**Solar Smart Parking Meter Specifications**

**General Specifications**

The smart meter base model housing shall be all-zinc with expanded capacity vault that holds $65 in quarters, features a tapered base to prevent upward blows meant to dislodge the meter from the post, and a rear-loaded lock to prevent pulling out or punching in the lock. All materials are new and unused. All parts are plug-in, field replaceable. All electronic components, connections, and wiring shall be coated for moisture resistance.

The dome shall be die-cast zinc, powder painted to resist corrosion and graffiti. The dome shall interlock at all four corners of the mechanism housing.

The display and buttons shall be backlit for easy nighttime use, yet easily seen in bright sunlight as well.

**Software and Management Components**

TOTAL $44,220.00

Plus shipping and tax

A cloud based management website shall be provided and hosted by the meter vendor to show events in real-time at the Status Dashboard; specific events, i.e. coin jam, communication failure, etc., may be flagged to alert personnel by email for retrieval at a PC, smartphone, or tablet. The management backoffice website shall allow for two-way communications with the meters without the need for a separate wi-fi network.

The management website shall be a MySQL program with data residing on the meter vendor’s secure server and accessible indefinitely. Reports and exported data saved to local hard drive will naturally be accessible offline indefinitely as well. The user may define, sort, and filter data for reporting. For example, audit data may be filtered for daily, monthly, weekly, and annual reports by simply defining the date ranges. Choose summary or detail, and sort by area, post number (which may include GIS locator), mechanism i.d. number, or collector. Use the meter revenue audit reports for cash and credit card reconciliation.

Data is refreshed with each credit card transaction, when polled, or in real time (the latter method using a greater amount of power than the former). The definition of real time is immediately as it occurs, and the wireless modems in the meters shall always be on standby to facilitate this.

The administrator/user shall set up his or her self and additional users with a unique log-in and password and access set or denied to each individual menu and menu item on the data dashboard and the optional handheld device. No credit card number or personal data are kept on the server, on the data website, nor anywhere by or at the meter vendor’s location.

The meter management website shall allow configuration of rate profiles (called Mechanism Specifications in the program) and remote downloading to specific or a range of meters for dynamic rate adjustments.

A separate PCI certified gateway provider shall provide end-to-end DUKPT tokenization encryption of the credit card transactions for processing by the city’s merchant service provider. This gateway provider shall also host a back office data website for the credit card transactions, with real time access to more card detail, i.e. settlement status, with ability to void or refund payments, print reports and receipts, and to provide a checks-and-balances method against the meter vendor’s own back office.

**Wireless Communications**

Each smart meter shall include a low-power, highly efficient 3G cellular modem operating over T-Mobile and/or AT&T networks. The meter shall be able to work in areas of low signal by either modified antenna or use of a different type SIM, or both.

**Display**

The display shall be graphical, 50% reflective, and shall measure 4.4” diagonally. The brighter the sunlight, the easier the display shall be to view, and the display and buttons shall be backlit for easier viewing in low light conditions. The display and large, rear solar panels shall be protected by GE Lexan®, UV stabilized to help prevent yellowing.

The display draws no power when displaying a static message.

Rates and hours programming shall be defined by the user from the cloud dashboard. Rates may be fixed, or may change at different times of the day or week. The user may define up to 25 special event dates with associated rate profiles.

Four superbright RGB lights on front AND back of the meter may be configured with a large variety of colors, i.e. red for expired space(s), yellow for malfunction, green for paid time running down, strobe across to indicate progress, or even red-white-blue on Independence Day.

**Keypad**

Four heavy-duty stainless steel buttons shall be provided and shall be impact resistant and sealed to prevent infiltration of moisture. The buttons shall not have a dedicated “burned in” function, but rather shall be interactive with the display for maximum functionality. The buttons shall be backlit for use during low-light conditions.

**Payments**

The smart meter shall accept US nickels, dimes, quarters, and all dollar coins in circulation; tokens (as recommended by the vendor so as not to cross-buy with coins); Atmel cryptomemory prepaid chip smart cards; all major credit and debit cards; and optional cell phone payments.

All card and cell phone payments are authorized in real time; if approved, the meter will display the purchased time. If not, the display will recommend trying again or using alternate payment.

The coin acceptor shall have no moving parts and shall feature electric eye wakeup and 3-RF-coil size and metallic content reading. If backward movement of the coin is detected, the time previously purchased with that coin will be removed from the meter AND from the audit table, and a log of such cheating attempts will be incremented. Jams may be cleared easily without removing or disassembling the coin chute.

Credit cards and smart cards shall be inserted into the same slot, but the outer card slot shall be heavy duty die-case zinc, powder painted to resist corrosion and graffiti.

To pay for parking, press any button to start, then follow the on-street prompts to pay. If paying with coins, the user may simply begin dropping in coins to see amount of time increment. To purchase with credit card, a minimum purchase amount will appear, then press a button to increase the time, Select OK to accept transaction and then insert and remove the card, or CANCEL. The encrypted transaction is authorized in real time, in less than 15 seconds. If paying with smart card, select smart card, then insert card. Leave card in to see remaining value on the card flash 4 times, then begin to increment time on the meter. If refunding is enabled, the user may return to find leftover time on the meter, and they may retrieve this leftover time (value) by reinserting the card. The card (again) displays leftover value four times, then REFUND, then the new value of the card.

**Data Security**

Security features shall include redundant data at the meter vendor and the gateway provider hosted servers. Data shall be encrypted and password protected with firewall, SSL connection security, and scheduled backups.

The gateway provider shall utilize end-to-end DUKPT tokenization encryption and shall be PCI-DSS Level 1 Compliant. Dialing out shall commence immediately upon choice of card payment , and no credit card or user information shall be stored at the meter, but rather shall be encrypted and sent in real time immediately after the card is swiped, to prevent unauthorized capture of the card details.

The gateway processing network shall consists of at least four independent processing nodes (data centers), each capable of handling the full transaction processing load. These centers shall be cross-connected by high reliability, carrier-diverse links.

All electronic data shall be encrypted and backed up, archived on a weekly basis to secure off-site underground storage. Specific (confidential) policies shall be in place to deal with the need to evacuate the head office building on a short and long term basis, to deal with eventualities such as fire, flood, theft, explosion and terrorism.

All systems and networks shall be designed for reliability and resilience to enable an uptime delivery of a minimum of 99.9%. The gateway provider must be willing to certify that during the past three years, the current network architecture has provided 99.996% uptime.

The gateway provider shall have in place DDOS (Distributed Denial of Service) protection to prevent malicious attack from bringing down the service.

The gateway provider shall have at least 20,000 clients worldwide and shall work with most all processors, including but not limited to Heartland, First Data, FHMS, TSYS, RBS, Elavon, Fifth Third Bank, Global, Chase Paymentech, Moneris, ADS, and Mercury Payment Systems.

**Clock**

The 365-day clock shall sync with the POM server once every 24 hours, at which time the clock is updated. Changing the battery shall not lose programming. The quartz crystal shall be accurate to plus-minus 20 ppm, which equates to 1.728 seconds per 24-hour period. The clock shall track day of week and year, and shall display this information on the display either during payment process, at rest, and/or during reset.

**Power**

The smart meter mechanism shall be powered by a rechargeable Lithium Ion battery pack, charged by large solar panel and power management chip; the backup battery pack shall be a three D-Cell Lithium Thionyl battery pack. When the backup battery reaches a low parameter, an alert shall be sent to the dashboard and to designated maintenance personnel for reaction. Status of the rechargeable and backup batteries shall be seen from the status dashboard as well as from the meter display itself. Batteries are easily and quickly changed from a large, rear snap-on battery compartment door, and all battery connections shall be moisture resistance.

Other features of the meter that are designed to save power are the static display and low-power modem. All meter programming shall be stored in the meter’s non-volatile memory and shall thus be unaffected by loss of power in excess of seven days.

**Warranty/Vendor Support**

Products are warranted for defects in material and workmanship for one year from date of delivery. Remedy is limited to repair or replacement at POM’s option. This warranty does not cover defects caused by acts of God, vandalism, improper or inadequate preventive or reactive maintenance per factory training and documentation, nor use of improper packaging for return of items to the factory.

**Training**

Upon initial delivery of smart meters to the city, online training will be provided and shall equip city technicians to set-up and install the meters and perform preventive maintenance, repair, and troubleshooting of the meters in this proposal; and to set-up the data dashboard. Designated client management/finance personnel will be trained in the use of the cloud dashboard, including setting up dynamic rate structures, downloading to the meters, running reports, and checking meter status. Collection personnel will be trained in collecting the money from the meters and use of audit cards to send up the audit data during collection. Documentation will be provided for all facets of the training for ongoing reference.

**Reports**

Custom reports can be run and downloaded in delimited spreadsheet or pdf format, from both the meter management dashboard and from the gateway provider’s dashboard, to provide a checks-and-balances system for meter credit card revenue. Credit card data can be filtered and sorted by date & time, reference number, amount, transaction or card type, expiry date, card number, settlement date, unique reference number, merchant reference number, card issuer, country of issue & fraud response (if fraud screening is in use).

**Upper Housing**

The upper housing shall be of die-cast zinc alloy, electrostatically painted inside and out with polyester powder paint in gray or gloss black, and baked to a finish that will withstand ASTM B117 1000-hour salt spray test.

The upper housing shall be arranged to prevent access to the interior, except by secured lock and key through the opening provided for servicing the meter mechanism. The coin box shall not be accessible through the coin drop opening at the bottom of the upper housing. The upper housing must be designed in a way that a build-up of coins cannot block the upper housing locking mechanism from operating correctly.

**Upper Housing Dome**

The upper housing dome shall lock in place at four corners with a secured series, multi-tumbler lock and key. A one-piece dome shall install from within the dome housing to provide a clear, vertical view of the front display with tactile buttons, clear protected exposure of the rear solar panel, and shall be made of genuine virgin Lexan®, UV stabilized to resist yellowing. The dome assembly may be removed from the upper housing when unlocked, may be hung on the rim of the upper housing during on-street maintenance, and shall not be attached to the mechanism.

**Vault**

The vault and all components shall be new and unused and of the latest and highest quality. The vault shall be constructed of die-cast zinc alloy, having a minimum tensile strength of 45,000 psi. The vault shall be electrostatically painted inside and out with polyester powder paint in gloss black, and baked to a finish that will withstand ASTM B117 1000-hour salt spray test. The design shall prevent unauthorized entry into the coin compartment by prying around the door or punching or pulling the lock. The rectangular door shall be at least ¼” thick and constructed in such manner as to prevent prying. Vault walls are at least 1/4" thick. Upon turning the key, the vault door “falls” open, thus reducing key wear and making the collection process faster and easier. Other than a small coin drop opening at the top of the vault, the coin door shall be the only other opening in this lower section of the meter housing. Accessibility to the attachment of the meter itself to the mounting post or yoke shall be possible only through the vault door. Meters shall mount to 2-inch inner diameter, Schedule 40 galvanized steel post, utilizing expanding patented Gripper® wedges, which feature sawtooth edges that actually “bite” into the post to prevent forced removal of the meter from the post. The base of the vault shall taper to the post to deflect upward blows meant to dislodge the meter from the post . The vault door shall feature a rear-loaded lock and shall be removable without the use of tools by simply squeezing the hinges together.

The vault shall house a new and unused cylinder style inner security coin box large enough to hold approximately $65 in U.S. quarters. The coin box shall feature a coin drop entrance with anti-back-up fingers to prevent coins from being shaken out and locked door that can only be opened by special key in a collection cart receptacle that prevents removal of the coin box in the locked position. The coin collection person will not have access to the coins using this sealed coin collection system. Key series for these coin boxes will not be available to the public nor used in other parking installations in the surrounding region.

**Vault Door Locks**

The vault door shall lock by secured series, multiple tumbler lock and key through a deep, narrow, pick-resistant corridor.

**OPTIONAL**

**Iron Vault**

As an option, the vault shall be made of ductile iron, having a minimum tensile strength of 65,000 PSI, and shall house a coin box with capacity to hold $65 in US quarters. The design shall prevent unauthorized entry into the coin compartment by prying around the door or punching or pulling the lock. The rectangular vault door and walls shall be at least ¼” thick. Upon turning the key, the vault door “falls” open, thus reducing key wear and making the collection process faster and easier. Round style doors that require the user to lift and pull the door open using the key shall not be considered. Other than a small coin drop opening at the top of the vault, the coin door shall be the only other opening in this lower section of the meter housing. Accessibility to the attachment of the meter itself to the mounting post or yoke shall be possible only through the vault door. Meters shall be mounted on Schedule 40, 2-inch inner diameter, galvanized steel posts utilizing expanding Gripper® wedges. Gripper wedges feature saw tooth edges that “bite” into the post to prevent forced removal. The base of the vault shall taper to the post (or yoke) to deflect upward blows meant to dislodge the meter from the post (or yoke).

**SmartLock**

As an option, the vault lock may include a solenoid integrated by cable to the solar smart meter. Use of the special collection card shall disengage the solenoid, allowing the key to turn in the vault door. This creates a record of the collection and sends the audit data cut off as of the date and time of the collection, to the MeterManager.Net dashboard. After a few seconds, the solenoid reengages the lock so that when the door is shut, it cannot be opened again without use of the SmartLock audit card.

**Victorian Sleeves and Bases**

An extruded aluminum, fluted post cover, and die-cast decorative base, shall cover the parking meter post and shall be powder painted to match the meter and/or existing city street fixtures. The sleeve shall initially be 42” long but can be cut to size using a diamond blade chop saw. Adjustment set screws in the base allow further adjustment to the sleeve height.