expense to MEAN in 2016. In our Lyons financials we should be sure and document it separately as an extraordinary revenue so our expense line doesn't get distorted.

With water and wastewater we began by talking about the CIP we received from RGA. The estimated total cost is \$3,600,000 over 20 years or \$180,000 per year. Water improvements are 60% or about \$110,000 and wastewater then \$70,000. Can we budget this general amount or should we try and determine which projects we will do first. The majority leaned towards needing actual projects budgeted. We will ask RGA when they present at our next meeting what they think we might budget for 2017. **If we don't get something from them Kyle will try and determine what our first priority should be.** We noticed that we had spent \$40,000 this year so far on CI but had budgeted \$7,000.

Longmont Water Rate increases by .10 per 1000 gallons next year and increased by .10 this year which may not have been accounted for. We had 92,000 gallons in 2014 and 87,000 in 2015 so the increase is less than \$10.

It was a cooler summer last year. Through Jun. 2016 we have 32,000 but 3rd quarter is much higher usage from lawn watering. Planning for 95,000 should allow for some growth and a warmer summer. at 1.62 per 1,000 we might budget \$153,900.

There was concern about the amount of water from the water leak and if it put us over our maximum daily allowed usage with Longmont and would we be paying a fine next year. **We need to look at the water true up letter from Longmont when we get it in June.**

With wastewater we need to add the WWTP savings guarantee cost of \$14,891 for this year and can reduce expenses by at least the guaranteed savings amount. We also wondered how the fund is projected to be \$136,000 in the black when the rate increase was not going to cover the new debt expense and we expected a loss of around \$100,000.

Town Utility Account Tracking - At the Utility fund budget workshop the mayor and other trustees said they thought it would be a great project for the UEB to work on tracking and documenting the town utility use. When we heard how much water was being used at the new Splash feature at Lavern Park we thought we would start by determining if **Parks and Rec will be paying for the water they use? Aaron will attend the Parks and Rec Budget Workshop.**

Meeting ended: 5:55 pm. **Minutes Submitted by:** Aaron Caplan

The distributed energy generation discussion during the Ad Hoc and Power Supply workshop focused on distributed generation policy, but also included presentations and discussions on bond refinancing, lost load, potential for waste to energy plant in Fort Morgan, CO, and a Kimball wind farm update. No voting or official positions were taken at the workshop.

The distributed energy generation discussion focused on rules requiring metering and what to use for metering. A presentation (attached) by Michelle Lepin, MEAN attorney, went over the FERC rulings that pertain to the requirement to meter behind the meter power generation as it relates to transmission. Lyons uses WAPA LAP for transmission service and is already over the 150kW limit that requires metering. Brad Hans, Deputy Director of Wholesale Electric Operations, expects that the distributed generation solution for collecting meter data will be active by April, 1, 2017, the start of the next MEAN fiscal year.

Two metering options were discussed 1) Verizon grid wide utility solution and 2) Utility Advanced Metering infrastructure (AMI) systems. Most MEAN utilities are still using old style meters and do not have the capability to record hourly loads from customer solar systems.

The Verizon solution would be for MEAN to purchase the Verizon's grid wide utility solution to read all the meters and the MEAN member utilities responsibility would be to install production meters on their solar systems. A presentation was made by Patrick Caustrita, Verizon Grid Wide Business Development and Strategy Planning, [303-915-3006](tel:303-915-3006). The readings would go directly to MEAN for use in billing the utility appropriately for transmission and MEAN Fixed Cost of Recovery (FCRC) charges. The meter readings could also be provided by MEAN to the associated utility. The cost of the Verizon solution would be about \$35k for the infrastructure, \$185 per meter, and \$3 per month per meter charge. Installation cost per meter would be additional. MEAN would negotiate the contract with Verizon to get the cost down below the \$185 per meter and \$3 per month fee. MEAN would pick up the infrastructure cost and member utilities would pay for the meter and monthly fee costs. This is the solution MEAN is primarily pursuing.

The second alternative was requested by those utilities with AMI systems such as what Lyons plans to procure. In this case the utility would collect the data and transmit the data to MEAN. How often this transmission of data would be provided and the data exchange format still needs to be worked out. Rich Small, MEAN, suggested that the data would need to be transmitted once per day so the utilities could use this data to plan loads for the following day.

An updated draft of the MEAN Distributed Generation policy (attached) was distributed. The primary change was to add wording that would require estimation of grandfathered systems to have their loads. This estimation would still require 20% of the systems to be metered. It was open whether non grandfathered systems meter readers could apply to the 20% metered requirement. A formula how the kWhs would be estimated is included in the policy.

An updated list of pre-existing distributed generation facilities (attached), based on the 45 day extension voted at the last MEAN quarterly meeting, was provided that showed only minor changes for each utility. Lyons had no additional meters recorded.

The new proposed Waste to Energy plant in Fort Morgan was also discussed. The current MEAN average cost of energy is \$52/MWh. The new Fort Morgan plant would be less at \$48/MWh. MEAN would not purchase the plant but instead would enter into Planned Purchase Agreement (PPA) for the power. Members reiterated a desire for the PPA to not extend MEAN schedule M utility obligations past 2041 when most of the current bonds and obligations will be paid off. This plant qualifies as a renewable energy.

MEAN continues to have maintenance issues with the Kimball Wind Farm. When purchased MEAN paid with cash. Of 7 windmills three generators have failed over the last year. Over the life of the project 17 generators and 4 gearboxes have failed. The proposal is to sell the project a company that can receive tax credits that MEAN is ineligible for. MEAN would potentially then enter into a PPA to purchase the power and no longer be responsible for maintenance costs.

The Torrington, NE loss of load issue was also further discussed from the last MEAN quarterly meeting. The City of Torrington lost an Ethanol facility a year ago August and will lose their Western Sugar Beet facility this December. It has been proposed to provide relief to Torrington by changing their FCRC timeframe from 3 to 2 years. There was some discussion of changing the timeframe for all utilities from 3 to 2 years. MEAN staff is favoring keeping the 3 year timeframe although a number of utilities appeared to be in favor of changing the timeframe to 2 year. The 3 year timeframe rewards those utilities with increasing usage and reduces the variation in the FCRC. It was argued that the

FCRC variation would not be so bad since those utilities with increasing loads would be in a good financial position and those with reduced loads would get over the increased charges faster. It was also requested that MEAN conduct additional analysis on Torrington to show what their unemployment rate and new electric rate would be. It was noted that Torrington has very low electric rates and should have been adequately budgeting for just this event. It was also noted that Torrington currently has an unemployment rate lower than other member utilities such as Delta, CO.

Jamie Johnson, Director of Finance & Accounting, announced that MEAN successfully refinanced most of their bonds. The refunding decreased cash required for debt service by approximately \$18.1 million over the life of the bonds, an average of \$800,000 per year. One aspect of the bond refinancing discussed is that while MEAN retained its bond credit rating of 'A' it could potentially do even better. To increase MEAN's rating further Andrew Ross, Director of Retail Utility Services, and Bob Poehling, Executive Director, suggested MEAN conduct health assessments for its member utilities. This would include cost of service studies MEAN currently offers at half price. In order to facilitate this MEAN would need to hire an additional employee at a cost around \$150k. The cost would be included in the FCRC and be distributed among member utilities accordingly. It was expected that the additional cost of this service would more than be made up in further bond refinancing at a higher rating. A show of hands among the members present at the meeting indicated support for MEAN staff to further research this possibility.

MUNICIPAL ENERGY AGENCY OF NEBRASKA

Distributed and Renewable Generation Policy

Adopted: May 19, 2016

Revised: _____

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Policy Statement: The Total Requirements Power Supply Contracts between MEAN and the Total Requirements Participants (each, a "TRP" as defined below) provide for the Participant to purchase all of its electric requirements from MEAN in excess of its firm power allocation from the Western Area Power Administration. Recent trends in State and Federal regulation and legislation promote the expanded deployment of a wide variety of renewable and distributed generation technologies, including legislation implementing net metering policies.

This Policy has been adopted in recognition of these trends. This Policy also establishes a de minimis exception/clarification to the full requirements purchase obligation under the Total Requirements Power Supply Contracts for Participants to install under certain limited circumstances Renewable Generation Resources to offset portions of their electric supply requirements.

Section I. Definitions

In addition to terms defined elsewhere in this Policy, the following terms have the following meanings when used herein:

- 1.01 "Avoided Cost Rate" means MEAN's avoided cost rate as determined from time to time consistent with applicable legal and regulatory standards.
- 1.02 "Fixed Cost Recovery Charge" shall have the meaning ascribed thereto in the then-current Schedule of Rates and Charges to the TRP's Total Requirements Power Supply Contract.
- 1.03 "MEAN" means the Municipal Energy Agency of Nebraska.
- 1.04 "Policy" means this Distributed and Renewable Generation Policy.
- 1.05 "PURPA" means the Public Utility Regulatory Policies Act of 1978, as may be amended from time to time.
- 1.06 "Renewable Generation Resource" means electric generation interconnected behind the wholesale meter of a TRP or behind the retail meter of (or otherwise owned by) an end-user and such generation's primary energy source is hydro, wind, solar, biomass, solid waste, or geothermal resources, or other forms of renewable generation as determined on a case-by-case basis by the Director of Wholesale Electric Operations of MEAN. In no event shall a generating facility qualify as a Renewable Generation Resource under this Policy unless it is of a type and character that would be within the definition of a "qualifying facility" or "renewable resource" under state or federal legislation or regulations. This definition shall not include any resource that is owned, purchased, or leased by a TRP that is either (i) approved by the MEAN Board of Directors or Management Committee to reduce the TRP's supplemental load to be served by MEAN, which approval must be granted in conjunction with execution of the Total Requirements Power Supply Contract, or (ii) leased or purchased by MEAN (in whole or in part) under a separate written agreement.

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1.07 “Total Requirements Participant” or “TRP” means the purchaser under a Total Requirements Power Supply Contract.

1.08 “Total Requirements Power Supply Contract” means a power supply contract under which the TRP agrees to purchase all of its electricity requirements from MEAN, less its Western Area Power Administration allocation(s), including without limitation agreements under Service Schedule M, Service Schedule K and Service Schedule J of the Electrical Resources Pooling Agreement.

Section 2. Establishment of Distributed and Renewable Generation Policy

2.01 Application of Policy. This Policy shall apply to TRPs who have executed a Total Requirements Power Supply Contract with MEAN.

2.02 Renewable Purchases. A TRP may (a) permit an end-use customer to utilize the electrical output of a Renewable Generation Resource to instantaneously supply all or a portion of such customer’s own load and/or (b) purchase all or a portion of electrical output from a Renewable Generation Resource owned by an end-use customer, in each case consistent with applicable laws and interconnection standards. A TRP’s purchase of output from an end-use customer as described above shall be defined as “Renewable Purchases”.

2.03 Renewable Generation Offsets. A TRP may install, own and operate Renewable Generation Resources (including without limitation community solar projects) under certain conditions as set forth in this Policy. TRP must receive approval from MEAN for each Renewable Generation Resource as described in Section 2.15. Renewable Generation Resources other than community solar projects must be located on the TRP’s system. Community solar projects must be located on the TRP’s system or on the system of another TRP if it is a joint community project among MEAN TRPs. The TRP may use the output from such Renewable Generation Resources to reduce its purchases of electricity from MEAN (“Offset”), subject to the Cap described in Section 2.04 below. No power purchase agreements will be permitted pursuant to this Section. MEAN shall adjust the TRP’s monthly bill as necessary to ensure the Energy Charge reflects reduced kilowatt hour (“kWh”) purchases from MEAN due to Renewable Generation Resource output for the current billing month only. Once the TRP reaches the Cap, no further Energy Charge reductions will be given in that fiscal year.

2.04 Cap. Approval of a TRP-Owned Renewable Generation Resource under Section 2.15 shall be granted to TRP only if all the requirements of this Policy are met and MEAN determines in its sole discretion that the aggregate annual output of the subject Renewable Generation Resource and any previously approved Renewable Generation Resource(s) owned by the TRP (excluding facilities grandfathered as described in Section 2.08) will not exceed the Cap of two percent (2%) of the TRP’s most recent three-year historical annual average annual kWh load (based on MEAN’s fiscal year) served by MEAN (excluding any non-MEAN resources including without limitation firm electric service from Western Area Power Administration or electrical output from facilities owned or purchased by the TRP with approval of the MEAN Board of Directors) (“Cap”).

2.05 Facility-Specific Provisions.

- a. The following provisions apply to (i) Renewable Generation Resources with an estimated rated generating capacity of 25 kW or less per meter which are owned by an end-use customer of the TRP, and to (ii) Renewable Generation Resources owned by a TRP under the Cap described above:
1. All monthly output from such Renewable Generation Resources will be added back to the TRP's monthly peak demand for purposes of determining the TRP's Fixed Cost Recovery Charge allocation, and may be added back for purposes of network integration transmission charges or any other non-energy charges, as applicable, assessed to the TRP on whose distribution system the facility is interconnected.
 2. TRP shall provide advance notice to MEAN prior to interconnecting any end-use customer Renewable Generation Resource. TRP shall make every effort to inform MEAN of a potential Renewable Generation Resource as soon as the TRP becomes aware of the potential resource. Notice shall comply with the provisions of Section 2.16.
 3. TRP must receive pre-approval from MEAN as described in Section 2.15 for any Renewable Generation Resources owned by a TRP.
 4. TRP shall timely provide MEAN with the necessary meter data to facilitate proper billing and reporting. Metering and data shall comply with the provisions of Sections 2.11 and 2.12. For any month in which the TRP fails to provide the necessary meter data to MEAN in a timely manner as described in Sections 2.11 and 2.12, the theoretical maximum output applies as follows:
 - a. MEAN will add the theoretical maximum output of such Renewable Generation Resource for purposes of calculating the Fixed Cost Recovery Charge allocation; and
 - b. MEAN may at its discretion add the theoretical maximum output of such Renewable Generation Resource for purposes of reporting network load to calculate transmission charges or any other non-energy charges from MEAN to TRP.
 5. No Energy Charge shall apply to output from such Renewable Generation Resources.
 6. The TRP shall at all times remain responsible for compensating the end-use customer for electrical output.
- b. The following provisions apply to Renewable Generation Resources with an estimated rated generating capacity of greater than 25 kW per meter which are owned by an end-use customer of the TRP:
1. The TRP may, at its discretion, work with MEAN to negotiate a power purchase agreement directly between MEAN and the end-use customer or project developer under which MEAN will purchase the output of the facility. If (i) the TRP elects not to work with MEAN to negotiate such a power purchase agreement, or (ii) the parties for any reason cannot reach mutually acceptable terms for such purchase, the other provisions of this Policy will apply.

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2. All monthly output from such Renewable Generation Resources will be added back to the TRP's monthly peak demand for purposes of determining the Fixed Cost Recovery Charge allocation, and may be added back for purposes of network integration transmission charges or any other non-energy charges, as applicable, assessed to the TRP on whose distribution system the facility is interconnected.
3. TRP shall provide advance notice to MEAN prior to interconnecting any Renewable Generation Resource owned by an end-use customer. TRP shall make every effort to inform MEAN of a potential Renewable Generation Resource as soon as the TRP becomes aware of the potential resource. Notice shall comply with the provisions of Section 2.16.
4. TRP shall timely provide MEAN with the necessary meter data to facilitate proper billing and reporting. Metering and data shall comply with the provisions of Section 2.11. For any month in which the TRP fails to provide the necessary meter data to MEAN in a timely manner as described in Section 2.11, the theoretical maximum output applies as follows:
 - a. MEAN will add the theoretical maximum output for purposes of calculating the Fixed Cost Recovery Charge allocation;
 - b. MEAN may at its discretion add the theoretical maximum output of such Renewable Generation Resource for purposes of reporting network load to calculate transmission charges or any other non-energy charges from MEAN to TRP; and
 - c. MEAN may at its discretion assume monthly kWh output equal to the theoretical maximum output of such Renewable Generation Resource when calculating the credit on the Total Requirements Power Supply Contract bill for the energy delivered to the distribution system and the increase to the TRP's kWh billing amount for energy purchased from MEAN as further described on Appendix A to this Policy.
5. Each Renewable Generation Resource will be treated as if it were a MEAN generation resource through a sale or assignment to MEAN, as further described on Appendix A to this Policy.
6. The TRP shall at all times remain responsible for compensating the end-use customer for electrical output.

A TRP shall cooperate with MEAN in a commercially reasonable manner to give effect to the foregoing provisions, including the execution of such instruments of sale or assignment as may be deemed necessary or desirable by MEAN.

Grandfathered facilities meeting the requirements of Section 2.08 are not subject to Section 2.05.

2.06 No Breach Under Total Requirements Power Supply Contract. A TRP that complies with the provisions of this Policy will not be considered to be in violation or breach of its total requirements purchase obligation under its Total Requirements Power Supply Contract.

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2.07 Billing and Credits for TRPs. Billing and credits shall be administered as set forth on Appendix A. All costs and liabilities associated with the installation, ownership and operation of Renewable Generation Resources shall be borne by the TRP or its end-use customers.

2.08 Pre-Existing Facilities.

a. A Renewable Generation Resource that was installed and operational prior to May 19, 2016, or other Renewable Generation Resource for which the TRP has an executed interconnection agreement prior to October 2, 2016, may, at the discretion of the Board of Directors of MEAN, be grandfathered if the TRP reports to MEAN all necessary data regarding the resource within sixty (60) days of MEAN's request for such data. Grandfathered facilities are shown on Appendix B. Output from grandfathered facilities will not be subject to the Cap or an Energy Charge, and will not be factored in the Participant's Fixed Cost Recovery Charge. In no event will output from grandfathered facilities be applied in a manner to reduce any other demand or non-energy charges or network integration transmission service charges that would otherwise be due if such output had not been generated. The TRP shall at all times remain responsible for compensating the end-use customer for electrical output.

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b. The TRP shall timely provide MEAN with the necessary meter data to facilitate proper reporting of output from grandfathered facilities for purposes of reporting network load to calculate transmission charges or any other non-energy charges from MEAN to TRP. Metering and data shall comply with the provisions of Sections 2.11 and 2.12.

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c. For any month in which the TRP fails to provide the necessary meter data to MEAN in a timely manner as described in Sections 2.11 and 2.12, one or more of the following assumptions will apply:

1. In the event that:

- a. TRP attests that it has Representative Sample Facilities, as that term is defined below, and
- b. TRP attests that at least XX percent (XX%) of the Representative Sample Facilities are metered and reported to MEAN, and
- c. such Representative Sample Facilities are in fact metered and reported as required by Sections 2.11 and 2.12, and
- d. such attestation is made at least XX days before MEAN's deadline to report the TRP's network load to the transmission provider and includes a written agreement on behalf of the TRP to reimburse MEAN for any charges or penalties imposed by a third party for failure to report the actual output.

then output from any similar unmetered grandfathered facilities on the TRP's distribution system shall be assumed at a percentage equal to the Assumed Capacity Value, as that term is defined below, calculated at the time of the transmission provider's system peak for the applicable billing period.

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Representative Sample Facilities shall mean Renewable Generation Resources installed and operational on the TRP's distribution system that are of similar type, technology and energy source as the unmetered grandfathered facilities; and

Assumed Capacity Value shall mean the arithmetic mean of the capacity value of the metered and reported Representative Sample Facilities calculated at the time of the transmission provider's system peak for the applicable billing period. Capacity value refers to the contribution of a Renewable Generation Resource to reliably meet demand. The capacity value is measured as a fraction of the nameplate capacity (AC rated) of the Renewable Generation Resource.

Sample calculation (for illustrative information purposes only):

Number of Grandfathered Facilities:	20
Sample Size for metering:	20%
Number of Facilities Requiring Meters:	4

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Calculation to establish Average Output of metered facilities at Transmission Provider's Coincident Peak

Facility #	Nameplate (kW)	Metered Output in AC at Transmission Provider's Coincident Peak (kW)	Output as a Percentage of Nameplate	Calculated Output for Reconstitution of Load for Transmission (kW)
1	6.0	3.7	61.0%	3.7
2	36.0	23.5	65.2%	23.5
3	14.0	8.2	58.6%	8.2
4	5.2	3.5	67.8%	3.5
	61.2			38.9
Average Output at Critical Peak of Metered Facilities:			63.2%	

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**Calculation of Non-metered Grandfathered Facilities using
Average Output at Coincident Peak of Metered Facilities**

Facility #	Nameplate (kW)	Output as a Percentage of Nameplate using Average Output of Metered Facilities	Calculated Output for Reconstitution of Load for Transmission (kW)
5	4.0	63.2%	2.5
6	7.5	63.2%	4.7
7	5.0	63.2%	3.2
8	6.0	63.2%	3.8
9	10.0	63.2%	6.3
10	9.9	63.2%	6.3
11	20.5	63.2%	12.9
12	10.0	63.2%	6.3
13	10.0	63.2%	6.3
14	5.7	63.2%	3.6
15	11.6	63.2%	7.3
16	96.0	63.2%	60.6
17	22.9	63.2%	14.5
18	6.5	63.2%	4.1
19	3.9	63.2%	2.5
20	3.3	63.2%	2.1
	232.8		147.0

Total Nameplate:	294.0 kW
Output at Transmission Provider's Critical Peak:	185.9 kW

- To calculate the output from any grandfathered facility not meeting the requirements of subsection 1. above, MEAN may at its discretion add the theoretical maximum output of such Renewable Generation Resource for purposes of reporting network

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load to calculate transmission charges or any other non-energy charges from MEAN to TRP.

d. The nameplate capacity of Renewable Generation Resources must be reported as an AC rating.

e. The requirements in this Section 2.08 shall apply in lieu of Section 2.05 with regard to grandfathered facilities.

2.09 Environmental Attributes Associated with Offsets. The TRP shall retain any and all rights with respect to environmental attributes associated with Offsets permitted under Section 2.03, and at MEAN's sole discretion shall transfer and sell to MEAN, at MEAN's standard rate for compensating PURPA qualifying facilities for environmental attributes, any environmental attributes associated with electrical output from Renewable Generation Resources that exceeds the Cap described in Section 2.04. The TRP's rights described in this Section shall be subject to the following right of first refusal: If the TRP seeks to transfer, sell, or otherwise use the environmental attributes as renewable energy credits ("RECs") for a purpose other than (a) to meet a statutory obligation imposed directly on the TRP, (b) to benefit the TRP's own end-use customers, or (c) to meet the obligations associated with any state or federal government program from which the funding for the Renewable Generation Resource or a portion thereof was received, then MEAN shall have the right of first refusal to purchase the environmental attributes from the TRP.

2.10 Environmental Attributes Associated with End-Use Customer Facilities. The end-use customer shall retain any and all rights with respect to environmental attributes associated with output that was consumed by the customer. For any output sold to TRP under Section 2.02, including attributes associated with output that was banked under a net metering program, TRP shall, if directed by MEAN in its sole discretion, negotiate in good faith to purchase the environmental attributes from the end-use customer and transfer and sell to MEAN any environmental attributes associated with such output. Compensation for the sale of attributes to MEAN shall be at the rate paid to the end-use customer; however, the TRP shall not agree to pay an amount greater than MEAN's standard rate for compensating PURPA qualifying facilities for environmental attributes without consent of MEAN.

2.11 Metering of Directly Connected End-Use Customer Facilities. TRP shall cause to be installed revenue-quality metering equipment at the point of delivery capable of recording the following readings from each end-use customer with Renewable Generation Resource(s): (1) the total instantaneous output of the generator, (2) the total instantaneous energy delivered by the customer to the TRP's system, and (3) the total instantaneous energy delivered by the TRP to the customer. TRP shall take meter readings on the same cycle as the otherwise applicable rate schedule.

2.12 Metering of TRP-Owned Generation. TRP acknowledges that it must comply with the provisions of the Electrical Resources Pooling Agreement and the Policies and Procedures issued thereunder, including but not limited to Article XIV, Metering and Records, of the Electrical Resources Pooling Agreement and Article XI, Metering, of the Electrical Resources Pooling Agreement Policies and Procedures.

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2.13 Net Metering Provisions. A TRP may, at its sole cost and expense, offer net metering or other financial incentives to end-use customers (whether required by law or voluntarily). Notwithstanding any net metering or other financial incentive offered by a TRP, the rate paid to a TRP by MEAN for output from Renewable Generation Resources will not exceed MEAN's Avoided Cost Rate unless otherwise approved by the MEAN Board of Directors. TRP shall be responsible for developing and administering an application process for interconnection and net metering, if applicable, of customer-owned renewable generation in accordance with this Policy. TRP shall be responsible for ensuring the necessary metering equipment as well as conducting the appropriate inspections of customer-owned generation systems. TRP and eligible customers shall be required to execute an Interconnection, Energy Purchase and Service Agreement setting forth the terms and conditions for interconnection and metering of customer-owned renewable generation that is consistent with this Policy.

2.14 Rate Setting. The TRP acknowledges that it has covenanted in the Total Requirements Power Supply Contract with MEAN to fix rates and charges for the services of its municipal electric utility system, and revise the same from time to time, and collect and account for the revenues therefrom so that such rates and charges will produce revenues and receipts which will at all times be sufficient to enable the TRP to pay the amounts payable by it to MEAN under the Total Requirements Power Supply Contract when and as the same become due. Further, the TRP agrees that nothing in this Policy affects, modifies or amends such covenants.

2.15 Application Process for TRP-Owned Generation. TRPs desiring to take advantage of the Offsets under this Policy shall submit a request to the Executive Director of MEAN which at a minimum shall detail the following information and a statement by the TRP that the request meets the program criteria as outlined in this Policy:

- a. estimated rated generating capacity (in kW) of the facility,
- b. estimated total A/C electrical output in kWh from the facility per month,
- c. type of generating unit (examples include wind and water powered turbine generators and photovoltaic generators/invertors),
- d. fuel type (examples include hydro, wind, solar),
- e. one-line electrical diagram including interconnection, and
- f. any other information related to the facilities or TRP's system as MEAN may request from time to time.

The Board of Directors of MEAN shall approve the TRP's request following a review by MEAN staff if the Board determines that the criteria of this Policy have been satisfied. If the Board of Directors determines that a particular request does not meet the criteria or that the information submitted is lacking, MEAN shall advise the TRP of the deficiency and the TRP shall have an opportunity to supplement or revise its request.

2.16 Notice Regarding End-Use Customer Facilities. TRPs shall provide advance notice to MEAN prior to interconnecting any end-use customer facility. Such notice shall include but not be limited to the following information:

- a. estimated rated generating A/C capacity (in kW) of the facility,
- b. estimated total electrical A/C output in kWh from the facility per month,

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APPENDIX B
 PRE-EXISTING FACILITIES LIST¹
 TO
 MEAN DISTRIBUTED AND RENEWABLE GENERATION POLICY

Dated effective as of August 18, 2016

Participant ²	# of units	Nameplate Capacity (kw)
ALLIANCE	4	1.96
ASPEN	27	230.84
CRETE	1	4.32
DELTA	4	24.00
DENVER	1	8.00
FAIRBURY	1	25.00
FORT MORGAN	15	102.74
GERING	2	2.40
GLENWOOD SPRINGS	69	515.01
GUNNISON	9	46.34
INDIANOLA	2	7.30
KIMBALL	1	2.10
LYONS	28	164.83
NEBRASKA CITY	1	3.50
OAK CREEK	1	25.00
RED CLOUD	1	5.00
SIDNEY	1	1.05
TORRINGTON	1	15.00
WALL LAKE	1	660.00
WAVERLY	5	62.52
WRAY	1	900.00
Total	176	2806.91

¹ Facility-specific data is on file with MEAN.

² List does not include generating facilities that were previously approved by the MEAN Board of Directors.

APPENDIX B
PRE-EXISTING FACILITIES LIST¹
TO
MEAN DISTRIBUTED AND RENEWABLE GENERATION POLICY

Dated effective as of November 17, 2016

Participant ²	# of units	Nameplate Capacity (kw)
ALLIANCE	4	1.96
ASPEN	27	230.84
CRETE	1	4.32
CURTIS	1	9.36
DELTA	6	55.08
DENVER	1	8.00
FAIRBURY	1	25.00
FORT MORGAN	15	102.74
GERING	2	2.40
GLENWOOD SPRINGS	69	515.01
GUNNISON	9	46.34
INDIANOLA	2	7.30
KIMBALL	1	2.10
LYONS	28	164.83
NEBRASKA CITY	1	3.50
OAK CREEK	1	25.00
RED CLOUD	1	5.00
SIDNEY	1	1.05
TORRINGTON	1	15.00
WALL LAKE	1	660.00
WAVERLY	6	64.02
WEST POINT	1	24.90
WRAY	1	900.00
Total	180	2865.75

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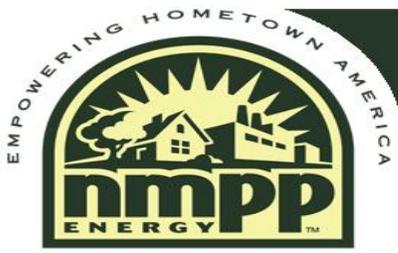
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¹ Facility-specific data is on file with MEAN.

² List does not include generating facilities that were previously approved by the MEAN Board of Directors.



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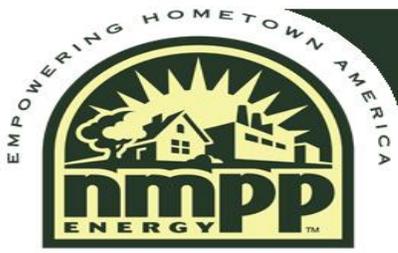
ACE

Ad-Hoc Distributed and Renewable Generation Policy

Michelle Lepin

Brad Hans





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NPGA

ACE

Reporting of Network Load Behind the Retail Meter Generation

Relevant FERC Orders and Cases (not exhaustive)

Order 888 at 31,736 (4/24/96)

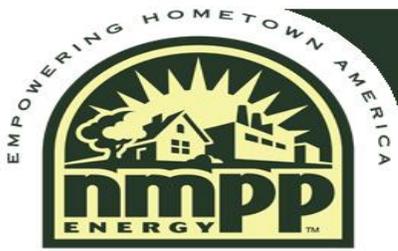
Order 888-A at 30,258-261 (3/4/97)

Order 890-A Paragraph 965 (12/28/07)

Docket ER03-1312-000 and ER03-1312-001

Florida Power & Light Co., 105 FERC ¶ 61,287 at P 19 (2003)

Consumers Energy Co., Opinion No. 456, 98 FERC ¶ 61,333 at 62,410 (2002)



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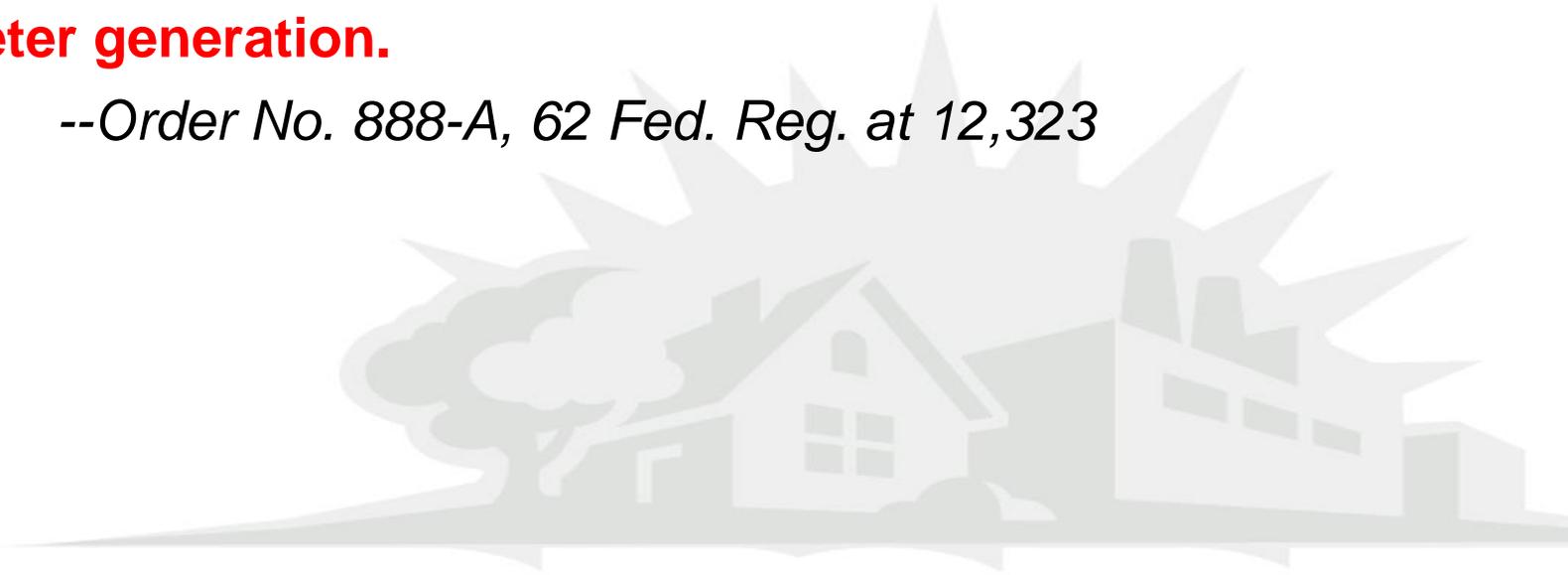
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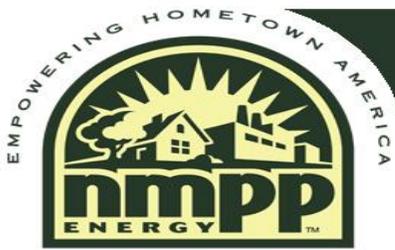
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FERC Rules Reporting of Behind the Retail Meter Generation

General Rule: A customer may exclude "the entirety of a discrete load" from its network load **(and obtain point-to-point service as necessary for that load)**, but it cannot exclude merely part of that discrete load, **even if that part is served by behind-the-meter generation.**

--Order No. 888-A, 62 Fed. Reg. at 12,323





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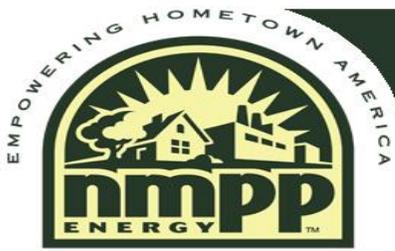
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FERC Rules (continued) Reporting of Behind the Retail Meter Generation

FERC “made clear in Order 888 and its progeny that the entire load at a discreet point of delivery must be designated as Network Load, including load served by behind-the-meter generation, **regardless of whether that load is served at retail or wholesale.** ...”

“Accordingly, Midwest ISO should include load served by behind-the-meter generation ... in Network Load when it charges for Network Service.”

--FERC Docket ER03-1312-000 and ER03-1312-001



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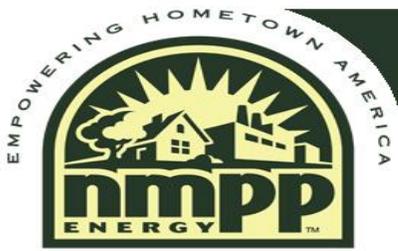
FERC Rules (continued) Reporting of Behind the Retail Meter Generation

MISO Informational Filing to FERC Sept. 2003

“There are no provisions in the OATT that allow Network Load served by behind the meter generation resources to be treated differently in the purchase of transmission service simply because the generator is located on a customer's premises.

There is no justification to afford different treatment of generation behind the meter for retail customers versus wholesale customers.”





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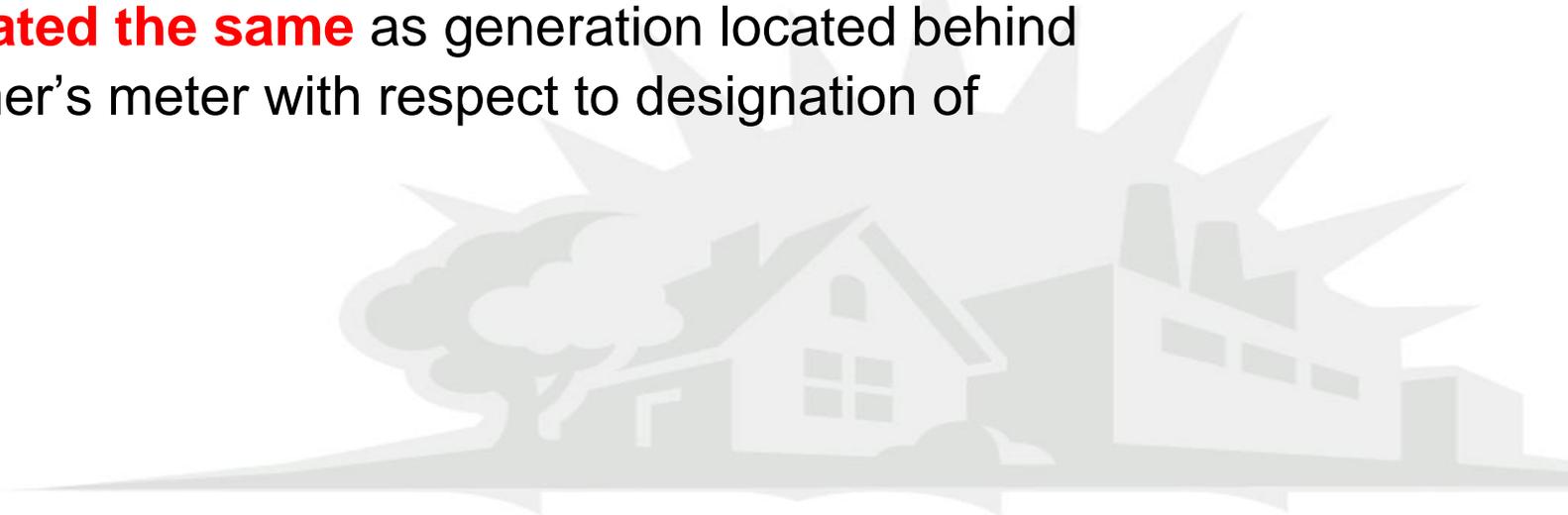
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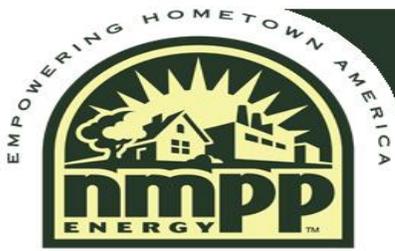
ACE

FERC Rules (continued) Reporting of Behind the Retail Meter Generation

*Consumers Energy Co., Opinion No. 456,
98 FERC ¶ 61,333 at 62,410 (2002)*

Affirmed initial decision that **generation located behind the retail meter should be treated the same** as generation located behind the wholesale customer's meter with respect to designation of Network Load.





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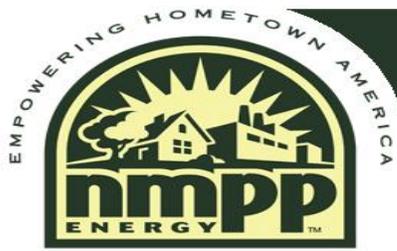
FERC Rules (continued) Reporting of Behind the Retail Meter Generation

Order 890-A Paragraph 965 (12/28/07)

c. Behind the Meter Generation and Uses of Point-to-Point Service

965. **The Commission declined to require transmission providers to allow netting of behind the meter generation against transmission service charges** to the extent customers do not rely on the transmission system to meet their energy needs, ...

The Commission concluded it is most appropriate to continue to review alternative transmission provider proposals for behind the meter generation treatment on a case-by-case basis.



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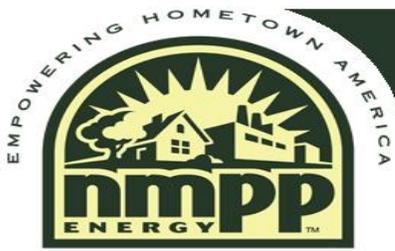
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Current Practices

Transmission Provider	MISO	SPP	WAPA	PSCo	Tri-State
Tariff Contains Pro Forma Definition of Network Load	Yes	Yes	Yes	Yes	Yes
Exceptions			150 kW aggregate		
Proposed Changes	Common Issues Forum 9/16: Stakeholders requested summary of current rules and potential changes	Task Force/ Working Group discussing potential changes	WAPA is updating current Business Practice IRT Ancillary Services		
Notes				PSCo also requires BTMG data for forecasting	

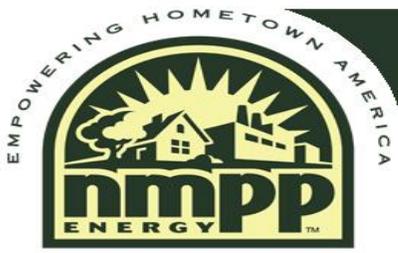


WAPA Business Practice



- “Behind-the-Meter Generation shall include all generation located on a network customer’s system behind a revenue meter used for network loads, with the following exceptions:
 1. Generation sources that have a total installed capacity of less than 150 kW; provided there are not multiple units of a size less than 150 kW at the same substation where the combined capacity is greater than 150 kW.
 2. Generation sources that only operate isolated from the transmission system. Such generation only runs when the load is disconnected from the interconnected grid.”
- *However... When the aggregate reaches 150kW, a way to meter it would need to be figured out per WAPA*
- If you have a belief that this will continue to grow, then it’s probably prudent to require metering from the start

Western Area Power Administration, Behind the Meter Generation Business Practice



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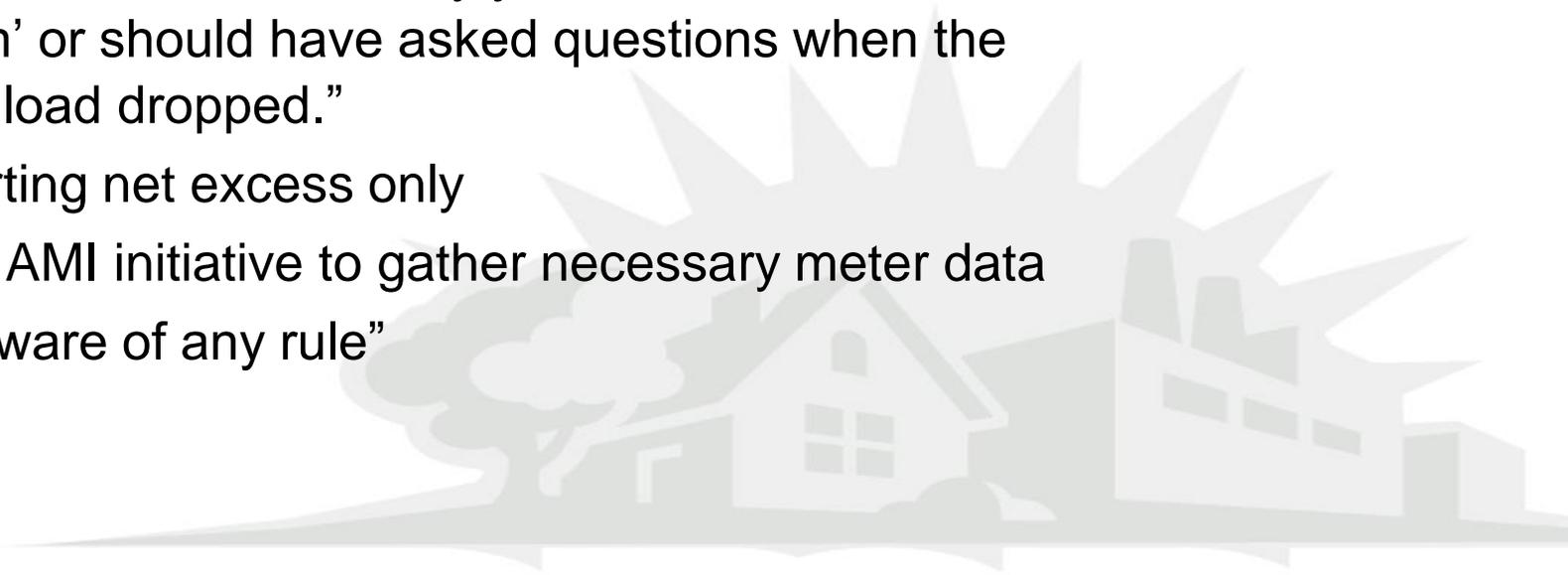
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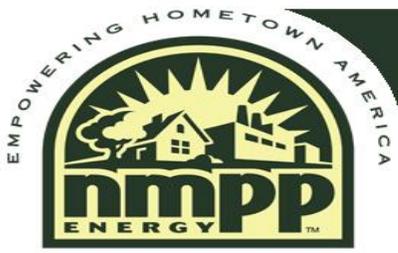
Reporting of Behind the Retail Meter Generation

**Informal survey of joint action agencies
and co-ops in 2015**

Responses varied

- “Even if you weren’t aware these facilities were online, the RTO would say you ‘should have known’ or should have asked questions when the City’s load dropped.”
- Reporting net excess only
- Major AMI initiative to gather necessary meter data
- “not aware of any rule”





NMPP

MEAN

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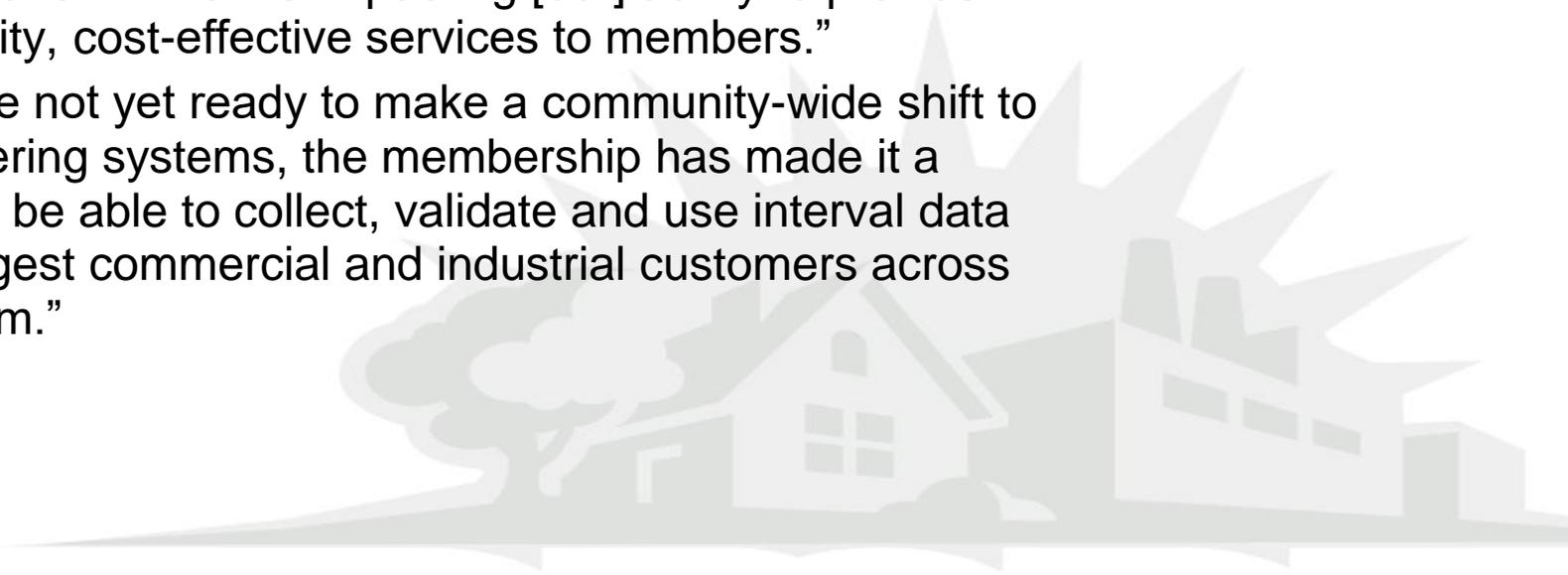
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Reporting of Behind the Retail Meter Generation

JAA Advanced Metering Infrastructure Initiative

2013 rollout as part of the technology commitment to members:

- “Collecting, managing and using interval data is the single most important initiative impacting [our] ability to provide high-quality, cost-effective services to members.”
- “For those not yet ready to make a community-wide shift to new metering systems, the membership has made it a priority to be able to collect, validate and use interval data for its largest commercial and industrial customers across the system.”



Discussion



- Policy has been shaped in regards to metering and reconstitution of load
- Still a topic on the forefront of many Transmission Operators and Transmission Customers

*Helping Customers Manage Energy Resources to
Improve Financial Performance*

**Town of Lyons, Colorado
Waste Water Treatment Plant
Post Installation Conditions Report
October, 2016**



Submitted: October 2016

CONTACT

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Larry Guzy, Measurement and Verification Specialist
Phone: (815) 979-3722, Email: Larry.Guzy@Honeywell.com

Aamer Athar, Measurement and Verification Field Leader
Phone: (713) 202-3995, Email: Aamer.Athar@Honeywell.com

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1.0 Overview

Executive Summary

The Town of Lyons entered into an Energy Cost Savings Contract with Honeywell International, Inc. for the Waste Water Treatment Plant on December 12, 2013.

This Post Installation Conditions Report (PICR) has been prepared to document a successful transition from the construction period to the guarantee¹ period for the work performed at The Town of Lyons. All work was completed and accepted by The Town of Lyons on July 21, 2016. The acceptance documents are in the Appendix. The energy guarantee for the project began on August 1, 2016 and will be in effect for three (3) years. The first year of performance will be from August 1, 2016 through July 31, 2017.

Also in the Appendix is the Colorado Department of Public Health & Environment updated Final Plans and Specifications for Construction Approval which was in part based on a written certification that the project facilities were built in accordance with the approved plans, specifications, and change orders, upon which the proposed savings calculations were based. The approved maximum month hydraulic and organic design capacities are 0.381 MGD and 705 lbs. of BOD per day, respectively.

Performance Year 1 Projected and Agreed to Savings:

- ECM #1 - Upgrade Existing WWTP to Reduce Energy Costs: The estimated energy consumption at start-up conditions of 0.166 MGD and 461 PPD BOD load are 393,113 kWh/Yr. and 6,488 kWh/MG which, at a rate of \$0.051 per kWh results in an Annual Energy cost of \$21,621 per Exhibit F-3. With agreed to rate escalation of 0% the Year 1 Energy Savings are projected to be \$21,621. The Projected Year 1 savings of \$21,621 will exceed the Year 1 Guarantee of \$19,025 by \$2,596.
- ECM #4 - Upgrade WWTP to Reduce Sludge Processing and Hauling Costs & ECM#9 Upgrade WWTP to Reduce Operations & Maintenance (O&M) Costs:
 - The Year 1 O&M savings for:
 - ECM #4 are agreed to be: \$67,426 with 0% rate escalation.
 - ECM #9 are agreed to be: \$46,602 with 0% rate escalation.
 - Total O&M Savings: \$114,028

As provided for in the M&V plan, during the performance period, an engineer will assess the ongoing plant operations and maintenance and recommend improvements to maximize savings.

On behalf of Honeywell, we look forward to working with you and ensuring your savings are sustainable. The Measurement & Verification (M&V) Plan detailed in the next section will ensure that the savings will persist throughout the performance period.

Please contact Larry Guzy at (302) 501-2834 or larry.guzy@honeywell.com with any questions or comments regarding this report or your M&V services.

¹ The initial term of the guarantee shall be for three (3) years. Colorado State statute requires a minimum 3 (three) year guarantee period. Lyons may elect to extend the guarantee after this statutory period and the associated scope & cost for Annual M&V Service. The guarantee will expire after this initial three (3) year period unless Lyons elects to extend the M&V contract beyond this 3-year term. (Reference page 56 of EPC document: [Honeywell EPC 12Dec2013 signed.pdf](#))

2.0 Summary

Savings Summary - Energy

The completion dates correspond with the Signed Certificates of Acceptance that can be found in Appendix A. Based on the customer acceptance of the WWTP the designed throughput and energy efficiency will be achieved during Year 1 if all key operating parameters are met.

Table: Year 1 Projected As Built Savings

ECM Description	Electric Year 1	Non-Electric Year 1	Water Year 1	Total Year 1
Upgrade Existing WWTP to Reduce Energy Costs	\$21,621	\$0	\$0	\$21,621
Totals	\$21,621	\$0	\$0	\$21,621

Table: Guarantee

ECM Description	Electric Year 1	Non-Electric Year 1	Water Year 1	Total Year 1
Upgrade Existing WWTP to Reduce Energy Costs	\$19,025	\$0	\$0	\$19,025
Totals	\$19,025	\$0	\$0	\$19,025

Discussion: The Projected Year 1 savings of \$21,621 will exceed the Year 1 Guarantee of \$19,025 by \$2,596.

Savings Summary - Operational Guarantee

ECM#	Operational Savings Description (OSD)	Schedule A Ref.	Cost Avoidance Category (O&M, Capital)	1st Year Cost Avoidance
4	Upgrade WWTP to Reduce Sludge Processing and Hauling Costs	ALL	O&M	\$67,426
9	Upgrade WWTP to Reduce Operations & Maintenance (O&M) Costs	ALL	O&M	\$46,602
Total				\$114,028

Discussion:

The Projected Year 1 savings for ECM #4 of \$67,426 and for ECM #9 of \$46,602 are as agreed to by the Customer. The baseline adjustment is stipulated to be an escalation of 0% per year for operational costs used in the determination of operational cost avoidance each year. The operational cost avoidance values were identified, reviewed, and agreed to by a team of Customer’s representatives.

The annual guarantee of operational cost avoidance strategies are shown in the table above. The Savings are based on the listed Energy and Operational Cost Avoidance Guarantee Practices contained in Section 1.3 of the contract. The operational cost savings as described in the table above and identified in Section 1 of the contract were deemed satisfied upon contract execution. The Customer acknowledged and agreed that, if it did not enter into this agreement, it would have had to have taken future steps to achieve the same ends as did the work included in Schedule A of this contract, and that, in doing so, would have incurred operational costs of at least the amount per year over the life of the performance period as presented below and in the Schedule of Savings. The Customer agreed that, by entering into the agreement, it will avoid future operational costs in at least the amounts shown in the table above. The Customer acknowledged that operational cost savings categorized as capital cost avoidance are part of, or are causally connected to scope of work specified in Schedule A (i.e., the ECMs being implemented), and have been documented by industry standard engineering methodologies acceptable to the Customer.

Semi-annual site visits will be made by Honeywell systems engineers to inspect and analyze plant operations and operational reports and utility meter electrical usage, then present a report to the customer on inspection results with comments and suggestions for improved operation and energy efficiency.

3.0 Contract Exhibit Detail

Exhibit F-1 – Measurement and Verification Plan

The proposed plan for monitoring and verifying savings from the installed Energy Conservation Measures (ECMs) is based on the methods described in the International Performance Measurement and Verification Protocol (IPMVP). The intent of the Measurement and Verification (M&V) plan is to verify that the ECMs installed by Honeywell are performing at the expected energy-efficiency levels. In order to achieve this goal, accurate and cost effective measurement procedures must be identified and implemented.

The purpose of performing any monitoring and verification is to establish an agreed upon process that provides the customer both a level of satisfaction that the improvements have been delivered and ongoing information as to their operation and performance.

The Town of Lyons and Honeywell have agreed on a mutually acceptable methodology for measuring and verifying energy savings for the ECMs that Honeywell installed. The M&V plan, which is based on the International Performance Measurement & Verification Protocol (IPMVP) provides the framework and procedures to document the energy savings for the proposed ECMs.

General Approach to M&V

Energy and Operations & Maintenance (O&M) savings are determined by comparing the energy (or O&M) use associated with a facility or certain systems within a facility before and after the installation of an ECM or other measure. The “before” case is called the baseline. The “after” case is called the post-installation, or performance, period. Baseline and post-installation energy use measurements or estimates can be constructed using the methods associated with M&V options A, B, C, and D, as described in IPMVP guidelines. The challenge of M&V is to balance M&V costs, accuracy, and repeatability with the value of the ECM(s) or systems being evaluated, and to increase the potential for greater savings by careful monitoring and reporting.

M&V Options

The IPMVP M&V Guidelines classify the M&V procedures into four categories: Options A, B, C, and D. As shown in Table 1 below, these options differ in their approach to the level of complexity of the M&V procedure. These M&V options are used to verify energy savings ECMs. In this project, only ECM #1 has energy savings. ECMs #4 and #9 have no energy savings calculated for these measures – all savings are calculated as Operations & Maintenance savings.

The following pages detail the baseline energy model and savings calculations:

- Exhibit F-2: Proposed WWTP Energy Model - kWh per Million Gallons Treated
- Exhibit F-3: ECM 1 Savings Calculations
- Exhibit F-4: ECM 4 Savings Calculations
- Exhibit F-5: ECM 9 Savings Calculations

Exhibit F-2 – Proposed WWTP Energy Model – kWh per Million Gallons Treated

Project: Town of Lyons WWTP Upgrade

9/24/2013

ESTIMATED ENERGY CONSUMPTION at START-UP CONDITIONS : 0.166 MGD AND 461 PPD BOD LOAD

Equipment Description	Quantity		Motor Size		Power, ea (estimated)			Run Time, hrs		Annual Energy Use	NOTES
	Installed	Operating	Motor Size (HP)	Total Installed (HP)	BHP	Elect Eff.	(kW)	(hr/day)	(hr/yr)	(kWh)	
Influent Grinder	1	1	3.00	3.00	2.50	0.90	2.08	24	8760	18,201	runs continuously, regardless of flow, estimated BHP
Influent Pumps	2	1	20.00	40.00	1.20	0.90	1.00	24	8760	8,737	Existing pumps:BHP calc'd at Start-up Flow - 115 gpm at 25 ft TDH
Fine Screen/Conveyor	1	1	2.00	2.00	1.25	0.90	1.04	3	1095	1,138	Estimated cumulative run time (float based)
Jet Vortex Grit System - Blower	1	1	1.50	1.5	1.10	0.90	0.91	24	8760	8,009	runs continuously, regardless of flow
Grit System - Grit Pump	1	1	5.70	5.7	5.00	0.90	4.16	2	730	3,034	on Timer; est run time
Grit System - Classifier	1	1	1.00	1.0	0.70	0.90	0.58	2	730	425	Match grit pump run time
SBR System (Sanitaire ICEAS)											
Submersible Mixers	2	2	8.3	16.6	6.40	0.90	5.32	16	5840	62,127	Assume both run abt 2/3 of time (anox pre-reactors)
Aerzen Delta Hybrid Blowers	2	1	30.0	60.0	15.43	0.88	13.10	20	7300	95,647	BHP and Kw adjusted using BOD factor: 461 ppd at start-up /705 ppd design
Effluent EQ/ UV Feed Pumps	2	1	3.0	6.0	2.00	0.90	1.66	24	8760	14,561	BHP based on 200 gpm at 25 ft (feed to UV)=288,000 gpd pumped
WAS/ IMR Pumps	2	2	5.0	10.0	4.00	0.90	3.32	24	8760	58,244	Run continuous in either IMLR mode or WAS diversion to hold tank
Decanter Mech/ Misc Loads Allowance (all bldgs)	2	2	n/a	n/a	n/a	n/a	6.2	8	2,080	12,854	Based on miscellaneous electrical load of 1.5 W/sf - DOE 2 default for offices
Lighting allowance (all bldgs)	50	50	n/a	n/a	n/a	n/a	4.1	8	2,080	8,570	Based on installed lighting load of 1.0 W/sf - typical value for offices
UV Disinfection Equipment	1	1	n/a	n/a	n/a	n/a	1.40	24	8760	12,264	87.5 watts per lamp; 16 lamps; per Trojan
NPW Pump	1	1	7.5	7.5	5.00	0.90	4.16	4	1460	6,067	BHP calc'd at 100 gpm @ 140 ft TDH
Sludge Tank Blower * (shared w/ SBR)	1	1	30	30.0	18.9	0.90	15.71	12	4380	68,801	Assume on-off operation (50/50) and min air for mixing
Submersible Sludge Transfer Pump	2	1	3.0	6.0	1.00	0.90	0.83	n/a	390	324	BHP very low at 30 gpm (avg 7.5 hr/ week at start-up)
Rotary Lobe Centrifuge Feed Pump	2	1	5.0	10.0	1.50	0.90	1.25	n/a	390	486	Running HP per vogelsang
Centrifuge (Centrysis)	1	1	18.5	18.5	13.00	0.93	10.46	n/a	390	4,078	Estimate on running BHP
Dewatered Cake Conveyor *	1	1	3.0	3.0	2.50	0.90	2.08	n/a	390	810	May not be needed.
Foul Air Fans (from Bioair)	2	1	3.0	6.0	1.20	0.90	1.00	24.0	8760	8,737	BHP for 877 cfm FA from infl. channel, headworks, solids room, sludge tanks

Total	Kwh/ yr	393,113
Total	Kwh/ MG	6,488

Note:

Annual Cost at \$ X/ kWh \$0.051 \$21,621

- Values shown assume use of more efficient two (2) 30 Hp Delta Hybrid blower approach (1 -duty; 1-standby (shared with sludge holding)
- Values shown are for start-up conditions: 0.166 MGD and 461 lbs BOD
 - blower kWh is reduced proportionately from design at Q= 0.254 MGD and 705 PPD (BOD)
 - centrifuge run time (per year) is reduced since less biosolids produced at start-up
 - influent pump BHP based on start up flow of 166,000 gpd and 25 ft THD; existing pump motors are oversized at 20 HP
- To determine kWh/y consumption at AVG DESIGN flow (0.254) and Load (705 PPD); then apply flow, load, or run-time ratio correction factors to KWH
- For additional Power savings utilize the offered influent conditioning/ sludge holding approach (similar to Kersey, CO SBR); (Bid Alt)
 - With this approach, we estimate savings of approximately 100,000 kWh/yr due to less SBR blower power consumption and aerated sludge holding tank power savings
- Electrical efficiencies are approximate. For 30 Hp Aerzen blower, Kw is per Aerzen and includes motor and VFD efficiency

Exhibit F-3 – ECM 1 Savings Calculations

Savings Estimate for: Town of Lyons WWTP Upgrade Project

Prepared by: Justin Rundle
Date: 08 Oct 13

1.0 Upgrade Existing WWTP to Reduce Energy Costs

Assumptions

1 None

A. General Data for Baseline and Proposed Operation

1 Client Agreed Baseline is 3 yr average

2 Electrical Blended Rate (EBR)	\$0.051 /kWh	From HON Electrical Rate Analysis
3 Electrical Energy Rate (EER)	\$0.051 /kWh	From HON Electrical Rate Analysis
4 Electrical Demand Rate (EDR)	\$0.00 /kW	From HON Electrical Rate Analysis
5 Three Year Average Energy Spend	\$40,319 /yr	Supplied from TOL - see Electrical tab
6 Three Year Average Energy Use	790,625 kWh/yr	A.5 / A.1
7 Three Year Average WWTP Flows	0.159 mgd	From EPA Flow Data
8 Energy Use Index for Three Year Average	13,639 kWh/Mgal	A.5 / (A.6 x 365 days / yr)

B. Savings Calculations

1 Expected Energy Use Index (EUI) - New Facility	6,275 kWh/Mgal	Attachment No. 1 - Tetra Tech
2 Expected EUI - New Facility - Modified for lights / AC	6,488 kWh/Mgal	Attachment No. 2 - Modified for Lights / HVAC
3 Expected Energy Use - New Facility	376,101 kWh/yr	B.2 x A.6 x 365 days / yr
4 Expected Energy Spend - New Facility	\$19,180 /yr	B.2 x A.1
5 Three Year Average Energy Use	790,625 kWh/yr	A.6
6 Three Year Average Energy Spend	\$40,319 /yr	A.5
7 Expected Energy Savings - New Facility	414,524 kWh/yr	B.4 - B.2
8 Expected Energy Savings - New Facility	\$21,139 /yr	B.5 - B.3
9 Savings Percent	52%	B.4 / B.3

Fiscal Year Costs for WWTP Operations

(from Level 2 Report - information supplied by TOL accounting dept.)

Fiscal Year	Electrical Spend	Natural Gas Spend	Sludge Hauling	Contracted Operations	Maintenance & Supplies	Chemicals & Lab Supplies	Chlorine	Telephone	Annual
2010	\$40,386	\$1,178	\$41,585	\$75,414	\$10,638	\$22,433	\$0	\$1,599	\$193,233
2011	\$38,342	\$1,236	\$58,367	\$79,578	\$23,184	\$24,123	\$16,657	\$1,694	\$243,181
2012	\$42,228	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$248,870
3 Yr Avg	\$40,319	\$1,303	\$54,374	\$86,174	\$14,797	\$24,104	\$5,552	\$1,805	\$228,428

2013 Budget	\$41,000	\$1,500	\$45,000	\$118,880	\$13,800	\$18,000	\$0	\$1,500	\$239,680
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Baseline	\$40,319	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$246,961
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ECM #1 Savings	\$21,139	\$0	\$21,139						
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Baseline after ECM #1	\$19,180	\$1,496	\$166,698	\$10,569	\$25,756	\$0	\$2,123	\$225,822
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ECM #2 Savings	\$0	\$0	\$67,426	\$0	\$0	\$0	\$0	\$67,426
-----------------------	------------	------------	-----------------	------------	------------	------------	------------	-----------------

Baseline after ECM #2	\$19,180	\$1,496	\$99,272	\$10,569	\$25,756	\$0	\$2,123	\$158,395
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ECM #3 Savings	\$0	\$0	\$42,664	\$0	\$1,652	\$0	\$1,163	\$45,479
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Baseline after ECM #3	\$19,180	\$1,496	\$56,608	\$10,569	\$24,104	\$0	\$960	\$112,916
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Exhibit F-4 - ECM 4 Savings Calculations

Savings Estimate for: Town of Lyons WWTP Upgrade Project

Prepared by: Justin Rundle
Date: 08 Oct 13

4.0 Upgrade WWTP to Reduce Sludge Processing and Hauling Costs

Assumptions

1 None

A. General Data for Baseline and Proposed Operation

1 Client Agreed Baseline is 2012 Actual Data

2 2012 Actual for Labor for Sludge Processing	\$43,124 /yr	Sludge worksheet - data from client
3 2012 Actual for Labor for Sludge Hauling	\$32,910 /yr	Sludge worksheet - data from client
4 2012 Actual for Processing & Sludge Hauling	\$76,034 /yr	A.2 + A.3

B. Savings Calculations

1 WWTP BOD Loading - full capacity	707 dry ppd	CDPHE permit
2 WWTP BOD Loading - current operations	463 dry ppd	Attachment No. 1
3 Sludge Loading Percent - current	65%	B.2 / B.1
4 Expected sludge projection - full capacity	430 dry ppd	Attachment No. 2
5 Expected sludge projection - current capacity	282 dry ppd	B.4 x B.3
6 Expected de-watering production	17.5%	Attachment No. 3, avg of 15 to 20%
7 Expected sludge production	1,609 wet ppd	B.5 / B.6
8 Expected sludge production	294 wet TPY	B.7 x 365 dys/yr / 2,000 lbs per ton
9 Hauling costs per ton	\$22.5 / wet ton	Attachment No. 4, use vector attracting
10 New Hauling Costs	\$6,608 /yr	B.8 x B.9
11 Expected Polymer Costs	\$800 /yr	Maximum, per discussions with Tetra Tech
12 Hauling costs - screenings & grit	\$1,200 /yr	Estimate \$100 / mo
13 Total Hauling Costs	\$8,608 /yr	Sum B.10 to B.12
14 2012 Actual for Processing & Sludge Hauling	\$76,034 /yr	A.4
15 Expected annual savings	\$67,426 /yr	A.1 - B.13
16 Savings Percent	89%	B.16 / A.1

Fiscal Year Costs for WWTP Operations

(from Level 2 Report - information supplied by TOL accounting dept.)

Fiscal Year	Electrical Spend	Natural Gas Spend	Sludge Hauling	Contracted Operations	Maintenance & Supplies	Chemicals & Lab Supplies	Chlorine	Telephone	Annual
2010	\$40,386	\$1,178	\$41,585	\$75,414	\$10,638	\$22,433	\$0	\$1,599	\$193,233
2011	\$38,342	\$1,236	\$58,367	\$79,578	\$23,184	\$24,123	\$16,657	\$1,694	\$243,181
2012	\$42,228	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$248,870
3 Yr Avg	\$40,319	\$1,303	\$54,374	\$86,174	\$14,797	\$24,104	\$5,552	\$1,805	\$228,428

2013 Budget	\$41,000	\$1,500	\$45,000	\$118,880	\$13,800	\$18,000	\$0	\$1,500	\$239,680
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Baseline	\$40,319	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$246,961
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ECM #1 Savings	\$21,139	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$21,139
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Baseline after ECM #1	\$19,180	\$1,496	\$166,698	\$10,569	\$25,756	\$0	\$2,123	\$225,822
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ECM #2 Savings	\$0	\$0	\$67,426	\$0	\$0	\$0	\$0	\$67,426
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Baseline after ECM #2	\$19,180	\$1,496	\$99,272	\$10,569	\$25,756	\$0	\$2,123	\$158,395
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ECM #3 Savings	\$0	\$0	\$42,664	\$0	\$1,652	\$0	\$1,163	\$45,479
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Baseline after ECM #3	\$19,180	\$1,496	\$56,608	\$10,569	\$24,104	\$0	\$960	\$112,916
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Exhibit F-5 - ECM 9 Savings Calculations

Savings Estimate for:
Town of Lyons WWTP Upgrade Project
 Prepared by: Justin Rundle
 Date: 08 Oct 13

9.0 Upgrade WWTP to Reduce Operations & Maintenance (O&M) Costs

Assumptions

1 None

A. General Data for Baseline and Proposed Operation

- 1 Baseline is 2012 Actual Data - to Compare "Apples to Apples"
- 2 2013 Budget for "Contracted Operations" \$118,880 /yr
- 3 2013 Budget for "Maintenance & Supplies" \$13,800 /yr
- 4 2013 Budget for "Chemicals & Lab Supplies" \$18,000 /yr
- 5 2013 Budget for "Chlorine" \$0 /yr
- 6 2013 Budget for "Telephone" \$1,500 /yr
- 7 2013 Budget for Operations Issues Above \$152,180 /yr

Fiscal spending table
 Sum from above

B. Savings Calculations

- 1 Expected "Contracted Operations" **\$48,000** /yr
- 2 Expected "Sludge Hauling" Costs \$8,608 /yr
- 3 Total Sludge Hauling & Contract Operations \$56,608 /yr
- 4 Expected "Maintenance & Supplies" \$10,569 /yr
- 5 Expected "Chemicals & Lab Supplies" \$24,104 /yr
- 6 Expected "Chlorine" \$0 /yr
- 7 Expected "Telephone" \$960 /yr
- 8 Revised Baseline O&M costs \$137,720 /yr
- 9 O&M Savings **\$45,479** /yr
- 10 Savings Percent 33%

Maximum expected value based on bids received to date
 ECM 2, Line B.13
 B.1 + B.2
 Maintenance & Supplies Required - use "typical" year for newer facility
 Need Chemicals & Lab Supplies - newer facility, use average
 No more Nocardia problems
 Switch to cell phone for SCADA alarms at \$80 / mo
 Table to Right- less energy costs
 Table to Right
 B.11 / A.6

Fiscal Year Costs for WWTP Operations									
(from Level 2 Report - information supplied by TOL accounting dept.)									
Fiscal Year	Electrical Spend	Natural Gas Spend	Sludge Hauling	Contracted Operations	Maintenance & Supplies	Chemicals & Lab Supplies	Chlorine	Telephone	Annual
2010	\$40,386	\$1,178	\$41,585	\$75,414	\$10,638	\$22,433	\$0	\$1,599	\$193,233
2011	\$38,342	\$1,236	\$58,367	\$79,578	\$23,184	\$24,123	\$16,657	\$1,694	\$243,181
2012	\$42,228	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$248,870
3 Yr Avg	\$40,319	\$1,303	\$54,374	\$86,174	\$14,797	\$24,104	\$5,552	\$1,805	\$228,428

2013 Budget	\$41,000	\$1,500	\$45,000	\$118,880	\$13,800	\$18,000	\$0	\$1,500	\$239,680
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Baseline	\$40,319	\$1,496	\$63,169	\$103,529	\$10,569	\$25,756	\$0	\$2,123	\$246,961
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ECM #1 Savings	\$21,139	\$0	\$21,139						
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Baseline after ECM #1	\$19,180	\$1,496	\$166,698	\$10,569	\$25,756	\$0	\$2,123	\$225,822
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ECM #2 Savings	\$0	\$0	\$67,426	\$0	\$0	\$0	\$0	\$67,426
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Baseline after ECM #2	\$19,180	\$1,496	\$99,272	\$10,569	\$25,756	\$0	\$2,123	\$158,395
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ECM #3 Savings	\$0	\$0	\$42,664	\$0	\$1,652	\$0	\$1,163	\$45,479
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Baseline after ECM #3	\$19,180	\$1,496	\$56,608	\$10,569	\$24,104	\$0	\$960	\$112,916
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4.0 Appendix

Appendix A – Construction Completion

Customer Acceptance Letter		Honeywell
Customer Name: TOWN OF LYONS	Job Number: USB-005483	
Customer Order#: Signed Contract	Job Name: TOWN OF LYONS	
Contact Name: Victoria Simonsen		
Address: 432 5TH AVENUE		
LYONS, CO, US		
0000080540		

Honeywell has completed all work included as part of this Contract. Devices have been completely installed and have been checked to ensure proper operation. All known punch list items have been completed and accepted.

Honeywell warrants the Equipment & Labor furnished under our contract for a period of:

One-Year Other _____, starting **Jun 30, 2016**

This equipment is defined as:

All Items as outlined below -or- Specific Items as outlined below

(Define Equipment Here. Attach additional sheets as required)

ECM 1.0
ECM 3.0
ECM 4.0
ECM 5.0
ECM 9.0

If portions of this Contract were previously placed under Warranty, those dates are still valid. This date is only for the equipment defined above.

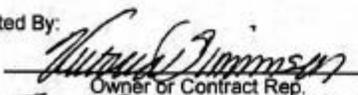
If during the warranty period service becomes necessary, it will be performed during Honeywell's normal working hours (8:00 A.M. to 4:30 P.M., Monday through Friday)

Honeywell's Warranty and Limitation of Liability shall be in accordance with:

Customer Order No.: **Signed Contract** between the Customer and Honeywell dated **Dec 12, 2013**

Notwithstanding the foregoing, Honeywell's Warranty does not include routine maintenance, e.g., equipment cleaning, mechanical parts or lubrication, pilot lamp replacement, operational testing, etc. It does not cover repair or replacement of equipment damaged by under- or over-voltage, misuse, lack of proper maintenance, or acts of God, e.g., lightning.

Upon signature of this document Honeywell's accounting department will be notified to issue the final invoice for this project. By signing this document you agree to pay Honeywell's final invoice in accordance with the contract terms.

Accepted By: 	Date: 7/21/16
Town Administrator	
Title	Honeywell Inc.
	PROJECT MANAGER
	Title

Appendix B – M&V Commissioning Site Photographs

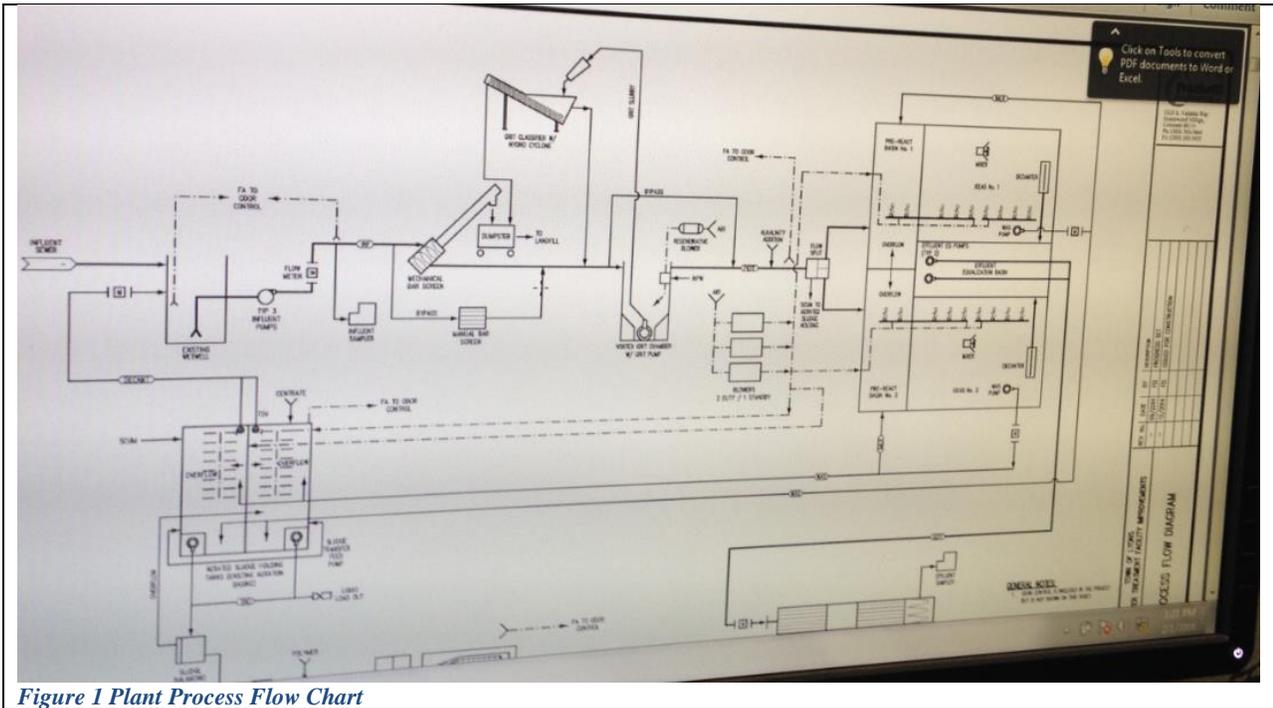


Figure 1 Plant Process Flow Chart

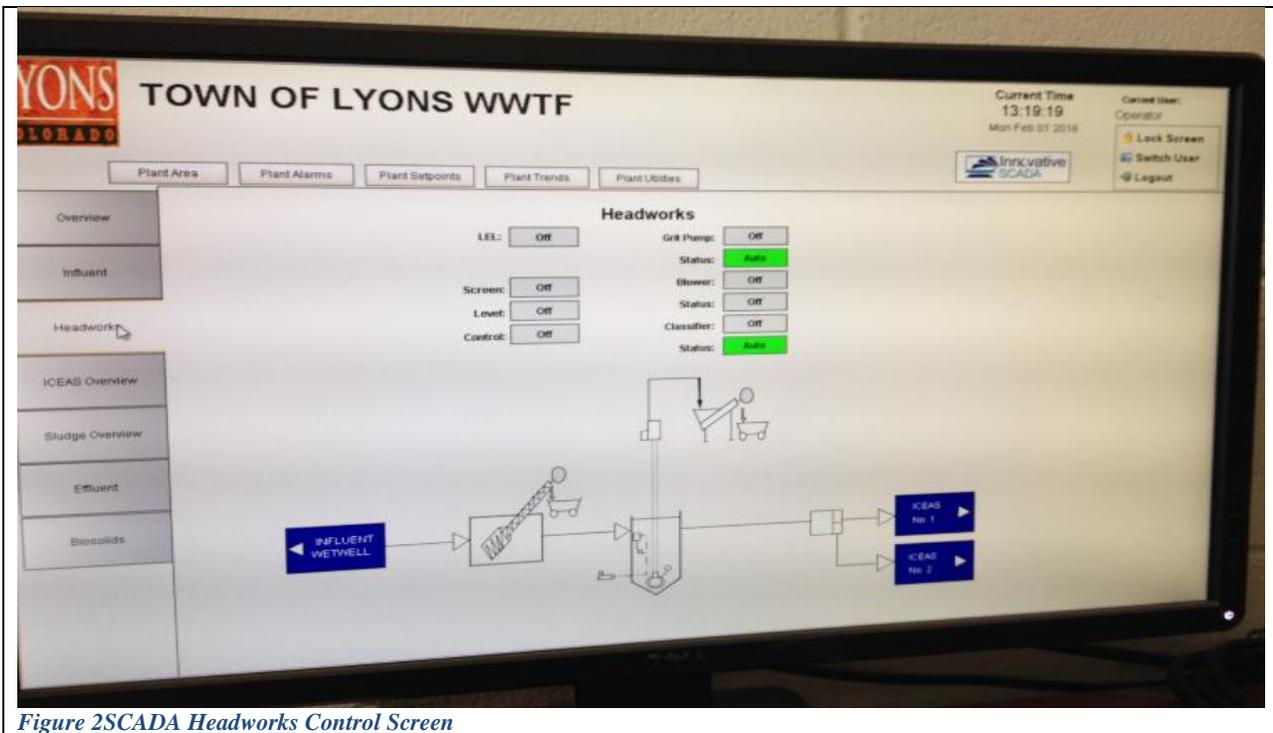


Figure 2 SCADA Headworks Control Screen



Figure 3 AERZEN Control Panel



Figure 4 Influent Pump Control Panel

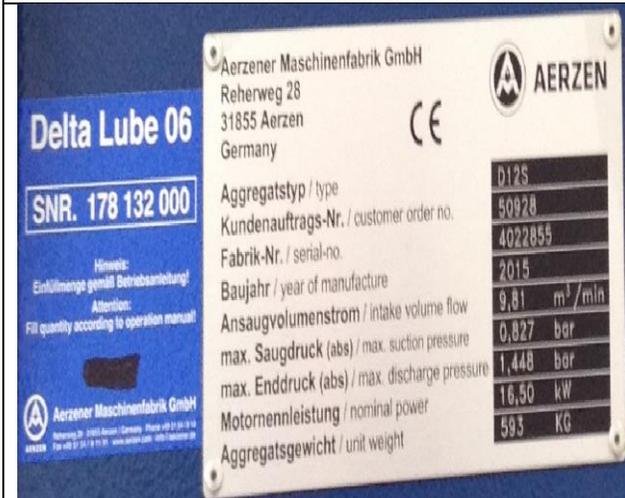


Figure 5 AERZEN Blower Nameplate



Figure 6 Raw Sewage Pump Control



Figure 7 Sludge Dewatering Centrifuge Control



Figure 8 Ultraviolet Control



Figure 9 Concrete Wetwell



Figure 10 Chemical Treatment

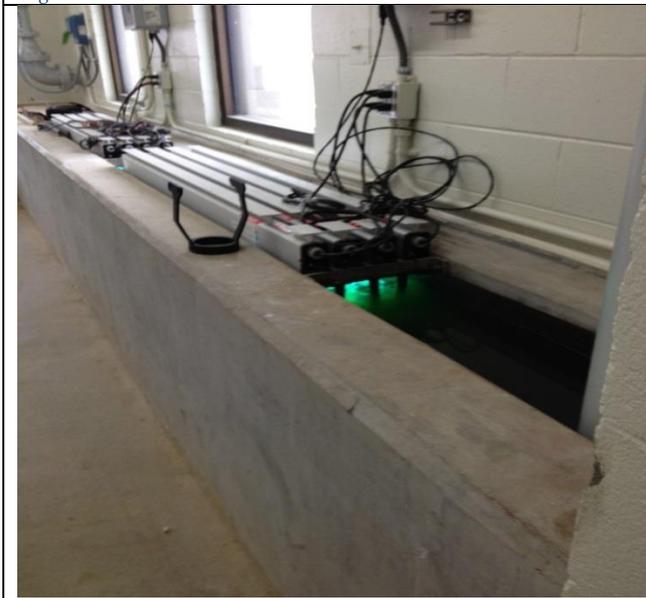


Figure 11 Ultraviolet Treatment



Figure 12 AERZEN Blowers Number 1 & 2



Figure 13 Holding Tank



Figure 14 Switchgear



Figure 15 Biosolid Station



Figure 16 AERZEN Blower Number 3

Appendix C – M&V Plan

ECM #1

The M&V Option chosen for these energy savings ECM is an Option A approach. In an attempt to balance M&V cost and accuracy, an Option A approach was selected. A general M&V rule-of-thumb is not to spend more than 10% of an ECM’s annual energy savings to verify performance. The annual savings for this ECM are very low and the added cost to perform an Option B or C approach does not make sense. Option A, for this specific ECM, gives the greatest value in terms of low cost and verification of the ECM’s performance as designed. The key parameter for this ECM is that the final installed equipment matches the project Scope of Work as calculated in the energy savings calculations model.

ECM #4

The savings for this ECM are from O&M savings. O&M savings are not usually verified with IPMVP methodologies. The savings for this measure are stipulated, with values shown in Schedule F, Section 1.2. Since these O&M savings account for the majority of the annual guarantee savings, semi-annual site visits will be made by systems engineers to inspect and analyze plant operation and operational reports and utility meter electrical usage, then present a report to the customer on inspection results with comments and suggestions for improved operation and energy efficiency. Based upon the findings of these semi-annual reports, the Customer and Honeywell will attempt to return the system to optimal efficiency. If Honeywell is responsible for the miss of savings (installation of wrong equipment or installation), then Honeywell will reimburse the Customer for the missed savings (that are less than the 16% solids calculation point). If the Customer is responsible for the miss of savings (faulty operation of equipment, etc.), then this miss will be documented in the annual savings report to the Customer. In either case, there will be an attempt to adjust or repair any abnormalities and bring the system back to correctly designed operation.

ECM #9

The savings for this ECM are from O&M savings. O&M savings are not usually verified with IPMVP methodologies. The savings for this measure are stipulated, with values shown in Schedule F, Section 1.2.

ECM	ECM Description	M&V Option	Post-Retrofit Approach	Annual Approach
1	Upgrade Existing WWTP to Reduce Energy Costs	A	Verify ECM via manufacturer’s cut sheets, setup and commissioning reports, applicable installation documentation, and customer acceptance documentation. Perform visual inspection of ECM equipment and operation – compare to Scope of Work and specs.	Visual inspection of ECM equipment and operation – compare to Scope of Work of project. Review and document performed maintenance. Review any operational issues with customer.

4	Upgrade WWTP to Reduce Sludge Processing and Hauling Costs	O&M Savings	Savings shall be considered accepted and met upon contract execution, as shown in engineering calculations and in Attachment D, Part D, Section 1.2.	Semi-annual site visits will be made by systems engineers to inspect and analyze plant operations and operational reports and utility meter electrical usage, then present a report to the customer on inspection results with comments and suggestions for improved operation and energy efficiency.
9	Upgrade WWTP to Reduce Operations & Maintenance (O&M) Costs	O&M Savings	Savings shall be considered accepted and met upon contract execution, as shown in engineering calculations and in Attachment D, Part D, Section 1.2.	Semi-annual site visits will be made by systems engineers to inspect and analyze plant operations and operational reports and utility meter electrical usage, then present a report to the customer on inspection results with comments and suggestions for improved operation and energy efficiency.

M&V Methodology

The following describes the Measurement and Verification procedures, formulas, and stipulated values which may be used in the calculation of the energy cost avoidance.

Energy Conservation Measure	Electric Savings Verification Method	Fuel Savings Verification Method	Other Utility Savings Verification Method
Upgrade Existing WWTP to Reduce Energy Costs	Retrofit Isolation with Validation of Installation and Operation via Startup and Commissioning Documentation (Option A)	N/A	N/A

Operational cost avoidance methodology and/or calculation details are attached hereto and are incorporated herein as the exhibits outlined in the following table.

ECM#	Operational Savings Description	Cost Avoidance Methodology	Exhibit
4	Upgrade WWTP to Reduce Sludge Processing and Hauling Costs	The existing sludge thickening equipment required high labor and chemicals to operate. Install new dewatering equipment to reduce labor, chemicals, and disposal costs.	F-1
9	Upgrade WWTP to Reduce Operations & Maintenance (O&M) Costs	The existing WWTP has older equipment that has high operation and maintenance (O&M) costs. Upgrade the WWTP for lower O&M costs.	F-1

The operational savings measures and which budget line items or invoice categories that are affected, are cross-referenced in each Operational Savings Cost Avoidance Detail in the Exhibits.

Appendix D – Project Financial Summary

Project Financial Summary

Town of Lyons - Wastewater Performance Contract
 ***** Cost & Savings Summary & Cash Flow Table *****
 October 23, 2013

Net to Finance

Installed cost for selected measures	\$ 5,866,976	Grant
Grants & rebates	\$ -	0%
Town capital contribution	\$ 1,500,000	26%
Other (TBD)	\$ -	0%
Net	\$ 4,366,976	

Interest rate information for financed installation cost (CDPHE low interest loan)

Term, years	30 years	25 years	20 years	15 years
Annual Rate	N/A	N/A	1.25%	1.25%
Use in model	20 years			
Rate	1.36%	Rate is based on \$2M at 0% for green reserve + balance @ approx 2.5%.		
Payments/year	4			
Advance/arrears	arrears			
NPV	\$ (1,283,863) Amount of project cost in present day \$'s beyond savings &			

First Year Savings

	\$'s	Annual Esc.
Energy	\$ 19,025	0.00%
Revenue	\$ -	0.00%
Operations & Maintenance	\$ 114,028	0.00%
Total	\$ 133,053	

Simple Payback

Without grants	44.1 years
With grants	44.1 years

Annual Service

M&V of savings	\$ 14,891	Monitoring & verification of savings
Other Services	\$ -	Include? N
Annual service escalation	\$ 14,891	3.5%

Interest rate "calculation"

\$ 4,366,976	total project amount to be financed
\$ 2,000,000	green reserve loan amount
\$ 2,366,976	amount borrowed at "standard" SRF rate
0.00%	green reserve rate
2.50%	rate on balance per Ryan Shipley, CWRPDA 6-6-13
1.36%	average rate for lease payment calculation

30 – Year Cash Flow Model

Year	Energy	Operations & Maintenance	Total	Debt Service	M&V Services for Savings Guarantee	Annual Service	Total	Annual Net	# of Sewer Accounts	Annual Cost per Account	Monthly Cost Per Account
1	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ 14,891	\$ -	\$ 264,529	\$ (131,476)	966	\$ 136.10	\$ 11.34
2	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ 15,412	\$ -	\$ 265,050	\$ (131,997)	966	\$ 136.64	\$ 11.39
3	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ 15,952	\$ -	\$ 265,590	\$ (132,537)	966	\$ 137.20	\$ 11.43
4	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
5	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
6	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
7	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
8	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
9	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
10	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
11	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
12	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
13	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
14	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
15	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
16	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
17	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
18	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
19	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
20	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
21	\$ 19,025	\$ 114,028	\$ 133,053	\$ 249,638	\$ -	\$ -	\$ 249,638	\$ (116,585)	966	\$ 120.69	\$ 10.06
22	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
23	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
24	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
25	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
26	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
27	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
28	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
29	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
30	\$ 19,025	\$ 114,028	\$ 133,053	\$ -	\$ -	\$ -	\$ -	\$ 133,053	966	\$ 120.69	\$ 10.06
	\$ 570,750	\$ 3,420,840	\$ 3,991,590	\$ 5,242,401	\$ 46,255	\$ -	\$ 5,288,656	\$ (1,297,066)		\$ 3,669	

SCHEDULE F. SAVINGS MEASUREMENT AND CALCULATION FORMULAE; METHODOLOGY TO ADJUST BASELINE; MEASUREMENT AND VERIFICATION PLAN

For savings measurement and calculation formula and methodologies to adjust the baseline, refer to Exhibits F-1 – F-5 below.

The measurement and verification (“M&V”) plan and methodologies presented in this section is based on the energy conservation measures (“ECMs”) selected by Lyons for inclusion in the Energy Cost-savings Contract (the “ECSC”).

1. Schedule of Savings

The total energy and operational savings (cost avoidance) over the Term of the contract is equal to or greater than \$399,161 as defined in the table below:

YEAR	ENERGY SAVINGS	OPERATIONAL SAVINGS	TOTAL SAVINGS
1	\$19,025	\$114,028	\$133,054
2	\$19,025	\$114,028	\$133,054
3	\$19,025	\$114,028	\$133,054
TOTALS	\$57,075	\$342,085	\$399,161

or the sum of the Retrofit and Support Costs for such Guarantee Year, whichever is less. Provided further, in no event shall the cost avoidance guarantee provided herein exceed the total installation, maintenance, and financing costs for the Work under this Agreement. Proforma budget neutral or positive cash flows are not guaranteed.



COLORADO
Department of Public
Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

July 15, 2016

Victoria Simonsen, Town Administrator
Town of Lyons
432 5th Ave.
Lyons, CO 80540

Subject: **UPDATED** Final Plans and Specifications for Construction Approval
Site Location Approval No.: ES.12.45343 and 4289
Town of Lyons, Lyons Wastewater Treatment Facility Improvements
Colorado Discharge Permit System (CDPS) No. CO0020877, Boulder County
GLU Project No. 090117W, ES Project No. ES.14.CWFDR01171 and ES.15.SRF.02362

Dear Ms. Simonsen:

The Water Quality Control Division (Division), Engineering Section has received and reviewed the Plans and Specifications for the Town of Lyons Wastewater Treatment Facility (WWTF). The project was a design/build delivery and was conducted in phases that required a two-phased final plans and specifications design review to facilitate the delivery method. Phase 1, deliverable Package A included civil and structural components and was approved on August 28, 2014. The second and final phase, deliverable Package B included the process, mechanical, electrical, and architectural components of the facility and was approved on April 7, 2015. This final plans and specifications approval letter has been updated to include both Package A and Package B and updated based on plant modifications noted during the final construction inspection conducted by Engineering Section on December 8, 2015. Therefore this approval letter replaces and supersedes previous approval letters dated April 7, 2015 and August 28, 2014. The final plans and specifications meet the requirements of the *State of Colorado Design Criteria for Domestic Wastewater Treatment Works* (Design Criteria) and are hereby approved as listed below. The approved maximum month hydraulic and organic design capacities are 0.381 MGD and 705 lbs of BOD per day, respectively.

This approval addresses the following:

- Influent Compliance Point: Headworks
 1. Influent flow measuring will be a 6-inch magnetic flow meter located on the 8-inch forcemain from the influent pump station to the headworks.
 2. Influent flow sampling conducted by automatic sampler located in the headworks with sample draw off on 8-inch forcemain prior to the influent screen.
- Influent Pumping:
 1. One existing influent concrete wetwell; 1,750 gallon maximum operating capacity.
 2. Three (2 duty, 1 standby) dry pit immersible pumps, VFD controlled, 900 gpm (1.3 MGD) firm capacity.
- Preliminary Treatment:
 1. Mechanical screening, spiral auger with 6 mm screen spacing, 1.3 MGD capacity. Housed within a 1'-8" cast-in-place concrete primary channel. 1'-8" cast-in-place concrete emergency bypass channel with manual bar screen, ¼-inch bar, 1-inch bar spacing.
 2. Grit chamber vortex grit removal (Design Basis: Fluidyne FHG-2.5 Hydro-Grit with AirCirc), 1.3 MGD capacity with 3.0 hp blower.
 3. Grit classifier, 240 gpm capacity classifying cyclone and 4.1 yd³/hr capacity screw.
 4. Grit pump, submersible (design basis: Wilo FA 10.22W), 240 gpm capacity.



- Chemical Addition:
 1. Alkalinity addition system, magnesium hydroxide fed at influent pump station discharge to SBR influent, 2 duty and 1 spare peristaltic feed pumps (Design Basis: Stenner peristaltic pump), 0.08 gph capacity. Two 55-gallon solution tanks with 1/2 -hp mixers and secondary containment. Magnesium hydroxide design dose 14 mg/L as CaCO₃.
 2. Sodium hypochlorite chemical feed system at the influent to the Sequencing Batch Reactor for filament control in the SBR basins. One peristaltic chemical feed pump (Design Basis: Blue White A-100 NF), 55-gallon chemical solution tank, and secondary containment pallet. Sodium hypochlorite fed on a as-needed basis to control filaments if present in SBR basins.

- Secondary Treatment:
 1. Existing biological treatment/clarifier basin shall be decommissioned.
 2. Acceptance of biological design calculations for reduction of BOD, TSS, and ammonia with a two (2) train, Sequencing Batch Reactor (SBR) (design basis: Sanitaire ICEAS SBR system). The SBR process design MLSS is 3,800 - 4,700 mg/L with a SRT of 21-27 days, minimum design temperature of 12°C.
 3. Two (2) SBR trains including:
 - a. Two (2) Pre-React Basins, 0.046 MG capacity each.
 - b. Two (2) Main-React Basins, 0.164 MG capacity each
 - SBR includes two (one each basin) mixers, located in main-react basin (design basis: Flygt submersible compact mixer), 8 hp capacity.
 - SBR includes two (one each basin) waste activated sludge (WAS) submersible solids pumps (design basis: Flygt N series), 700 gpm capacity.
 - Two (2) mechanical pivoting trough decanters, 1,411 gpm peak capacity.
 - c. Aeration system including fine bubble diffusers and three (2 duty, 1 standby) positive displacement blowers, 350 standard cubic feet per minute (scfm) capacity each (provide aeration for SBR and Aerated Sludge Holding Tanks).
 4. Effluent equalization basin, 0.06 MG maximum working capacity
 - a. Two (1 duty, 1 standby) submersible effluent EQ pumps, 425 gpm capacity each.

- Disinfection Process:
 1. Ultraviolet Disinfection system including single concrete channel, two banks, 4 modules per bank with total 32 lamps (Design Basis: Trojan UV 3000PTP), 0.6 MGD (425 gpm) peak hour capacity (peak equalized flow from SBR) providing 46 mWs/cm² dose at 65% UVT and 0.41 MGD maximum month capacity providing 34 mWs/cm² dose at 65% UVT. Design dosages above meet minimum Design Criteria Requirement of 30 mWs/cm² based on output from lamps at end of lamp life and a Fouling Factor = 0.80.

- Non-Potable Water (NPW) System:
 1. One, (1) duty vertical multistage pump draws water downstream of UV system for plant service water, 60 gpm capacity. One 2-inch magnetic flow meter for NPW flow measurement. Backup potable water connection to NPW system provided with reduced pressure zone (RPZ) backflow preventer.
 2. Sodium hypochlorite chemical feed system at the discharge of the non-potable water (NPS) pump located downstream of the UV system. Sodium hypochlorite dosing is for preventing bacterial growth in NPW system only. One peristaltic chemical feed pump (Design Basis: Blue White A-100 NF), 55-gallon chemical solution tank, and secondary containment pallet.

- Biosolids Handling:
 1. Existing, refurbished concrete tanks; two (2) aerated sludge holding tanks (aeration provided by SBR blowers), 0.059 MG capacity each. Design includes two (2) new sludge transfer pumps, 150 gpm capacity for feed to centrifuge. Air applied through new fine bubble diffusers. Aeration provided for mixing, design capacity of 15 scfm/1,000 ft³ of tank volume.
 2. One sludge balancing tank, located downstream of aerated sludge holding tanks prior to centrifuge, 135 gallon capacity.
 3. Centrifuge solids dewatering system:
 - a. One (1) dewatered sludge pump (design basis: PD rotary lobe pumps), 40 gpm capacity.
 - b. Emulsion polymer feed system (design basis: Velodyne VM-4.5D-600-C), 33 lbs/dry ton solids design dose, 250 lbs/hr maximum solids loading capacity.
 - c. Centrifuge unit, 30 gpm hydraulic capacity, 189 lbs/hr solids capacity, design feed solids concentration at 1.5% and final cake concentration at 18%.
- Odor Control:
 1. Two (1 duty, 1 standby) foul air fans, 766 actual cubic feet per minute (acfm) capacity each.
 2. Biotrickling filter system (design basis: Bioair) providing odor control for influent wetwell headspace, headworks channel headspace, aerated sludge holding tank, and solids processing area; 875 acfm capacity. Design includes one biotrickling filter unit, 134 ft³ tank with synthetic media (design basis: EcoBase media).
- Back-up Power:
 1. Secondary utility power feed from City of Longmont including automatic transfer switch (ATS) located at WWTF providing emergency backup power for primary treatment, secondary treatment, aeration, disinfection, and building lighting and heating.
- Effluent Compliance Point: Existing Outfall pipeline to St. Vrain Creek
 1. Effluent flow measuring; 4-inch magnetic flow meter located on influent to UV System (must take into account NPW flowmeter for determining total effluent flow).
 2. Effluent flow sampling; automatic sampler located downstream of UV system prior to discharge.

Conditions of Approval:

1. Upon completion of construction and prior to commencement of operation, a written certification must be submitted to the Division stating that the project facilities were built in accordance with the approved plans, specifications, and change orders. The certification must be signed by the applicant's registered engineer.
2. Any change orders or addenda that change facility capacity, water quality, or processes, must be submitted to this office for review and approval.
3. Please note that during construction and operation activities, the provisions specified in the Design Criteria Sections 2.2.0, 2.3.17 and 2.3.18, must be implemented and followed. This review does not relieve the owner from compliance with all Federal, State, and local regulations and requirements prior to construction nor from responsibility for proper engineering, construction, and operation of the facility.

4. No point source discharges of water and/or contaminants from this facility to the waters of the state are authorized during construction unless a permit for such discharges has been issued by the Division. If you have any questions regarding permit issues or requirements, please contact the Permits Section at 303-692-3510.
5. In accordance with Section 2.4.0 of the Design Criteria, all wastewater treatment facilities shall develop suitable operations and maintenance manuals.
6. In accordance with Chapter 11 of the Design Criteria, all wastewater treatment facilities shall develop management and operating plans for ultimate use or disposal of biosolids. Biosolids management plans shall conform to Federal Requirements in 40 CFR 503. All disposal options shall also conform with Federal Requirements 40 CFR 257 and 40 CFR 503, Colorado Biosolids Regulation 64, and the requirements of the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, as applicable.
7. All biosolids and/or similar waste material removed from the project during this project must be properly disposed at an approved site.
8. Close out documentation for the State Revolving Fund (SRF) loan should be submitted to Water Quality Control Division, Grants and Loans Unit Project Manager, as identified below:

Failure to submit these documents may delay processing pay requests. Please direct any questions regarding the above required submittals to:

Corrina Quintana (GLU Project Manager)
Colorado Department of Public Health and Environment
Water Quality Control Division, Grants and Loans Unit
4300 Cherry Creek Drive South B-2
Denver, CO 80246-1530
EMAIL: corrina.quintana@state.co.us (GLU Project Manager)

Documents reviewed:

- Site Location Approval No: ES.12.45343 (Amendment) for Town of Lyons Wastewater Treatment Facility dated June 26, 2014.
- Final Design Review Set (Design Plans) for the Town of Lyons Wastewater Treatment Facility by FEI Engineers, dated December 2014.
- Town of Lyons WWTF Improvements Project Manual by FEI Engineers, dated December 2014.
- Revised Specification 113800 Ultraviolet Disinfection submitted February 24, 2015 by FEI Engineers.
- Miscellaneous correspondence.

In accordance with the current Operators Certification Board Regulations, this wastewater treatment plant is a Class B Domestic Wastewater Treatment Facility and the collection system is a Class 2 collection system.

The Engineering Section is interested in gaining feedback about your experience during the engineering review process. We would appreciate your time to complete a Quality-of-Service Survey regarding your experience during the engineering review process leading up to issuance of this decision letter. The Engineering Section will use your responses and comments to identify strengths, target areas for improvement, and evaluate process improvements to better serve your needs. Please take a moment to fill out our survey at the following website: <http://fs8.formsite.com/cohealth/form627710151/index.html>.

If you should have any questions please contact Mark Henderson by phone at 303-692-6255 or by electronic mail at mark.henderson@state.co.us.

Sincerely,

Mark Henderson, P.E.
Senior Review Engineer
Engineering Section | Water Quality Control Division
Colorado Department of Public Health and Environment

cc: Jim Blankenship, Town of Lyons
Gary Bergard, Honeywell
Brenton Watkajtys, Honeywell
Nathan Martinson, FEI Engineers
Mark Maxwell, Tetra Tech
Justin Whittaker, Filanc Construction
Erin Dodge, Boulder County
Amy Zimmerman, WQCD ES Engineering Review Unit, Unit Manager
Corrina Quintana WQCD Grants and Loans Unit
Site Application File | Discharge Permit File (CO-0020877)

Report Delivery Receipt

Honeywell has presented the Post Installation Conditions Report for Town of Lyons.

Please sign below to acknowledge receipt of this report. Your signature does not indicate acceptance of the results.

Received by:

Name (please print)

Signature

Date

Presented by:

Name (please print)

Signature

Date