



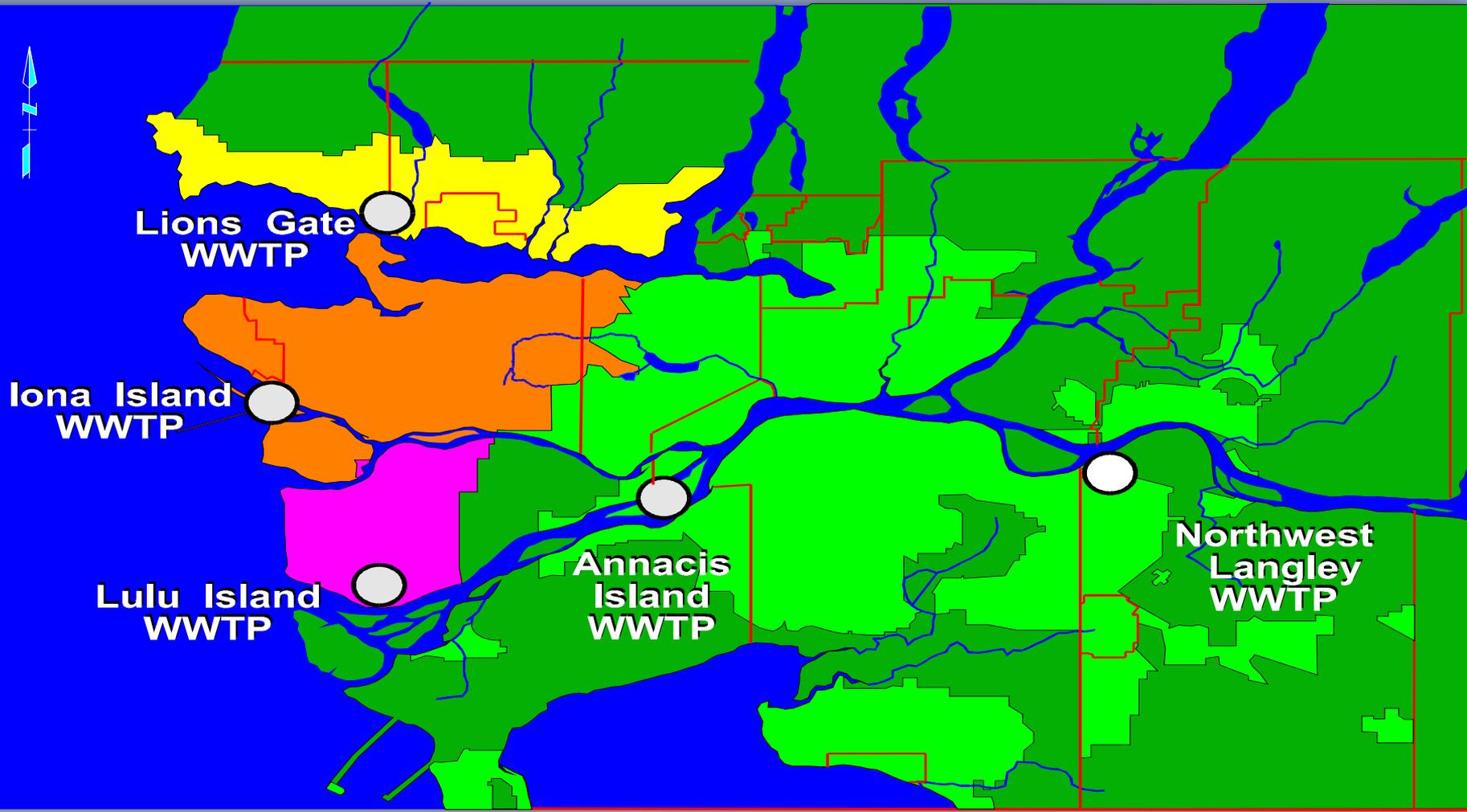
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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

# Co-digestion at the Annacis Island Wastewater Treatment Plant: Metro Vancouver's Path to Increase Energy Rich Biogas Production for Plant Use

Paul Lam; Echo Lin  
Methane Expo 2013  
March 14, 2013  
Vancouver

# Metro Vancouver operates 5 wastewater plants serving a population of ~2 million



# Annacis Island WWTP



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# What is Co-digestion?

Controlled direct feeding of high strength organic wastes to wastewater anaerobic digesters to generate energy-rich biogas

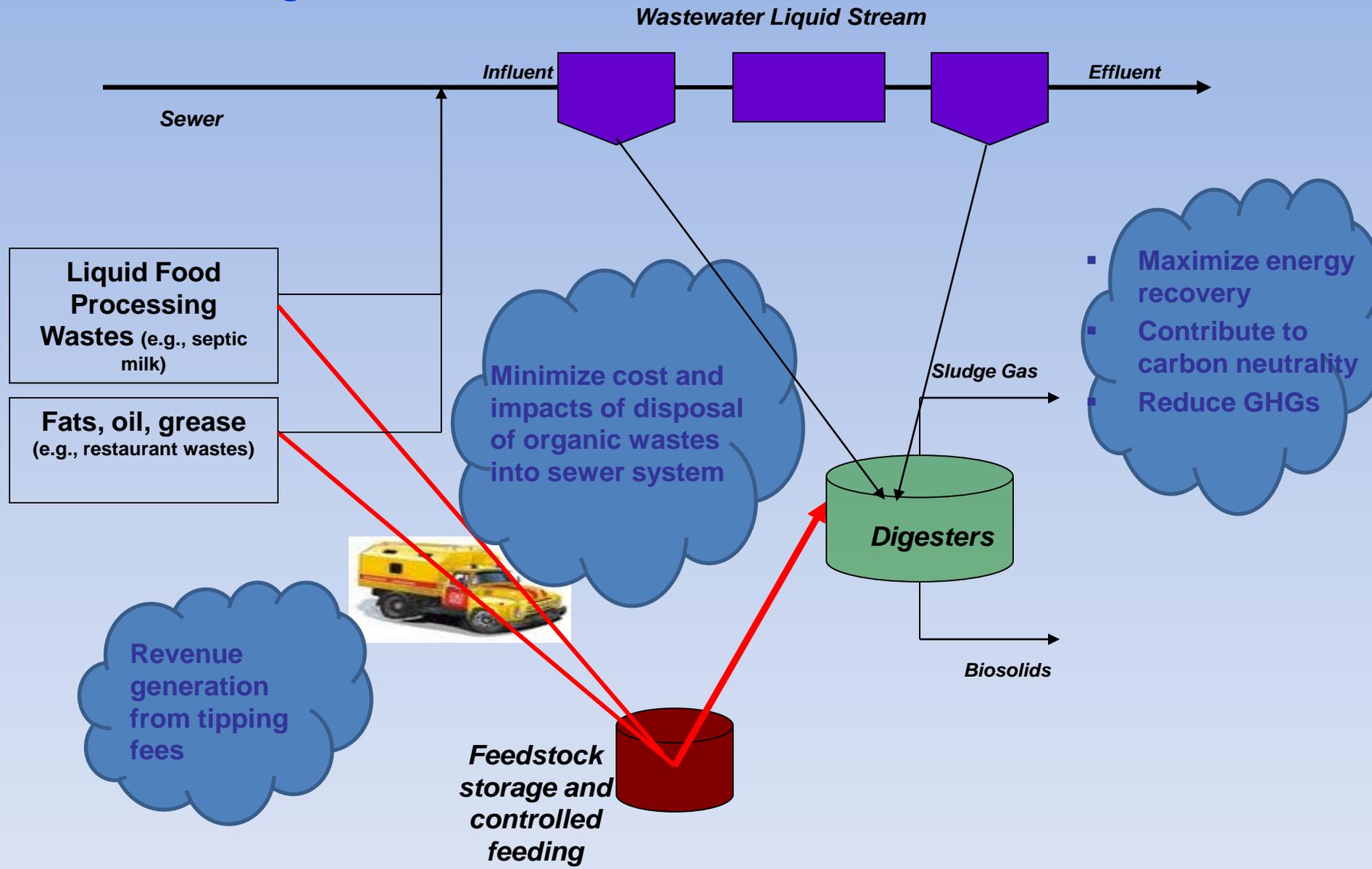
- **New technology** originally developed in Europe
- **Large scale municipal waste application** in Canada



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# Benefits of Co-digestion



# Background and Concept Development

- **Major drivers for Co-digestion**
  - **Technical**
  - **Economic**
  - **Environmental**
- **Drivers for Annacis**
  - **Mitigation measures for Iona and Lions Gate WWTPs**
  - **Utilize surplus digester capacity**
  - **Provide better outlet for trucked liquid wastes**
  - **Carbon neutrality**

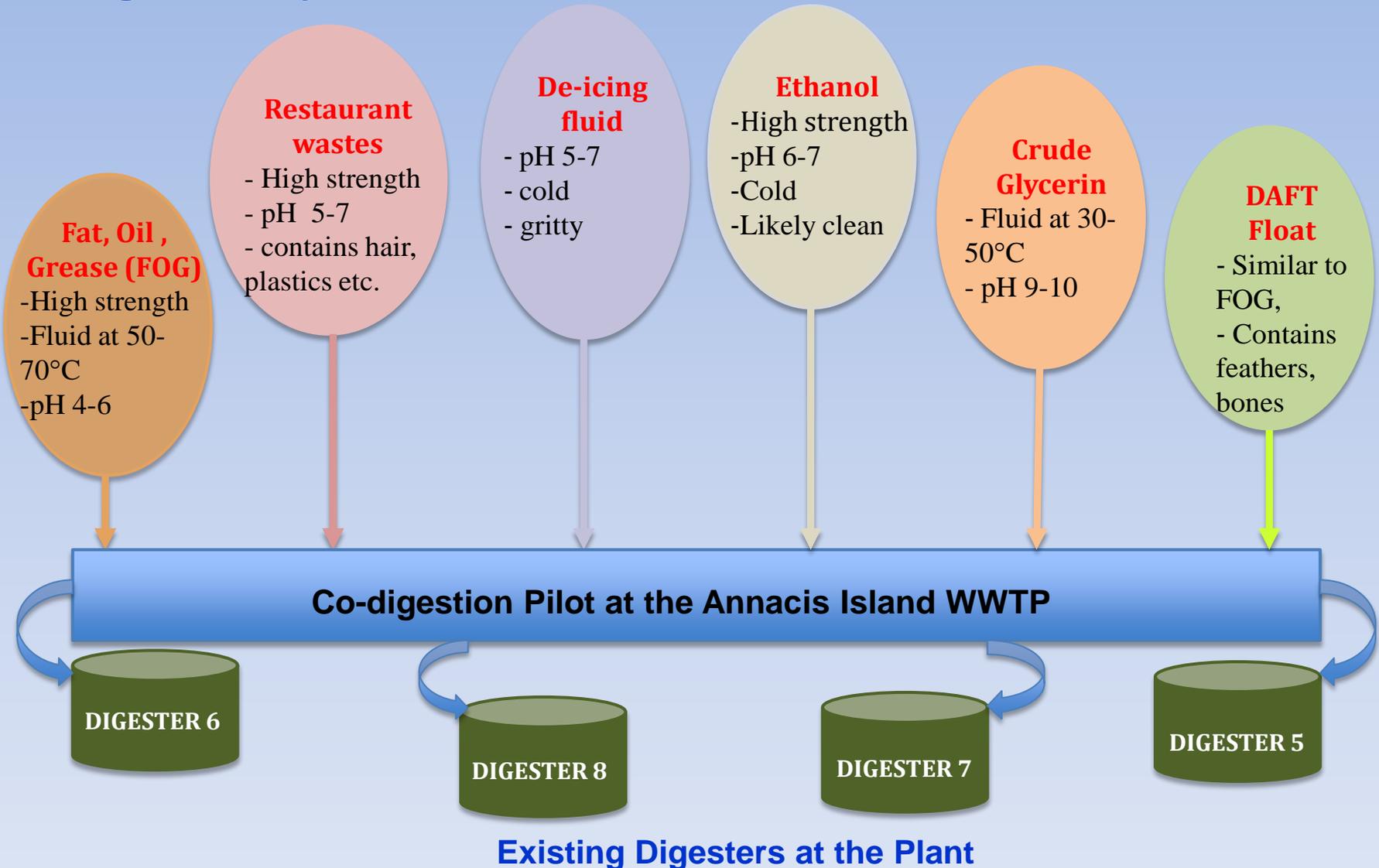


# Project Implementation - Scope Definition

- **Scope definition started in 2008**
  - **Business Casing**
  - **Potential benefits**
  
- **Challenges identified**
  - **Digester overload**
  - **Biosolids quality/ quantity**
  - **Feedstock characterization**
  - **Uncertain market availability**



# Examples of Organic Wastes (Feedstocks) that can be used in Co-digestion System at the Annacis Island WWTP



# Potential Financial Benefits

- **Carbon credit – 1,500 tonnes CO<sub>2e</sub>/year**
- **Additional sludge gas production – 2.6 million m<sup>3</sup>/year**
- **Potential revenue**
  - **through co-generation – \$168 K/year or**
  - **through exporting gas – \$ 490 K/year**
  - **through tipping fee – \$ 572 K/year**



# Project Implementation - Design and Construction

- **Design started in 2009 with construction completed in early 2011**
- **A fully automated system**
- **Organic wastes are screened and pumped to a storage tank for storage, mixing and homogenizing prior to being fed to the digesters**
- **Parallel 2 month full scale testing at Annacis in 2009**



# Co-digestion Pilot Project at the Annacis Island WWTP



Storage Tank

Utility Shed

Off Loading Truck

To Digesters

Feed Pump

Screens

Capital cost - \$ 2.6 million

Capacity - 50 m<sup>3</sup>/d

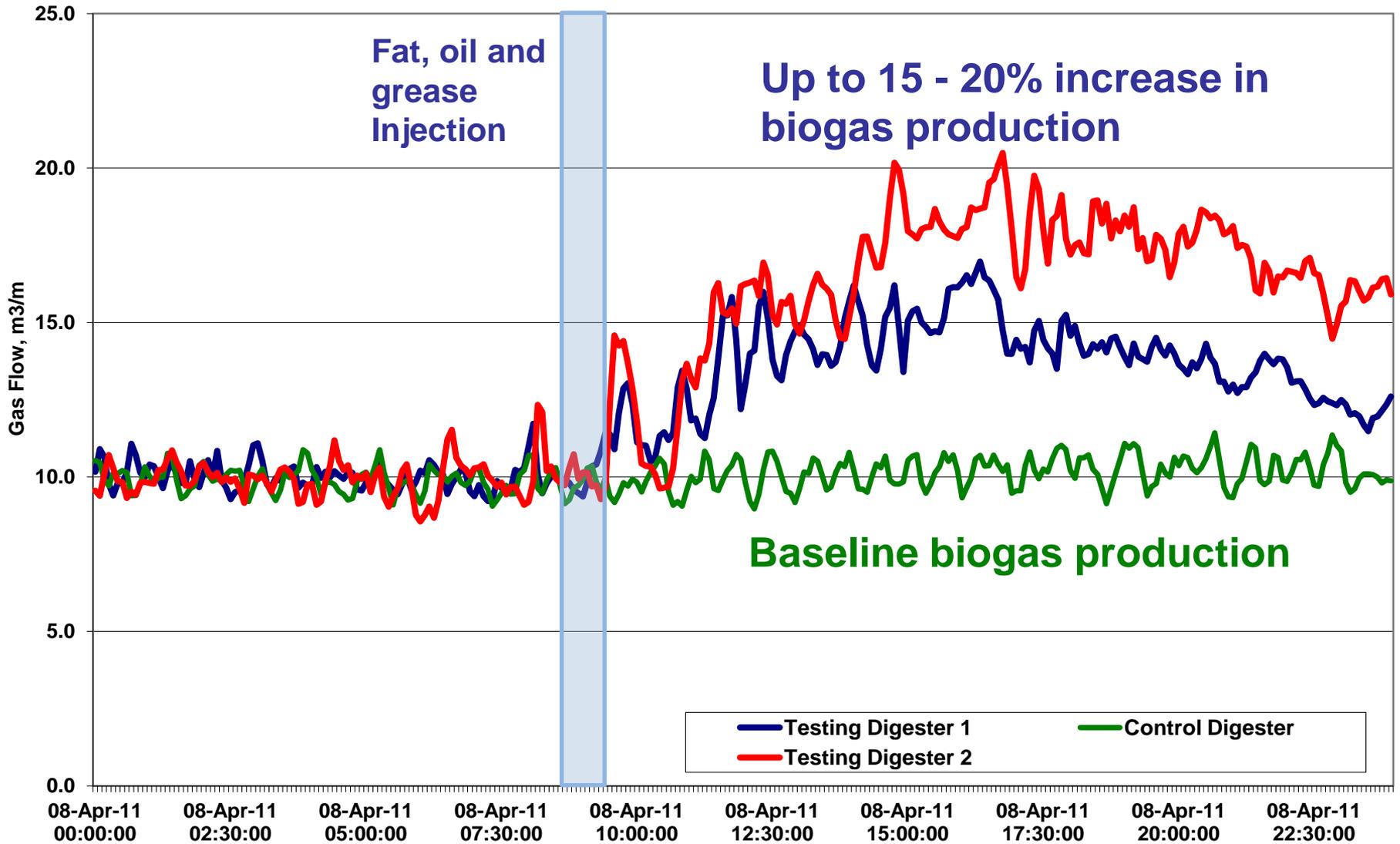
Commissioned - April, 2011

# Project Implementation - Operation

- **Loads processed**
  - **FOG**
  - **Ethanol**
  - **De-icing fluid**
  - **Restaurant grease trap materials**
- **The biogas increase from co-digestion has been stable**
- **No significant negative impacts on the digester performance or the biosolids quality or quantity have been observed.**



# System Performance





# Potential Risks

- Clogging of the screening system
- Upsetting the anaerobic digesters
- Creating digester foaming problems
- Feedstock supply uncertainty

# Risk Mitigation Measures

- Developed a testing program including:
  - An operational protocol
  - A co-digestion system laboratory analysis
  - A screening tool to prioritize potential feedstocks
- Conducted a market survey to identify secure feedstock sources

# Steps Forward

## 2013

- **Continuous operation**
- **Pre-qualification process to select and test potential future feedstocks**
- **Business case for future expansion opportunities**

## 2014

- **Public tender process to secure long term supply**



# Questions?

