



Webinar

Financing CHP at Wastewater Treatment Facilities with Clean Water State Revolving Fund Resources

Webinar Overview

- **Welcome and Introduction**
 - Neeharika Naik-Dhungel, U.S. EPA CHP Partnership Program
- **SRF Overview and Regional Role**
 - Emily Nicasio, U.S. EPA Clean Water State Revolving Fund (CWSRF) Program
 - Magdalene Cunningham, CWSRF Coordinator, U.S. EPA Region 3, Water Protection Division
- **Delhi Charter's Experience with CWSRF to install CHP**
 - Sandra Diorka, Director of Public Services, Delhi Charter Township, Michigan
- **CHP Technical Assistance Through the U.S. DOE CHP Technical Assistance Programs (TAP)**
 - Patti Garland, Oak Ridge National Laboratory, US DOE CHP Technical Support Coordinator
- **Questions and Answers Session**

Resources for WWTF

- WWTF Sector Resources
 - Resource on how CHP can be funded through CWSRF (2014)
<http://epa.gov/chp/documents/CHPCleanWaterStateRevolvingFundFactSheet-102014.pdf>
 - A report on the CHP potential in the WWTF sector (2011)
http://epa.gov/chp/documents/wwtf_opportunities.pdf
 - A Catalog of CHP Technologies (2014)
http://epa.gov/chp/documents/catalog_chptech_full.pdf
- Project Development Resources
 - Spark Spread Estimator
http://epa.gov/chp/documents/spark_spread_estimator.xlsm
 - Project Development Handbook
http://epa.gov/chp/documents/chp_handbook.pdf
 - Local Government Climate and Energy Strategy CHP Guide
<http://epa.gov/statelocalclimate/documents/pdf/CHPguide508.pdf>

Financing CHP with Clean Water State Revolving Funds

March 16, 2015

Emily Nicasio
U.S. EPA
Office of Wastewater Management
May 16, 2014



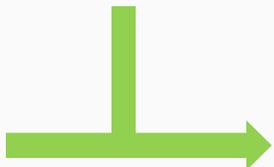


What is the SRF?

- The SRFs are federally capitalized, state-run water infrastructure banks
 - Provide billions annually
 - Offer low interest rates, flexible terms
 - Offer “additional subsidization” in the form of principal forgiveness, negative interest rates, or grants
 - Borrowers include municipalities, businesses, non-profits, and individuals



Federal capitalization provides initial funding



States match federal capitalization grant (20 percent of capitalization)



Clean Water State Revolving Fund

Low interest loans



Loan repayments

Bond repayments



Bond proceeds

Bond holders provide additional funding



Eligible CWSRF Projects





Clean Water SRF

- Created in 1987 when Congress amended the Clean Water Act
- Replaced the existing Construction Grants program
- Clean Water SRF programs can fund many types of projects:
 - Projects that address **municipal wastewater and stormwater** pollution
 - Projects that address **nonpoint source** pollution
 - Projects that address water pollution in **estuaries**



Clean Water SRF

- The Clean Water Act was amended again in 2014 by the WRRDA
 - Added new eligibilities
 - Changed additional subsidization requirement
 - Increased the allowable loan term
 - Created new requirements of cost and effectiveness and fiscal sustainability planning
 - Codified existing requirements like Davis Bacon and AIS
 - Did not codify GPR



CHP Eligibilities

- At POTWs, CWSRFs can fund:
 - Planning and design
 - Capital costs associated with CHP systems
- Capital costs include
 - Digesters
 - Pretreatment equipment and compressors
 - Engines/microturbines
 - Pumps and pipes
 - Other necessary retrofits or upgrades



CHP Eligibilities

- Privately-owned WWTFs ***might*** be eligible to receive CWSRF financing in certain cases
 - If the project implements a State’s nonpoint source management plan under 603(c)(2)
 - If the privately-owned facility is in a national estuary and the project implements a Comprehensive Conservation and Management Plan under 603(c)(3)



CHP Eligibilities



Eligibility criteria are nuanced and the eligibility of a specific project may depend on ownership, permit status, the State, and other factors



Energy Resources

- Energy Efficiency

- [Energy Efficiency for Water and Wastewater Utilities](#)
- [Energy Self-Assessment Tools and Energy Audits for Water and Wastewater Utilities](#)
- [Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities](#)

- CHP

- [CHP for Municipal Wastewater Treatment Facilities](#)
- [Evaluation of Combined Heat and Power Technologies for Wastewater Treatment Facilities](#)
- [Opportunities for and Benefits of Combined Heat and Power at Wastewater Treatment Facilities](#)



Emily Nicasio

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Clean Water
State Revolving Fund

Financing Combined Heat & Power Clean Water State Revolving Fund

Region's Role

March 16, 2015

Magdalene Cunningham, CWSRF Coordinator
U.S. Environmental Protection Agency,
Region 3, Water Protection Division



States' Role

- Borrowers Submit Applications to State
- Reviews & Ranks Project Applications
- Prepares Project Priority List (PPL)
- Prepares Intended Use Plan (IUP)
- Public Review & Comment of IUP/PPL
- Executes Loans for Projects on IUP



State's Role

- Ensure Projects comply with all requirements
- Periodically inspects projects as built
- Reviews Borrower Invoices
- Pays invoices during construction
- Collects Repayments - begins within 1 year.
- Reports annually to EPA



EPA Region's Role

- Review Priority Ranking Systems – when revised
- Review Project Priority Lists and Intended Use Plans
- Award annual Federal Appropriations to States
- Technical Assistance to States
 - Address eligibility questions
 - Explain policy and guidance
- Conduct annual review of State program
 - Oversight of compliance with program requirements
 - Make recommendations for future improvements



Regional & State Contacts

To find your Regional or State CWSRF Contact. . .

http://water.epa.gov/grants_funding/cwsrf/contacts.cfm



Water: Clean Water State Revolving Fund

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Clean Water State Revolving Fund Regional and State Contacts

For a CWSRF program representative in your region or state, select from the following:

- [CWSRF Regional Office Contact Information \(PDF\)](#) (1pp, 14.5KB, [about PDF](#))
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To view a specific state's financial / CWSRF assistance website, select from the following list [EXIT Disclaimer](#) :

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U. S. EPA CWSRF Regional Office Information

Region I: (CT, ME, MA, NH, RI, VT)

U. S. EPA

One Congress Street, Suite 1100

JFK Federal Building

Boston, MA 02114-2023

CWSRF Contact: Jamie Bourne

(617) 918-1610

(617) 918-1505 (fax)

Region II: (NJ, NY, Puerto Rico, U. S. Virgin Islands)

U. S. EPA

290 Broadway, 24th Floor

New York, NY 10007-1866

CWSRF Contact: Steve Vida

(212) 637-3862

(212) 637-3889 (fax)

Region III: (DE, MD, PA, VA, WV, DC)

U. S. EPA

1650 Arch Street, (3WP50)

Philadelphia, PA 19103

CWSRF Contact: Magdalene Cunningham

(215) 814-2338

(215) 814-2782 (fax)

Region IV: (AL, FL, GA, KY, MS, NC, SC, TN)

U. S. EPA

61 Forsyth Street, SW., 16th Floor, (9T25)

Atlanta, GA 30303-8960

CWSRF Contact: Gracy Danois

(404) 562-9119

(404) 562-9728 (fax)

Region V: (IL, IN, MI, MN, OH, WI)

U. S. EPA

77 West Jackson Blvd. (WS 15D)

Region VI: (AR, LA, NM, OK, TX)

U. S. EPA

1445 Republic Agency, Suite 1200 (6WC AD)



Clean Water SRF Agencies - Names, Locations, and Contacts

Connecticut

Lead State Agency: Department of Environmental Protection
Type of Agency: Environmental

Mailing Address:
City:
Zip Code:

Street Address: 79 Elm Street
City: Hartford
Zip Code: 06106-5127

Director: Betsey Wingfield
Director's Title: Bureau Chief
Phone Number: (860) 424-3704
Fax Number: (860) 424-4067
E-mail Address: betsey.wingfield@po.state.ct.us

Contact Person:
Phone Number:
Fax Number:
Email Address:

Secondary Agency: Office of the Treasurer - Debt Management
Type of Agency: Financial

Mailing Address:
City:
Zip Code:

Street Address: 55 Elm Street
City: Hartford
Zip Code: 06106-1773

Director: Sarah K. Sanders
Director's Title: Asst. Treasurer for Debt Management
Phone Number: (860) 702-3134
Fax Number: (860) 702-3034
E-mail Address: sharon.peay@ct.gov

Contact Person: Sharon Dixon Peay
Phone Number: (860) 702-3134
Fax Number: (860) 702-3034
Email Address: sharon.peay@ct.gov

Delaware

Lead State Agency: Department of Natural Resources and Environmental Control
Type of Agency: Environmental

Mailing Address: 5 East Reed Street, Suite 200
City: Dover
Zip Code: 19901

Street Address: 5 East Reed Street, Suite 200
City: Dover
Zip Code: 19901

Director: Terry Deputy
Director's Title: Administrator, Financial Assistance Branch
Phone Number: (302)-739-9941
Fax Number: (302) 739-2137
E-mail Address: terry.deputy@state.de.us

Contact Person: Frank Paquette
Phone Number: (302) 739-9941
Fax Number: (302) 739-2137
Email Address: frank.paquette@state.de.us



Water: Clean Water State Revolving Fund

[Contact](#)

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| California | Louisiana | New Mexico | Texas |
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- Water Quality Improvement Fund
- Glossary
- Resources & Links
- Nonpoint Source Funding
- Contacts
- Applications & Info
- FY 2015 Annual Solicitation
- Stormwater Funding Programs



Clean Water Financing & Assistance

Programs Overview

The Virginia Clean Water Revolving Loan Fund (VCWRLF), previously known as the Virginia Revolving Loan Fund, was created in 1987. The Department of Environmental Quality, on behalf of the State Water Control Board (SWCB), manages the VCWRLF, administering the policy aspects of the Fund, receiving applications and providing funding recommendations to the SWCB. The Virginia Resources Authority (VRA) serves as the financial manager of the Fund.

Initially, the VCWRLF included a single program which was established to provide financial assistance in the form of low-interest loans to local governments for needed improvements at publicly-owned wastewater treatment facilities and/or collection systems. In 1999, 2001 and 2003 the scope of VCWRLF activity was expanded by the State Water Control Board and DEQ implemented additional programs to provide low interest loans related to agricultural and other non-point source water quality issues. The following loan programs are now operated within the Virginia Clean Water Revolving Loan Fund.

Wastewater Loan Program

SLAF Solicitation

The Department of Environmental Quality (DEQ) is pleased to announce the FY15 grants authorized for the Stormwater Local Assistance Fund (SLAF). Grants totaled about \$21.5 million and cover 64 projects in 25 localities. Here is the [Director's Authorization Memo](#) explaining the process and the list of the projects selected.

CWFAP Notifications

To improve communication, efficiency and timeliness, sign up [HERE](#) to receive e-mail notifications on the funding opportunities available through the Clean Water Financing and Assistance Program to include solicitations for the Clean Water



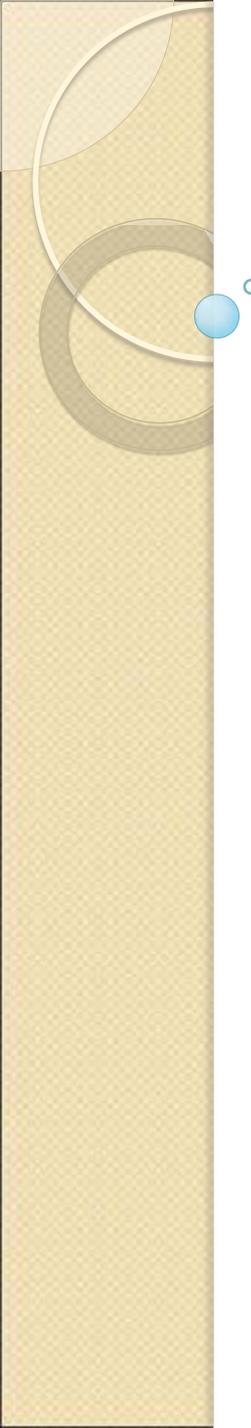
EPA-CWSRF Contacts



Magdalene Cunningham
Office of Infrastructure and Assistance
Region 3 Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103
Phone: 215-814-2338
Email: cunningham.magdalene@epa.gov



CWSRF Website Homepage:
http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm



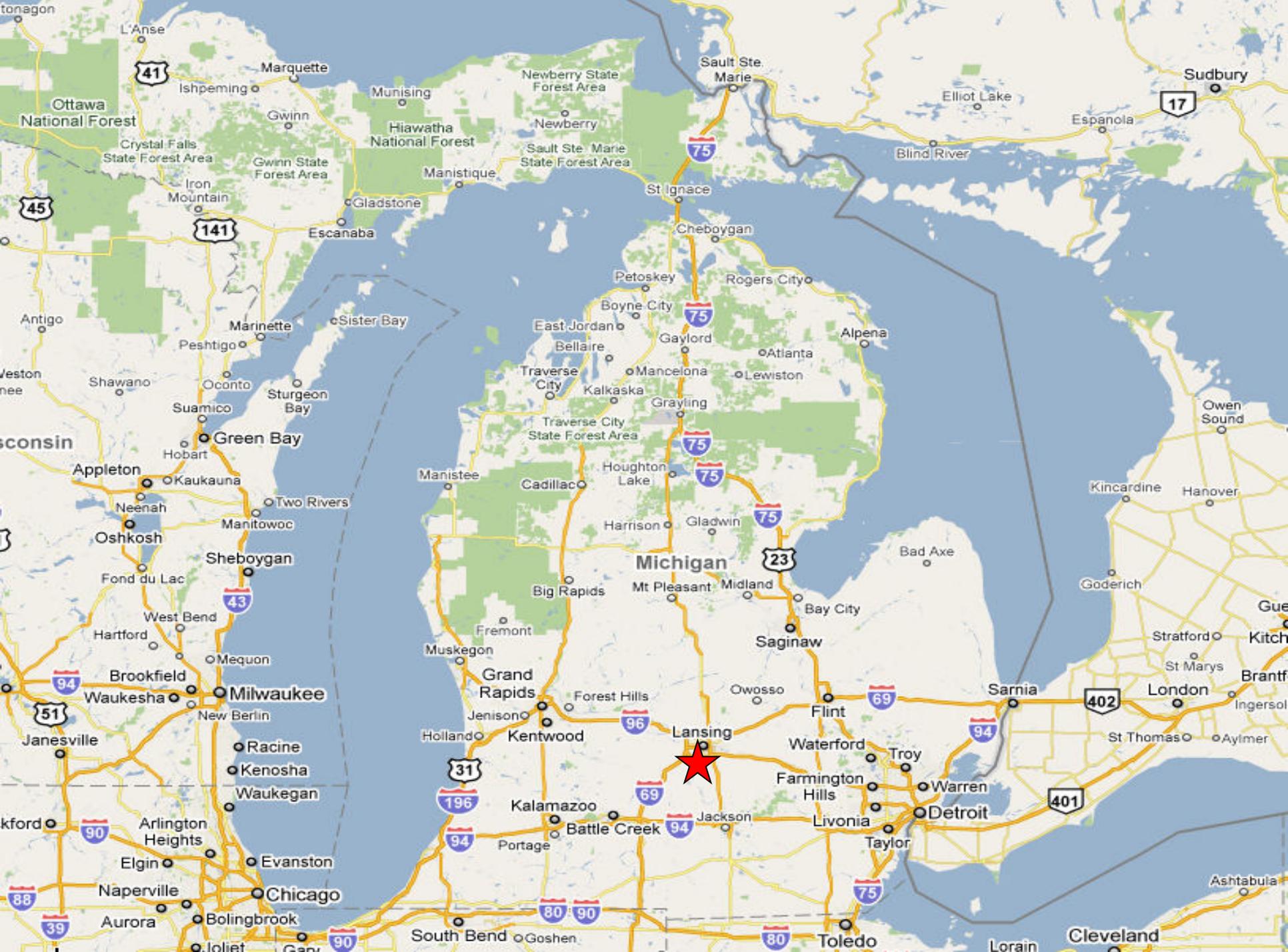
Delhi Charter Township

Combined Heat and Power Project

Clean Water State Revolving Fund in Action

Sandra Diorka, Director of Public Services

Delhi Charter Township



Project Background

- 1962 first primary treatment facility was built and it included two anaerobic digesters
- 1978 secondary treatment was added to the plant and two new larger digesters were added
- 1978 boiler was plumbed to utilize biogas
- ~1984 boilers failed due to sulfuric acid damage from digester gas

Project Background

- From 1984 on, all digester gas was wasted to a flare
- 2004 Master Plan indicated an increase in solids handling capacity was needed ASAP
- Design for new class B mesophilic digesters was fairly close to completion when Delhi was approached about partnering in a 21st century jobs fund grant application

Project Background

- Project involved installing two phase anaerobic digestion (Thermophilic/Acid Phase – Mesophilic/Gas Phase) producing class A biosolids instead of class B
- Grant money would fund two micro turbine generators to produce electricity from methane
- Generator exhaust heat would be used to heat the process

Project Background

- Delhi did not get the grant however; the Delhi Board liked the project so much they voted to build it without the grant
- Delhi's engineering firm Hubbell, Roth and Clark, Incorporated suggested applying for a State Revolving Fund loan
- Delhi had never considered this funding mechanism, believing it was difficult to obtain and came with too many strings

SRF Decision Process

- The Manager's ears perked up when the interest rate was mentioned
- An S2 grant was available to fund the required SRF Plan and design engineering
 - “The S2 Grant Program was specifically created with the intent of accelerating the progress of water pollution control efforts and stimulating the use of the revolving fund programs.”

SRF Decision Process

- Delhi obtained the grant
- An SRF project was born in 2007
- Michigan's first Integrated Biomass to Energy System was finished in 2009









EXTOL
CONCRETE - ALL SIZES
PIPE - ALL SIZES
CULVERTS - ALL SIZES
DRAINAGE - ALL SIZES

FRONT
↑
FRONT
↑
FRONT
↑





Bobcat

Miller

F
U
E





Project Finances

| Option | Project Cost* | Present Worth Cost* | Annual Equivalent Cost* |
|-----------------------------------|---------------|---------------------|-------------------------|
| Conventional Mesophilic Digestion | \$6,307,000 | \$11,242,000 | \$912,000 |
| 2PAD with CHP | \$7,113,000 | \$11,263,000 | \$913,000 |

*Does not include \$500,000 SRF S2 Grant for Project Planning, Design and Revenue System Development received by the Twp.

Project Finances

- Final costs
 - SRF Plan \$131,023
 - Design/bid/legal \$727,319
 - Const. Eng. \$548,673
 - Construction \$9,242,475
 - Total Project \$11,533,714
 - SRF Loan \$9,850,000
- 1.625% (total interest paid will be roughly 1/2 market)
 - Delhi's own bond rate at that time was a variable interest rate of 1.1% - 3.65%

Metrics

- Facility natural gas use reduced by 63% while producing class A sludge (~\$40,000 now less due to price)
- KWH produced (not sure of time frame): 336,177 equates to roughly \$30,256.
- Maximum generation around 10% of total facility usage
- KWH produced on peak: 192,586
- Used primarily during peak hours
- Heat exchanger **NOT** in service during cold months

Lessons Learned

- Internal combustion engines produce more heat
- Do not locate units outside in a cold climate
- Do not mix thermo/acid phase gas with mesophilic gas
- Do not get a flare with a continuous burn pilot light
- ALWAYS treat boiler gas
- Monitor boiler exhaust temperature and clean boiler often
- Incorporate gas storage



CLEAN WATER
STATE REVOLVING FUND
2008 PISCES AWARD

Performance & Innovation in the SRF
Creating Environmental Success
Awarded to
Delhi Charter Township,
Michigan

For
Innovative & Effective Use of
SRF Financing Mechanisms



DELHI CHARTER TOWNSHIP POTW
DIGESTION SYSTEM IMPROVEMENTS
May 2009

Board of Trustees

Supervisor: Stuart Goodrich

Clerk: Evan Hope

Treasurer: Harry Ammon

Trustees: John Hayhoe
Jerry Ketchum
Paul Krepps
Roy Sweet

Township Manager: John Elsinga

Director of Public Services:
Sandra Diorka

Engineer: Hubbell, Roth & Clark, Inc.

General Contractor:

Irish Construction Co., Inc.

IBES Supplier: HESCO

SRF Loan Funding: MDEQ



Thank you!

Sandra Diorka

Director of Public Services

Delhi Charter Township

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Holt , MI 48842

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www.delhitownship.com

U.S. Dept. of Energy's Combined Heat and Power (CHP) Deployment Program

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



CHP Technical Assistance through the U.S. DOE CHP Technical Assistance Partnerships (CHP TAPs)

3/16/2015

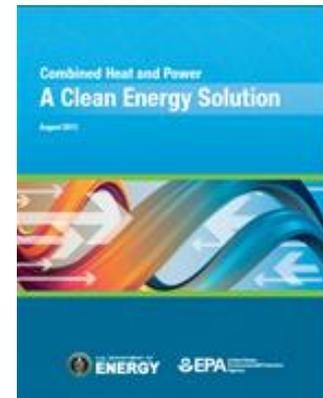
Patti Garland
Oak Ridge National Laboratory
U.S. DOE CHP Technical Support Coordinator

Claudia Tighe
U.S. DOE CHP Deployment Program Manager

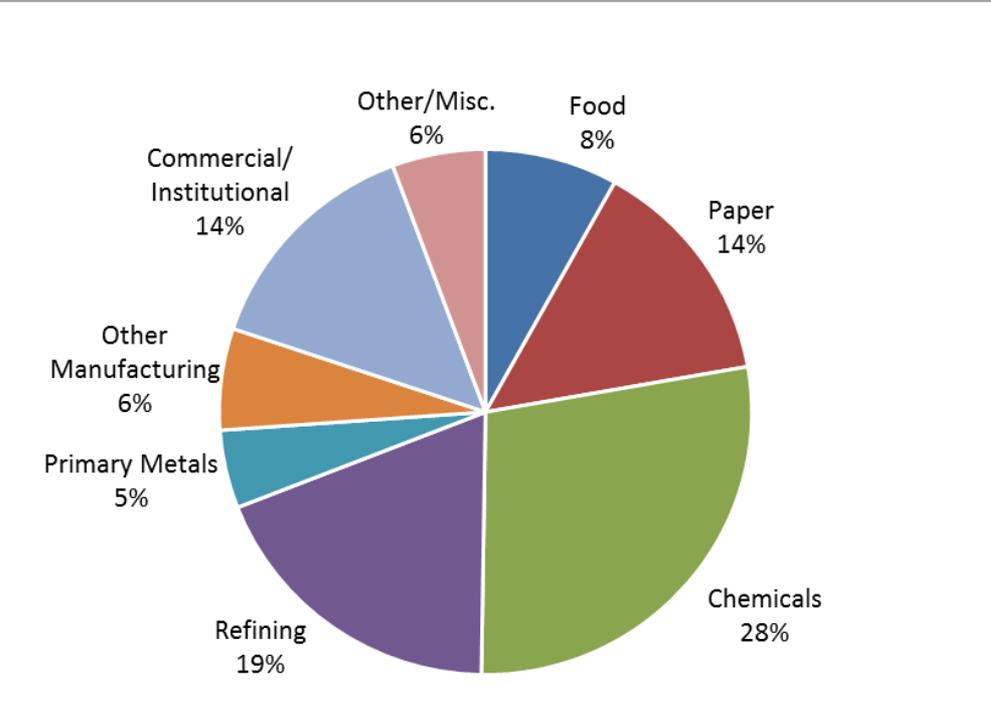
President's Executive Order 13624: 40GW of new CHP by 2020

DOE's AMO CHP Deployment Program assists industrial, institutional, commercial, and multifamily facilities/buildings to accelerate investment in energy-efficient CHP thereby improving competitiveness, heightening energy security, and protecting our environment. The DOE CHP Technical Assistance Partnerships (CHP TAPs) provide:

- Regional CHP expertise
- Fact-based, un-biased information on CHP:
 - Technologies
 - Project development
 - Project financing
 - Local electric and natural gas supplier interfaces
 - State best practice policies
- Vendor, fuel, and technology neutral assessments of CHP viability



U.S. CHP Installations



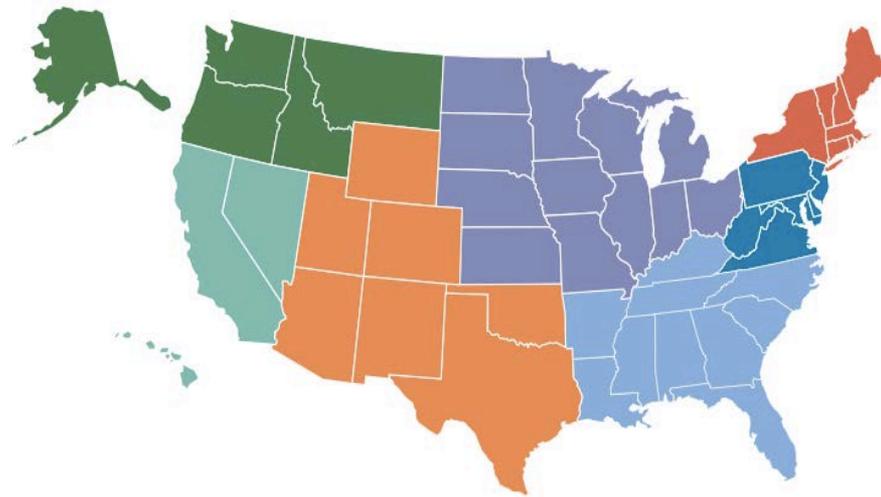
- **82.7 GW** of installed CHP over 4,300 industrial and commercial facilities
- 80% of capacity in industrial applications
- 70% of capacity is natural gas fired
- Avoids more than **1.8 quadrillion Btus** of fuel consumption annually
- Avoids **241 million metric tons of CO₂** compared to separate production

Sources: DOE/ICF CHP Installation Database (U.S. installations as of December 31, 2013); EIA <http://www.eia.gov/todayinenergy/detail.cfm?id=8250> Energetics, "US Manufacturing Energy Use and Greenhouse Gas Emissions Analysis, November 2012"

DOE CHP Technical Assistance Partnerships (CHP TAPs)

DOE's CHP TAPs promote and assist in transforming the market for CHP, waste heat to power, and district energy or microgrid with CHP throughout the United States. Key services include:

- **Market Opportunity Analysis**
Supporting analyses of CHP market opportunities in diverse markets including industrial, federal, institutional, and commercial sectors
- **Education and Outreach**
Providing information on the energy and non-energy benefits and applications of CHP to state and local policy makers, regulators, end users, trade associations, and others.
- **Technical Assistance**
Providing technical assistance to end-users and stakeholders to help them consider CHP, waste heat to power, and/or district energy or microgrid with CHP in their facility and to help them through the development process from initial CHP screening to installation.



www.energy.gov/chp

DOE CHP Technical Assistance Partnerships (CHP TAPs)

NORTHWEST www.northwestCHPTAP.org

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MID-ATLANTIC www.midatlanticCHPTAP.org

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SOUTHEAST www.southeastCHPTAP.org

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DOE CHP Technical Assistance Partnerships (TAPs): Program Contacts

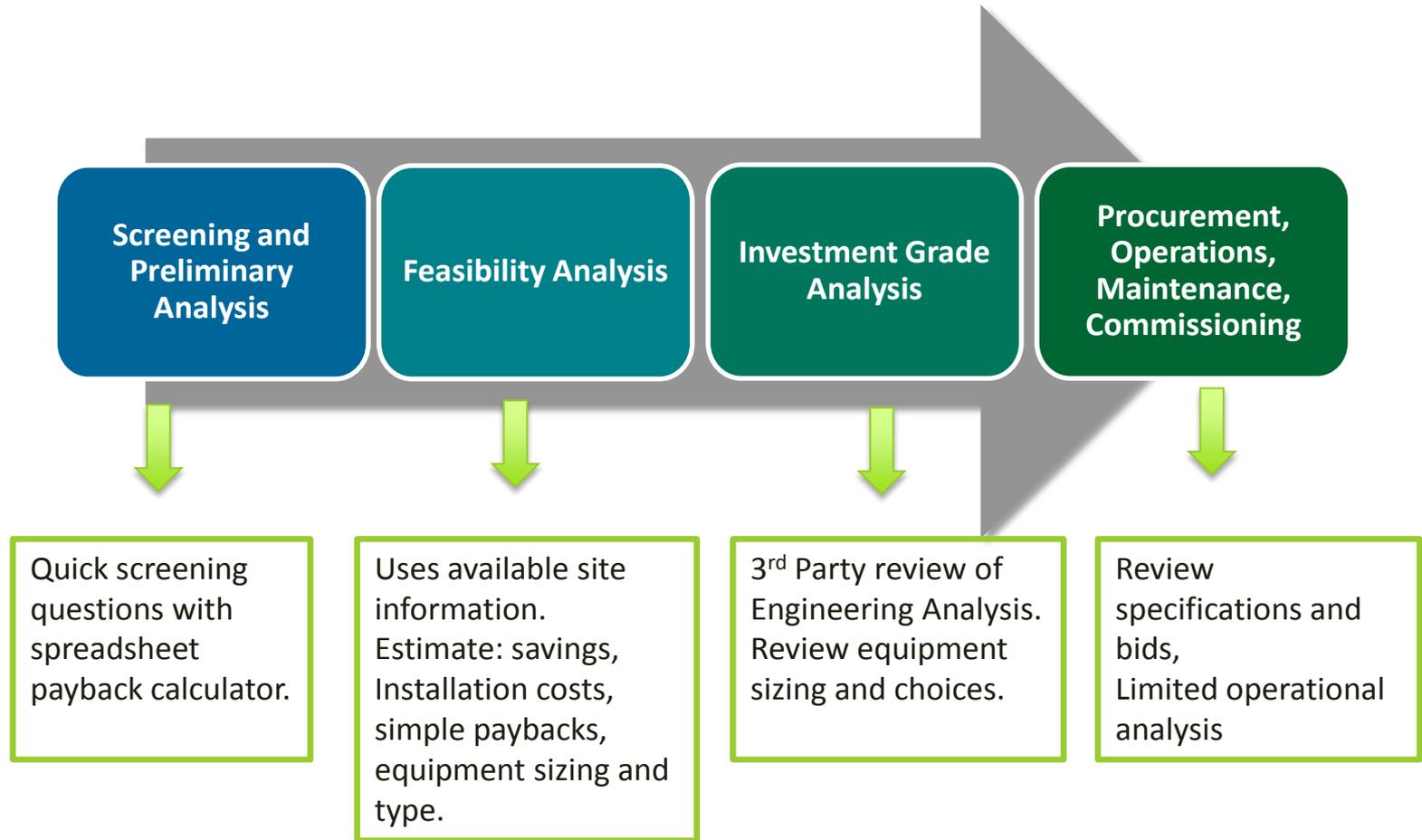
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CHP TAP Project Development Technical Assistance



CHP TAP Site Qualification Process

- Qualification Screenings
 - Minimal Inputs
 - Simple Payback
- Questionnaire for qualitative information



Example CHP System Highlights:

Downers Grove Sanitary District

Downers Grove, IL

Electrical Capacity: **280 kW**

Fuel: **Biomass**

Prime Mover: **Recip. Engines**

Installed: **2014**



Restaurant waste grease is used to produce the digester gas which fuels the 280 kW engine. This offsets 50% of the treatment plants energy consumption.

Source: <http://www.baxterwoodman.com/projects/combined-heat-power-improvements/>

Example CHP System Highlights:

Danville Sanitary District Danville, IL

Electrical Capacity: **150 kW**

Fuel: **Biomass**

Prime Mover: **Internal Combustion Engine**

Installed: **2013**



Solids collected by the sewers from the residential, industrial, and commercial districts are separated from the accumulated solids. The separated solids [sludge] are pumped into anaerobic digesters that produce gas to fuel the engine.

Source: <http://www.midwestchptap.org>

Parameters for CHP Success

- CHP Champion on site
- Interaction and Relationship with local Utility
- System design
 - Collaborate with DOE CHP TAPs
 - Experienced project developer preferred
 - Biogas scrubbing a key balance of plant component
 - Using co-digestion: It can flip the economics positive (natural gas can supplement)
 - Visit DOE CHP Deployment website for project profiles
http://www1.eere.energy.gov/manufacturing/distributedenergy/chp_projects.html



Opportunities & Next Steps

- Economic advantage – make your own power for on-site use or sell it/wheel it
- A long-term power purchase agreement is helpful
- Quality design is essential
- Use the biogas efficiently – maximize heat recovery
- DOE Services available to help with next steps
 - DOE CHP Qualification Screenings (go/no go scan of potential)
 - DOE CHP Technical Assistance

Thank you!

Learn more about the DOE CHP Deployment Program
and contact us:

www.energy.gov/chp

Questions

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