# Request for Qualifications and Quotation
# RFQ #PDXCS100

## Solar Photovoltaic Systems Installation on 8 pre-selected Sites Hosted by City of Portland, Portland Public Schools, and SE Uplift

**June 11, 2012**

## "Portland Community Solar"

## RFQ Released by Tangerine Power Corporation
**In partnership with**
## City of Portland Bureau of Planning and Sustainability

Tangerine Power™

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.

**Proposals due: 6:00 am, PST, Monday, June 25, 2012**

**Submit Proposals to:** proposals@tangerinepower.com
Email 1 electronic copy in either MS Word or PDF format as an attachment to the email address provided above. You may send an email to mickey.lee@carbonconcierge.com to request confirmation that your electronic submission has been successfully received.

**Refer Questions to**:
RFQ Coordinator Mickey Lee at: proposals@tangerinepower.com

## Table of Contents

# 1. Introduction

1.1 Portland Community Solar

Tangerine Power is requesting submission of a Request for qualifications and quotation from qualified and experienced firms, partnerships, corporations, associations, or professional organizations to design and construct cost effective solar photovoltaic (PV) electric generating system(s) at one or more of the eight designated sites hosted by City of Portland, Portland Public School (PPS) and SE Uplift. (See section 2.2 for site descriptions)

Portland Community Solar is a new community project working to generate more clean energy in Portland while giving Portland citizens an investment opportunity that banks on the sun.

This year, Portland Community Solar, a community investment program developed in partnership with the City, PPS and SE Uplift, plans to install solar energy systems on five schools, two neighborhood centers, and a park. Using a community-based funding model, the project will offer affordable investment opportunities to involve people who want to help Portland build more solar energy.

Everyone can participate; investors can include homeowners who are unable to install solar on their roof, renters, nonprofit organizations, PTAs and other groups interested in supporting in local solar energy production.

The winning contract will sign a contract with Portland Community Solar, LLC, an Oregon business created for the purpose of owning & operating the solar assets to be constructed under this contract on behalf of community investors.

1.2 Goals and Objectives

This Community Solar Project looks to partner with a contractor(s) that can effectively and efficiently provide design, materials and installation of PV Systems for the determined eight locations for the City, PPS and SE Uplift. The goal is to contract with a proven and credentialed, local solar photovoltaic organization(s) to install the solar energy systems on or before the targeted deadline in accordance with the limits and timelines of the Oregon Volumetric Incentive Rate Program (feed in tariff) requirements.

The Community Solar project objective is to provide an opportunity for companies that have a proven track record of working on solar photovoltaic with public partners, and enable them to subcontract with companies that have the expertise and experience, yet may not have had the opportunity to work directly with local government entities in the past. We look to partner with contractor(s) that can demonstrate an ability to understand and adopt the High Road Goals and Targets identified in Exhibit D.

Those submitting for the RFQ:

- Must have expertise installing PV System equipment and technology.

- Must have capability to provide the design, materials and installation of PV Systems

• Must be able to comply with Oregon Prevailing Wage requirements.

• Firms that are not General Contractors registered with the Oregon Construction Contractors Board, and in good standing, shall not be considered qualified to propose on this project. Firms that cannot demonstrate that the principals have designed and installed PV Systems totaling at least 500 KWp DC of grid-connected capacity are unlikely to receive sufficient points on this criteria to receive the award of a contract.

1.3 Pre-Proposal meeting

An optional pre-proposal meeting of all contractors submitting proposals for the RFQ will be held on:
Thursday June 14th, 2012, 9-10am
Bureau of Planning and Sustainability
1900 SW 4th Ave, STE 7100, Room 7A
Portland, OR 97201

The meeting may be attended remotely by a teleconference bridge.
Conference call option is:
Call in number: (530) 881-1200
Access Code: 106233#

To RSVP email RFQ coordinator, Mickey Lee at proposals@tangerinepower.com

1.4 Project Timeline

Because of the deadlines and requirements of the utility Feed in Tariff (FIT) the commissioning deadline of this project must be adhered to. Remaining milestones are proposed targets for the vendor to meet.

| | |
|---|---|
| Pre-Proposal Meeting (optional) | 6/14/2012 |
| Last day for Submitting Questions | 6/20/2012 |
| RFQ Application deadline | 6/25/2012 |
| Contractor(s) awarded contracts | 7/06/2012 |
| Solar site structural evaluations finished | 7/31/2012 |
| Permitting of designs, engineering, warranty in place | 8/15/2012 |
| Installation begins | 8/20/2012 |
| All eight systems are commissioned for interconnections | 10/1/2012 |
| All eight systems are installed and live | 10/8/2012 |

## 2. Scope of Work

2.1 Project Overview
Tangerine Power, in partnership with the City of Portland, Portland Public Schools (PPS) and SE Uplift of Portland, intends to implement eight solar power projects that will help reduce carbon emissions in the region, provide an opportunity for community engagement within the project, provide jobs and realize financial benefits back to the communities and organizations involved.

Contractor(s) will be required to provide all applicable design, engineering, supplies, materials, and labor for the installation of the PV System. The Contractor will be required to submit documents identified in Part 3, Deliverables and Schedule of the RFQ.

Tangerine Power will provide funding through the Portland Community Solar financing model to enable these projects to be completed in time for compliance with Oregon Feed in Tariff (FIT) contracts received by the City of Portland for the designated sites. Tangerine Power along with a community-nominated vendor selection team made up of 9 individuals from eight local organizations will select contractor based on project evaluation criteria (see section 5 for details)

2.2 Site locations
Designated sites include:

The following are the proposed designated sites. Interconnection approval has already been obtained from the applicable utility for all sites. The solar capacity authorized thru the VIR program at each site is listed below.

| Electric utility supplier | Site Name | Site Owner | Address | Zip Code | Capacity kW |
|---|---|---|---|---|---|
| | | | | | |
| PGE | Southwest Community Center | City of Portland | 6820 SW 45th | 97219 | 9.9 |
| PGE | Portland International Raceway | City of Portland | 1940 N Victory blvd | 97217 | 9.9 |
| PGE | Southeast Uplift | SE Uplift | 3534 Southeast Main | 97214 | 5.0* |
| PP&L | King School | Portland Public Schools | 4906 NE 6th Ave. | 97211 | 9.9 |
| PGE | Buckman Arts Elementary | Portland Public Schools | 320 SE 16th Street | 97214 | 9.9 |
| PGE | Oliver P. Lent School | Portland Public Schools | 5105 SE 97th Ave. | 97266 | 9.9 |
| PGE | Rieke Elementary | Portland Public Schools | 1405 SW Vermont St. | 97239 | 9.9 |
| PGE | Bridger School | Portland Public Schools | 7910 SE Market St. | 97215 | 9.9 |

*See Preliminary building assessment report for this location

2.3 Installation Minimum System Requirements

1) Complete PV system that includes all engineering, design hardware, and services necessary for a complete system, including, without limitation:

2.3.2 Solar PV modules.

2.3.3 Inverter(s) with a rated efficiency of at least 95.5%, and that are fully compatible for interconnection to the Portland General Electric and Pacific Power standards. Please note the efficiency of your inverter(s) in your proposal.

2.3.4 Web-based monitoring system including power, energy, and system performance data over multiple periods such as day, week, month, and life of the system.

2.3.5 All other racking hardware and signage necessary for the City, PPS and SE Uplift and utility acceptance of the PV system, if applicable.

2.4 Statement of Qualifications & Quotation

A dated Letter of Interest should be submitted, including the legal name of the respondent(s), address, telephone, email address and the name, title, and signature of the person(s) authorized to submit the Request for Qualifications and Quotation on behalf of the firm.

2.4.1 Narrative. Provide a Narrative of the solar/PV design and construction services offered by your firm. The narrative should include the following:

2.4.2 Experience.

- Describe your experience during the past five (5) years with solar/PV design, installation, construction, and commissioning, with a focus on projects for public entities. Include the scope of projects, description, and costs where applicable.

2.4.3 Personnel

- Include names of key personnel who would likely be assigned to this project, including subcontractors that might be working on this project even if it turns out that they would not be assigned to the project.

2.4.4 Commitment to Inclusion

- Explain how your company will attempt to achieve the High Road Goals and Targets and targets outlined in Exhibit D. Including specifically:
  - Identify your current diversity of workforce by trade and/or occupation and describe your firm's commitments to providing equal employment opportunities.
  - Identify any current work or opportunities on this project to provide innovative mentoring, technical training or apprentice opportunities to traditionally under-represented minority communities

2.4.5 BOLI Prevailing Wage

- Include a description of your firm's experience with Oregon BOLI prevailing wage & employment standards. The selected vendor will be expected to comply with these standards for the duration of the project.

2.4.6 Warrantees

- Include typical warrantees provided by the firm on its work product. If your firm offers an energy production guarantee, please include that in your response.

2.4.7 Additional Data.

- If relevant, include letters of reference or testimonials, ongoing commitment to professional education of staff, and any other data that may assist the evaluation teams in understanding your qualifications and expertise.

2.4.8 Review of Preliminary Site Assessment.

- Please review the documents attached as Exhibit A. These include initial evaluations regarding the size and types of PV systems and modules that an independent solar contractor believes may be possible at each site.

- Please provide your firm's own preliminary assessment as indicated here. Provide a preliminary analysis and assessment of these documents, including whether your firm believes these are feasible and if your firm has different suggestions, solutions, or options which your firm is qualified to deliver.

2.4.9 Portland Public Schools Security Check and Identification

- Within seven days of notice by District, Contractor shall cause each of its employees doing Work on the project to report to District Security Services for a criminal history background check and fingerprinting, and for issuance of a District identification badge.
- Contractor alone shall bear the cost* for this security check and badge issuance. The District will provide Contractor a packet with directions about this process, including information requiring the Contractor pay District Accounting Services before the security check and badging. This cost is non-reimbursable.

  *Currently, $82/person. Subject to change by the State of Oregon

2.4.10 Price Quotation

- Provide a proposed pricing schedule based on the total capacity (in kilowatts DC) of participation in the project(s). If your firm proposes different prices based on various equipment manufacturers, provide details. Itemize structural, access, roof, electrical, or other conditions that would increase system costs the sites, and estimate additional costs per installation on either a per watt or per system basis.

- Pricing must include all materials, equipment, labor, transportation, permits, warranties and services required to assess the designated sites and design and install the systems in accordance with all applicable laws and codes, interconnection requirements, Energy Trust of Oregon, and Oregon Department of Energy Installation Requirements.

- Additional services and features not stipulated by these requirements, such as extended warrantees or ancillary monitoring equipment, may be listed and priced separately.

- Pricing should be presented as price per-watt of installed capacity, before any eligible state and federal tax incentives. Final pricing for the program will be determined once contractor selection is made. In the event that more than one contractor is selected to provide services, a single price will need to be negotiated between the selected firms to provide uniformity in program financing.

- Please note specific measures to be taken to maximize the performance of each installation in your proposal, such as high-efficiency solar modules. Specify the expected annual output in kWh of each proposed system configuration.

- Greater specificity in line item costs will gain the vendor more points during the review process.

- Cost quote should not include roofing or structural engineer.

- To meet the project's financial objectives, proposals with a total installed cost (not including structural and roofing) of greater than $4.50 per watt are unlikely to be accepted.

## 3. Deliverables and Schedules

Deliverables shall be considered those tangible resulting work products which are to be delivered to the designated sites through the agreement with Portland Community Solar such as reports, draft documents, data, interim findings, drawings, schematics, training, meeting presentations, final drawings and reports.

Deliverables and schedules for projects shall include, but not be limited to the following:

3.1 Site Evaluation:

- If PV Systems are to be installed on a roof, the Contractor shall hire mutually agreed upon competent personnel to perform a roof inspection to determine the condition of the roof. The roof shall meet wind-load, seismic, and structural requirements. The Contractor shall also hire appropriate competent personnel qualified to perform a structural analysis of the roof (i.e. an Engineer licensed in the appropriate area of expertise). Results of the roof inspection and the structural analysis will be reviewed by the Contractor, PCS, the City, PPS and SE Uplift. Costs of roof inspections and structural analysis shall be borne by the Contractor.

3.2 Design, Engineering, Permitting and Incentives--Design documents:

The Contractor shall design and engineer solar PV Systems for longevity and robust electricity production, taking into consideration the objectives of the PCS, proposed installation site, available solar resource, installation costs, aesthetics, structural limitations, roof condition and other relevant factors.

For each site, the Contractor shall submit design documents, "Site Review Package", for PCS review. Those documents should include the following information:

- System description.
- Equipment details and descriptions
- Plans with the PV system layout, including racking, module placement, conduit raceways, conduit sizes, module spacing, etc.
- For ground mounted systems, a vegetation and maintenance plan for the ground beneath and surrounding the system modules and support structures.
- Single line diagrams indicating system layout and all required connections to the utility, specifying the inverter models and ratings.
- Length of warranty for major components compared to the industry average.
- The Contractors written specifications for procuring and installing the equipment.
- Professional Engineer verification that the system will meet wind-load, seismic, and structural requirements.
- Mounting details and appropriate certification. *Note: Portland's Bureau of Development Services requires significant review for building permits seeking to use ballasted mounting systems. Proposals for ballasted mounting will be considered on a case-by-case basis.* For mounted systems, address what accommodations the PV owner will make when the City, PPS and SE Uplift desire to replace the existing roofing material.
- Electrical grid interconnection and approved Net Metering Agreement with the local utility.
- Controls, monitors and instrumentation.
- Web-based monitoring.
- Educational displays or features.
- Site Safety Plan
- Erosion Control Pan
- Waste Management Plan with an 85% recycling goal.
- The Site Review Package shall be submitted in a format suitable for the City, PPS and SE Uplift as determined at the time PCS is engaged in discussions for the site to be developed. The Site Review Package shall be submitted to PCS prior to submission to the Bureau of Development Services. As the Contractor works with the Bureau of Development Services to obtain necessary permits, changes to the Site
- Review Package may be requested of the Contractor. In order to ensure that the changes are satisfactory to City, PPS and SE Uplift, these proposed changes must be reviewed and approved by the City, PPS and SE Uplift. The Contractor shall be responsible to ensure that the review process occurs. Prior to the construction at a particular site, the PCS will issue a Site Access Release signed by the appropriate PCS project manager.
- The Contractor shall identify an appropriate location for the solar PV inverter equipment and its related components and environmental control systems that will meet the following criteria:
    - Compatibility with existing facilities and uses
    - Ease of maintenance and monitoring
    - Efficient operation
    - Low operating losses
    - Secured location and hardware
- The Contractor shall secure from the Bureau of Development Services (BDS) and appropriate utility company all required rights, permits, approvals and interconnection agreements at no additional cost to the City, PPS and SE Uplift including but not limited to a Net Metering Agreement. PCS will become the signatory on these agreements and permits only where required by law. The Contractor shall discuss particular site details with the City, PPS and SE Uplift.
- The Contractor shall complete and submit to the appropriate entity in a timely manner all

pre-applications, post applications and other documentation required to qualify each installation for available rebates, tax credits, utility solar incentive program or other applicable incentive.

3.3 Procurement and Installation

- Supply and install complete, operational PV systems, optimized for maximum annual performance at each site, in accordance with all codes and utility requirements.
- Electrical Interconnection: The Contractor shall supply and install all equipment required to interconnect the PV Systems to PCS and the distribution utility system. The Contractor shall fulfill all application, study, and testing procedures to complete the interconnection process. All costs associated with utility interconnection shall be borne by the Contractor.
- If after the Net Metering application has been submitted, the electric utility determines that the PV System will trigger new distribution system upgrades and significant expense, then the Contractor is not obligated to install the PV System. However, the Contractor and the City, PPS, or SE Uplift representatives will consider these unexpected costs and determine if there is mutual benefit in reconsidering or modifying the project. If so, PCS reserves the right to negotiate with the Contractor to modify the terms and conditions of the Contract.

3.4 Commissioning and Acceptance Test:

- During PV System start-up, PCS and, or the City, PPS, or SE Uplift shall observe and verify each PV System's performance.
- Contractor will provide all information required for PCS to take action in the event that emergency shut off conditions occur during the contract period. All acceptance testing shall be at the Contractor's expense. PCS and the City, PPS, and SE Uplift shall have the right to observe testing and confirm test results at its cost if it is deemed necessary.
- Required commissioning and acceptance test services includes:
  - Starting up the PV System until it achieves the performance requirements of the power sales agreement.
  - Conducting performance testing over a consecutive 24-hour period.
  - Conducting the successful delivery of power within 30 days following the completion of the system.

- If roof penetrations are required for the installation of the PV systems, they shall be performed by qualified roofers, and the roofing penetrations shall be warranted by the roofing company for a minimum of twenty years. Recognizing that the PV system will likely outlast composition and membrane roof systems, Proposers are strongly encouraged to utilize rack designs that accommodate reroofing with minimal disturbance to the PV system and minimal added cost.

3.5**.** Manuals and Drawings:

- The Contractor shall provide three (3) sets of site-specific operation, maintenance and equipment and parts manuals for each installed PV system. The manuals shall cover all components, options and accessories supplied. They shall include maintenance, troubleshooting, and safety precautions specific to the supplied equipment at the site. The Contractor shall also provide three (3) sets of as-built drawings in the appropriate format, hard copy and electronic, as specified by PCS on whose project they are working. These deliverables shall be provided prior to acceptance of the system.

3.6. Warranties and Guarantees:

- The Contractor shall provide the following warranties:
  i. Photovoltaic Power Modules shall be warranted for at least 20 years with a minimum 80% performance at 20 years. No more than 10% power output degradation in the first 10 years and no more than 20% power output degradation in the first 20 years from date of purchase will be acceptable. Non-performing modules shall be replaced by the Contractor with equal or upgraded modules at no cost to Portland Community Solar.

  ii. 15-year inverter warranty

  iii. 20-year roof penetration and building penetration warranty. Roof penetrations shall be made after consultation with the City, PPS, or SE Uplift's roofing contractor or roofing specialist as provided by the City, PPS, or SE Uplift, and they shall be completed in conformance with the existing roof warranty

  iv. All exposed quick-connect wiring shall be warranted against UV degradations for a period of 20 years.

  v. All metals used in the construction of the system including, but not limited to, PV modules and array support structures shall be warranted against degradation for 10 years.

3.7. Public Education and Monitoring:

- Public education and on-line monitoring of the system performance are important elements of the City, PPS, and SE Uplift's renewable energy goals. The Contractor shall provide a turnkey data acquisition and display system that allows the City, PPS and SE Uplift and public to monitor and display historical and live electricity generation for each site. The system should allow PCS to track cumulative power generated. The regularly collected data should include, but not be limited to the following:

  i. System performance showing instantaneous output in kW, daily, year-to-date, output in kWh

  ii. Display of accumulated kWh output in a user-friendly format

  iii. System availability and weather related data (ex: ambient temperatures, irradiation, wind speed)

  iv. Capacity factor

  v. Degradation

  The data system shall be designed for turnkey, remote operation. Data shall be transmitted via internet or telephone from the PV system site to a remote server. Data storage, management and display will be the responsibility of the Contractor. The data system must not require that a dedicated or always-on personal computer be located at each site.

  All deliverables and resulting work products from this contract will become the property of

the PCS. The above listing shall be considered the minimum deliverables with the City, PPS, and SE Uplift specifying and additional deliverables required for their specific project.

## 4. Insurance Requirements

- The Contractor shall provide and maintain public liability and property damage insurance in the minimum amount of $2,000,000 total / $1,000,000 per occurrence that protects the Contractor, Portland Community Solar, and the City of Portland, Portland Public Schools and its officers, agents and employees from any and all claims, demands, actions and suits for damage to property or personal injury arising from the Contractor's work under this contract.

- The insurance shall be without prejudice to coverage otherwise existing and shall name as additional insured's Portland Community Solar and the City of Portland, Portland Public Schools, SE Uplift and their officers, agents and employees. Notwithstanding the naming of additional insured's, the insurance shall protect each additional insured in the same manner as though a separate policy had been issued to each, but nothing herein shall operate to increase the insurer's liability as set forth elsewhere in the policy beyond the amount or amounts for which the insurer would have been liable if only one person or interest had been named as insured.

- The coverage shall apply as to claims between insured's on the policy. The insurance shall provide that the insurance shall not terminate or be canceled without thirty (30) days written notice first being given to Portland Community Solar. If the insurance is canceled or terminated prior to completion of the contract, the Contractor shall provide a new policy with the same terms.

- The Contractor agrees to maintain continuous, uninterrupted coverage for the duration of the contract.

Automobile Liability

- Contractor shall be required to carry automobile liability insurance with a combined single limit of not less than $1,000,000 each occurrence for bodily injury and property damage. The insurance shall include coverage for any damages or injuries arising out of the use of automobiles or other motor vehicles by the Contractor.

Workers' Compensation

- Prior to the performance of any work under a contract awarded by Portland Community Solar , the Contractor shall comply with the workers' compensation law, ORS Chapter 656, as it may be amended, and if workers' compensation insurance is required by ORS Chapter 656, the Contractor shall maintain coverage for all subject workers as defined by ORS Chapter 656 and shall maintain a current, valid certificate of workers' compensation insurance on file with the City of Portland Auditor for the entire period during which work is performed under the contract.

Certificate of Insurance

- As evidence of the required insurance coverage, Contractor shall furnish acceptable insurance certificates to Portland Community Solar with the return of the signed contract.

The certificates shall specify Portland Community Solar, the City of Portland, Portland Public Schools and SE Uplift as additional insured and shall include a 30-day notice of cancellation clause.

- Notwithstanding the naming of additional insured, said policy will protect each insured in the same manner as though a separate policy has been issued to each; but nothing herein will operate to increase the insurer's liability as set forth elsewhere in the policy beyond the amount or amounts for which the insurer would have been liable if only one person or interest had been named as insured.

- Depending upon the individual bureau projects, Contractor may be required to provide additional insurance as a condition prior to execution of a Solar Sub-Agreement.

## 5. Evaluation Criteria

| | |
|---|---|
| Demonstration of ability to perform scope of project services | 35 points |

- Demonstration of experience in comparable projects including design engineering, permitting and incentives as stated in section 3.2 of RFQ.
- Demonstration of ability to provide procurement and Installation requirements in section 3.3 of RFQ
- Ability to demonstrate quality control measures
- Provide clarity of ability to meet commissioning deadlines and acceptance tests associated with past project planning, coordination, scheduling, cost control, capabilities and techniques.
- Provide examples of manuals and drawings, see section 3.5 of RFQ.
- Provide examples of education systems and monitoring of PV system capability.
- Ability to demonstrate, from previous projects, the predicted vs. actual energy performance for PV systems installed.
- Provide demonstration of experience with Oregon Building Codes and Regulations.
- Key personnel that Include names of key personnel who would likely be assigned to this project including qualifications, education and relevant experience of the key team members, including subcontractors
- Ability to bring roofing and structural engineering partners to perform key elements of the project.

| | |
|---|---|
| Proposal Cost | 35 points |

- The cost of the project based on the estimated total 75 kilowatts of installed capacity
- Specificity of line items, cost adders in firm's quote.
- Quotation should adhere to requirements listed in section 2.4.10 (Price Quotation) of the RFQ.

| | |
|---|---|
| Administrative ability to carry contract | 10 points |

- Clarity of submittal and responsiveness to this RFQ. Questions and requests for clarification regarding this RFQ must be directed in writing, via email to the person listed below.

- The deadline for submitting such questions/clarifications is June 20, 2012 at 4:30pm Contact: Mickey Lee proposals@tangerinepower.com
- Insurance levels should demonstrate ability to meet requirements stated in section 4 of RFQ.
- Firm's proposed warranty. Provide clarity of warranty provided including any energy production guarantees. Warranty should adhere to requirements in section 3.6 of the RFQ.
- Firm's proposed power production guarantee, if provided, should be clear and provide stated energy performance.
- Include narrative that describes:
- Experience in the past five (5) years with solar/PV design, installation, construction, and commissioning, with a focus on projects for public entities
- If relevant, include letters of reference or testimonials

| | |
|---|---|
| Inclusionary employment practices | 20 points |

- Ability to include Oregon Bureau of Labor and Industries (BOLI) prevailing wage & employment standards
- Identify current diversity of workforce by trade and/or occupation and describe your firm's commitments to providing equal employment opportunities to Minority-owned, Women-owned Business.
- Identify any current work or opportunities on this project to provide innovative mentoring, technical training or apprentice opportunities to traditionally under-represented minority communities
- Demonstrate ability to achieve the "High Road Goals and Targets", see Exhibit D
- Provide understanding and adherence to the Oregon Prevailing Wages agreement ORS 279C.800 to 279C.870 and the Oregon Prevailing Wage Rate (PWR) Law

# Exhibits

- A: Preliminary building assessment report
- B: Portland Public Schools building facility maps
- C: Portland Map of sites
- D: High Road Goals and Targets

City of Portland
Portland Public Schools

Solar Electric Feasibility Assessment
1-13-12

By Laurie Hutchinson
E C Company

**Background:**
The City of Portland requested an assessment of 9 sites owned by City of Portland and Portland Public Schools. These sites are under consideration as pilot projects for a "cooperative solar ownership model" in development by the City of Portland. All sites won allocations in the <10 kW category for the Oregon Solar Payment Option in October, 2011.

The scope of the assessment was to provide a preliminary solar assessment regarding the constructability and solar resource of the contemplated sites. E C was commissioned to identify any factors that would prohibit construction or add unreasonable costs to the solar installations.

The building sites addressed in this report are: Southwest Community Center, Portland International Raceway, SE Uplift Center, Buckman School, Lent School, King School, Reike School, Skyline School, and Bridger School.

The assessment was conducted on in December 2011 and covered the following scope.

- Visual verification, where possible, of roofing type and roof condition
- Visual Verification, where possible, of structural condition of the roof
- Identification and inspection of potential interconnection locations
- Suggestion of potential attachment method to building structure and locations for solar installation.
- Visual shading assessment
- Identification of any factors which may prohibit or add significant cost to a proposed solar electric system.

**Note on Feed in Tariff Interconnection Applications Filed by E C Company:**

Feed-In Tariff Applications for Interconnection were completed and submitted by December 14, 2011 for all locations except the Skyline School. Skyline cannot be considered for the Solar Payment Option due to the existing net metered wind system. (The Oregon Public Utility Commission Docket UM 1462 establishes a limit of one customer generation meter per consumption meter at any one site. The wind system is interconnected at the only consumption meter on the site.)

For purpose of the application all sites except SE Uplift Center were designed with SolarWorld 255 modules and Fronius 10kW or 11.4 kW inverters (depending on interconnection voltages) for a total system size of 9.945 kW. The SE Uplift Center application was for a 5 kW system due to the smaller roof space.

As of 1/13/12, 7 of the 8 submitted applications for interconnection were accepted as complete by the utilities. The Bridger School is pending confirmation by PGE of the service entering the building.

**Notes on Pricing and Product Choices:**
Budgetary pricing is provided for turn-key solar installations including permitting, procurement and installation compliant with utility and jurisdiction requirements. The solar market is in a period of flux with module prices for silicon crystal modules recently dropping and expected to stay low for the next year at least. Budgetary estimates provided are based on current pricing using locally made, higher density modules. Currently, some imported modules with similar specifications and warranties are available and an investor might expect to save about $4000 on a 10 kW system if "off shore" modules are acceptable.
**All pricing estimates are budgetary only and pending engineering and full design. Pricing may be influenced by changes in the solar market.**

**Other Costs**:
Monitoring:
Solar monitoring allows both the owner and the installer to track system performance remotely as well as use the solar data for educational or PR purposes. Most inverter manufacturers offer low cost solutions to be able to export system performance data from the inverter to free data storage internet sites hosted by the manufacturer. Assuming that access to onsite network is available, an inverter based monitoring system may cost $400 - $1000 installed. Inverter based monitoring is the most cost effective way to monitor solar output remotely.

Additionally, "3rd party" or add-on monitoring packages with solar data hosting packages are available. The City of Portland has several solar sites currently monitored by Deck Monitoring Systems. 3rd party monitoring installation and solar data hosting costs are $4200 - $5000 for base monitoring systems. Hosting fees are typically $250 in 5 year increments after the first 5 years. The main advantages of 3rd party monitoring are customizable web interfaces and the possibility of aggregating data from several sites.

Bonneville Environmental Foundation offers curriculum, data hosting on the Solar4Schools website and activity resources under their "Solar4Schools" program. Some grant funds may be available for educational training for teachers, access to teaching activity resources and kits. Deck or Power1 monitoring is required for participation in the Solar4Schools program. Contact Craig Collins at B.E.F, 503-553-3925, for further information.
http://www.solar4rschools.org/

Estimated monitoring fees are additional to estimated solar installation costs.

# City of Portland Sites

## Portland International Raceway (PIR)

E C assessed several areas at the PIR site: the Timing and Scoring Building, the Broadcast Services Building and the North Restrooms Building as well as a potential ground mount site were assessed.

E C identified a suitable area for a ground mount system. The area southeast of the Pump Building is a good location for a small ground mounted system that does not conflict with other uses of the grounds. Interconnection would be at the electrical service at the North Restroom Building

The Timing and Scoring Building is a two story building with sufficient electrical service for an interconnection. The roof angle is sloped, not ideally, at 10° northward. Tilt up racking would in theory used to achieve a system that slopes 10 - 20° southward for a single row of modules. With current module densities that would be approximately 6 kW system. The structure is likely sufficient for standard track permitting with 2 x 8 rafters at 24 inch spacing. The roof condition was *not* visually verified for 15 year life.

The North Restroom Building is a single story building with roof aspects sloping east and west. It has a single phase service with sufficient breaker space for interconnection. However the available roof space is not sufficient for a 10 kW system on either facet.

Other buildings such as the Fastrack Café were not assessed due to noticeably aged roofs. The pump building is does not have sufficient roof area for a 10 kW installation. In addition the meter for this building is under another entity and, thus, not usable for interconnection under the PIR Interconnection Application.


Recommendations: A 10 kWh ground mounted solar system is most likely the best option at this site. It can be designed at an optimal tilt of 25 -30°, oriented south and would produce 10,320 in the first year. East and west facets of the North Restroom building could also accommodate smaller systems at lower production. At either a west or east orientation on this building, the solar resource is approximately 14% less than a

ground mounted system facing 180 south at 25°. The Timing and Scoring Building can accommodate a smaller system but would not be visible from the ground.

Installation Cost and Production Estimate: A 10 kW ground mount system, if kept in production for the 15 year contract, would yield 10,319 kWh in the first year and $55,055 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation. Typical costs for a 10 kW ground mount system may be in the range of $60,000.

**SE Uplift Center – 3534 SE Main Street**

This building is a two story community center with a flat roof which is slated for a major re-roofing project. Shading from trees at this site is considerable. E C measured solar resource, using a Solmetric Suneye shade analysis tool, at several points on the roof and found only 82 – 84 % solar resource on most areas of the roof. E C Company generally designs to achieve 90% or better solar resource. The only area of the roof with greater than 85% total solar resource is between the north and south HVAC units and west of the north HVAC unit. This area can accommodate about 12 higher density 240- 260 watt modules currently available – or approximately 3 kW.

Recommendations: This site has marginal solar access. E C recommends sizing the system to only use areas of the roof with 85% or better solar access or perhaps forgoing solar at this site.

Installation Cost and Production Estimates: A 2.5 kW system installed on the most optimal area of the roof might yield 2,295 kwh in the first year, $858 at the volumetric incentive rate of .374. If the 2.5 kW installation moved forward you might expect pricing similar to a typical residential installation, approximately $12,500 - $14,000.

**Southwest Community Center**

Roof Type and Attachment Method: The Southwest Community Center has an 18° pitched, standing seam roof which will work with S-5 or other non-penetrating seam clamps. This method of attachment, where possible, is preferable both from a cost and long term maintenance perspectives. Eliminating roof penetrations means less roofing maintenance. Verification of attachment of the roof to the sub-structure will be needed to verify that a system can be installed under the Portland Bureau of Development Services "Prescriptive Path" for solar.

Recommendations – The Community Center is a great site for solar with plenty of solar access. Most of the roof is free of shading; electrical interconnection is in the center of the north side of the building. The main recommendation is to plan any small systems with an eye toward preserving prime open spaces for a future, larger installation. This roof may accommodate approximately 90 kW.

Installation Cost and Production Estimate: A budgetary estimate of an installation on the standing seam roof is $52,000. A 10 kW system located in an un-shaded area of the pitched roof, if kept in production for the 15 year contract, would yield 10,200 kWh in the first year and $54,587 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

# Portland Public School Sites

## Bridger School – 7910 SE Market Street

The Bridger School is a good location for solar with minimal shading and easy access for electrical interconnection. *Further verification of structure is needed.* The only visible area for assessing the structure was in the cafeteria/auditorium roof which has wide spans of glulam beams. A solar installation may need additional structural members installed above the roof spanning these beams. Further assessment and engineering is required.

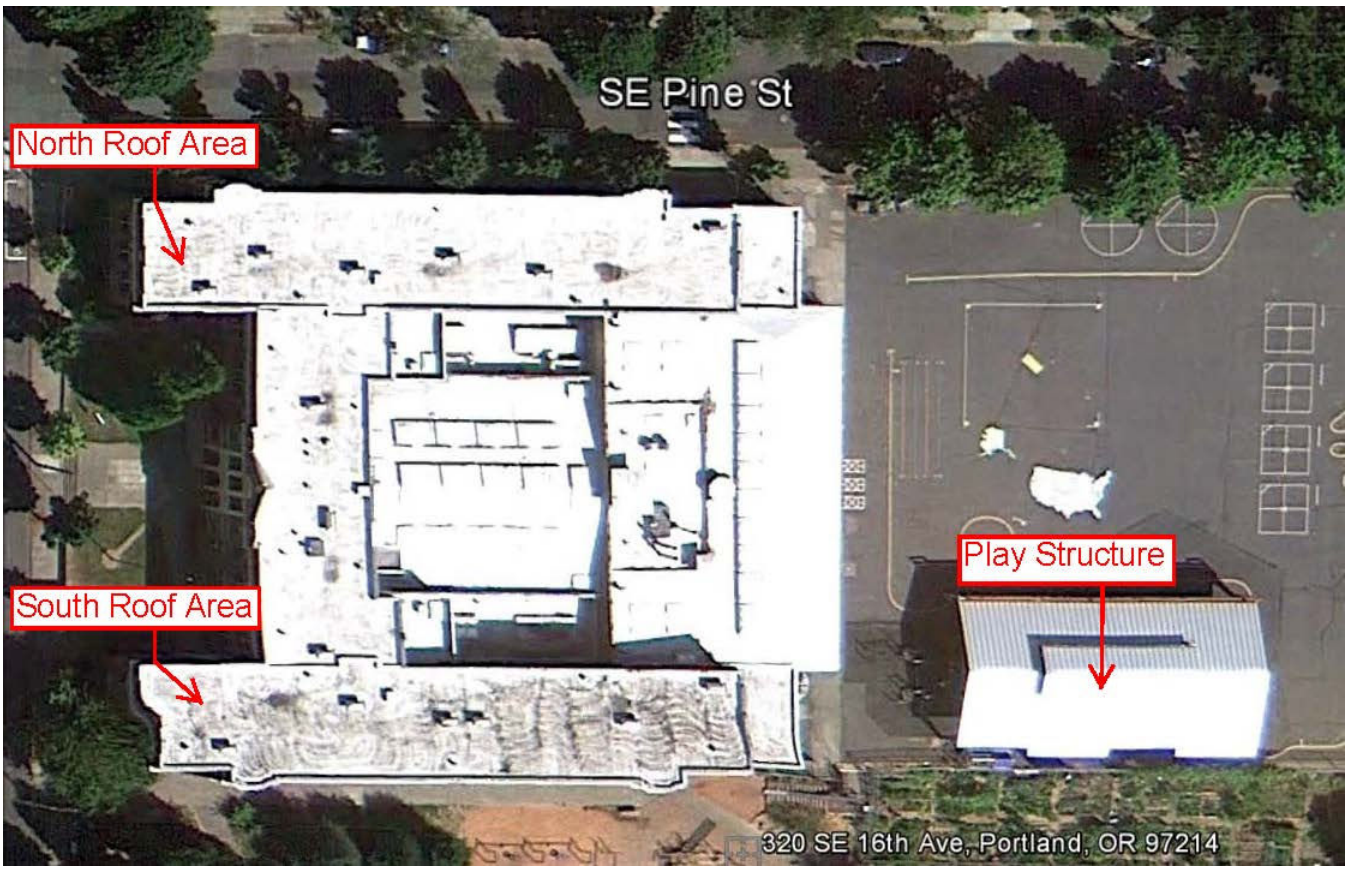
Recommendations: Assuming structural suitability, both the cafeteria and gym roofs are acceptable for a solar system installed on tilt up racking. The main electrical service is located in the west side of the building close to either of these roofs for an easy interconnection point. The roof age was not verified but appears to be less than 10 years old and showing sufficient life for a solar installation.

Installation Cost and Production Estimate: Installation cost may be $55,000 - $63,000. If additional structural support is required this may add to the cost of the system. There is little shading on most of the roof. A 10 kW system, if kept in production for the 15 year contract, would likely yield 9,990 kWh in the first year and $52,800 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

**Buckman School – 320 SE 16th Ave**

Two areas were assessed for solar at the Buckman School – the main school building and the play structure southeast of the main building. There are large areas on the north and south areas of the building which could easily accommodate 10 kW systems installed in tilt up racking. The main building was re-roofed approximately 8 years ago. There is plenty of wood structure to support a solar installation. Any of several 208 V subpanels on the second floor could serve as interconnection point for the solar. PGE meter located inside, near boiler room in the east side of bldg.

The play structure would be preferable from a visibility perspective and is a viable location for solar. It can accommodate at least 10 kW. A penetrating attachment would be necessary as well as some additional costs for trenching and conduit to run interconnection wires to main electrical room on the northeast end of the main building.



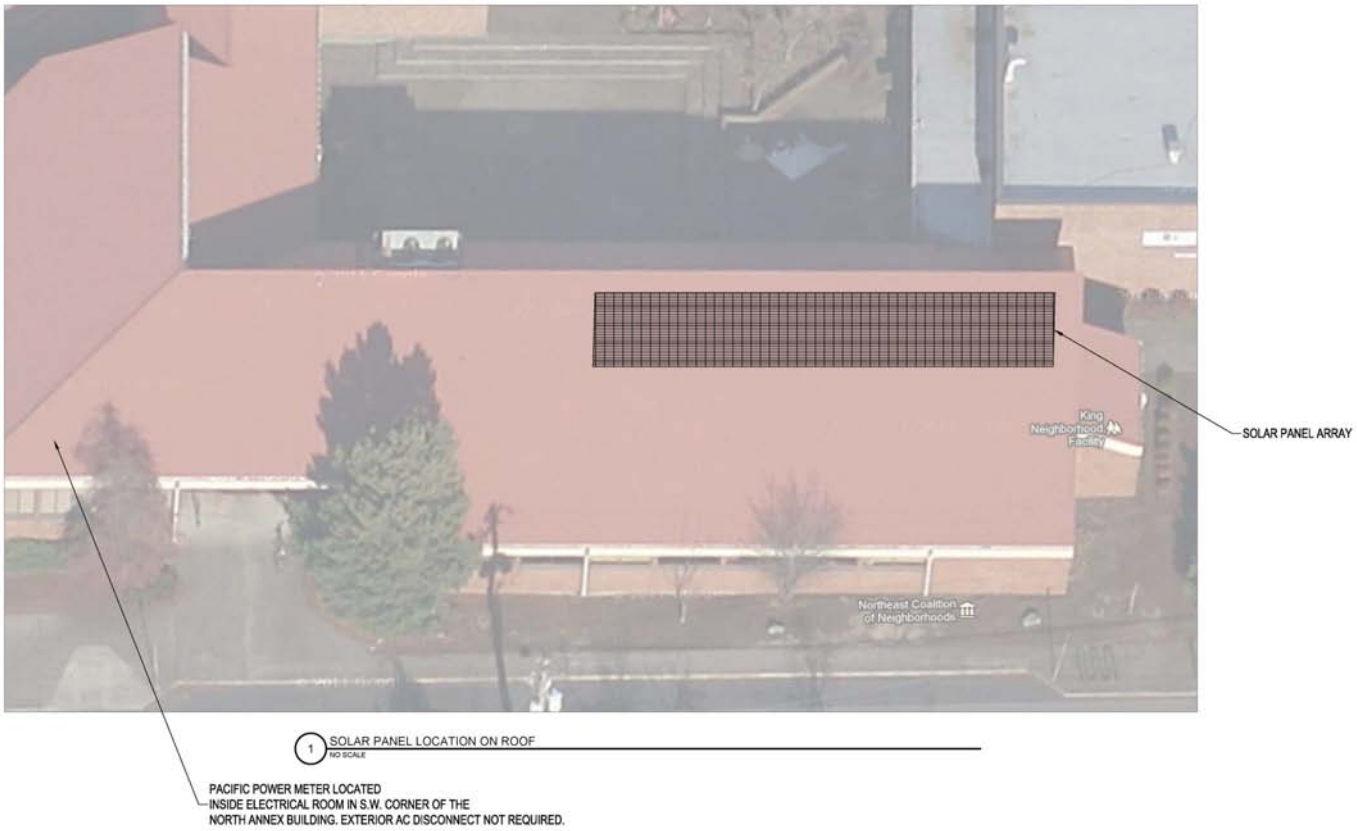

Recommendations: If the play structure is preferred from a visibility perspective it is certainly feasible. The cost of attaching the system will be minimal but there will be additional costs associated with locating inverter and the distance to interconnection. It is fine place to showcase a solar installation. The north and south roofs of the main building are also very good for solar. The Buckman School, overall, is a good choice for solar.

Installation Cost and Production Estimate: Installation costs would be similar for the play structure or the main roof: a budgetary estimate is $55,000 for either roof. A 10 kW system, if kept in production for the 15 year contract, would yield 10,000 kWh in the first year and $53,360 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

**King School – 4906 NE 6th Ave**

The incentive allocation was won for the meter in the area of the building known as the North Annex. This is the only part of the building was included in this solar assessment. There is a metal roof sloping south installed over tongue and groove wood ceiling and wood beams, spaced approximately 10' running N - S. This seamed roof is not compatible with standing seam (non-penetrating) roof clamps on the market. This installation will require a combination of rail and either penetrating standoffs installed between seams or attachment capping the standing seams lagged to the wood beams below.

The proposed interconnection point is in the electrical room in the SW corner of the building. There is currently a 400 A subpanel with sufficient space for solar interconnection breakers.




Recommendations: This is a good location for a solar installation. Some care will need to be taken to minimize the visibility of attachments from inside the building since there is no drop ceiling. This can be done by spanning the wood beam structure above the roof or painting hardware used inside to match the wood.

Installation Cost and Production Estimate: A budgetary estimate for this installation is $57,000. A 10 kW system, if kept in production for the 15 year contract, would yield 10,000 kWh in the first year and $53,360 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

**Lent School - 5105 SE 97th Ave**

Several buildings were considered. The main building of the Lent School houses an existing 120 kW solar system. Areas of the main building are suitable for another solar system but interconnection under the solar payment option is prohibited; the Oregon Public Utility Commission Docket UM 1462 establishes a limit of one customer generation meter per consumption meter at any one site. The building southwest of the main building has good solar access but is likely under the same meter as the 120 kW system and is, therefore, not a consideration for the Solar Payment Option. The annex building which houses a music classroom, northeast of the main building, is the best location for solar with a flat roof and sufficient electrical service for interconnection.

Recommendations: The Music Annex Building: the structure is open web beams with approximately 8' spacing running north – south. The roof life could not be visually verified but is thought to be less than 7 years old with sufficient life for a solar installation. Additional engineering and structure above the roof may be required to attach to this building.

Installation Cost and Production Estimate: A budgetary estimate for this installation is $60,000. A 10 kW system, if kept in production for the 15 year contract, would yield 10,000 kWh in the first year and $53,360 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

**Rieke School – 1405 SW Vermont Street**

There are several potential locations for solar. The main building may need a re-roof prior to a solar installation. Two of the three annex buildings (the northern two) to the west of the main building are suitable for solar but are too small to accommodate 10 kW. (They are presumed to be occupied and therefore subject to Oregon Solar Structural Specialty Code setback rules of 3' on 3 sides of the array.) With required setbacks these buildings can accommodate up to 6 kW each.
The northern annex building houses the meter under which the interconnection application was applied. In addition a ground mounted system, south of the annex buildings, was contemplated and can be interconnected at one of the annex buildings.

Recommendations: The most immediately doable option for a 10 kW installation is the ground mounted option. One consideration for ground mounts is the greater potential for vandalism since they are so accessible. If re-sizing to a smaller system is workable, the north annex would be a straightforward installation. The main building roof needs further verification of roof life.


Installation Cost and Production Estimate: A budgetary estimate for the ground mount installation is $60,000. This 10 kW system, if kept in production for the 15 year contract, would yield 10,000 kWh in the first year and $53,360 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation. A budgetary estimate for a 6 kW annex roof installation is $33,000. If kept in production for the 15 year contract, would yield 5,900 kWh in the first year and $31,500 in solar payments given a volumetric incentive rate of .374 per kWh and typical production and module degradation.

**Skyline School – 11536 NW Skyline Blvd.**

This location cannot be considered for the Solar Payment Option due to the existing net metered wind system. The Oregon Public Utility Commission Docket UM 1462 establishes a limit of one customer generation meter per consumption meter at any one site. The wind system is interconnected at the only consumption meter on the site.

While this location cannot be considered for this Cooperative Solar Pilot, it might be considered for a small roof top installation at a future date. Approximately 75% of the south facing roof aspect is shaded in the winter by a row of trees and the wind tower/turbine to the south. Areas of the south facet and the flat roof of the NW wing could both be considered for future solar installations. There is plenty of wood structure and it could be easily permitted under the City of Portland Prescriptive Path for pitched roof installations.

**Summary of Recommendations:**

7 of the 8 roofs, for which Feed In Tariff applications were submitted, have areas of very good solar access and can support solar installations. Buckman School and South West Community Center appear to be outstanding locations for solar. SE Uplift Center is the only site with excessive shading and limited solar access. Further information may be needed to determine finals costs for the Lent Music Annex and the Bridger School - from visual assessment it is assumed that installations may require some additional structure but would not be prohibitive at either of these sites. All other sites have very good solar potential.

# PV Mounting Options and Other Solar Construction Recommendations

## Pitched Roof Attachments

Standing Seam Clamps:
The most cost effective method of attachment to a roof with a good solar orientation is using standing seam clamps such as S-5 clamps or a combination of S-5 clamps and aluminum rail. The clamps to standing seam allow a complete solar installation with no penetrations for solar attachment.

Attachment and Rail:
A variety of aluminum standoffs and l-feet and corrugated roof attachments are available that work with a variety of roof types and sub-structures.

## Flat Roof Attachments

Tilt-up Racking on Standoffs:
This method requires penetrating the roof and properly sealing the roof. This method is typically utilized on flat or shallow tilt roofs.

## Ground Mounted Solar

There are many racking options for solar installations mounted on the ground. Permitting is straight forward.

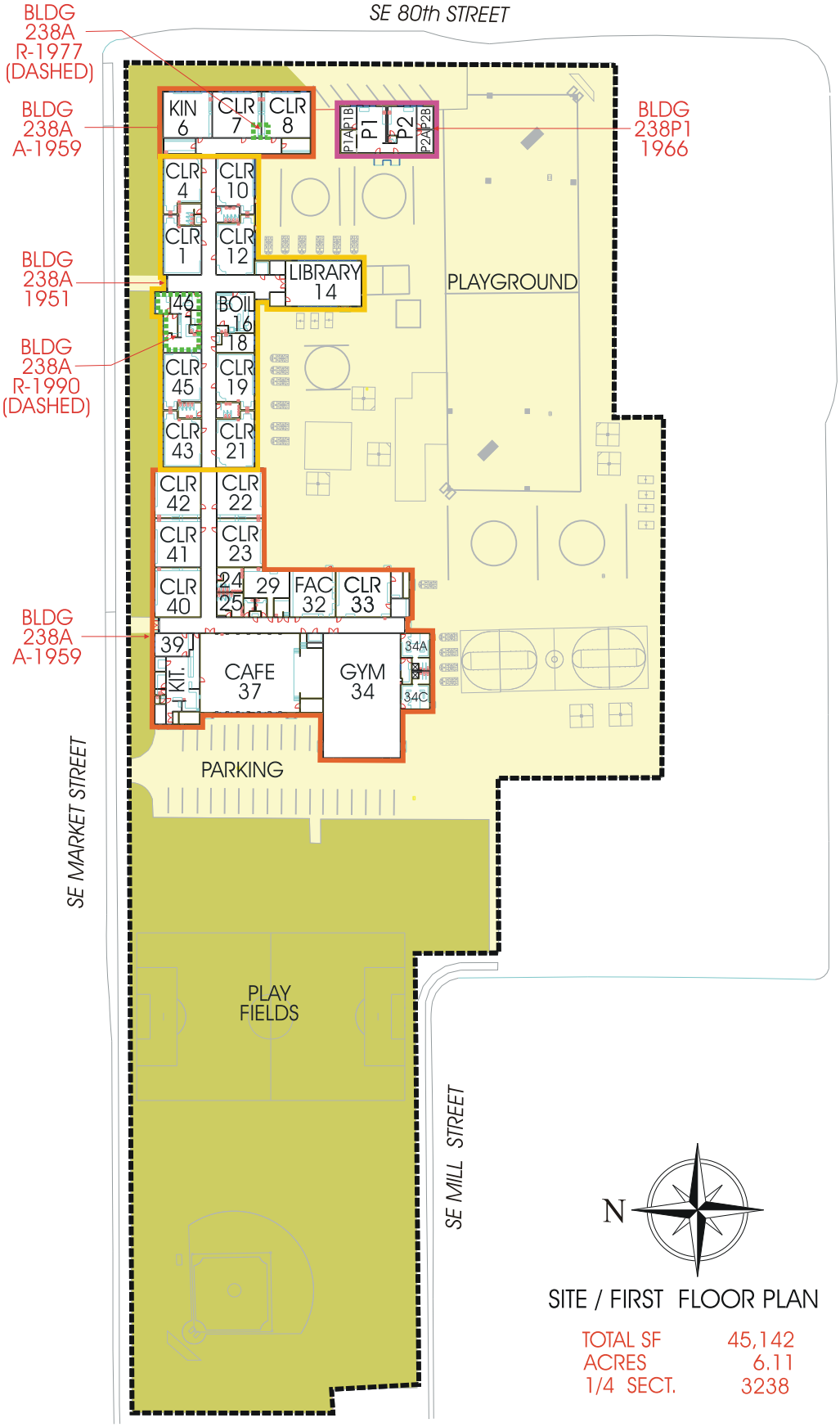
**Typical Solar Production – 9.945 kW**
Portland, Oregon
Orientation 180°South
Module Tilt 18°
Shading 3 %
Volumetric Incentive Rate $.374
Module Degradation Estimated at .7% per year.

| Year | Production | | Energy Sales Revenue |
|---|---|---|---|
| Year 1 | 10,002 | kWh | $3,740.62 |
| Year 2 | 9,932 | kWh | $3,714.43 |
| Year 3 | 9,862 | kWh | $3,688.25 |
| Year 4 | 9,792 | kWh | $3,662.06 |
| Year 5 | 9,722 | kWh | $3,635.88 |
| Year 6 | 9,652 | kWh | $3,609.69 |
| Year 7 | 9,582 | kWh | $3,583.51 |
| Year 8 | 9,512 | kWh | $3,557.33 |
| Year 9 | 9,442 | kWh | $3,531.14 |
| Year 10 | 9,372 | kWh | $3,504.96 |
| Year 11 | 9,302 | kWh | $3,478.77 |
| Year 12 | 9,232 | kWh | $3,452.59 |
| Year 13 | 9,162 | kWh | $3,426.40 |
| Year 14 | 9,091 | kWh | $3,400.22 |
| Year 15 | 9,021 | kWh | $3,374.04 |
| | | | **$53,359.89** |

# Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

## *Bridger Elementary School*
## *7910 SE Market Street 97215*
## *Facility Plan*



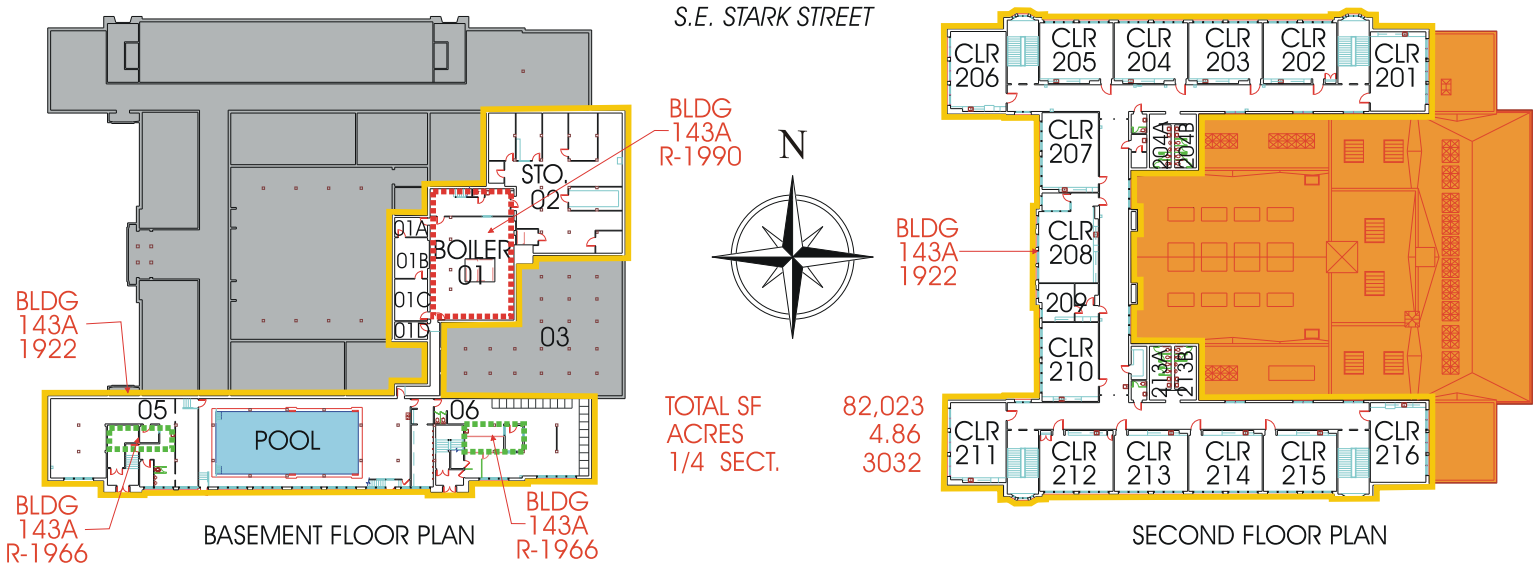

SITE / FIRST FLOOR PLAN

| | |
|---|---|
| TOTAL SF | 45,142 |
| ACRES | 6.11 |
| 1/4 SECT. | 3238 |

# Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

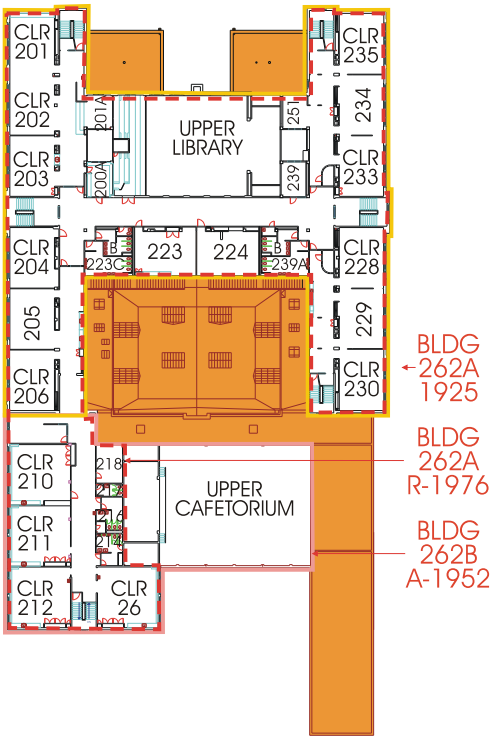
## *Buckman Elementary School*
## *320 SE 16th Street 97214*
## *Facility Plan*

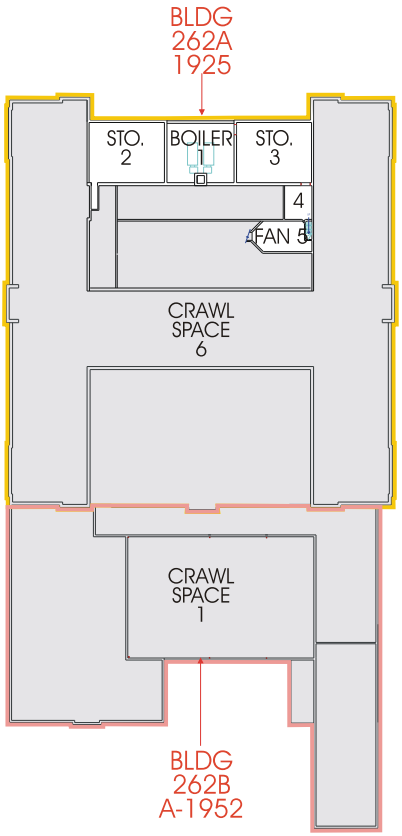
# Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

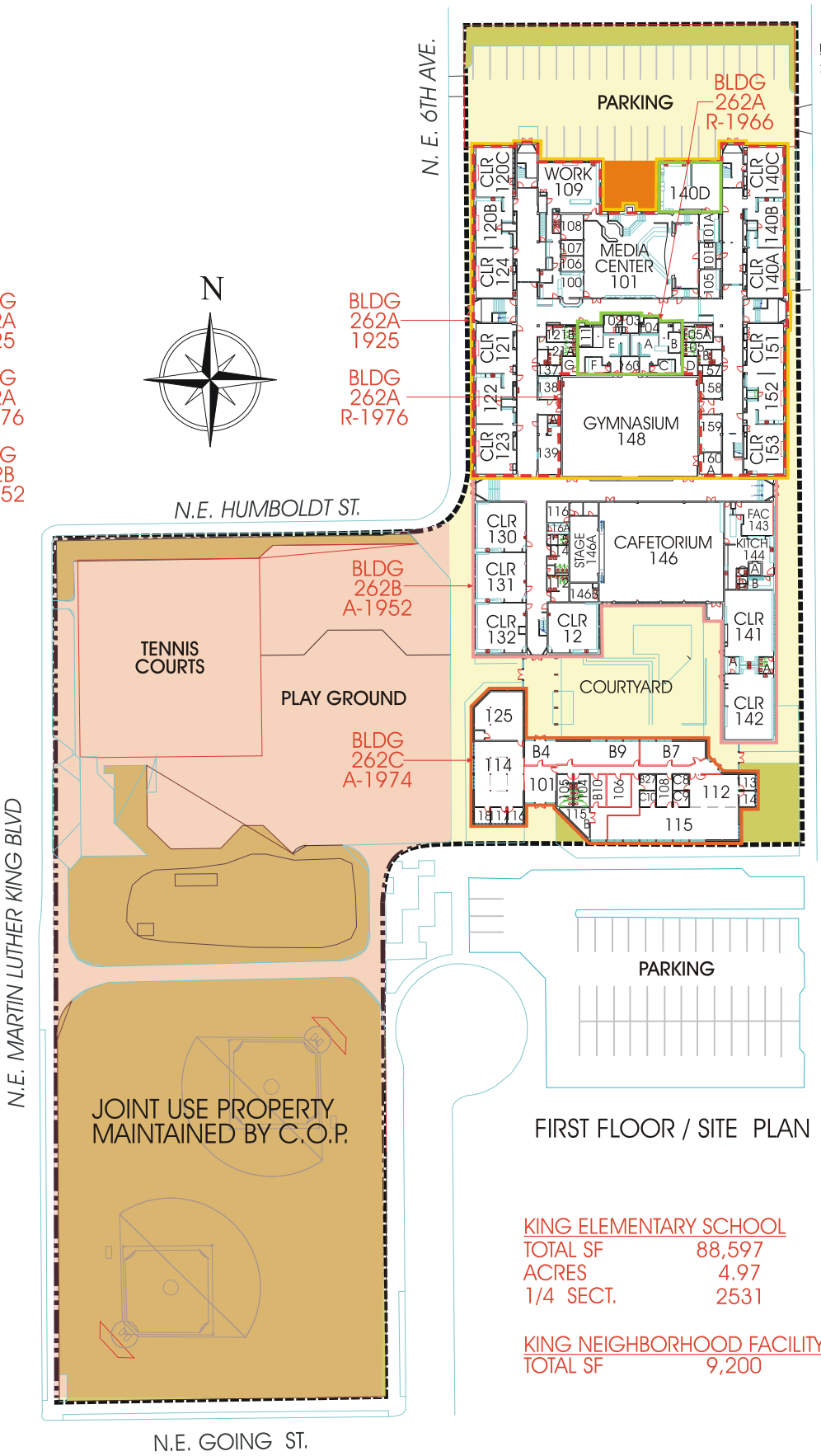
## *King Elementary School*
## *4906 NE 6th 97211*
## *Facility Plan*




SECOND FLOOR PLAN




BASEMENT FLOOR PLAN




FIRST FLOOR / SITE PLAN

KING ELEMENTARY SCHOOL

| | |
|---|---|
| TOTAL SF | 88,597 |
| ACRES | 4.97 |
| 1/4 SECT. | 2531 |

KING NEIGHBORHOOD FACILITY

| | |
|---|---|
| TOTAL SF | 9,200 |

# Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

## *Lent Elementary School*
## *5105 SE97th 97226*
## *Facility Plan*


| | |
|---|---|
| TOTAL SF | 76,478 |
| ACRES | 10.58 |
| 1/4 SECT. | 3540 |

SITE / FLOOR PLAN

# Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

## *Rieke Elementary School*
## *1405 SW Vermont Street 97219*
## *Facility Plan*


| | |
|---|---|
| TOTAL SF | 30,647 |
| ACRES | 7.17 |
| 1/4 SECT. | 3627 |

SITE / FIRST FLOOR PLAN

## Exhibit D: High Road Goals and Targets

Because of the unique contractual and legal framework of the Portland Community Solar project, and because of the relatively small size of the project, ensuring equity and broad opportunity in the project requires establishing some high road goals and targets for prime and subcontractors to work to achieve. Therefore, the City of Portland, Tangerine Power and the selected proposer shall work closely together to achieve the following goals and targets for the Portland Community Solar project.

***Local Workforce***: At least 80 percent of employees used on the project are from the local work force (within 75 miles of the Portland Metro area).

***Family-Supporting Jobs*****:** Workers participating in the photovoltaic installations will earn not less than Oregon BOLI prevailing wage

***Health Insurance*****:** Strive to ensure that employees working on the project have access to adequate and affordable health insurance, and work to mitigate the burdens on small contractors associated with providing health insurance.

***Diverse Workforce:*** Strive to assist historically disadvantaged or underrepresented people, including people of color, women, formerly incarcerated individuals, and low-income residents to perform at least 30% of total trades and technical project hours for the project.

***Diverse Business Participation****:* Businesses owned by historically disadvantaged or underrepresented people, including people of color- and women–owned businesses should be utilized in sub-contracting.

***Highly-skilled Workforce*****:** As practical, contractors should work to help Oregon Limited Renewable Technicians complete apprenticeship hours on the project.