

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 066-B2

Project Title:

Urban Anaerobic Digester and Community Greenhouse

LCCMR 2010 Funding Priority:

B. Renewable Energy Related to Climate Change

Total Project Budget: \$ \$1,950,000

Proposed Project Time Period for the Funding Requested: 2 years, 2010 - 2012

Other Non-State Funds: \$ \$1,050,000

Summary:

An anaerobic digester to manage waste, reduce GHGs and create renewable energy and organic fertilizer. Co-located with a greenhouse to produce organic food and training opportunities/jobs for youth. Replicable statewide.

Name: James Postiglione

Sponsoring Organization: Linden Hills Power & Light

Address: 2720 W 43rd St , #101
Minneapolis MN 55410

Telephone Number: (612) 275-5659

Email: info@lhpowerandlight.org

Fax: _____

Web Address: www.lhpowerandlight.org

Location:

Region: Metro

County Name: Hennepin, Ramsey

City / Township: Minneapolis/St Paul

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

MAIN PROPOSAL

PROJECT TITLE: Urban Anaerobic Digester/Greenhouse

I. PROJECT STATEMENT

Linden Hills Power and Light (LHP&L) is an environmental non-profit formed in 2006. LHP&L worked with Hennepin County and the City of Minneapolis to establish a pilot curbside composting program currently encompassing 1080 homes, due to spread to other parts of the city in the next year. LHP&L is applying for an LCCMR grant to build a sustainable, demonstration urban Anaerobic Digester, co-located with a community greenhouse. Anaerobic digestion uses organic (compostable) waste to produce renewable energy. Operating a greenhouse is synergistic with anaerobic digestion since it can efficiently utilize all digester outputs (electric power, heat, liquid and solid nutrients). In addition to environmental benefits, the digester/greenhouse would provide jobs and an urban source of healthy, organic food production. This project will be **replicable** in other areas in Minnesota, both rural and urban. A 10-50 ton per day digester is community scaled, innovative, clean and offers huge carbon emission reduction from alternative waste disposal methods.

When trash is burned, incinerators emit CO₂ and nitrous oxide (N₂O), a greenhouse gas 310 times more powerful in atmospheric warming than carbon dioxide. On average in the U.S., incinerators emit more carbon dioxide per megawatt-hour than coal-fired, natural-gas fired, or oil-fired power plants. Compostable materials such as food waste and paper decompose anaerobically (without oxygen) in a landfill, producing methane (CH₄) which has 23-71 times greater heat trapping capabilities than carbon dioxide. Anaerobic digestion captures methane which can be used for transportation, heating or generating electricity. The technology is widely used in rural America and Europe; in place in Toronto (currently building 2 more); Australia, Israel, etc. **This project would give Minnesota an opportunity to be a leader in this field in America.**

This project will produce advances in renewable energy, education and urban agriculture. The specific goals of the project include:

- Demonstration of anaerobic digester technology and its potential benefits, particularly in urban areas, by having a sustainable, replicable model
- Providing greater energy self-reliance in the State by displacing fossil fuels with renewable energy, and reducing the need for chemical fertilizers and pesticides by creating organic byproducts.
- Implementing urban agriculture through the greenhouse produce, employment and education programs.

In Minnesota, recycling and composting 90% of our municipal solid waste would have the same impact as: Shutting down 20% of our state's coal power plants, *or* reducing every car usage in the state by two-thirds, *or* using 75% less electricity in Minnesota homes.

LHP&L is currently working on an RFI to help with selection and contracts for: project site, waste feedstocks, greenhouse partner, AD technology partner, design firm and contractor. This work will also include development of a business plan for the construction and sustainable operation of the AD/greenhouse facility. This work task will be completed prior to September 2009 so that we will be prepared to present a detailed project review to the LCCMR grant selection committee, and start work if grant funded, in July 2010.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Site Ready for Construction _____ **LCCMR Grant Budget:** \$ 150,000 _____

Deliverable

1. Site Selected and secured
2. Permitting completed. *Permit applications approved.*
3. Design finalized. *Design incorporates the best aspects of successful facilities in Europe, Canada, Australia, etc*

Completion Date

- Oct 2010
Jan 2011
Jan 2011

Result 2: Project Construction _____ **LCCMR Grant Budget:** \$1,750,000 _____

Deliverable	Completion Date
1. Site Development	May 2011
2. Construction of buildings and equipment for waste receiving, digestion, biogas utilization by combined heat and power, and greenhouse.	Oct 2011
3. Training rooms installed to facilitate community education programs for waste & energy conservation, renewable energy and urban gardening and food production	Oct 2011
4. Final system checkout. Testing.	Nov 2011

Result 3. Facility Initial Operation and Documentation _____ **LCCMR Grant Budget:** \$50,000 _____

Deliverable	Completion Date
1. Initial 12 month facility operation - <i>maximizing and documenting all aspects of the operation including biogas production, heat recovery/usage, odor control, utilization of nutrients and crop production.</i>	Dec 2012
2. Completion of a documentation report. <i>The facility performance will be compared to the business plan and will be disseminated to interested parties to provide valuable information to planners of similar facilities across Minnesota and the US.</i>	Dec 2012

Note: Operational budget includes demonstration testing and reporting only

III. PROJECT STRATEGY

A. Project Team/Partners

- **Linden Hills Power and Light:** Project management, assemble/coordination of team
- **Growing Power, Milwaukee** – Internationally renowned non profit specializing in urban food production and community training/education. www.growingpower.org : Set up greenhouse operation and education programs.
- **Waste receiving and preliminary treatment technology and equipment vendor** - to be selected via competitive RFP
- **AD technology and equipment provider** – to be selected via competitive RFP

B. Timeline Requirements

Following grant award July 1 2010 - the project design, permitting and construction is estimated to be complete in the fall of 2011. One year of operation will be required to demonstrate that the project meets the business plan. The documentation report will be complete by the end of 2012.

C. Long-Term Strategy

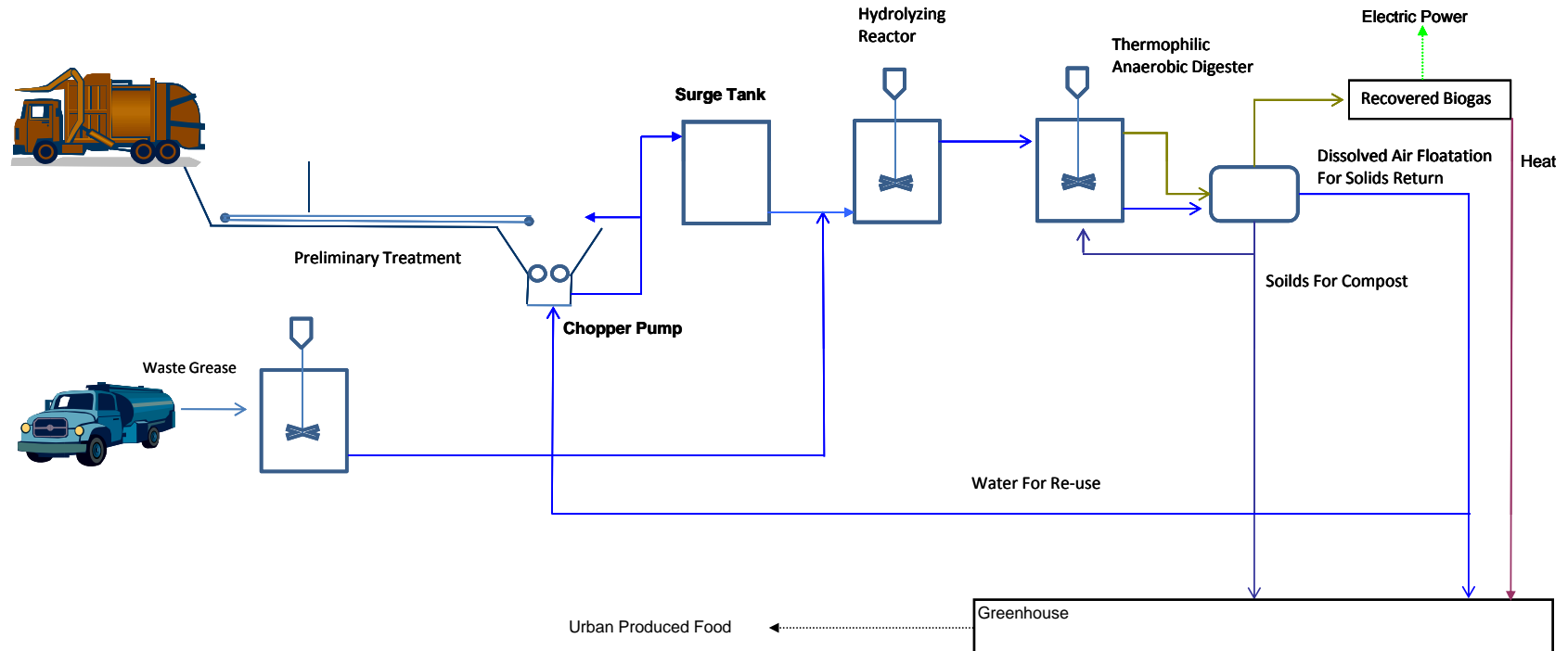
The goal of this project is to demonstrate a viable process for management of urban organic wastes that benefits the community. The process is intended to be sustainable following the demonstration period with revenues from electric power and crop sales exceeding operating labor and maintenance cost. No further grants are anticipated to be needed for system operation. Promotion of the AD/greenhouse process will also continue through community outreach and education programs and conference presentations. We anticipate other cities and rural communities will replicate the business and project plan to benefit their communities. As this technology becomes more common and in demand, or as gas prices rise, and/or carbon credits are introduced, we anticipate that future facilities will not need grant funds for construction, but will enjoy a satisfying return on investment.

Project Budget

IV. TOTAL PROJECT REQUEST BUDGET (2 years)	
BUDGET ITEM (See list of Eligible & Non-Eligible Costs, p. 13)	AMOUNT
Personnel:	
AD Technical Staff. Contract. Project Management. Salary 100%, benefits 0. One year. half time.	\$ 30,000
Contracts:	
Environmental Permitting consultant - to be determined. Site analysis, permitting.	\$75,000.00
Engineering Design consultant -to be determined. Facility design	\$75,000.00
AD Technology Vendor -TBD - provide digester technology licencing.	\$10,000.00
Facility Construction contract -TBD - build facility	\$ 1,230,000
Greenhouse operator/Educators contract - TBD - grow produce, develop training, workshops, retail, etc. Set up so LHP&L can run once it's established.	\$40,000.00
Testing Consultant - TBD - documentation, testing of facility performance	\$50,000.00
Equipment/Tools/Supplies:	
Separation and macerating equipment - Pretreat waste prior to digestion	\$150,000
Scrubbers - odor control	\$30,000
Monitoring equipment - Digestion process monitoring and control system	\$60,000
Biogas treatment - Hydrogen sulfide scrubber	\$40,000
Power generators - Produce power and heat	\$70,000
Mixers and pumps - Transfer liquids/solids, mix digester	\$50,000
Solids separator -Concentrate solids for fertilizer use	\$25,000
Flare -Contingency treatment of biogas	\$15,000
Acquisition (Fee Title or Permanent Easements): 2 acres, Title holder to be determined - City, County, or non profit.	0
Travel:	0
Additional Budget Items:	0
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 1,950,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:		
LHP&L Volunteer labor	\$ 30,000	pending
LHP&L staff time	\$ 30,000	secured
Project Developer	\$ 500,000	pending
Other grant	\$ 370,000	pending
Other State \$ Being Applied to Project During Project Period:	\$ -	
In-kind Services During Project Period:		
LHP&L Volunteer labor	\$ 100,000	secured
Greenhouse consultant - professional services	\$ 10,000	pending
AD Technology Vendor -professional services	\$ 10,000	pending
Total Other Funds.	\$ 1,050,000	
Funding History:		
MN Pollution Control Agency - Grant for feasibility study	\$ 30,000	completed
MN Dept of Commerce - Grant for feasibility study	\$40,000	completed



Organization Description

Linden Hills Power & Light is a neighborhood-based 501c3 organization, aiming to shrink our local carbon footprint through education and community action. We promote sustainable energy, waste reduction and energy conservation. Linden Hills Power and Light was established in the 2006. LHP&L successfully completed Climate Change Innovation grants for the City of Minneapolis in 2007 and 2008. Additional grants completed by LHP&L include a \$30,000 grant from the Minnesota Pollution Control Agency (MPCA) and \$45,000 from the Department of Commerce for a feasibility study on anaerobic digestion. LHP&L worked with the City of Minneapolis and Hennepin County to establish a pilot curbside collection of compostable waste, diverting 4 tons of trash per week from incineration and landfill.

Community Connections: LHP&L works with the MPCA, Green Institute, Center for Environment and Energy, The City of Minneapolis, Hennepin County, Community Education, Minneapolis Public Schools, the Bakken Museum, the Minneapolis Park and Recreation Board, MN Project, Eureka Recycling, and the City of Minneapolis Department of Solid Waste and Recycling, among others. We have support from our Council member Betsy Hodges, County Commissioner Peter McLaughlin, Senator Scott Dibble, and State Representative Frank Hornstein. www.lhpowerandlight.org

Project Manager Qualification: James A. Postiglione, PE; Process Engineer

Experience Summary

Mr. Postiglione, PE, has been an environmental engineering consultant since 1984. He has extensive experience in the areas of physical/chemical and biological treatment related to water wastewater and remediation projects. Mr. Postiglione's recent focus has been related to biogas production and utilization projects. Project experience includes work for municipalities, federal government and private industry involving pilot testing, feasibility studies, design, reporting, troubleshooting, training and start-up. MS, Environmental Engineering, University of Minnesota, Minneapolis, 1987; BS, Civil Engineering, University of Minnesota, Minneapolis, 1982

Select Project Experience

Potato Processor, Grand Rapids Minnesota. Process engineer providing concept analysis and completing cost estimates for an anaerobic digester to convert solid potato waste to biogas. The analysis evaluated potential biogas production, treatment and use as a heating fuel on-site. [2008]

Rendering Plant, Minnesota. Project engineer providing cost estimates and preliminary design services for anaerobic digestion and downstream biological treatment of wastewater at two large plants. Projects included evaluating impacts from an MPCA LTM study and use of biogas in the facility boilers. [2008]

MPCA, Landfill Gas to Energy, Andover Minnesota. Lead process engineer providing design, construction oversight and start-up for a new plant generating electrical energy from landfill gas. The project involved modifying the existing landfill gas blower and flare, installing gas pretreatment equipment and installing four external combustion engines/generators. The flare system was modified to run more efficiently at flows ranging from a low excess gas rate to the landfill capacity rate. The system generates approximately 200 KW. [2007]

Employment History

Current work as an independent consultant
04/2008 - 01/2009, Project Manager/Engineer, Liesch Associates
10/1990 - 02/2008, Earth Tech, Project Manager/Engineer
08/1989 - 10/1990, IT Corporation, Project Engineer
08/1984 - 08/1989, PACE, Inc., Project Engineer
06/1980 - 09/1982, Minnesota Pollution Control Agency
Resume available on request.