

CITY OF PORT ANGELES, WASHINGTON

REQUEST FOR PROPOSALS FOR A

LANDFILL GAS UTILIZATION PROJECT

AT THE CITY OF PORT ANGELES LANDFILL



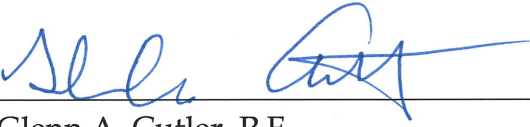
JANUARY 6, 2012

COVER PAGE

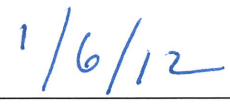
Request for Proposals
City of Port Angeles, Department of Public Works and Utilities

In compliance with this Request for Proposals ("RFP"), the City of Port Angeles ("City") requests Proposals for developing a turn-key landfill gas ("LFG") utilization project at the City's landfill.

All Proposals must be received at the following location, subject to the conditions delineated on Page 5 below by 5:00 PM PDT, May 11, 2012. All Proposals are to be remitted in strict accordance with the requirements listed below.



Glenn A. Cutler, P.E.
Director of Public Works & Utilities



Date

***** This cover page must be submitted to the City by February 17, 2012 *****

Submitting Firm Name _____

Address: _____

Telephone: _____

Fax Number: _____

Contact Name: _____

Title: _____

Email Address: _____

Signature: _____

Date: _____

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OBJECTIVE

The objective is to enable the City to determine the most qualified prospective Project Developer (“Developer”), which is defined as the firm that submits the most responsive Proposal to the City for a LFG utilization project.

SECTION 1: BACKGROUND FOR THIS RFP

The City wishes to select a firm to implement a LFG utilization project (“Project”) at the City’s landfill located in Clallam County, Washington. The City is interested in Proposals that can provide unique solutions to utilize the landfill’s LFG. This RFP has been prepared by the City to solicit Proposals from a qualified Developer to finance, design, permit, construct, own, operate, manage and maintain a LFG-to-energy or other beneficial use project. The City is an Equal Opportunity Employer, and encourages women and minority contractors to apply and the use of women and minority subcontractors is encouraged.

In exchange for the LFG and the use of the associated City property, the City intends to contract with a qualified Developer that submits a responsive Proposal that the City deems to represent the “best value” and “least risk” to the City. Developers are encouraged to submit a Proposal for a turn-key Project described in this RFP. Partnering and/or subcontracting are encouraged where necessary to meet City requirements.

The City reserves the right and has the sole discretion to:

- Reject any and all Proposals considered by the City to be non-responsive or not in the best interest of the City;
- Supplement, amend or otherwise modify this RFP or cancel this RFP without substitution;
- Waive any or all informalities in the Developer’s Proposal or failures to comply with the RFP requirements;
- Request further information, presentations, demonstrations, and interviews from Developers as needed to support the City’s selection of a preferred Developer;
- Select any Proposal, or elements of any Proposal that, in the opinion of the City, represents the best value and least risk to the City;
- Modify the procurement schedule; and
- Award the LFG Development Agreement with no additional discussions.

This RFP and related information regarding the LFG Utilization Project is available on the City's File Transfer Protocol ("FTP") website at <http://olympen.com/copa> under the "LFG Project RFP" folder. Interested Developers that wish to receive all official City communications in reference to this RFP shall sign and return the RFP's cover page to Phil Lusk, Power Resources Manager, via e-mail to plusk@cityofpa.us before February 17, 2012.

SECTION 2: RFP SUBMISSION INSTRUCTIONS

All Proposals received will become a part of the official City public records and may be subject to disclosure.

PROPOSAL FORMAT

Developers are expected to thoroughly examine all specific information and instructions set forth in this RFP. Each Developer shall furnish the full information required by this solicitation. The Proposal and all other information proposed by the Developer must be signed by an officer of the company who is legally authorized to enter into a contractual relationship for the Developer.

MANDATORY RFP DOCUMENTS SUBMISSION CHECKLIST

Developers must include the following information with their proposal:

- **Cover Letter:** and include a brief introduction of Developer
- **Part 1: Proposed Project Summary**
- **Part 2: Project Development Timeline**
- **Part 3: Project Development Experience, Qualifications and Financial Resources**
- **Part 4: Total Revenue and Anticipated Risk to the City**
- **Part 5: Local Socioeconomic Benefits**
- **Part 6: Proposed Development Agreement**

SUBMITTAL FORMAT

All proposals must be submitted in a sealed envelope or container with the outer-most container stating the full submission name of the Developer, address, telephone number, and "City of Port Angeles Landfill Gas Utilization Project".

One (1) CD-Rom or USB-thumb drive (digital) copy of the complete signed Proposal. The digital copy must be clearly labeled with the Developer's name used for Submittal.

Eight (8) Bound and Printed Copies of the complete signed Proposal.

Developers are responsible for informing any commercial delivery service, if used, of all delivery requirements and for ensuring that the required address information appears on the outer-most wrapper or envelope used by such service.

No responsibility shall attach to the City for the premature opening of a Proposal not properly addressed and identified, and/or delivered to the proper or improper address.

Proposals sent using facsimile will not be considered.

Proposals will be received at the following location, until **5:00 PM PDT, Friday, May 11, 2012.**

Where to submit Proposals:

Mailing Address

City of Port Angeles
Department of Public Works and Utilities
P.O. Box 1150
Port Angeles, WA 98362

Physical Location

City of Port Angeles
Department of Public Works and Utilities
321 East 5th Street
Port Angeles, WA 98362

RFP TIMETABLE

The anticipated schedule for the RFP and Development Agreement approval is as follows:

RFP Available	January 6, 2012
Deadline for Cover Page Submission	February 17, 2012
Pre-Proposal Conference and Site Visit	March 2, 2012
Deadline for Question Submissions	April 13, 2012
Deadline for Proposal Submission	May 11, 2012
Proposal Evaluations	June 15, 2012
Development Agreement Negotiations	June 29, 2012
Utility Advisory Committee Consideration	July 10, 2012
City Council Consideration	July 17, 2012
Proposals Valid Until	November 2, 2012

CONTACT PERSON

If any Developer has questions about the specifications or other solicitation documents, the Developer should email the contact listed below:

Philip D. Lusk
Power Resources Manager
plusk@cityofpa.us
360.417.4703

ADDITIONAL INFORMATION / ADDENDA

The City will issue responses to inquiries and any other corrections or amendments it deems necessary in written addenda issued prior to April 13, 2012. Developers should not rely on any representations, statements or explanations other than those made in this RFP or in any addendum to this RFP. Where there appears to be a conflict between the RFP and any addenda issued, the last addendum issued will prevail.

Any revisions to the RFP will be made only by addendum issued by the City, and will be posted at <http://olyphen.com/copa/LFG Project RFP>.

Developers are responsible for checking addendums and are instructed to contact only the contact person stated above to clarify any part of this RFP. Any unauthorized contact may result in the rejection of the Developer's Proposal.

Request for additional information or clarifications must be made in email to plusk@cityofpa.us no later than the date specified in the RFP Timetable. The request must contain the Developer's:

- a. Name
- b. Address
- c. Phone number
- d. Fax number
- e. Email address
- f. Question or reference to this RFP

ORIGINAL SOURCE

Developers who obtain this RFP from any source other than the City are advised to revisit the City's FTP website at <http://olympen.com/copa> under the "LFG Project RFP" folder to obtain any addenda, which may be issued. The City assumes no responsibility for Developers' failure to acknowledge any addenda issued.

Late Proposals, Modifications and Withdrawals

Proposals received after the proposal due date and time are late and will not be considered. Proposal modifications received after the RFP due date are considered late and will not be considered. The Proposal shall not be modified, withdrawn, or cancelled by the Developer until November 2, 2012.

COST INCURRED BY DEVELOPERS

All expenses involved with the preparation and submission of the Proposal to the City, or any work performed in connection therewith shall be borne by the Developer(s).

SECTION 2: REQUEST FOR PROPOSAL INTRODUCTION AND SUMMARY

GENERAL INFORMATION

Location

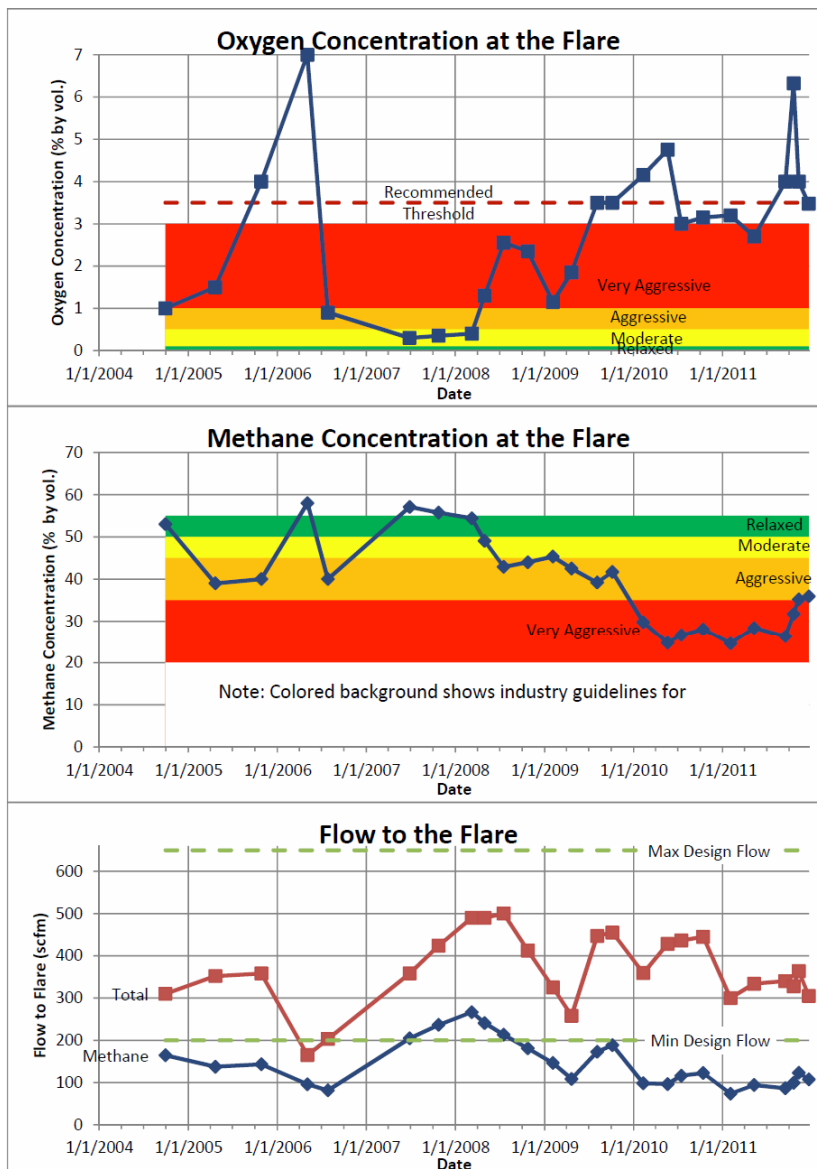
The Port Angeles Landfill is located in Clallam County, Washington, at 3501 West 18th Street in Port Angeles. The gas collection system serves approximately 22 acres. The average depths of the landfill cells vary considerably and are between 50 feet and 120 feet. The Port Angeles Landfill is surrounded by the Strait of Juan de Fuca to the north and undeveloped property to the east, west and south.

History and Management

According to City estimates, the City received approximately 50,000 tons of waste per year since the mid 1960's. The landfill was closed in 2008 and there are no plans to reopen it. The LFG resource was estimated using data from the Landfill Gas Assessment Report prepared for the City by SCS Engineers on October 30, 2008, which is provided as Attachment A to this RFP. Key information from that study came from the Landfill Gas Analysis and changes to the Landfill Gas Analysis would change the results of this study accordingly.

Waste in Place

According to City estimates, the total landfill waste is approximately 1,026,000 million tons. The landfill was closed in 2006 and there are no plans to reopen it. The LFG resource was estimated using data from the Landfill Gas Assessment Report prepared for the City by SCS Engineers on October 30, 2008, which is provided as Attachment A to this RFP. Key information from that study came from the Landfill Gas Analysis and



changes to the Landfill Gas Analysis would change the results of this study accordingly.

Based on City's best available information, graphs of historical oxygen and methane concentrations and flow to the flare facility are provided in Figure 7. As a result of overly aggressive recovery efforts by the City in late-2009, the LFG extraction rate now averages about 100 standard cubic feet/minute (scfm), consisting of 25%-35% methane by volume.

Prior to the 2009, the collection system flared about 475-500 scfm of LFG, with methane

Figure 7

concentrations in the 45%-50% range by volume.

One necessary component of a LFG-to-energy project is the gas collection and flare system. The current equipment gathers the LFG for combustion at an existing candlestick flare. Since the collection and flaring system already exists at the City's Landfill site, the costs associated with these systems represent a "sunk" cost and the Developer's project costs will only include modifications to the system to tie in to the proposed project equipment.

SECTION 3: SUMMARY OF SERVICES

SCOPE OF SERVICES

The City seeks Proposals from qualified Developers to implement a turnkey LFG utilization project at the City's landfill. Proposals should provide for installation, construction, and operation including all labor, equipment, materials, supervision, technical support, design and permitting (federal, state and local) of a beneficial use LFG project.

The City is interested in obtaining the best environmental and/or economic value for the City and is open to reviewing any credible submission, so long as the Proposal follows the full submission instructions.

The selected Developer will be expected to design, construct and initiate the operation, management and maintenance of the LFG collection, processing, conveyance and utilization system to work in concert with the existing LFG capture and control system at the City's landfill.

The selected Developer will be required to present all design, construction, operation, management and maintenance plans to the City for approval. These plans will be evaluated to determine and ensure that the proposed system does not interfere with the City's ability to operate and maintain the landfill in full regulatory compliance. The City recognizes that all recoverable LFG represents a potential revenue stream through the energy recovery and the selected firm is expected to maximize LFG recovery through installation of additional equipment to the existing voluntary LFG capture and control system.

SECTION 4: QUALIFICATIONS AND EXPERIENCE

DEVELOPER QUALIFICATIONS

The City may make such reasonable investigations as deemed proper and necessary to determine the ability of the Developer to perform the work and the Developer shall furnish to the City all such information and data for this purpose as may be requested.

The City reserves the right to inspect the Developers physical facilities prior to award to satisfy questions regarding the Developers capabilities. The City further reserves the right to reject any proposal if the evidence submitted by, or investigations of, such Developer fails to satisfy the City that such Developer is properly qualified to carry out the obligations of the contract and to complete the work/furnish the item(s) contemplated therein.

The Developer must have the following minimum qualifications and experience:

- a. Extensive documented experience designing, permitting, constructing, installing and operating, managing and maintaining LFG collection systems and beneficial use projects.
- b. If the Developer proposes a LFG-to-energy project, the Developer shall document that they have successfully implemented a LFG-to-energy/beneficial use project of this size preferably within a regulated energy market environment.
- c. Sufficient financial resources to finance, develop, operate manage and maintain the project.
- d. Proper registration and licensing to do business in the State of Washington.

INSURANCE

The City will require a Performance Bond, equal to the amount of the anticipated cost of the project, before construction begins. The Developer shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance specified below. The insurer shall be in good standing within the State of Washington.

The Developer shall procure and maintain for the remaining duration of the Project, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the Developer,

their agents, representatives, employees or subcontractors. Failure by the Developer to maintain the insurance as required shall constitute a material breach of contract upon which the City may, after giving five working days notice to the Developer to correct the breach, immediately terminate the Contract or at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the City on demand, or at the sole discretion of the City, off set against funds due the Developer from the City.

a. Minimum Scope of Insurance

The Developer shall obtain insurance of the types described below:

- i. Automobile Liability insurance covering all owned, non-owned, hired and leased vehicles. Coverage shall be written on Insurance Services Office (ISO) form CA 00 01 or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage.
- ii. Commercial General Liability insurance shall be written on ISO occurrence form CG 00 01 and shall cover liability arising from premises, operations, stop gap liability, independent contractors, products-completed operations, personal injury and advertising injury, and liability assumed under an insured contract. The Commercial General Liability insurance shall be endorsed to provide the Aggregate Per Project Endorsement ISO form CG 25 03 11 85. There shall be no endorsement or modification of the Commercial General Liability insurance for liability arising from explosion, collapse or underground property damage. The City shall be named as an insured under the Developer's Commercial General Liability insurance policy with respect to the work performed for the City using ISO Additional Insured Endorsement CG 20 10 10 01 and Additional Insured-Completed Operations Endorsement CG 20 37 10 01 or substitute endorsements providing equivalent coverage.
- iii. Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.
- iv. Builders Risk insurance covering interests of the City, the Developer, Subcontractors, and Sub-contractors in the work. Builders Risk insurance shall be on a all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including flood and earthquake, theft, vandalism, malicious mischief, collapse, temporary

buildings and debris removal. This Builders Risk insurance covering the work will have a deductible of \$5,000 for each occurrence, which will be the responsibility of the Developer. Higher deductibles for floor and earthquake perils may be accepted by the City upon written request by the Developer and written acceptance by the City. Any increased deductibles accepted by the City will remain the responsibility of the Developer. The Builders Risk insurance shall be maintained until final acceptance of the work by the City.

b. Minimum Amounts of Insurance

The Developer shall maintain the following insurance limits:

- i. Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of \$1,000,000 per accident.
- ii. Commercial General Liability insurance shall be written with limits no less than \$1,000,000 each occurrence, \$2,000,000 general aggregate and a \$1,000,000 products-completed operations aggregate limit.
- iii. Builders Risk insurance shall be written in the amount of the completed value of the project with no coinsurance provisions.

c. Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions for Automobile Liability and Commercial General Liability insurance.

- i. The Developer's insurance coverage shall be primary insurance with respect to the City. Any insurance, self-insurance, or insurance pool coverage maintained by the City shall be in excess of the Developer's insurance and shall not contribute with it.
- ii. The Developer's insurance shall not be cancelled or reduced as to coverage by either party, except after forty-five (45) days prior written notice by certified mail, return receipt requested, has been given to the City.

SECTION 5: EVALUATION & SELECTION

PROPOSAL EVALUATION

The selection committee will evaluate each Proposal based on the following criteria, in no particular order:

1. Proposed Project Summary (10%)
2. Project Development Timeline (10%)
3. Project Development Experience, Qualifications and Financial Resources (15%)
4. Total Revenue and Anticipated Risk to City (30%)
5. Local Socioeconomic Benefits (10%)
6. Proposed Development Agreement (25%)

SELECTION PROCESS

The selection committee may interview Developers as a part of the selection process. The selection committee reserves the right to perform any due diligence necessary to ensure that the Developer is capable of implementing a LFG project that is in the best interest of the City.

Total revenues and anticipated risk to the City, along with the proposed Development Agreement, will be a significant factors, but will not be the sole determining metrics. After any interviews have been conducted, the selection committee may negotiate changes to the proposed Development Agreement with the Developer, which, in its opinion, is the most qualified and has the best Proposal.

In the event that a Development Agreement is not reached with the selected Developer, the selection committee may choose another Developer with which to begin negotiations.

ASSIGNMENT OF DEVELOPMENT AGREEMENT

A Development Agreement shall not be assignable by the Developer in whole or in part without the prior written consent of the City. Additionally, after reviewing all submitted Proposals and Development Agreements, the City has the right to neither award nor assign any contract to a Developer, if the Proposal is deemed insufficient by

the City. The Developer's submittal of any Proposal is not intended to, and does not, constitute a binding agreement or establish any obligation of the City.

SECTION 6: ADDITIONAL GENERAL REQUIREMENTS

APPROVAL OF PROJECT DESIGN

All construction drawings, plans, construction specifications, equipment specifications, site plans, construction schedules, startup and operational procedures, and permit applications must be reviewed and approved by the City prior to implementation or permit application. Operation of the landfill and compliance with Federal, State, and local laws, codes, and regulations affecting the operation of the landfill shall take precedence over all aspects of the LFG beneficial use project.

PREPARATION

The City intends that responses to this RFP be concise and informative. Proposals should be organized in the order in which the requirements are presented in this RFP. An authorized representative with the authority to bind the Developer shall sign the proposal. All information requested by the City shall be submitted by the Developer. Failure to submit all information requested may result in the City requiring prompt submission of missing information and/or giving a lowered evaluation of the proposal.

UNDERSTANDING OF LOCAL CONDITIONS

The signatory to the Proposal acknowledges that it has satisfied itself as to the nature and location of the project, including but not limited to availability, quantity and quality of the LFG, labor, electric power, fiber optic network, communications, utility poles and underground conduits and vaults including clearance issues. The Developer further acknowledges that it has satisfied itself as to the character, quality, and quantity of information provided by the City. Failure by the Developer to acquaint itself with the local conditions and all the available information will not relieve it from its responsibility for determining the difficulty or costs of successfully performing the project. The Developer warrants that, as a result of its examination and investigation of all the data referenced above, it has considered all risks and can execute the project in a good and workmanlike manner and to the satisfaction of the City.

The following Parts 1-6 shall be used by the Developer to prepare its proposal to the City.

PART 1: PROPOSED PROJECT SUMMARY

Include, but not be limited to:

1. Developer should clearly define the intended use of the LFG under each development scenario proposed.
2. List the technology type and vendors used for sourcing the necessary equipment for the full project development.
3. Provide contact information, including company affiliation, title and location for the individual that would be the project lead if the proposal is selected by the City.
4. If the Developer is proposing an electricity project, please include the details of either a power purchase agreement (counterparty, term) or marketing plans for merchant generation. The City also requires the Developer to detail the proposed project's interconnection to the City's electric utility grid.
5. If the Developer is proposing an electricity project, the City will require the Developer to provide a memorandum of understanding or a term sheet stating which entity will be purchasing the power and any Renewable Energy Certificates ("RECs), the term of the agreement and the price per MWh for power & RECs.
6. Detail any teaming agreements or partnerships the Developer has in place that would allow 3rd party access to proposed project development and the City's Landfill.
7. Detail the major components of the proposed project, including, but not limited to, the capital equipment and its manufacturer. Manufacturer catalogue cut-sheets are acceptable. Also indicate if the proposal capital equipment is new or used.
8. List the local, state and federal permits required to construct, operate, manage and maintain the proposed project.

PART 2: PROJECT DEVELOPMENT TIMELINE

Include, but not be limited to:

1. Developer should provide a comprehensive project timeline clearly detailing the dates for expected Development Agreement execution, design, permitting, full construction schedule and the anticipated commercial operation date of the project.
2. Within the comprehensive project timeline, please include the anticipated amount of time budgeted between the full Development Agreement execution and the beginning of construction.

PART 3: PROJECT DEVELOPMENT EXPERIENCE, QUALIFICATIONS AND FINANCIAL RESOURCES

Include, but not be limited to:

1. List the LFG utilization projects the Developer has been involved with in the past five years. Provide a brief project description for each project that includes the technology used, construction cost, how the project was financed, and the length of time required from notice to proceed to start up of the system. Include a statement as to whether or not the facility has received any notice of deficiency or notice of violation from any regulatory agency.
2. The Developer should include a detailed statement of organizational structure and a summary of the makeup of that structure, including a brief statement concerning the names and experience of the staff to be directly assigned to this project.
3. Provide three references specific to the Developer's experience in developing beneficial use projects within the last five years.
4. List the primary subcontractors the Developer will use on this project and discuss their role on the project and Developer's previous experience working with these subcontractors. If there is any work the Developer plans to use a third party for, the City needs to be made aware of this in the Proposal.
5. The Developer should include a clear and concise description of their plan to finance the project, including sources of tax credits, grants, equity and debt.
6. Provide a description of the Developer's financial resources that demonstrates the means to finance or to obtain financing for the proposed project.

PART 4: TOTAL REVENUE AND ANTICIPATED RISK TO THE CITY

Include, but not be limited to:

1. If the Developer is proposing an electricity project, they should provide a separate valuation of the RECs along with the valuation of the electricity (MWh) produced by the project.
2. Provide a *pro forma* financial statement detailing all formulas and pricing assumptions used in calculating the final cost and revenue projections for the proposed project. The *pro forma* financial statement **must** identify any revenues, costs or financial risks that will be realized or incurred by the City in the conduct of the project.
3. If relevant, the developer must include any failure to complete previous beneficial use projects at landfills and detail the reasons for failure.

PART 5: LOCAL SOCIOECONOMIC BENEFIT

Include, but not be limited to:

1. The Developer should include an estimated number of jobs created during the construction phase of the project as well as any anticipated long-term jobs created as a result of the completed project's operation, management and maintenance.
2. Detail both the positive and negative impacts this project could have on the surrounding economic community, both during the construction phase and once the project is fully operational.

PART 6: PROPOSED DEVELOPMENT AGREEMENT

Include, but not be limited to:

1. The term of the proposed Development Agreement (*e.g.*, 10, 15, or 20 years).
2. The detailed terms and conditions of the proposed Development Agreement, which must also include a section on how the proposed project will be removed or abandoned in the event of a Developer default or the expiration of the Development Agreement.
3. The revenues, costs and risks to the City.
4. The required performance bond and certificate of insurance requirements.

ATTACHMENT A: SCS LFG ASSESSMENT REPORT

**Landfill Gas Assessment Report for a Glass and Ceramic Arts
Campus at the Port Angeles Landfill (Port Angeles, WA)**

Prepared for



**U.S. Environmental Protection Agency
Landfill Methane Outreach Program**

Prepared by

**SCS Engineers
11260 Roger Bacon Drive
Suite 300
Reston, Virginia 20190**

October 30, 2008

Executive Summary

Introduction

This Landfill Gas Assessment Report addresses the potential for using landfill gas (LFG) to fuel a public glass and ceramic arts complex. This report was prepared by SCS Engineers under contract with the U.S. EPA Landfill Methane Outreach Program (LMOP) for the Port Angeles Economic Development Chamber of Commerce.

The initial assessment shows that the utilization of landfill gas at the Port Angeles Landfill for a glass and ceramic arts complex is feasible. This investigation is not comprehensive, and a more complete feasibility study is recommended as the next step.

This investigation included internet research, a site visit conducted on August 14, 2008 by SCS Engineers, interviews with persons knowledgeable about the landfill, and a preliminary LFG feasibility assessment. The purpose of the site visit was to gather information, meet with local artists, and inspect the Port Angeles Landfill.

Key Findings

- The Port Angeles Landfill appears to have sufficient landfill gas to run all the artists appliances and supply the needs of an arts campus. In 1990, a gas extraction system consisting of vertical and horizontal extraction wells was installed at the landfill. The gas flow of the LFG collected from 1990 to 2006 was 200 standard cubic feet per minute (scfm). The current LFG collected at the landfill is 475-500 scfm (0.684 million standard cubic feet per day (mmscfd) to 0.72 mmscfd) with an average methane content of 40-45 percent. The increase in LFG is the result of the installation of a landfill cap in 2006. The LFG model (combined with reported gas flow data) indicates there should be sufficient gas to operate the artist facility for the next 30 years or more.
- Glass furnaces require extra heat when they are being recharged (as new glass is melted down). The relatively low BTU value of this landfill gas may be a problem when the furnaces are recharged. Removing some of the CO₂ from the gas may alleviate this problem.
- Land is available on or immediately adjacent to the Port Angeles Landfill property to construct the arts campus. Further research would be required to determine if the land could be purchased by the artist community, and at what price. Jeff Young, Superintendent of the Port Angeles Waste Water Treatment Plant, stated that the former wastewater lagoons on the landfill property are going to be closed and would be potentially available land for an art studio. He stated that the majority of the remaining land within the landfill property has been landfilled, and would not be suitable for buildings.

Background

Location - The Port Angeles Landfill is located in Clallam County, Washington, at 3501 West 18th Street in Port Angeles, Washington, with driving access from West 18th Street. It has a total of approximately 15 acres that has been landfilled to an average depth of 32 feet. The Port Angeles Landfill is surrounded by the Strait of Juan de Fuca to the north and undeveloped property to the west, east, and south.

History and Management – The Port Angeles Landfill is a public municipal solid waste landfill. In 1972 the city acquired and began operating the landfill. Prior to 1972, the landfill was privately owned and operated. The landfill closed in 2006. The city assumes that approximately 15 acres of the site has been used for landfilling.

Waste in Place –Waste disposal information from 2000 to 2005 for the landfill was collected from the Washington State Department of Ecology, and confirmed with Port Angeles Solid Waste management staff, was used for this study. According to estimates from Jeff Young of the City of Port Angeles, the landfill waste in place is approximately 1,710,000 cubic yards (also the permitted capacity) or 1,026,000 million tons of waste in place in 2006, the year the landfill closed.

Landfill Gas Collection System – Currently there is a landfill gas collection system in place at the landfill. The landfill was required to install a landfill gas collection system per the Olympic Region Clean Air Agency (ORCAA) Permit No. 90NOC439. The landfill is currently closed; however, the landfill gas projections indicate there should be sufficient gas to operate the artist facility for the next 30 years or more.

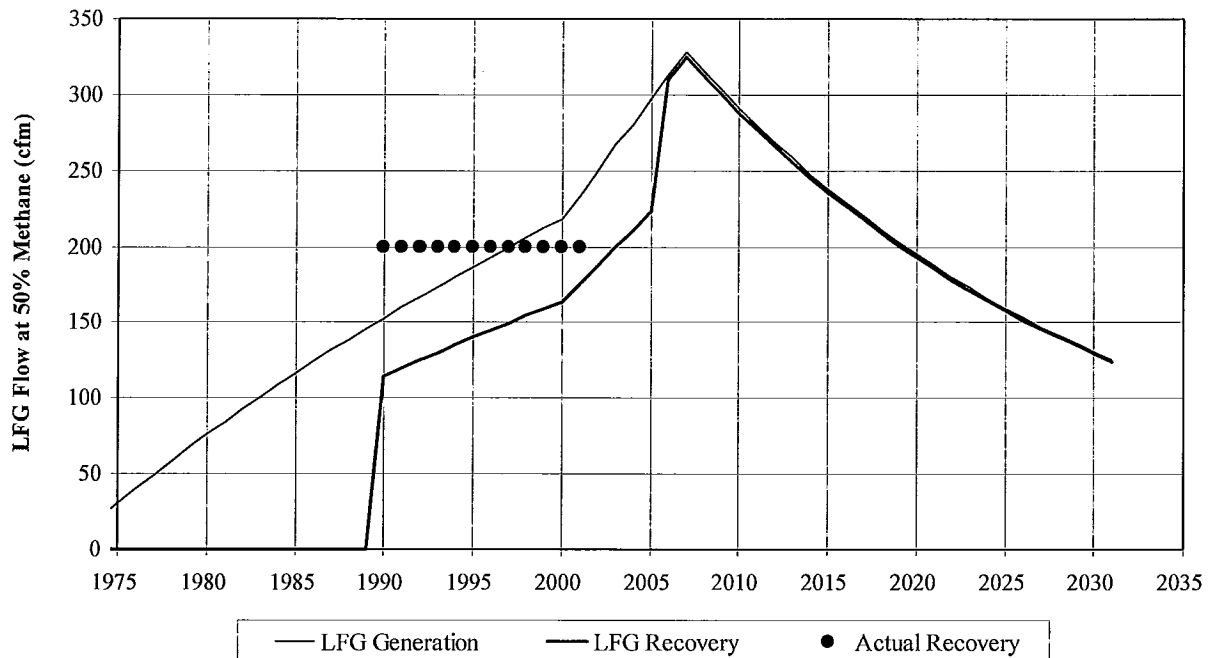
Port Angeles Landfill has a landfill gas collection system in place that consists of vertical landfill gas wells and horizontal collector wells, and two blowers connected to an enclosed flare. According to Jeff Young of the City of Port Angeles, the collection system currently flares about 475-500 standard cubic feet per minute (scfm) of landfill gas (0.684 million standard cubic feet per day (mmscfd) to 0.72 mmscfd. The LFG consists of 40 to 45 percent methane. The landfill is currently closed.



Landfill Gas Analysis

EPA LMOP also ran an LFGcost model to determine if the project was feasible for purposes of extracting and using the LFG. The economic evaluation assumed direct use of the LFG, capital costs and operation and maintenance of a pipeline to deliver the landfill gas, a fifteen year project lifetime, a ten year loan at 8 percent interest, and a distance of less than a quarter mile to the artist facility. The economic evaluation did not take into account the cost to purchase the land, building structure, or equipment (e.g. furnace(s), kiln(s)) to operate the artist community. The cost of the landfill gas collection system is not included in the cost; it is assumed that that current LFG collection system is sufficient. A constructed pipeline length of approximately 0.25 miles was assumed for economic evaluation purposes. Depending on where the artist community is located, the distance could be shorter or longer.

**LANDFILL GAS GENERATION AND RECOVERY RATES
Port Angeles SLF, Port Angeles, Washington**



Direct use technology involves using landfill gas (LFG) to offset the use of another fuel (natural gas, coal, fuel oil). This direct use of LFG can be in a boiler, dryer, furnaces, kiln, or other thermal applications. Over 100 projects using LFG in industrial and commercial applications have been developed to date including auto manufacturing, greenhouses, chemical production, food processing, pharmaceutical, cement and brick manufacturing, wastewater treatment, consumer electronics and products, paper and steel production, and prisons.

Summary of LFGcost Analysis*

Project Type	Net Present Value	Internal Rate Of Return	Net Present Value Payback (yrs)	Capital Costs	O&M Costs (Initial Year of Operation)
Direct Use	\$178,644	93%	0	\$83,329	\$6,781

*excluding cost to purchase the land, structure, or equipment to operate the artist community project.

Available Land – Further research would be required to determine what land nearby the landfill is available for an art studio. Based upon the cost of the land and building, the studio space fees could be determined. It needs to be determined if there is available land within the former landfill site that could be used for a studio. Initial conversations with Jeff Young, Superintendent of the wastewater treatment plant, indicated that there is limited non-landfilled space within the landfill property; however, there are former lagoons that are going to be closed and could potentially be used to house a studio.

Resources

Natural gas and propane are the two most common fuels for pottery kilns and glass furnaces. A strong and growing interest in alternative and renewable fuels exists among artists. The EnergyXchange Renewable Energy Center in North Carolina is a glass and clay facility whose concept would work well in Port Angeles. Stan Steury of Stewardship Associates works with the Energy Xchange in Asheville, North Carolina and is a good contact for further information regarding the existing art studio that utilizes LFG.

Financial– A grant search is needed to identify foundation and corporate resources. Jeff Young stated that the City conducted previous research to utilize the gas, but decided that it would not be cost effective. However, due to the minimal LFG needed for a gas studio, it seems that such a project would be advantageous to utilize the available gas presently being flared.

Key Contacts

1. Paul Labrie, Director, Artist heading efforts for this project; labrieglass@msn.com
2. Steve Sperr, P.E., Deputy Director of Engineering Services/City of Port Angeles; 360-417-4803; ssperr@cityofpa.us
3. Jeff Young, Superintendent, Waste Water Treatment Division, City of Port Angeles; 360-417-4845 (has knowledge of the lfg collection system at the site).
4. Tom Frankiewicz, EPA Landfill Methane Outreach Program, 202-343-9232; frankiewicz.thomas@epamail.epa.gov
5. Stan Steury, Stewardship Associates, 828-773-8752, works with the EnergyXchange in Asheville, North Carolina (an existing art studio that uses lfg).
6. Tom McCabe Superintendent, Solid Waste Division, City of Port Angeles; 360-417-4872
7. Glenn Cutter, Public Works and Utilities Director, City of Port Angeles; 360-457-0411

Summary and Next Steps

A landfill gas energy project to fuel an arts complex at the Port Angeles Landfill could provide the following benefits:

- Reduce the cost of fuel by replacing natural gas and propane with landfill gas for glass blowing and clay studios.
- Provide affordable studio space for clay and glass artists in and around the city of Port Angeles.
- Provide a community setting for established artists to mentor younger artists.
- Eliminate the negative environmental impact of using fossil fuels in art studios.
- Use the energy resources at the Port Angeles Landfill that are currently being flared and not used for energy.

- Provide development opportunities for other businesses interested in collocating with Arts Campus

Next Steps

- Tom Frankiewicz, LMOP, will meet with local partners to review this report later this year.
- Further funding and land availability research to be conducted by Paul Labrie and his art community for the purpose of obtaining a grant for a feasibility study and planning grant for this project.

LMOP is a voluntary partnership program that was created to reduce methane emissions from landfills by encouraging the use of landfill gas for energy. LMOP attempts to track whether or not specific landfills are required to reduce landfill gas emissions under the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills (NSPS/EG), and is providing such information to you now at your request. Because LMOP is not a regulatory program, it cannot make an official EPA designation regarding any landfill's NSPS/EG status. Information relating to NSPS/EG was obtained by voluntary submittal and is subject to change over time. Therefore, LMOP cannot guarantee the validity of this information and will assume no responsibility for inaccuracies contained in the data.

Background on Glass and Ceramic Arts Community and LFG Projects

Inspiration & Leadership -

In March of 2007, the Annual National Council on Education for the Ceramic Arts Conference occurred Louisville, Kentucky. At the conference she attended a panel discussion about the successful development of the EnergyXchange Renewable Energy Center (www.energyxchange.org) in western North Carolina and the planning of a similar arts campus by Lori Beck and Ohio Valley Creative Energy (www.ohiovalleycreativenergy.org) in southern Indiana, near Louisville. Both of these arts campuses are based on the use of landfill gas to fire ceramic kilns and glass furnaces. Nina was Artists enthusiastic about the prospects or a similar project in their area and contacted the US EPA's Landfill Methane Outreach Program (LMOP) for assistance. Two LMOP contractors, SCS Engineers and Stan Steury of Stewardship Associates were asked to provide assistance to identify a suitable host landfill and evaluate the potential for an artist campus project.

Arts Community Dynamics - The most common limiting factors in the development of ceramic and glass arts businesses in the region are the availability of affordable studio space and the high cost of fuel for kilns and furnaces. The high fuel cost is particularly true for glass artists where the glass furnaces run 24 hours a day/ 365 days per year. Glass blowers in the San Francisco region often spend in excess of \$3,000 per month for fuel (natural gas or propane).

Summary Report
LFGcost Analysis



U.S. EPA Landfill Methane Outreach Program

**Landfill Gas Energy Cost Model
LFGcost, Version 1.4
Summary Report**

Landfill Name or Identifier: Port Angeles Landfill, Washington

LFGE Project Type: Direct Use

Date: Tuesday, November 04, 2008

Disclaimer:

LFGcost is a landfill gas energy project cost estimating tool developed for EPA's LMOP. LFGcost estimates landfill gas generation rates using a first-order decay equation. This equation is used to estimate generation potential but can not be considered an absolute predictor of the rate of landfill gas generation. Variations in the rate and types of incoming waste, site operating conditions, and moisture and temperature conditions may provide substantial variations in the actual rates of generation.

The costs that are estimated by LFGcost are based on typical project designs and for typical landfill situations. The model attempts to include all equipment, site work, permits, operating activities, and maintenance that would normally be required for constructing and operating a typical project. However, individual landfills may require unique design modifications which would add to the cost estimated by LFGcost.

Analyses performed using LFGcost are considered preliminary and should be used for guidance only. A detailed final feasibility assessment should be conducted by qualified landfill gas professionals prior to preparing a system design, initiating construction, purchasing materials, or entering into agreements to provide or purchase energy from a landfill gas project.

Summary Results

Project Start Year:	2009
Project End Year:	2023
Project Type:	Direct Use

Financial Results:

Net Present Value:	\$178,644	<i>(at year of construction)</i>
Internal Rate of Return:	93%	
Net Present Value Payback (yrs):	0	<i>(years after operation begins)</i>
Capital Costs:	\$83,329	
O&M Costs:	\$6,781	<i>(for initial year of operation)</i>

These financial results DO NOT include the costs associated with the LFG collection and flaring system.

Environmental Benefits**Benefits from Collecting and Destroying Methane (during the life of the project):**

Lifetime		
(million ft ³ methane):	753	
(MMTCO ₂ E):	3.03E-01	
Average Annual		
(million ft ³ methane/yr):	50	
(MMTCO ₂ E/yr):	2.02E-02	

Benefits from Avoided Direct Use of Fossil Fuels (during the life of the project):

Lifetime (MMTCO ₂ E):	9.35E-03
Average Annual (MMTCO ₂ E/yr):	6.23E-04

Landfill Characteristics

Open Year:	1972
Closure Year:	2006
Waste-In-Place at Closure (tons)	1,027,470
Average Waste Acceptance (tons/yr):	30,220
Average Depth of Landfill Waste (ft):	32
Area of LFG Wellfield to Supply Project (acres):	15

Landfill Gas Generation, Collection, and Utilization**Modeling Parameters for First-Order Decay Equation:**

Methane Generation Rate, k (1/yr):	0.040
Methane Generation Capacity, L ₀ (ft ³ /ton):	3,204
Methane Content of LFG:	50%

Generated During Project Lifetime (ft³/min):

Minimum:	167
Annual Average:	225
Maximum:	293

Collected During Project Lifetime (ft³/min):

Minimum:	142
Annual Average:	191
Maximum:	249

Project Size: Defined by User

Design Flow Rate for Project (ft³/min): 50

Utilized by Project (ft³/min):
Annual Average: 45

LFG Collection Efficiency: 85%

Financial Assumptions

Loan Lifetime (years):	10	
Interest Rate:	8.0%	
General Inflation Rate:	2.5%	<i>(applied to O&M costs)</i>
Equipment Inflation Rate:	1.0%	
Marginal Tax Rate:	35.0%	
Discount Rate:	10.0%	
Down Payment:	20.0%	
Collection and Flaring Costs:	NOT Included	

Direct Use Production and Sales Summary

Pipeline Length From Landfill to End User (mi):	0.3	
LFG Average Utilization (million Btu/yr):	11,968	<i>(during the life of the project)</i>
Initial Year LFG Price (\$/million Btu):	4.5	
Royalty Payment to Landfill (\$/mmBtu)		