

CONSOLIDATED EDISON COMPANY OF NEW YORK AND ORANGE AND ROCKLAND UTILITIES, INC.

Product and Services Request for Information for Carbon Monoxide Sensor Integrated with AMI Communications

June 26, 2017



Confidential

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1 Introduction

Consolidated Edison Company of New York (“Con Edison” or “CECONY”) and Orange and Rockland Utilities, Inc. (“Orange and Rockland” or “O&R”) are subsidiaries of Consolidated Edison, Inc.

1.1 Background

Con Edison and its affiliate, Orange and Rockland Utilities (O&R), are deploying Advanced Metering Infrastructure (AMI) across its service territories. The AMI project will involve installing electric and gas smart meters along with building the supporting communications network for territory-wide coverage. For more than 180 years, Con Edison has been supplying the energy that powers New York.

Consolidated Edison Company of New York (Con Edison), a regulated utility, provides electric service in New York City (except for a small area of Queens), and most of Westchester County. The company provides natural gas service in Manhattan, the Bronx, and parts of Queens and Westchester. Con Edison also owns and operates the world’s largest district steam system, providing steam service in most of Manhattan. The company serves approximately 3,500,000 electric customers and approximately 1,100,000 gas customers.

Located in the northwestern suburbs of New York City, Orange & Rockland and its subsidiary, Rockland Electric Company, deliver energy to customers in seven counties in New York and northern New Jersey.. The company serves approximately 300,000 electric customers in all three states and approximately 128,000 natural gas customers in New York and Pennsylvania. O&R's service territory encompasses a thriving 1,350 square-mile region, principally residential in nature, with a broad base of commercial, industrial, agricultural and recreational facilities.

Over 260,000 underground structures exist in New York City and Westchester. Faulty or aging cables cause manholes to explode, damaging infrastructure and presenting a risk to the public. Damaged cables can cause an electrical short circuit generating heat that may eventually cause a fire or explosion. The electrical short circuit creates heat, and as the temperature rises, gas by-products are released including carbon monoxide, carbon dioxide, acetylene and possibly methane. The cable smoulders to generate polycyclic aromatic hydrocarbons that collide and then coagulate to form particles that increase in size as the temperature rises to form smoke and more volatile gases. Sensing carbon monoxide is critical to public safety. Integrating these sensors with the Silver Spring Network would allow alarms and events to be sent to a control center for classification and response through the Outage Management System and preventive measures to be taken such as dispatching a crew to respond prior to an event occurring

1.2 General Information

For the purposes of this Request for Information (RFI):

- The term “**Response**” shall be considered synonymous with the term “**Proposal**” or “**Quote**”.
- The terms “**Respondent**”, “**Vendor**” and “**Supplier**” shall be considered synonymous to mean the firm, organization or entity submitting a Response in response to this RFI.

The purpose of this Request for Information (RFI) is to understand the availability of a carbon monoxide gas sensor which can be integrated with a long life battery and a communications module compatible with the Companies' AMI communications network from Silver Spring Networks. This sensor, once integrated with an AMI communication module will be made available to be installed inside more than 260,000 vaults and premises on (or near) electric service infrastructure and detect the presense of CO indicating a potential service problem.

This issuance of this RFI does not constitute a commitment to issue a request for bids/proposals, award a contract, or pay any costs incurred in preparation of a response to this RFI. The Companies requires that all responding suppliers abstain from providing any actual quotes or bids in response to this RFI.

Any information received in response to this RFI will assist the Companies in finalizing the scope of work and requirements which may be used at a future date in the issuance of a Request for Proposals (RFP). Submitting a response to this RFI is not a guarantee in any way that a supplier will be selected for any subsequent RFP, nor does it preclude any supplier from responding to future procurement opportunities.

It is the sole responsibility of the Respondent to read and understand all of the terms, conditions, components and other requirements of this RFI. Failure to comply with these bidding instructions may disqualify a respondent from further consideration.

All drawings, plans, specifications, reports, books, photographs, films, tapes, recordings, models, computer programs, and documentation, and all copies thereof, furnished or prepared by the Respondent, regardless of any statements thereon or therewith purporting to make them confidential or the subject of a loan or to limit the use the Companies may make of them, shall be the property of the Companies, to use in any way they see fit.

The Companies are not, and shall not be, liable for any fees, costs, or expenses incurred by any Respondents and associates of Respondents in preparing and submitting a proposal because of the Response to this RFI.

The contents of this RFI are as follows:

- **Section 2:** Includes the schedule of events related to the RFI and instructions for submitting responses.
- **Section 3:** Defines the CO Sensor Product Requirements.
- **Attachment 1:** Silver Spring Networks Global IoT Partner Program and Support Services

2 Instructions

Respondents are instructed to prepare responses in accordance with the instructions outlined in this section. The Respondent shall explicitly indicate if it is not capable of fully meeting any of the requirements of this RFI. Any collaboration with third-party vendors to support or perform a particular function or service must be explicitly stated.

2.1 Schedule of Events

Event	Date
Responses Due	10/1/2017 at 2:00pm EDT
Scheduled On-site Presentations or Conference call *	From 10/1 to 10/15/2017
* NOTE: Some qualified RFI respondents may be asked to provide an on-site presentation or participate in a conference call during the week of August 3. Actual dates/times to be confirmed.	

2.2 Additional Documents

The following documents make up the entirety of the RFI:

1. AMI CO Sensor RFI.doc (this document)
2. Attachment 1. Silver Spring Networks Global IoT Partner Program

2.3 RFI Response

The RFI Resonse must be submitted electronically to TejadaR@CONED.com no later than the time and date indicated above.

The Respondent's response must be submitted as a Word or PDF document and shall include the sections described below.

2.3.1 Cover Letter

The cover letter should have a maximum length of two (2) pages and must contain:

- The legal name and address of Respondent
- The name, title and telephone number of the designated contact for this RFI
- A statement that the Respondent has read, understands, and agrees to all provisions of the RFI

The document must be submitted in Microsoft Word™ (Word) or Adobe PDF format.

2.3.2 Section 1: Proposed Solution

Provide a summary of the Respondent's company background, relevant experience and solutions offered. Provide a description of the overall solution you are proposing to meet Con Edison's

requirements (Section 3). The summary should demonstrate the Respondent's understanding of the Companies' CO sensing needs as set forth in this RFI and shall describe how the proposed technology will support the Companies' requirements. This summary should also briefly (no more than 2 pages) explain and demonstrate an understanding of the Companies' requirements and why the proposed AMI CO Sensors are the best solution for the Companies. This section should be no more than 6 total pages.

2.3.3 Section 2: Product Development and Testing Methodology

Respondent shall describe its standard product development and testing methodology including its documentation and quality assurance practices. Respondent should include a high level schedule, with milestones and checkpoints, for the development of the integrated AMI CO Sensor for testing. Respondent should include its standard firmware development process and how respondent ensures that the firmware is fully tested and certified prior to release. Respondent should include its standards and processes for maintain the security of the devices against cyber attack. Respondent should include experience and standard processes for integrating battery and communications technology with its sensor and experience developing packaging to survive the deployment and environmental conditions of Con Edison.

This should include suggested responsibilities for Con Edison and Silver Spring Networks. As part of this implementation plan, please include details regarding independent third party testing support, development and customization services which are commercially available for your product, should Con Edison desire such support.

This section should be no more than 5 total pages.

2.3.4 Section 3: Product Manufacturing

Respondent shall describe its standard manufacturing and quality assurance practices. If testing is successful and a successful business case can be made for deployment of CO sensors, the Companies intend to purchase and deploy more than 260,000 AMI CO Sensors. Respondent shall describe its manufacturing and quality assurance capabilities to build and deliver this quantity of devices at rates up to 10,000 per month. Respondent should include a high level schedule, with milestones and checkpoints, for the establishment of any manufacturing facilities and capabilities as well as manufacturing lead times and any shipping/delivery considerations. Respondent should include its standard warranty process and support programs. This section should be no more than 5 total pages.

2.3.5 Section 4: Standard Hardware Warranty

Respondent shall include its warranty agreement for the sensor, battery and packaging which comprises the AMI CO Sensor. Respondent shall include standard maintenance and support policies, including description of return processes, help desk support, escalation processes and standard problem categories and resolution times.

2.3.6 Section 5: AMI CO Sensor Requirements Compliance

Respondent shall review and indicate compliance with technical and functional requirements described in Section 3. The requirements are formatted for simple, succinct responses and complete answers are required. In some cases an additional reference document, as an appendix, may be supplied to further demonstrate compliance.

2.3.7 MSRP Pricing

Respondent shall provide manufacturer suggested retail pricing on a per unit basis that includes the integrated sensor, battery and installation kit including any additional materials that are required to complete the installation of each type of equipment. The Companies may purchase limited quantities of the integrated sensor for testing.

2.3.8 Key Response information

The Respondent to this AMI CO Sensor Product RFI shall provide the information in the response to allow the Companies to identify any vendor that can meet their business and technical requirements in the challenging environment and scale of the Companies' service area across multiple jurisdictions. A complete response to this RFI will provide sufficient information and detail to answer the following questions and concerns:

- Will the CO sensor solution, in conjunction with the vendor's expertise, provide a reliable, high quality and easy to install and maintain CO sensor integrated with the AMI SilverSprings communication network which Con Edison can deploy to monitor its electric infrastructure?
- Will the product meet the Companies' business and technical requirements?

2.4 Questions and Contact Information

All correspondence, questions, clarifications or comments concerning this RFI or any of the information contained herein shall be directed to Ron Tejada at tejadar@coned.com and Tom Langlois at langloist@coned.com. Con Edison will reply to all Respondent questions within **(3)** business days from the date of receipt to questions.

3 AMI CO Sensor Requirements

The AMI CO Sensor Product should integrate a CO sensor with a Milli5 communication module from Silver Spring Networks and a battery into an environmental package and should meet the following requirements:

3.1 CO Sensor Requirements

Respondent shall provide an integrated CO sensor package which integrates the Silver Spring Networks' latest version of Milli5 module and long life battery into an enclosure which can be easily installed. Respondent shall join Silver Spring Global IoT Partner Program and will receive development and certification support services as described in Attachment 2. Respondent shall fully describe how its AMI CO Sensor meets or exceeds each of these requirements. Respondent should indicate when it could begin supporting the production delivery of up to 10,000 AMI CO Sensors each month.

3.1.1 CO Sensor Technical Requirements

The proposed CO sensor must be capable of meeting or exceeding the following technical requirements. Please note that the desired product is going to operate in a harsh environment and we are looking for a low cost product that can be easily installed. We aren't expecting the product to have any active measures to mitigate the environmental conditions that add significant cost.

- Measurement range: Linear response 0 ppm to 1,000 ppm
- Recovery from overload: 5,000 ppm
- Minimum accuracy: +/- 5%
- Warning Low Set Alarm: CO level > 35 ppm (Adjustable)
- Emergency High Set Alarm: CO level > 100 ppm (Adjustable)
- No calibration required
- Operating Temperature: -10 degrees Celsius to + 80 degrees Celsius
- Humidity: up to 99% non-condensing
- Contaminant submersion: submersion in rain water (up to 10 feet) or contaminants comprised of salt and outdoor debris (MIL-STD-202G Sub 103B, Condition D) for up to 7 days
- EMF resistance: The CO sensor will be colocated with 120V electric wires, 4kV and above (up to 33kV) electric cables and equipment and must be able to tolerate EMF noise and interference from these cables.
- Sensing Element Life: >8 years (must alarm at >Warning Low Set Alarm value over this 8 year service life)
- Battery Life: >8 years (in operation) and >20 years (shelf life)
- LED indicators indicating power, sensor health, battery health, and alarm condition (s)
- NEMA 4X Enclosure (NEMA 6P rating)
- Audible alarm: 85 dB
- Visual alarm
- No special tools for installation
- Form factor not exceeding a cylinder of 6" in diameter and 5" in height

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3.1.2 Temperature Sensor (Optional) Technical Requirements

The proposed CO sensor may optionally include a temperature sensor capable of meeting or exceeding the following technical requirements:

- Measurement range: Linear response -10 degree C to 100 degree c
- Operating life: > 8 years
- Minimum accuracy: +/- 2% over operating temperature range
- Quick response: < 0.5s

3.1.3 Sound Sensor (Optional) Technical Requirements

The proposed CO sensor may optionally include a sound sensor capable of meeting or exceeding the following technical requirements:

- Measurement range: 1 Hz to 20 kHz
- Operating life: > 8 years
- Quick response: < 0.5s

3.1.4 Water Sensor (Optional) Technical Requirements

The proposed CO sensor may optionally include a water sensor capable of meeting or exceeding the following technical requirements:

- Measurement range: 4 to 11 pH, Salinity p=0.005 to 5 S/m (to saturation)
- Operating life: > 8 years
- Quick response: < 0.5s

3.1.5 CO Sensor Functional Requirements

The proposed CO sensor must be capable of meeting or exceeding the following technical requirements:

- The AMI CO Sensor must be incorporated into an enclosure that can be easily mounted in underground structures such as manholes with service boxes (these may be cylindrical or rectangular). The steel covers may be perforated to allow for ventilation or may be completely solid. The device may be installed in the cover, or near the cover without interfering with entry to the structure. It may be mounted on the concrete wall or integral to the cover in any case not exceeding a cylindrical device with a 6" diameter and 5" deep cavity. A 1/4 – 20 TPI 3/8" length top center thread is requested for hanger options. Respondent should indicate in the response the proposed sensor package size and all supported installation options and work with Con Edison to come up with the selected solution.
- The AMI CO Sensor must have a label which clearly displays the Con Edison unit identifier, the FCC and UL certifications, and bar code (readable by Con Edison bar code readers).

- The AMI CO Sensor battery must, as an option, be easily replaced in the field.
- The AMI CO Sensor must generate a daily “heart beat” communication through the Silver Spring Networks communications network to allow the AMI HES (Head End System) to alert if the sensor has failed or cannot communicate with the network. The heart beat communication must include an identifier for the integrated sensor, an identifier for the firmware version, the date and time of the sensor turn-on and other information necessary to track and monitor the sensor.
- The AMI CO Sensor must generate a positive warning alarm by sending a CoAP message through the integrated Milli5 module to the AMI HES as soon as the alarm as possible, and not later than 30 seconds of identifying the presence of CO > Warning Low Set Alarm levels. This alarm must be sent continuously (at least every 60 seconds) until the device is physically reset or CO levels return to acceptable levels.
- The AMI CO Sensor must generate a positive emergency alarm by sending a CoAP message through the integrated Milli5 to the AMI HES as soon as possible, and not later than 30 seconds of identifying the presence of CO > Emergency High Set Alarm levels. This alarm must be sent continuously (at least every 60 seconds) until the device is physically reset or CO levels return to acceptable levels.
- The AMI CO Sensor must generate a low battery alarm through the integrated NIC to the AMI HES and continue to send the alarm at least daily as part of the communications heartbeat
- The AMI CO Sensor must send an alarm if the sensor fails or detects a fault to the AMI HES and should continue to send the alarm at least daily as part of the communications heartbeat.
- The AMI CO Sensor, if equipped with optional temperature, sound or water sensor, must measure and transmit, as part of the heartbeat message, the minimum and maximum temperature, minimum and maximum sound levels and the minimum and maximum water measurements for the previous 24 hour period.
- The low battery alarm must ensure that the AMI CO Sensor will continue to operate for at least 90 days after the initial alarm.
- The manufacturer must provide installation instructions in English for bringing the device online beyond the physical installation (e.g. remove a protective tab etc.)
- The manufacturer must finalize the functional requirements as part of their scope of work (SOW) with Con Edison if their proposal is accepted.

3.1.6 AMI CO Sensor Performance Requirements

The proposed CO sensor must be capable of meeting or exceeding the following performance requirements (Please include performance rates which have been achieved with your product at other implementations):

- The AMI CO Sensor must have an annual failure rate less than 0.25%
- The AMI CO Sensor must communicate with the AMI network with a reliability greater than 99.5%
- The AMI CO Sensor must have a false alarm rate less than 0.01% over the life of the product.