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April 3rd, 2017

Request for Information
Smart Streetlights
RFI No. 2017-0001

usa.siemens.com/intelligenttraffic

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SIEMENS

Intelligent Traffic Systems

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Date April 7, 2017

Dear Mr. Simpson,

The City of Pittsburgh's Smart Streetlights RFI No. 2017-001 combines a desire to save nearly $1.5M per year in operating costs with a vision to strategically reinvest these savings into wireless technologies and software applications that enhance public services while building a 'foundation' that anticipates future needs and capabilities. This "Version 2.0" of the City's efforts to retrofit its streetlights and do far more in the process calls for a similar reboot of Siemens offer to align with this new vision, and therefore, a different business unit, our Mobility Intelligent Traffic Solutions (ITS) group, was asked to lead this RFI response. In the following 10 pages, we will describe the ideas and project approach which stem from our business whose portfolio and project experience uniquely combines all of the core competencies the City is seeking for this initiative: LED streetlight conversions via Energy Savings Performance Contract, selection and installation of Smart City applications, and in-house Intelligent Transportation Systems (ITS) traffic management hardware and software offerings.

Siemens has more than 135 years of experience in the implementation of pioneering technologies. We've performed over 170,000 LED conversions, and since our first Connected Vehicle test bed project with the USDOT in 2007, we've been at the forefront of emerging Smart Cities technology; no other company has this level of experience and depth of resources within a single entity to objectively assess and implement each element of the City's Smart City/transportation vision in both short and long-term timeframes.

For this response, the following two subject matter experts serve as the City's contacts in these areas:

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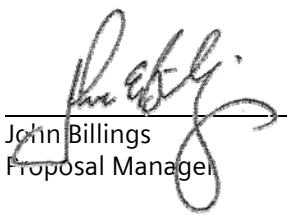
Thanks for your consideration in this exciting opportunity. All information in this response is unrestricted, and may be presented for public review. Siemens has no relationship or contact with city officials other than normal business communication.

Sincerely,



John Billings
Proposal Manager

Project Overview

The optimal Smart Streetlights solution for Pittsburgh meets the objective of combining the most cost-effective streetlight retrofit, one that minimizes the City's 15-year operating costs, with the citywide deployment of a wireless platform that serves to both enhance existing public services and create new services, with the flexibility to adapt to new capabilities throughout its useful life. To describe our solution, we will first describe how Siemens' proposal is informed by the portfolio of our Mobility ITS business, which uniquely combines the core competencies the City is seeking for this initiative: LED streetlight conversions, Smart City applications, and Intelligent Transportation Systems (ITS):

- **Siemens is a vendor neutral integrator of LED streetlight fixtures/controls, a manufacturer of ITS hardware and software, and a leader in the deployment of Connected Vehicle (CV) technology**. We have selected and procured over 170,000 LED streetlight fixtures in 76 municipalities across the U.S., and in over 20,000 of those we installed wireless controls systems. We recognize the labor cost savings potential of installing streetlight-based technology at the same time as fixture is changed out, and the ability to add features to an open source platform over time with minimal hardware changes. In each project, our Energy Engineers carefully assess the unique characteristics of the Town or City's lighting requirements to identify the 'best fit' fixture and/or lighting controls system. As proof, our installation base includes many of the major manufacturers in the industry (we had discussions about this project with **Acuity, Cree, GE, Leotek, and Philips** and various Smart City applications provided by these fixture manufacturers and third parties). Our vendor neutrality allows us to take advantage of competitive bidding and rapid advancements in technology, especially where several months may pass from the City's initial procurement to the ordering of fixtures or controls.
- Siemens manufactures both 2070 and NEMA Advanced Traffic Controllers (ATC) that operates traffic –adaptive signals and intersection networks as well as the software to integrate various devices and architectures. Finally, Siemens is leading efforts in the U.S. in the field deployment and associated testing of CV technology in Ann Arbor, Michigan and Tampa, Florida through grants we've helped our customers secure though the U.S. DOT.

- **Siemens is a licensed electrical contractor with extensive experience with both the maintenance of streetlights and traffic signal infrastructure.** Siemens technicians have installed the majority of the LED streetlights described above and we hold dozens of streetlight/traffic signal maintenance contracts in both large and small municipalities nationwide. We've had a 24/7 call center for nearly 20 years for accepting work orders via phone, email, and internet and regional administrative staff for deploying crews quickly and efficiently to investigate outages or traffic signal issues. These tasks include restoring pole knockdowns from storms or vehicle crashes to simple lamp replacements or fixture repairs to the installation and programming of traffic signal cabinets and adaptive traffic signal systems.
- We also utilize local subcontractors, especially where their local maintenance experience adds value to our competency. As an example of these partnerships, we have signed an MOU with **Allegheny City Electric** (ACE) for the purposes of partnering on the installation phase.

Allegheny City Electric (ACE) was founded locally in 1985 and has 55 employees. ACE has held Pittsburgh's citywide streetlight maintenance contract since 2009 and responsibilities include nightly surveys, work order management, and maintenance of existing LED fixtures. ACE has also recently been awarded the Pittsburgh Parking Authority LED lighting upgrade for all lighting in nine parking garages.

- **Siemens is an Energy Services Company with the resources to design, build, financing and operate/maintain a streetlight system via Guaranteed Energy Savings Agreements (GESA).** Siemens has completed a variety in GESA projects across Pennsylvania as well as LED streetlight conversion projects via performance contracts in several other states. We are well-versed in the performance contract requirements that are specific to the Commonwealth. Our internal financing arm, Siemens Financial

Services, has the ability to provide the City will 100% of the funding for the project at very attractive interest rates, with the ability to delay payments until the savings begin to accumulate, ensuring a positive cash flow throughout the payback period.

Having described who we are and what we do, we'll now describe our ideas in more detail.

Street Light Conversion

The streetlight conversion is initially the most public/high profile aspect of the project and generates the vast majority of the savings needed to pay for the overall vision of additional infrastructure articulated by the City. For these reasons, it is critical to build a solid base for the overall project with a successfully planned streetlight retrofit. In a nutshell this project is a combination of Energy Conservation Measures (ECM's) provided by the streetlights, which provides a cost savings funding mechanism for Facility Improvement Measures (FIM's) that fulfill the Smart City vision, with all work financed in a 10 to 15-year time period. Working together with the City, we will develop a comprehensive plan specifically catered to determining appropriate lighting levels: the right amount of light in the right places at the right time of day. This includes:

- Crafting a public outreach plan with the City that includes disseminating information via various media from press releases, City web FAQ's, to email blasts and social media. Depending on the nature of the deployment, special consideration may be given to privacy and data security concerns.
- Using a combination of GIS audit data, pole spacing information, and targeted photometric layouts to maximize energy savings, e.g., areas that are over lit due to existing wattage or pole spacing.
- Coordinating with Duquesne Light to advocate for a change from "assumed use" tariff to a "measured use" tariff. This is critical for the City to achieve additional energy savings from time of day dimming to the measurement of energy used by all devices powered from what is currently an unmetered connection to the electric distribution system.
- Selecting fixtures in a competitive bid process that provide equivalent lighting and/or meet industry standards where feasible and minimize 15-year operating costs.
- Delivering and installing new equipment via an accelerated schedule by assembling the necessary number of crews from a combination of Siemens and local subcontractor (ACE) resources.
- Conducting annual measurement and verification to confirm the City is maximizing energy savings and complies with GESA terms and conditions.
- Training City staff to share maintenance responsibilities in a way that takes advantage of existing City resources and competencies and uses the lighting control system to generate 311 work orders for asset management purposes. Integration with the City's 911 system allows dispatchers to manually change lighting levels to aid first responders when arriving on-scene during nighttime hours.

Integration of Streetlight-Based Technology

The installation of connected vehicle technology on a light pole is a logical methodology. It has been our experience one light pole can host the following devices and technology:

- Wireless Controls (assumed as base)
- Meter Reading (water, electric, gas)
- Asset Management
- Emergency Callbox
- Surveillance Cameras
- Air Quality Sensors
- Parking Applications
- Public wifi network
- Salable bandwidth to telecomm providers
- Traffic Monitoring

The key to this phase is to understand that the City's needs for these capabilities do not require the installation of all functions on all poles. In some situations, the City may only want basic lighting controls on a fixture, whereas others locations warrant some of the applications listed above. The key is to minimize hardware costs by tailoring the applications of nodes to the needs of various City neighborhoods, from dense commercial blocks of downtown to outlying single family residential areas.
Siemens' Lighting Controls Systems Deployments:

- Providence, RI: 16,800 nodes
- College Station, TX: 5,000 nodes
- Barrington, RI: 1,900 nodes

Each component must generate its own business case, satisfactory cost/benefit analysis, and deployment architecture. For example, parking applications include both the sensing of space occupancy and relaying to smart phone applications to the use of secure wireless networks to process credit card transactions (at least until full adoption of pay by phone apps).

Connected Vehicle

In conjunction with the conversion, Siemens also proposes its Siemens' Connected Vehicle Solution (SCVS). This will help Pittsburgh to improve public safety, reduce public infrastructure maintenance, mitigate traffic congestion, improve the quality of life for residents and businesses, and assist the City in becoming a leader in emerging technologies.

Connected Vehicle technology (CV) is an innovation that enables cars to communicate with each other, roadside equipment, signals, and pedestrians (with enabled SmartPhones) to provide information to help drivers make safer decisions. CV relies on dedicated short range communication, whose spectrum is managed by the FCC. CV is driven primarily by the need for crash avoidance technologies that include: vehicle forward crash-collision warnings, dangerous road condition warnings, such as sharp curves, "do not pass" alerts, and warnings that a vehicle ahead has stopped suddenly.

Connected vehicles could also "talk" to traffic signals, work zones, toll points, school zones and other types of infrastructure. In an online article on the USDOT website, RITA Administrator Gregory D. Winfree was quoted as saying, "Intelligent Transportation Systems are the future of driver, roadway and vehicle safety. The body of research going on across the country today shows that the life-saving potential for safety technologies that enable communications between vehicles and the roadway infrastructure is too great to ignore."

SCVS utilizes our proprietary RoadSide Unit (RSU), which is mounted on the intersection traffic pole. Our RSU then receives information from onboard units (OBUs) in cars, trucks, buses, emergency vehicles and other vehicular traffic, cameras and other detection, and traffic controllers; as well as from apps on SmartPhones carried by pedestrians, cyclists and persons in vehicles, and any apps integrated into the vehicles by the manufacturers or by vehicle owners aftermarket.

As part of the SCVS, there are also many use cases available to integrate into the system such as Red Light Running, Transit Prioritization, Pedestrian Conflicts, Enhanced Signal Coordination, Crash Avoidance, Queue Prevention, Smart Parking, Ped-SIG, Wrong-way Driving, and the use of camera technology to relay real-time traffic data to the TMC. More information as to the full availability of solutions may be found here: http://w3.usa.siemens.com/mobility/us/en/urban-mobility/road-solutions/Pages/road-solutions.aspx.

For the Connected Vehicle, the following deployments are developed and implemented:

- 2016: One of the three winning teams for the USDOT Connected Vehicle Project. Our team, the Tampa Hillsborough Expressway Authority (THEA), is implementing a regional Connected Vehicle and Pedestrian Safety Solution.
- 2014: Co-chair of the Society of Automotive Engineer J2735 harmonization effort between the US, UK, and EU, including Connected Vehicle pilot corridor between Rotterdam and Vienna and the Compass 4D test bed in the UK.
- 2013: Adaptive signal control software application that constantly adjusts signal timing
- 2014: Memorandum of Agreement with USDOT as a Test Bed Affiliate with access to the Connected Vehicle test bed data warehouse to insure interoperability of new pilot deployment with the existing USDOT pilot deployments
- 2014: USDOT Connected Vehicle corridors in from of Cobo Center for ITSA World Congress
- 2012: USDOT Safety Pilot in Ann Arbor, MI consisting of Siemens central software and

every 3 seconds based on approaching vehicles, while communicating signal countdown to vehicles

- 2011: USDOT Connected Vehicle intersections on International Drive and Universal Drive in Orlando, FL for ITSA World Congress

controllers communicating to 2,000 equipped vehicles, as well as interoperability demonstration with another controller manufacturer

- 2007: USDOT Connected Vehicle Test Bed in Oakland County, MI, consisting of 75+ intersections broadcasting Signal Phase and Timing to Crash Avoidance Metrics Partnership test vehicles

Deployment Plan

Street Light Conversion

When deploying a street light conversion project, Siemens takes a phased approach. The phases of a project, as described below, are typical, but will be verified with the city. Working together with the City, we will develop a comprehensive plan specifically catered to the project's strategic and technical business goals – ultimately striking the optimal balance between appropriate lighting levels and maximum energy savings. A parallel goal is to minimize labor costs by installing LED fixtures and associated equipment simultaneously.

During the implementation of an LED conversion, the major project stages are followed:

1. Audit: a GIS based survey of the entire streetlight infrastructure, verifying pole and fixture placement and type, an accurate field inventory, GIS mapping, and other data points to be used post-conversion.
2. Fixture Selection and Energy Savings Analysis: using Lawrence Berkley National Laboratory selection approach, Siemens will work with the City to determine which fixtures yield the optimum balance of illumination, energy savings, and cost. Siemens will use current energy consumption based on monthly utility bills. Using LM79 test results, a baseline calculation for savings will be determined, aiding in the fixture selection. This baseline will also be used post-conversion to provide a bench mark for realized savings.
3. Procurement: as a vendor-neutral LED supplier, Siemens will have already presented the best value fixture for the project, and have gained City approval. During this phase, staging, delivery, and other supply chain matters will be finalized and material ordering will begin.
4. Construction: the actual installation of streetlights and any attendant smart controls will be performed concurrently during this phase. The work will be performed in accordance with NEC, OSHA, and NESC provisions by qualified, licensed personnel. Schedule performance will be reported, and the previously developed GIS database will be used to update fixture sites with current status.
5. Customer Acceptance and Commissioning: the final step in a conversion project, this is where all work is inspected by the City, and testing or verification takes place, and the project is signed off and complete by the City and Siemens. Rebate applications, if applicable, will be signed, and final invoices submitted.
6. Warranty and Measurement/Verification: post acceptance, the contract transitions form project status to complete, and warranty as defined by the contract begins. Measurement and Verification (M&V) will continue annually as defined by the contract. During M&V, actual energy savings will be determined, and they system will be evaluated for any possible increase in savings.

Connected Vehicle

While no two projects are alike, Siemens has a baseline project roadmap for Connected Vehicle and traffic management projects. The following is a high-level project plan we have used in multiple deployments.

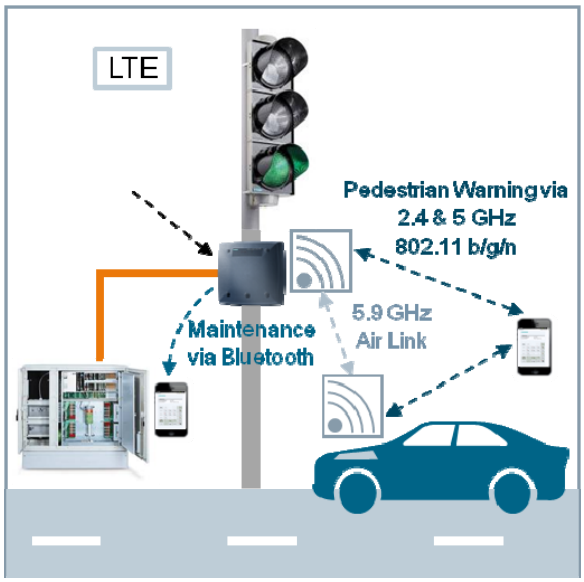
Project Management

- Kick off Briefing
- Project Management Plan

- Monthly Reports

Concept of Operations

- Stakeholders ConOps Panel Roster
- Needs Summary
- Concept of Operations
- Walkthrough Briefing Deck
- Comment Resolution Report
- Webinar with Customer
- Performance Measurement Plan



Pilot Deployment System Plan

- Stakeholder Review Panel Roster
- Systems Requirements Specification Document
- Systems Walkthrough Workbook
- Comment Resolution Report
- Application Deployment Plan
- Human Use Approval Summary
- Participant Training
- Stakeholder Education Plan
- Partnership Status Summary
- Outreach Plan
- Comprehensive Pilot Deployment Plan
- Deployment Plan Webinar
- Deployment Readiness Summary Briefing

Technical Specifications

Siemens' vendor neutral approach matches the fixture and controls manufacturer with the technical specifications that may be presented in advance in an RFP or collaboratively developed following selection based on qualifications alone. Our standard technical specifications include:

- Minimum efficacy of 90 lumens per watt
- Distribution: generally Type II, occasionally Type III for multilane collectors or arterials
- CCT of 3000K+/- 300K, CRI of > 65
- 10-year full fixture warranty. If for controls or Smart City devices, 10-year warranty shall cover both node and access points
- Data ownership: allow flexibility for City to host or pay for cloud-hosting services
- Control nodes shall connect to the fixture via a NEMA 7-pin photocell receptacle and ideally house all functionality within the photocell device; devices that require a power tap or are located inside the fixture are less desirable since they generally represent proprietary systems.
- Control nodes shall be "utility grade" meters, i.e., measure power use to 0.5%+/- accuracy.

We've identified three potential manufacturer partners: GE, Acuity and Philips and have attempted to give them equal space below. Each company's control system product name follows "/".

GE/LightGrid (AT&T exclusive reseller)

Current, powered by GE, would convert the City's 40,000 fixtures into one of three GE Evolve luminaries which cover the performance of the current 70W -400W HPS fixtures. To complement the Evolve LED luminaires, GE offers the LightGrid outdoor wireless lighting control system.

The LightGrid system is made up of three components: nodes, gateways and servers. Each LightGrid node is designed to fit GE's Evolve Cobrahead fixtures. The node and gateway placement creates a wireless mesh network tied to a central management server that the City of Pittsburgh can access remotely. Features include luminaire control, on/off, dimming, energy consumption and creating customer schedules. Visit http://www.currentbyge.com/lightgrid for more information.

Acuity/ROAM or Silver Spring Network

Acuity Brands, Inc. is a North American market leader and one of the world's leading providers of indoor and outdoor lighting, networked lighting controls and related IoT solutions. Networked lighting control systems range in functionality from proprietary and open protocol mesh platforms that support AMI metering, sensors, etc., to high bandwidth networks capable of supporting Wi-Fi, video, and other high bandwidth applications. With these options come use cases such as parking management and enforcement, traffic management, lighting management, surveillance and incident control, sensors, location-based data analytics, etc., etc.

Acuity can provide software and application development expertise. We currently have over ten million square feet of positioning, data analytics, and app's for commercial applications. Acuity also recently acquired Geometri for positioning and location analytics and asset tracking for both indoor and outdoor applications, such as airports and event venues. Acuity Brands can work with the City to assist in the development app's specific to the data and service needs of the City, utilizing the street lighting network architecture. Please see http://www.acuitybrands.com/brands/controls/roam for additional details.

Philips/CityTouch

Philips Lighting is developing System Ready Luminaires (SRL). Data from future sensors maybe back-hauled via the CityTouch connectivity platform and displayed on new apps in CityTouch. Later, other sensors (say, from third parties) could be attached and the data given in one way or another, via CityTouch web-services and applications program interface (API). This ensures Pittsburgh would consistently be able to adapt to the ever changing needs of the citizens it serves.

CityTouch LMS is an Internet of Things (IoT) enabled software platform that can securely integrate to Pittsburgh's developing IoT platform of choice and other smart devices. CityTouch, Philips Lighting's end-to-end street lighting management system (LMS), integrates connected devices with its intuitive web-based applications. An open system, CityTouch works with almost any type of streetlight from any manufacturer. CityTouch communicates to the individual device level via the existing public cellular network: no proprietary unlicensed networks are required to be set up and maintained, plus the suite of CityTouch APIs open data up towards other city systems, meaning that Pittsburgh can achieve its stated objective to deploy an open, extensible platform built upon with CityTouch. CityTouch is a point to cloud technology with no need for cumbersome networks of gateways and controllers.

More information can be found at http://www.lighting.philips.com/main/systems/connected-lighting/citytouch.

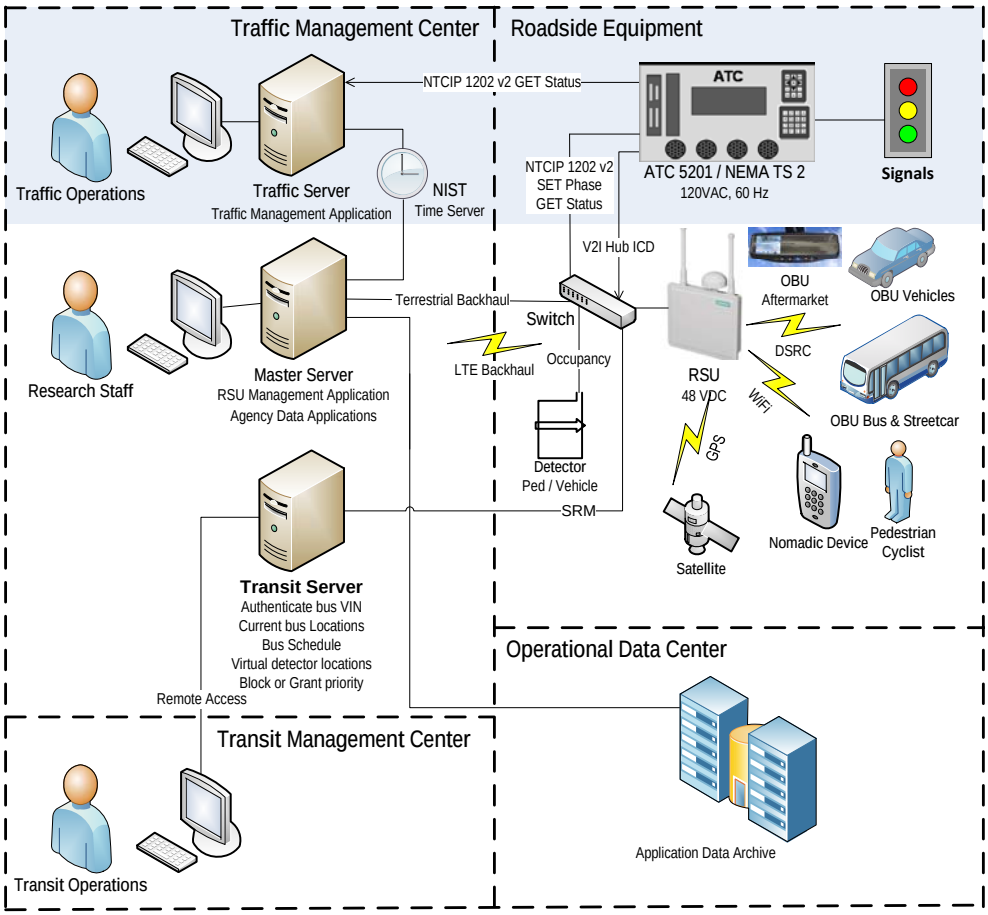
Siemens Road Side Unit (RSU)

As part of the response, Siemens has a full suite of Smart City products and applications. One of the most leading technologies available is the Road Side Unit, or RSU. The Siemens RSU is an industrial grade electronic instrument capable of both transmitting and receiving using 5.9GHz band dedicated short range communication (DSRC) for the purpose of facilitating connected vehicle applications. Each unit includes all components necessary for complete functionality of the unit. Types of proposed devices are RSUs that match RSUs being deployed in the USDOT Connected Vehicle Pilot in Tampa FL.

As a leader in traffic management systems, Siemens RSU have the following technical specifications:

- Capable of being integrated with traffic signal controllers and connected to an existing, fiber optic, back-haul communications network
- Supports both 10 and 20 MHz channel widths in the 5.9 GHz band
- Capable of transmitting SAE J2735-2016 Basic Safety Messages (BSM), and the Signal Phase and Timing (SPaT), Traveler Information Message (TIM), and intersection geometry (MAP) messages
- RSU hardware uses Power over Ethernet, PoE 802.3af
- MMITSS updates that match the installation and testing of the USDOT Pilot in Tampa FL for interoperability with the new cars
- USDOT RSE v4.0 compliant, and capable of a firmware upgrade to v4.1
- Support Global Positioning System (GPS) through external antennas with accuracy to less than one meter, and have two external 5.9GHz Omni-directional antennas
- RSU enclosure is NEMA TS2 rated with surge protection

A high level graphic of a typical RSU integrated into a traffic management system, is provided below.



Siemens is actively deploying these RSU as part of the Tampa-Hillsborough Expressway Authority (THEA) pilot. For complete information on the pilots involved, please visit: https://www.its.dot.gov/pilots/pilots_thea.htm.

Operational Considerations

Siemens anticipates that the useful life of all hardware installed will approach 20 years, with at a minimum of the first 10 years under manufacturer's product warranty. While product warranties typically run 10 years, they only cover the replacement of the failed unit. There are processing/shipping costs and the labor associated with

replacing the equipment. The City could include a full parts and labor warranty for a number of years as part of the upfront capital cost, or alternatively, employ a "pay as you go" model. Operational considerations include categorizing operating costs and examining alternative maintenance models.

Operating costs for the solution include the following components:

- Energy costs for supply and distribution;
- Maintenance costs for routine outages, infrastructure repairs/replacement/relocation, and storm/vehicle damage (where City/driver insurance reimbursement is not possible);
- For controls/Smart City applications:
    - Annual fees for software upgrades and technical support;
    - Cloud data hosting fees if data not City-hosted; and
    - Communications fees (e.g., cellular "bridge" between access points and fiber backhaul).

There are two primary maintenance/operational models that the City could consider:

- **Fixed fee maintenance**: generally a per light (node) per month fee that places the risk on the contractor to accurately predict the failure rate over the contract period;
- **Time and materials-based maintenance**: generally a fee per trip which places the risk on the City should failure rates be higher than predicted but also allows the City to benefit should failure rates be lower than predicted.

Business Model

As described in the overview, Siemens' business model for this project is a combination of Energy Conservation Measures (ECM's) provided by the streetlights conversion, which generates the bulk of the cost savings funding mechanism for Facility Improvement Measures (FIM's) that fulfill Pittsburgh's Smart City vision, with all work financed in a 10 to 15-year time period. Thus, the entire project will be funded in a budget neutral way, if current operating budgets were level funded. A few examples of cost savings opportunities are:

- Energy savings and maintenance cost savings from the conversion of all 40,000 streetlights to LED technology;
- Existing cell modem fees could be eliminated by using a private wifi network. Examples include traffic signal controller boxes that utilize cellular modems for communications and the City's 500+ 'pay on foot' parking kiosks that utilize wireless communications to accept credit and debit forms of payment.
- The incorporation of wireless lighting controls further increases energy and maintenance savings (e.g., night patrols to identify outages);
- Ultimately, the use of CV technology, where all vehicles broadcast their position, eliminates the need for detection infrastructure: loops, cameras, radar, etc.

In addition to cost savings, the project offers revenue opportunities described below:

- Telecommunications partnerships
- Utility meter reading
- Advertising/public information kiosks (CIVIQ as potential partner)

In the next section, we will briefly elaborate on each of these opportunities.

Evaluation

The format of this response section describes evaluation concepts for four examples of Smart City applications listed on pages 5-8 of the RFI.

Traffic Management

Evaluation includes measurements of both traffic flow improvements, priorities given to transit vehicles, and crash reduction through the advanced warnings that CV technologies provide:

- Delay reduction: Before/after peak period travel time studies in 'spine corridors;
- Transit vehicle priority: ability to maintain headways/schedule in peak periods, available strategies to reduce headways to meet increasing ridership demands;
- Siemens offers various products that allow constant communication with traffic signals and employ various measures of effectiveness that monitor the intersection's performance via web-based connections. These products include Tactics and SmartGuard.
- Siemens' adaptive traffic signal software products, ACSLite and SCOOT, include various measures of effectiveness that allow the system to adapt and in some cases anticipate, changes in traffic flow.

Public Safety

The USDOT, in a publication titled Connected Vehicle Benefits, estimates approximately 400,000 crashes and 7,000 fatal crashes could be addressed by CV technology. As part of this statistic, pedestrian safety must also be considered, and could also be improved by a Siemens developed technology – Ped-Sig (short for Pedestrian Signal System).

Street crossing poses a particular challenge to the blind and visually impaired as they are confronted with considerable hazards and barriers to their mobility. But now, blind and visually impaired road users can hope for more mobility: in future, with the aid of a special app, a smartphone could become an assistance system for safe and convenient navigation in city traffic. Siemens and its research partners have developed and tested the prototype as well as an online route planner and the technical infrastructure over the past three years.

As part of the project named "Inner-city mobility support for the blind and visually impaired" (InMoBS). Siemens is supplying the hardware and software used to transmit information to the user terminals. The system is based on Car2X technology and represents a new field of application for this modern communication concept. More information may be found here: http://www.siemens.com/press/en/feature/2014/mobility/2014-12-inmobs.php.

Air Quality

The Siemens City Performance Tool (CyPt) is a dynamic simulation tool used by major cities across the globe. Introduced and officially launched during the Smart Cities Week in 2016, Siemens CyPT, the tool is currently in use by cities such as Minneapolis, San Francisco, Riverside, Ca, and New Bedford, MA, and potentially Pittsburgh. Other cities around the world such as Mexico City, Mexico are also testing and using the tool, as well as Munich, Vienna, London, Nanjing, Berlin, Copenhagen, Aarhus, Helsinki, Wuhan, Seoul, Stuttgart, Nuremberg, and Adelaide, Australia.

This Siemens developed tool studies a series of more than 70 technologies from Building, Transport and Energy Technologies at different time periods and implementation rates. It analyzes impacts to reduce greenhouse gas emissions from buildings and transport, as well as air pollutants such as particulate matter (PM) and nitrogen oxides (NOx). It also looks at the creation of new local jobs to install, operate and maintain city solutions.

As part of the Street Lighting Initiative, Siemens would work with the City to understand which of these in-kind tools could be used for evaluation purposes. More detailed information, as well as the results for current cities using the tool may be found here: http://www.siemens.com/global/en/home/company/topic-areas/intelligent-infrastructure/city-performance-tool.html

Shared Capacity

We've divided a brief overview of "shared capacity" ideas into three categories: telecomm partnerships, utility meter reading, and advertising/public information kiosks:

Telecomm Partnerships

The idea that telecomm providers are willing to pay for additional "last mile" bandwidth and/or a more cost-effective distributed antenna systems/femtocells is one that Siemens can explore in a vendor neutral fashion to achieve the objectives of maximum and predictable year-to-year revenue, equitable risk sharing, and open platforms that enable multiple providers/app developers to gain access. Key points of the evaluation and associated questions include:

- Equity – providing free or low-cost access to a high-speed public Wi-Fi via telecomm providers seeking to use a streetlights-based network to enhance their existing service network. How many residents have access and how many actually use the service?
- Connectivity – the physical integration of small cells/femtocells into the access points and ultimately to a fiber backhaul that provides sufficient bandwidth. Are telecomm providers willing to pay for this service and how many years will they commit via service contracts?

Utility Meter Reading

Silver Spring Networks and Sensus are two companies that are building streetlight-based meter reading capabilities. These networks have to date, been focused on water and electric meters, but there is no known technical barrier to natural gas meters. Similar to the Telecommunications Partnerships, the question is: are the City's gas/water/electric providers interested in the service, what are their technical requirements, and how long will they commit to paying for this service?

Advertising/Public Information Kiosks

CIVIQ provides information kiosks that are known as WayPoints. These are engineered for simplicity and tuned to make every interaction easy, intuitive and useful to people on the go. These kiosks have the capability to increase revenue and enhance the capabilities of Pittsburgh through advertising. WayPoint devices are used to display digital advertisements on the street, targeting pedestrian and vehicle traffic. Other applications and technology available from CIVIQ Small cell hosting services, hosted network services, and advertisement supported WiFi access that presents revenue potential to the City in exchange for free WiFi to the passerby.

For more information please visit: http://www.civiqsmartscapes.com.

Thank you for your consideration of Siemens Mobility ITS response to this RFI. We look forward to the opportunity to partner with the City to implement a comprehensive vision that uniquely fits our various streetlights, Smart City, and ITS portfolios.

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