COUNCIL AGENDA: 10-16-07
ITEM: 7.2

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Larry Lisenbee
John Stufflebean

SUBJECT: SEE BELOW

DATE: 09-24-07

Approved

Date 9/26/07

COUNCIL DISTRICT: **City-Wide**

SUBJECT: REPORT OF BIDS AND AWARD OF CONTRACT FOR THE FUEL CELL SYSTEM PROJECT AND ADOPTION OF APPROPRIATION ORDINANCE AMENDMENTS IN THE SAN JOSE/SANTA CLARA TREATMENT PLANT CAPITAL FUND

RECOMMENDATION

1) Report on bids and award of two contracts for the project entitled, "Fuel Cell System," to the sole responsive bidder, Manuel Bros., Inc.:

   a) A design-build contract in the amount of $7,724,100 and approval of budget contingency of 10% at $772, 400.
   b) A service contract with a five year term and an annual cost of $203,932.80 commencing upon acceptance of the Fuel Cell System;

2) Adoption of a resolution authorizing the Director of Environmental Services to execute an option to replace the Fuel Cell System Module in the amount of $1,200,000, subject to future appropriation of funds by the Council.

3) Adoption of a resolution authorizing the Director of Environmental Services to negotiate and execute a Self-Generation Incentive Program contract with Pacific Gas and Electric, to receive a rebate of up to $4.5 million upon certification of the fuel cell system by Pacific Gas and Electric.

4) Adoption of the following Appropriation Ordinance amendments in the San José/Santa Clara Treatment Plant Capital Fund:

   a) Increase the Fuel Cell System appropriation by $4,917,000

   b) Decrease the Ending Fund Balance by $4,917,000

OUTCOME

Award of the design-build contract and approval of the Appropriation Ordinance will allow construction of the Fuel Cell System at the San José/Santa Clara Water Pollution Control Plant (Plant); and award of the service contract and approval of the Pacific Gas and Electric (PG&E) Self-Generation Incentive Program (SGIP) agreement will allow the City to receive a rebate of up to $4.5 million.

EXECUTIVE SUMMARY

The Plant is in the process of acquiring a Fuel Cell System to begin replacing aging engine generators. Having the ability to generate needed power in-house is essential for plant reliability in the event of a PG&E power outage. Staff looked at various replacement alternatives and identified fuel-cell electrical generation as a cost effective technology that would yield the greatest resource and environmental benefit to the City. This project is reserved to receive a rebate of up to $4.5 million from PG&E and with the requirement of a five-year service contract, the net project costs are $7.2 million. These costs are comparable to installing an internal combustion engine generator of similar size. While the costs are comparable, Fuel Cell Technology helps meet several of the City's goals, including energy self-sufficiency, green house gas reduction and implementing the Urban Environmental Accords. Staff is recommending the implementation of this project, including an additional appropriation request of $4.9 million in the current fiscal year, to cover the project costs above the allocated budget of $6.8 million. A rebate of $4.5 million is anticipated from PG&E to offset these costs in 2009.

BACKGROUND

The electrical generation and distribution system at the Plant is the lifeline of Plant operations, without which, the Plant would not function. As with much of the infrastructure at the Plant, the electrical system is 30 plus years old and is at a high-risk of failure. Of the eight existing engine generators at the plant representing a electrical capacity of 13 mega-watts (MW), one ¾ MW unit has failed and cannot be placed back in service, and four of them representing an additional 4.2 MW need replacement due to a lack of reliability, high maintenance costs, and difficulty in obtaining spare parts.

The Plant uses an average of 8.5 MW of electricity for its daily operation, with peak power loads reaching 12 MW on occasion. On average, 7.4 MW is generated in-house using engine generators fueled by natural gas purchased from PG&E, landfill gas purchased from Newby Island Landfill and digester gas produced on-site during the anaerobic digestion process of wastewater treatment. The remaining 1.1 MW of electricity is purchased from PG&E. Although the Plant has engine generation capacity of up to 12 MW, generation frequently falls short of demand due to the unavailability of generators down for maintenance and other operability factors. Even though the plant can purchase all of its electricity needs from PG&E, the ability to generate electricity in-house is critical for reliable plant operations in the event of a PG&E power

failure from an earthquake, blackout or other emergency. The plant can not go more than 10 minutes without power before raw sewage flows out of the collection system and floods onto plant grounds. Lack of reliable in-house electrical generation during PG&E power failures can have disastrous consequences with significant damage to critical equipment and facilities, and potential discharge of untreated sewage. In addition, the plant can generate power at a lower cost then can be purchased from PG&E.

Concurrent with the needs at the Plant for replacing aging engine generators, are the needs for increased energy efficiency and environmental sustainability. Concerns over climate change and environmental responsibility have prompted the City and the State of California to establish policies and programs aimed at addressing these issues. These include:

- The City signing the Urban Environmental Accords (November 2005).
- The City signing the U.S. Conference of Mayors Climate Protection Agreement (March 2007) with a goal of reducing greenhouse gas emissions by up to 80% of 1990 levels.
- The State of California, through the California Public Utilities Commission (CPUC) started the SGIP which offers substantial rebates towards the implementation of "greener" self-generation technologies, such as Photovoltaic Cells (solar), fuel cells, and wind turbines.

All of these developments prompted Staff to evaluate options for electrical power generation, which could meet the City's environmental goals and at the same time take advantage of the rebate incentives offered by the CPUC. Staff has evaluated the cost benefits and applicability associated with these "green" technologies and identified fuel cell electrical generation as a cost-effective technology that would yield the greatest resource and environmental benefit to the City. The enticement for fuel cells represents the highest financial incentive due in part to the required use of renewable energy (digester/landfill-methane gas) and lower air emissions compared to other technologies commonly used at self-generation facilities. Fuel cells generate approximately 20% less greenhouse gases compared to internal combustion engines and near zero air pollutant emissions. As a result, fuel cells do not require an air permit to operate. Fuel cells also have an added advantage of delivering a valuable by-product, hot water, which is recovered and reused in Plant operations.

As a result of these findings, City staff submitted an application for reservation of the rebate for the installation of a 1 MW fuel cell and received a conditional reservation letter for a maximum rebate up to $4.5 million. The remaining two important milestones of the conditional reservation are as follows:

- Execution of a contract for the purchase and installation of the fuel cell by October 28, 2007

- Submit proof of installation and operation of fuel cell by September, 1, 2008

ANALYSIS

The project which included the design-build of the fuel cell system, a five-year maintenance service contract (as required by PG&E to qualify for the rebate) and restacking of the fuel cell at the end of the five-year period was advertised in May 2007 and bids were opened on June 28, 2007. The bid results are as follows:

			Variance Over / (Under) Engineer's Estimate	
Contractor	City	Bid Amount	Amount	Percent
Alliance Power, Inc.	Littleton, CO	$ 11,187,040	$ 4,387,040	64%
Manuel Bros., Inc.	Grass Valley, CA	$ 9,943,764		
Revised Engineer's Estimate		**$ 9,160,000**	**$783,764**	**9%**
Initial Engineer's Estimate		$ 6,800,000	$ 3,143,764	46%

The bid submitted by Alliance Power has been determined to be non-responsive, due to the bidders' lack of the required contractor's license. The bid submitted by Manuel Bros., Inc., for the amount of $ 9,943,764 is 46% higher than the initial engineer's estimate. Staff has analyzed the engineers estimate and determined that the initial engineer's estimate had the following discrepancies:

- The engineer's estimate was for a 1 MW fuel cell system. Recent technology changes made the 1 MW size unavailable and the bid was based on a 1.2 MW system, which has 20% higher capacity, hence accounts for 20% additional cost.

- The need for a fuel cleansing system in order to run the fuel cell on Plant generated digester gas versus purchased natural gas which accounts for an additional $1.0 million in project costs.

Staff has prepared a revised estimate of $9.16 million to correct for the above discrepancies. At $9,943,764, the lowest bid is 9% above revised engineer's estimate. Staff believes this over bid price is a result of substantial increase in material and labor costs, and the demand for fuel cells due to a growing interest in green power generation technologies. Additional benchmarking was also conducted with other agencies in California that have recently implemented fuel cell technology (City of Los Angeles, City of Tulare, City of Santa Barbra) as part of the SGIP. This benchmarking indicates the cost of implementation of fuel cell technology at a unit rate of between $7,000 to $8,000 per Kilowatt-hour (KW-hr) excluding the service agreement and restacking fees. The current low bid price is within this range of costs ($7,290/Kw-hr) and is deemed to be a reasonable cost for the implementation of the fuel cell technology at the Plant.

Staff evaluated other alternatives for meeting the energy needs at the Plant, such as replacing the engine generator with another internal combustion engine. A summary of this analysis is shown in the table attached to this memorandum (Attachment-A). As can be seen from this table, the

Fuel Cell System has an initial capital cost about 77% higher than that of installing an engine generator, $8.7 million versus $4.9 million, respectively. However, the larger rebate, lower fuel usage, and the avoidance of additional expenditures related to permit compliance, offset the difference in capital costs.

Fuel cells do not require an air permit to operate and therefore result in significant savings related to permitting and compliance activities compared to engine generators. Fuel Cells have near zero air emissions (3 lbs/day) when compared to engine generators (260 lbs/day), and lower green house gas emissions. Due to the much higher air emissions, installation of an engine generator will require a permit from the Bay Area Air Quality Management District (BAAQMD) and the purchase of Emissions Reduction Credit (ERC) at an average cost of $300,000. The past decade has seen a steady tightening of internal combustion engine emissions standards resulting in increased costs for engine retrofits to meet new regulatory requirements and emissions monitoring. With the passing of Assembly Bill AB 32, concerns over climate change and air quality, this trend is expected to continue, resulting in less regulatory certainty for an engine generator than for the fuel cell.

Council policy provides for a standard contingency of ten percent for utility projects. Approval of ten percent contingency at $772,400 will provide funding for any unanticipated work necessary for the proper completion or construction of the project. The project also requires additional work to be completed either by Staff or under a separate construction contract related to utility interconnections at an estimated maximum cost of $1,000,000. The project will cost the City $7,216,174 after accounting for all project costs minus the PG&E rebate.

An additional funding of $4,917,000 is recommended as part of this memorandum to cover the unfunded part of this project. It should be noted that the estimated 2009-2010 Ending Fund Balance in the 2008-2012 Adopted CIP is $1,851,969. As more assets fail due to deferred rehabilitation and replacement; and lack of funding, the risk of catastrophic failure and increased costs is inevitable. This action will require the Environmental Services Department to reevaluate needs and prioritize future projects for Council consideration during the next budget process.

EVALUTION AND FOLLOW-UP

The implementation of this project is contingent upon the completion of the interconnection of the various utilities such as water, gas, and electricity for the Fuel Cell System. This interconnection project is likely to be completed under a separate contract or by City staff. Items requiring Council action as part of that project will be brought forward to Council and Treatment Plant Advisory Committee (TPAC) as they arise. The construction of the interconnection project is scheduled to start by June 2008 and completed by August 2008.

POLICY ALTERNATIVES

Alternative 1: Purchase and install an internal combustion engine-generator
Pros: Plant staff is very familiar with this technology. Engine generators get needed power online quickly.
Cons: This technology is less clean, less efficient, and has a smaller financial incentive through the SGIP.
Reason for not recommending: With similar net capital and O&M costs, the uncertainty related to the ongoing compliance costs and the fact that internal combustion engines are less green than fuel cells, makes this alternative less desirable.

Alternative 2: Reject bid, drop project and purchase needed power from PG&E
Pros: Funds already allocated for engine-generator replacement could be used for the electrical reliability project.
Cons: Five of the eight engine generators at the Plant are already 40+ years old resulting in reduced reliability in the event of a PG&E power failure. The City will also lose the opportunity for a $4,500,000 rebate and will forfeit the SGIP application fee of $22,500.

Reason for not recommending: Continued increases in operating and permit compliance costs and the loss of electrical reliability for the Plant.

PUBLIC OUTREACH/INTEREST

✓ **Criterion 1:** Requires Council action on the use of public funds equal to $1 million or greater. **(Required: Website Posting)**

☐ **Criterion 2:** Adoption of a new or revised policy that may have implications for public health, safety, quality of life, or financial/economic vitality of the City. **(Required: E-mail and Website Posting)**

☐ **Criterion 3:** Consideration of proposed changes to service delivery, programs, staffing that may have impacts to community services and have been identified by staff, Council or a Community group that requires special outreach. **(Required: E-mail, Website Posting, Community Meetings, Notice in appropriate newspapers)**

This item meets Criterion 1. The request for bids for this project was published by the City Clerk's Office in the San José Post Record, and by the City's Project Manager on the ESD Internet website, and City of San José's Bid Line.

This award memo will be posted on the City's website for the October 16, 2007 Council Agenda.

COORDINATION

This project and memorandum have been coordinated with the Departments of Planning, Building and Code Enforcement, Office of Equality Assurance, Risk Management, City Manager's Budget Office, and the City Attorney's Office. The City submitted an Air Board permit application to BAAQMD and received a permit to construct and operate. The City coordinated with PG&E and submitted an application for rebate through the SGIP and the City has received a conditional reservation letter. This item is scheduled to be heard at the October 11, 2007 TPAC meeting.

FISCAL/POLICY ALIGNMENT

This project is consistent with the Council approved Budget Strategy, Economic Recovery section, in that it will help to stimulate construction spending in our local economy. This project is in line with the City's Resolution Endorsing the U.S. Mayors Climate Protection Agreement, Urban Environmental Accords Action #3, and helps achieve the City's green house gas reduction goals. Fuel cell is a more efficient electric generation technology and will produce less greenhouse gasses compared to other technologies at the same amount electric energy produced.

COST SUMMARY/IMPLICATIONS

1. AMOUNT OF RECOMMENDATION/COST OF PROJECT: $ 9,943,764

Design	$ 108,400
Construction	$ 7,615,700
Contingency	$ 772,400
Service Contract	$ 1,019,664
Restacking (an option in the service contract)	$ 1,200,000
Interconnections	$1,000,000
Total Project Costs	**$11,716,164**
Rebate from PG&E (Estimated)	($4,500,000)
Net Project Costs	**$7,216,164**

2. COST ELEMENTS OF AGREEMENTICONTRACT:

Fuel cell system equipment	$6,287,700
Design	108,400
Five-Year Service Agreement	1,019,664
Restacking (an option in the service contract)	1,200,000
Fuel cell installation and commissioning	1,328,000

TOTAL CONSTRUCTION CONTRACT $9,943,764

3. SOURCE OF FUNDING: 512 - San José/Santa Clara Treatment Plant Capital Fund

4. FISCAL IMPACT: This project is consistent with the Council approved Budget Strategy, Economic Recovery section, in that it will help to stimulate construction spending in our local economy. The new Fuel Cell system will be operational by September 2008. This project includes operation and maintenance of the Fuel Cell for the first five years and will have an annual cost of about $443,932 including the price of restacking.

BUDGET REFERENCE

The table below identifies the fund and appropriations proposed to fund the contract recommended as part of this memo and remaining project costs, including project delivery, construction, and contingency costs.

Fund #	Appn #	Appn. Name	RC #	Total Appn.	Amt. for Contract	Proposed Budget Page	Last Budget Action (Date, Ord. No.)
Remaining Project Costs				**11,716,164**			
Current Funding Available							
512	5955	1MW Fuel Cell		5,200,000		V-140	6/19/2007
Total Current Funding Available				**5,200,000**	**9,943,764**		
Additional Funding Recommended				**4,917,000**[1]			
512	8999	Ending Fund Balance		4,917,000			
Funding in future years of CIP				1,600,000			
Total Funding for Remaining Project Costs				**11,717,000**[2]	**9,943,764**		

[1] This memorandum includes appropriation action requests that would decrease the Ending Fund Balance from $38,872,969 to 33,955,969.
[2] Revenue of $4.5 million from PG&E to offset these costs is included in the 2008-2009 budget projections.

CEQA

CEQA: Exempt, PP07-007.

for Angela A. Maguire

LARRY LISENBEE
Budget Director

JOHN STUFFLEBEAN
Director, Environmental Services

For questions please contact Dale Ihrke, Deputy Director, Environmental Services at (408) 945-5198.

Attachment

ATTACHMENT – A

Comparison of Energy Generation Options at the SJ/SC Water Pollution Control Plant

	1.2 MW FUEL CELL	1.2 MW ENGINE GENERATOR	PG&E
Capital Costs			
Construction	$8,724,100	$4,860,000	-
PG& E Rebate	($4,500,000)	($1,000,000)	-
Emission Reduction Credit	-	$300,000	
Net Capital Costs	$4,224,100	$4,160,000	
Annual Costs			
Annual O&M Cost	$443,626	$300,000	
Annual Fuel Cost	$413,000	$523,000	-
PG&E Costs	$65,000	$128,000	$1,200,000
By-Product Value (Hot Water)	($50,000)	-	-
Total Annual Costs	$871,626	$951,000	
Annual Savings (Compared to PG&E costs)	**$328,374**	**$249,000**	-
Payback in years	**13**	**17**	
Environmental Factors			
Green House Gas Emissions (CO2)	26,700 lbs/day	32,200 lbs/day	-
Air Pollutants (NOx, CO, POC)	3 lbs/day	260 lbs/day	-
Air Permit	None	Ongoing compliance testing; less regulatory certainty	-
Policy Alignment	♦ Sustainability ♦ Green House Gas Goals ♦ Energy Self Sufficiency	♦ Energy Self Sufficiency	-