TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON MARCH 18, 2013**
FROM:	**JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE**
SUBJECT:	**LANDFILL GAS UTILIZATION - NEXT STEPS – PREPARING FOR A FEED-IN-TARIFF SUBMISSION**

RECOMMENDATION

That, on the recommendation of the Director – Environment, Fleet & Solid Waste, the following actions be taken with respect to landfill gas utilization:

a) the Civic Administration **BE AUTHORIZED** to undertake the necessary due diligence on London District Renewable Energy Cooperative (LDREC) to become a joint venture partner with the City of London with respect to the landfill gas electrical generation power plant at the W12A landfill;

b) subject to the successful completion of a) above, the Civic Administration **BE AUTHORIZED** to negotiate a joint venture agreement as per the requirements of the Feed-in-Tariff (FIT) Program with LDREC to develop a landfill gas electrical generation power plant at the W12A landfill for submission to a future meeting of the Civic Works Committee for consideration;

c) the Civic Administration **BE AUTHORIZED** to prepare and release a Notice of Intent to private sector power developers for the design, construction, operation, and maintenance of a landfill gas power plant, which will contain technical information on the landfill gas collection system and its performance to provide developers an opportunity to consider development options;

d) the Civic Administration **BE AUTHORIZED** to prepare and release a Request for Proposals (RFP) for the design, construction, operation and maintenance of a landfill gas power plant, subject to the RFP containing the following:
   i) ensurance of opportunities for private sector financing and operation are presented as per the requirements under a FIT contract arrangement and without a FIT contract arrangement;
   ii) inclusion of the physical space and layout(s) of potential future use of other bioenergy feedstocks that could be used as energy sources contingent upon the resolution of the current electrical transmission constraints; and
   iii) provision for a thorough description of the role of the joint venture partner and its relationship to the FIT project and the private sector power plant developer; and,

e) the Civic Administration **BE DIRECTED** to report back to the Civic Works Committee providing the results of the RFP process.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

Relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Update on Landfill Gas Utilization, December 17, 2012 meeting of the Civic Works Committee (CWC), Agenda Item #4
- Request for Expressions of Interest for Partnership in Biogas Utilization, September 27, 2011 meeting of the Community and Neighbourhoods Committee (CNC), Agenda Item #11
- Feed-In-Tariff Contract with the Ontario Power Authority for W12A Landfill Gas Power Plant, June 7, 2010 meeting of the Environment and Transportation Committee (ETC), Agenda Item #22
- HELP Clean Water - Revised Priority List, October 27, 2008 meeting of the ETC, Agenda Item #3

BACKGROUND

PURPOSE

The purpose of this report is to provide the Civic Works Committee and Council with details in 8 areas including the supporting details for recommendations a) to d) as follows:

1. Status of Ontario's Feed-in-Tariff (FIT) Program
2. **Recommendations a) & b)** - A summary of the outcome of a Request for Expressions of Interest (REOI) from potential community energy co-operatives or aboriginal community partners for the joint-venture development of a landfill gas power plant under the Ontario Power Authority's (OPA's) Feed-In Tariff (FIT) program
3. The role of private sector participation and investment
4. An updated Business Case Summary for landfill gas utilization at the W12A Landfill Site (for electricity generation)
5. The status of HELP Clean Water funding
6. The potential role for other bioenergy feedstocks
7. **Recommendation c) & d)** – Preparation and Release of a Notice of Intent and Request for Proposals (RFP) for the Design, Build and Operation of the Landfill Gas Power Plant at the W12A Landfill Site
8. What happens if there is no FIT Program – is the landfill gas utilization project still feasible?

CONTEXT

At its January 15, 2013 meeting, Council adopted the following recommendation with respect to the landfill gas utilization at the W12A Landfill:

*(a) the Civic Administration **BE AUTHORIZED** to prepare options and an updated business case for the development of a landfill gas power plant to produce electricity at the W12A landfill including clearly defined roles for optimizing private sector investment and operations, the role for a community energy co-op or aboriginal participation, all other related matters as required by the Ontario Power Authority, the funding allotted from HELP Clean Water from the federal and provincial governments, and report back in March 2013. It being noted that a full report on Biosolids will be coming forward at a future date.*

The recent efforts to utilize landfill gas for renewable energy production are contained in a summary table format in Appendix A.

DISCUSSION

1. Status of Ontario's Feed-in-Tariff (FIT) Program

It is expected that the Ontario Power Authority (OPA) will issue a request for approximately 500 megawatts of power from new, large (greater than 500 kilowatt) renewable energy projects sometime in 2013.

Based on the experience with the recent Small FIT (less than 500 kW) procurement process, where over 800 megawatts of applications were received for a Small FIT procurement target of only 200 megawatts, competition for a FIT contract is expected to be strong. Under the new "points-based" FIT application process, successful applications would need to be in the top quartile in terms of project ranking within this ten-point system.

The City's best chance to be awarded a FIT contract is if it qualifies as a Community Participation Project as well as a Contract Capacity Set-Aside (CCSA) Project. For maximum competitiveness in the FIT process for our W12A Landfill gas project, the City would also need to maintain the City of London's Time Stamp from its Pre-Existing Application (in 2010) to act as a tie-breaker in the event that we are tied for FIT priority points with other joint venture projects across Ontario.

Joint Venture
To qualify for as a CCSA Project and retain the City's Time Stamp, the current OPA FIT rules (FIT 2.1) require that the City establish a Joint Venture with an Aboriginal Community or a Community Energy Co-op with the following structure:

- The City would elect or appoint fifty per cent (50%) or more of the individuals of who are responsible for the supervision or management of the Joint Venture
- The City would have 49% or more of the economic interest in the Joint Venture
- Aboriginal Community or a Community Energy Co-op would have 50% or more of the economic interest in the Joint Venture.

This is similar to what has just been organized with London Hydro and London District Renewable Energy Cooperative (LDREC) for rooftop solar projects. For these solar projects, the economic interest, equity brought to the table, and profit split after all operational expenses are paid, will be divided 49 percent London Hydro and 51 percent LDREC. London Hydro remains in management control of the projects (as per OPA rules for CCSA Eligible Projects, where the Joint Venture agreement states that London Hydro elects three members to the executive committee and that LDREC elects two).

Proposed Asset Ownership
The Joint Venture would share in the ownership of the power plant, which would include the ancillary equipment needed to operate the power plant, such as gas cleaning equipment and transformers. The City would have 49 percent or more of the economic interest in the Joint Venture, and its joint venture partner would have 50 percent or more of the economic interest in the Joint Venture.

The City of London would retain 100 percent ownership of the gas collection system. The City of London would expect the Joint Venture would pay landfill gas utilization rights to the City to take into account the value of this existing infrastructure and the inherent fuel value of the landfill gas.

As a final note of importance, the OPA is planning to review FIT rules prior to the opening of the Large FIT procurement process, and that the requirements above could change as a result.

2. Recommendations a) & b) - A summary of the outcome of a Request for Expressions of Interest (REOI) from potential community energy co-operatives or aboriginal community partners for the joint-venture development of a landfill gas power plant under the Ontario Power Authority's (OPA's) Feed-In Tariff (FIT) program.

As previously noted, the City's best chance to be awarded a FIT contract is if it qualifies as a Community Participation Project and as a CCSA Project by establishing a Joint Venture with an Aboriginal Community or a Community Coop.

To confirm there was interest in such a Joint Venture, a Request for Expressions of Interest (REOI) was sent out to the following aboriginal communities and community energy cooperatives:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Chippewas of the Thames First Nation
- Delaware Nation
- Chippewas of Kettle and Stony Point First Nation
- Munsee-Delaware Nation
- Oneida Nation of the Thames
- Walpole Island First Nation
- London District Renewable Energy Co-operative Inc.
- Green Energy London Co-Operative Inc.
- Ontario Sustainable Energy Association

The City of London only received one Expression of Interest, and that was from the London District Renewable Energy Co-operative Inc. (LDREC.)

Given that the City of London only received one Expression of Interest, the next steps will be simpler:

- Carry out a due diligence assessment of LDREC organization and financial capabilities
- Subject to the outcome of the previous step, enter in to a Joint Venture agreement with LDREC

Summary - Recommendations a) & b)
Based on the outcome of the REOI, City staff recommend proceeding with the assessment of LDREC's organizational and financial capabilities. Once confirmed, City staff will then enter in to negotiations for the Joint Venture partnership.

3. The Role of Private Sector Participation and Investment

The private sector cannot have direct ownership of the project if the project is to qualify as a Community Participation Project, a Contract Capacity Set-Aside (CCSA) Project, and maintain the City's Time Stamp. However, the private sector will be asked to submit proposals and pricing structures in these areas:

- Design, build, operate, and maintain the power plant on a fee for service basis, similar to that taken by Miller Waste to build and operate the Materials Recovery Facility
- Provide financing for some or all of the City of London's share of the development of the power plant subject to a financing analysis, and
- Provide financing to the selected Community Energy Co-op partner, subject to the Co-op requirements.

It is estimated that the Landfill Gas Power Plant will generate around eight jobs (three direct and five indirect) during construction and four indirectly-supported permanent jobs, based on the US National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) Model for natural gas power plants.

4. An Updated Business Case Summary for the Landfill Gas Utilization at the W12A Landfill Site (for Electricity Generation)

The economics and business case of developing a power plant at the W12A landfill, assuming the City can get a FIT contract, was examined for worst, expected and best case scenarios. The expected revenue under each scenario is provided in Table 1 (next page).

In summary, developing a landfill gas power plant as a Joint Venture under Ontario's FIT Program is expected to cost the City approximately $5 million and generate between $8 million (worst case) and $14 million (best case) in revenue over a projected 20 year period.

Potential Sources of Financing
Financing of the City of London's share of capital contribution for the development of the power plant will come from private sector (e.g., debenture, other financing arrangements) or Federal Gas Tax funding allocated to Solid Waste Management. The annual operating profit of the power plant is expected to cover any financing payments (if Federal Gas Tax funding is not used) and therefore there will be no requirement for the use of property tax to support the City of London's share of the construction and operation of the power plant.

The City's Joint Venture partner will be responsible for providing their own share of capital (about $5,000,000) through their own means.

5. The Status of HELP Clean Water Funding

Under the HELP Clean Water funding program, $4.6 million was originally allocated for "Methane Gas Capture and Green Power Production at W12 Landfill (SW6040)". Under the funding agreements with each of the Federal and Provincial governments, eligible project costs are shared equally amongst the three levels of government to a maximum contribution by Canada of $1,533,333 and by Ontario of $1,533,000.

Table 1 – Business Case Scenarios Assuming a FIT Contract

Consideration	Worst Case (landfill closure in 2024)	Expected Case	Best Case (more landfill gas)
Scenario Assumptions			
Nameplate Capacity (megawatts)	2.0	2.0	2.4
Capacity Factor	93% operating time 15% per year decline starting in 2028	93% operating time	93% operating time
Capital Costs			
Capital Cost	$10,000,000	$9,500,000	$9,500,000
City's Share of Capital based on FIT Rules	$4,900,000	$4,655,000	$4,655,000
Estimated Annual[a] Revenue and Costs			
FIT Revenue	$1,475,000	$1,725,000	$2,070,000
Direct Operating Cost	$780,000	$735,000	$795,000
City's Share of operating profit[b]	$340,000	$485,000	$625,000
Selling Gas Rights to Joint Venture	$70,000	$95,000	$100,000
Annual City Profit	$410,000	$580,000	$725,000
Simple Payback	12 years	8 years	6 years

Notes: a) Based on Net Present Value over 20 years
b) Based on 49% of JV's FIT revenue and costs

To date, $1,485,000 has been used towards the installation of a three phase power line from the landfill to the Wonderland Transformer Station, of which $990,000 was covered by the Federal and Provincial governments through the HELP/BCF program. This power line is required in order to get any power generated onto the electrical distribution grid. The upgraded power line was also required to support the new Material Recovery Facility and the new leachate pumping station.

During the February 28, 2013 meeting of the HELP/Building Canada Fund Agreement Management Committee, representatives from Infrastructure Canada, the Ontario Ministry of Agriculture and Food, and the Ontario Ministry of Rural Affairs expressed concerns about the uncertainty surrounding Provincial green energy policies, and the Committee's ability to recommend the reallocation of funding at a future date should the Provincial energy policies further delay the power plant project, or the proposed project not be approved under the FIT program. As of March 8, the Agreement Management Committee recommended that the remaining HELP funding be reallocated to enhanced and/or proposed water supply infrastructure projects that are currently under funded, as part of the Scope Change discussions currently underway for HELP Clean Water.

6. The Potential Role for Other Bioenergy Feedstocks

There has been some private sector interest expressed in the potential use of other bioenergy feedstocks (e.g., biosolids from sewage treatment, food processing residuals, etc.) for biogas production. Technologies such as anaerobic digestion and gasification could be constructed at the W12A Landfill Site. One goal of the Landfill Gas Utilization project at the W12A Landfill is to ensure that additional space is set aside to allow the expansion of energy production at the site. Potential facility layout and design would become part of a separate RFP process when electrical transmission capacity constraints, as noted below, have been removed.

Currently, there are two very important factors to consider about using the W12A Landfill Site as a location for additional facilities at this time:

- Under the OPA FIT rules, it is not possible to combine fuels into one project, as biogas gets a different FIT price than landfill gas. It is permitted to have multiple projects at one address if they use a different energy source (i.e., landfill gas and biogas). However, a biogas-based project at the landfill site would have to stand-alone with a FIT application to be evaluated separately by the OPA. Currently there is no specific FIT pricing for gasification projects but it is our understanding that this is under consideration on a case-by-case basis.

- According to current OPA information, there is about 3.4 MW of available capacity at the Wonderland Transformer Station. The current W12A Landfill gas power plant, with its Time Stamp point advantage, would use up to 2.4 MW of this capacity. This does not include potential growth in landfill gas quantities under different advanced gas recovery strategies. Based on preliminary information from London Hydro, recent Small FIT solar project applications may also use up to around 0.2 MW of this available capacity, leaving about 0.8 MW of capacity for a potential biogas project. It is not known what other projects may be pursuing some or all of the 3.4 MW capacity.

As noted in the Civic Works Committee report entitled Timeline for Major Environmental & Engineering Reports presented on February 25, a Sewage Residual Management Review is under way and is scheduled to be completed in July 2013. There are other approaches to managing residuals that involve different processes and infrastructure. These may have energy recovery and beneficial end use possibilities. London's existing method (i.e. trucking biosolids to a central location followed by dewatering, incineration and ash disposal) has energy recovery potential. It will be benchmarked against other approaches to provide long term planning direction on residual management, the optimization of it and related energy recovery potential.

7. Recommendation c) & d) – Preparation and Release of a Notice of Intent and a Request for Proposals (RFP) for the Design, Build and Operation of the Landfill Gas Power Plant at the W12A Landfill Site

The next step in development of the landfill gas power plant is to issue a Notice of Intent to potential private sector companies who could design, build and operate the facility. The Notice of Intent will contain technical information on the W12A Landfill, the current landfill gas collection system, and the most recent information on the performance of the landfill gas collection system. This will allow prospective private sector companies to do some preliminary evaluation of power generation technologies, and would allow for a faster turn-around time for the RFP for the Design, Build and Operation of the Landfill Gas Power Plant at the W12A Landfill Site.

The release of an RFP will be undertaken when further details are known from the OPA about the FIT Program and the Joint Venture partnership arrangement has been finalized. The RFP will include:

- opportunities for private sector financing, taking into consideration FIT Program rules, and

- a request for information within the RFP on alternative power plant financing and development options, should the Joint Venture be unable to participate in the FIT Program.

As noted before, the ability to accommodate an additional engine and ancillary equipment for a separate bioenergy facility, will be designed into any power plant arrangement at the W12A Landfill Site. The goal is not to limit the potential of increased power generation at this location.

A tentative schedule for the development of the landfill gas power plant is presented on Table 2 (next page) with the main steps listed below:

- Issue RFP to design, build, and operate the power plant
- Submit a Large FIT proposal to the OPA
- Execute FIT contract
- Select a company to design, build, and operate the facility
- Obtain a Renewable Energy Approval (REA) from the Ministry of the Environment
- Construct and commission the power plant

Table 2 - Landfill Gas Power Plant Schedule - Tentative

Period		Joint Venture Partnership	FIT Application Process	MOE Approval	Design, Build, Operate
2013	Jan	REOI open			
	Feb	REOI closes			
	Mar	Due Diligence			
	April				Notice of Intent
	May				
	June	Establish JV			JV Issues RFP
	July		Large FIT open(?)[a]		
	Aug		Submit application		Award RFP
	Sept				
	Oct				
	Nov				
	Dec		FIT offer received		
2014	1st		Sign FIT contract	Notice of Project	Start Final Design
	2nd			Studies/Consultation	
	3rd			REA submitted	
	4th				
2015	1st		Notice to Proceed	MOE approval	Construction
	2nd				
	3rd				Commission
	4th				In operation

Notes a) No date has been set for when large FIT will begin to receive applications. The above schedule will have to be adjusted when this date is known.

Summary - Recommendations c) & d)
Based on City staff's current understanding of the direction of the OPA FIT Program, releasing a Notice of Intent to private sector power developers for the design, construction, operation, and maintenance of a landfill gas power plant will ensure developers are aware of the City's plans and direction. This action would be followed by the preparation and release of an RFP including specifics such as roles for:

- private sector financing and operation (with and without a FIT contract arrangement)
- inclusion of the physical space and layout(s) of potential future use of other bioenergy feedstocks
- the joint venture partner and its relationship to the FIT project and the private sector power plant developer

8. What Happens if There is No FIT Program – Is the Landfill Gas Utilization Project Still Feasible?

As demonstrated by the City's experiences to date, there are often factors outside the control of the City of London than can have serious impacts on projects like this. In particular, there has been a history of sudden and unpredictable changes to provincial electricity policy for more than ten years. The following is a brief description of possible options and future scenarios.

Existing Ontario Electricity Market
Currently, the Ontario electricity market is the only other option available for electricity that is placed on to the grid. Given the complex nature of Ontario's electricity market and procurement,

the price for selling on to the grid (the Hourly Ontario Electricity Price – or HOEP) is significantly lower than the price consumer's pay. This is due to the fact that most of the power generation in Ontario (e.g., nuclear plants, hydro plants, gas plants, FIT projects) have fixed price contracts with the Province for supplying power. The difference between what the "market price" is and these fixed price contracts are settled through the Global Adjustment (GA).

At the current HOEP, about 2.5 to 3.0 cents per kilowatt-hour, the power plant would not provide a return on investment on its own. The power plant would require ongoing financial support.

Sell Environmental Attributes
Green energy retailers, such as Bullfrog Power, purchase the "environmental attributes" of renewable energy projects (electricity and natural gas), which they then sell to corporate and consumer customers interested in emissions-free sources of energy. However, there is no direct wire or pipeline between the producer and customer. The green energy retailers match up their supplier's environmental attributes with their customer's energy consumption.

At the current HOEP, we would need to be able to sell our environmental attributes for about 3.0 to 3.5 cents per kilowatt-hour to have a simple payback time under 20 years. This is in the range of what current Bullfrog Power customers pay for these attributes. However, the price for the City's environmental attributes would need to be negotiated with the green energy retailer.

The Ontario Progressive Conservative Party has proposed this approach as an alternative to the current Feed-In Tariff program, which they propose to cancel under their *Paths to Prosperity - Affordable Energy* policy paper.

Behind the Meter Use at Onsite or Adjacent Large Power User
If there was a significant demand for power on the landfill site, or adjacent to the landfill site, it is possible to build a dedicated power line to provide power "behind the meter" to this user. This would result in cost avoidance equal to the "total electricity" (HOEP + GA) price, which is around 7.5 – 8.0 cents per kilowatt-hour.

If the landfill gas power plant was able to find an onsite or adjacent customer who needs two megawatts of electricity on a continuous basis (24 hours per day, 7 days per week), then the simple payback time would be around 10 to 12 years. However, at this time, there are no known plans for a large power user on or adjacent to the landfill.

Hypothetical Return to Regulated Electricity Price
If the province scrapped the current electricity "market" and returned to a regulated electricity price, the new price will likely be in the range of the current "total electricity" price, which is around 7.5 – 8.0 cents per kilowatt-hour. If the landfill gas power plant was able to obtain this price for the power produced, then the simple payback time would be around 10 to 12 years.

Hypothetical Return to Renewable Energy Standard Offer Program (RESOP)
If the province scrapped the FIT Program and returned to the previous "reverse auction" process (where proposals are ranked by price offer in ascending order – lowest price at the top of the list), a landfill gas power project would likely be price competitive with other renewable generation projects. This could produce a situation of payback in less than 10 to 12 years.

Selling Landfill Gas Utilization Rights
In the event that any of these scenarios unfold, City staff would recommend that the City of London auction off landfill gas utilization rights to the private sector, as the private sector would be more capable of coming up with creative solutions. The revenue stream from selling landfill gas utilization rights would likely be more modest than those outlined in Table 1, as the revenue from the power plant would likely be lower than it would be under the FIT Program.

ACKNOWLEDGEMENTS

This report was prepared with assistance from Mike Losee, Manager – Solid Waste Engineering and Laurie Green, Financial Business Administrator.

PREPARED BY:	PREPARED BY:
JAMIE SKIMMING P. ENG. **MANAGER – AIR QUALITY** **ENVIRONMENTAL PROGRAMS**	**WESLEY ABBOTT, P. ENG.** **DIVISION MANAGER** **SOLID WASTE MANAGEMENT**
PREPARED AND RECOMMENDED BY:	**REVIEWED & CONCURRED BY:**
JAY STANFORD, M.A., M.P.A. **DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE**	**JOHN BRAAM, P. ENG.** **MANAGING DIRECTOR - ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER**

Appendix A Summary of Recent Efforts to Utilize Landfill Gas for Renewable Energy Production

APPENDIX A

Summary of Recent Efforts to Utilize Landfill Gas for Renewable Energy Production

The following table summarizes the recent efforts to utilize landfill gas for renewable energy production:

Date	Event	Comment
March 2010	City applies for Feed-in-Tariff (FIT) contract for 2.4 megawatt power plant	London Hydro recommends use of Wonderland Transformer Station (TS) based on available capacity
February 2011	Ontario Power Authoirty (OPA) informs City of London of Transmission Availability Test failure; no contract offered	London Hydro and Hydro One were not aware of transmission constraints
February 2011	Proponents without transmission capacity placed on a “first-come, first-serve” list for new capacity	W12A application is 82nd on the priority list for new capacity in southwestern Ontario
September 2011	Enbridge Gas and Union Gas submit joint proposal to Ontario Energy Board (OEB) to offer incentives for renewable natural gas production	Proposed rates were $13 per gigajoule, over double the market price at that time Quantities limited to small fraction of total market to minimize customer impact
November 2011	City issues Request for Expression of Interest (REOI) for Biogas Utilization, with a focus on upgrading landfill gas to renewable natural gas	Focus was on landfill gas (LFG) upgrading, but respondents given option of proposing other utilization options
January 2012	Five REOIs received from respondents	Most respondents focused on LFG upgrading, but many point out that power generation under FIT would be less risky
April 2012	OPA releases revised information about transmission capacity at Wonderland TS	Outcome of OPA review of FIT program rules
April 2012	OPA issues draft new rules for FIT program (FIT 2.0), which includes new points-based prioritization and tiered procurement approach (Small FIT < 500 kW & Large FIT)	New points system revives power generation option for W12A, although strong competition expected for limited new procurement target capacity
July 2012	OEB reject the proposal for offering renewable natural gas incentives, asking Enbridge & Union Gas for more research on customer impact	Union Gas unlikely to pursue this further with OEB, but offers to assist City of London to connect with willing buyer of renewable natural gas in the future
August 2012	REOI respondents notified of suspension of investigation of biogas utilization	Respondents informed that City investigating opportunities under FIT 2.0
December 2012	OPA issues final new rules for FIT 2.1	Points system revisions places greater emphasis on community/aboriginal partnership “set-aside” projects
December 2012 – January 2013	OPA opens 30 day application window for Small FIT projects (< 500 kW)	826 MW of applications received for 200 MW Small FIT procurement target