



# Flathead Electric Cooperative 1.6 MW LFGE Project Montana's First LFGE Project

Presented by:

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**Flathead Electric** *Community...Integrity...Reliability*

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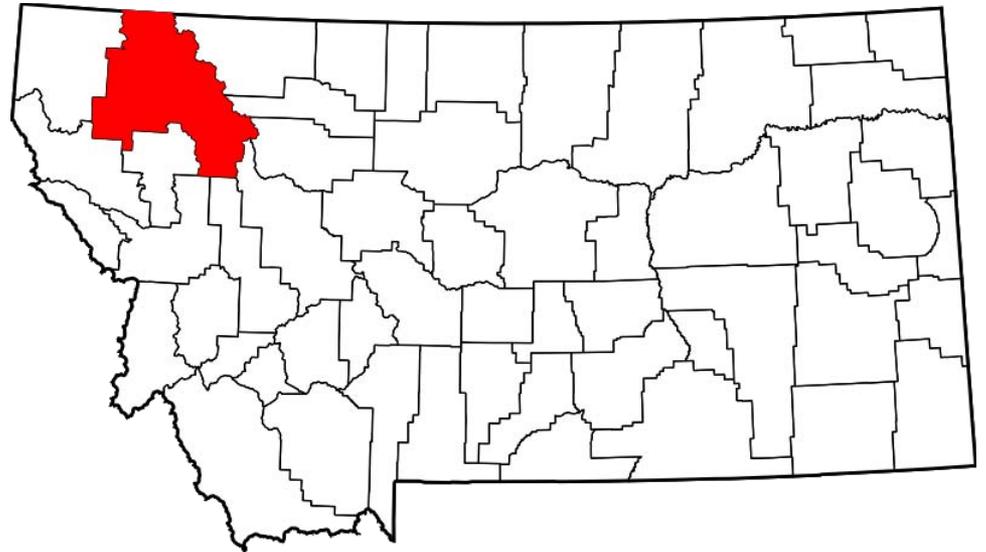
# Outline

- FEC
- Flathead County Sanitary Landfill
- 1.6-MW Project
  - Feasibility
  - Funding
  - Agreements
  - Design/Construct
  - Operations



# Flathead County, Montana

- Located in northwestern Montana
- Gateway to Glacier National Park



# Flathead Electric Cooperative

- Established in 1937 to bring electric service to rural areas of the Flathead Valley
- Locally owned and operated cooperative



# Flathead Electric Cooperative

- Unlike investor-owned utilities, a cooperative is owned by its members – its customers
- FEC buys electricity from some other entity and transmits the electricity through its distribution system to homes and businesses
- Second largest electric utility in Montana
- 47,000 members
- Annual power sales of ~ 1,300,000 MWh/year

# Flathead Electric Cooperative

- Purchases power from the Bonneville Power Administration (BPA)
- FEC has been the beneficiary of relatively low cost federal hydropower through the BPA
- Starting in October 2011, this will change, as BPA will cap the amount of low cost hydropower power available to FEC

# Flathead Electric Cooperative

- Montana has an RPS enacted in 2005:
  - 5% for compliance years 2008-2009
  - 10% for compliance years 2010-2014
  - 15% for compliance year 2015 and for each year thereafter



# Flathead Electric Cooperative

- The RPS in Montana is not mandatory for Electric Coops.
- However, the larger coops are required to operate with the intent of the law in mind.
- The FEC Board decided to meet the intent as much as possible.
- The renewable energy is not mandatory for anyone if it costs more than 15% of what they can otherwise get.

# Flathead Electric Cooperative

- What can we do locally?
- Flathead County Landfill was flaring LFG
- FEC & County partnership



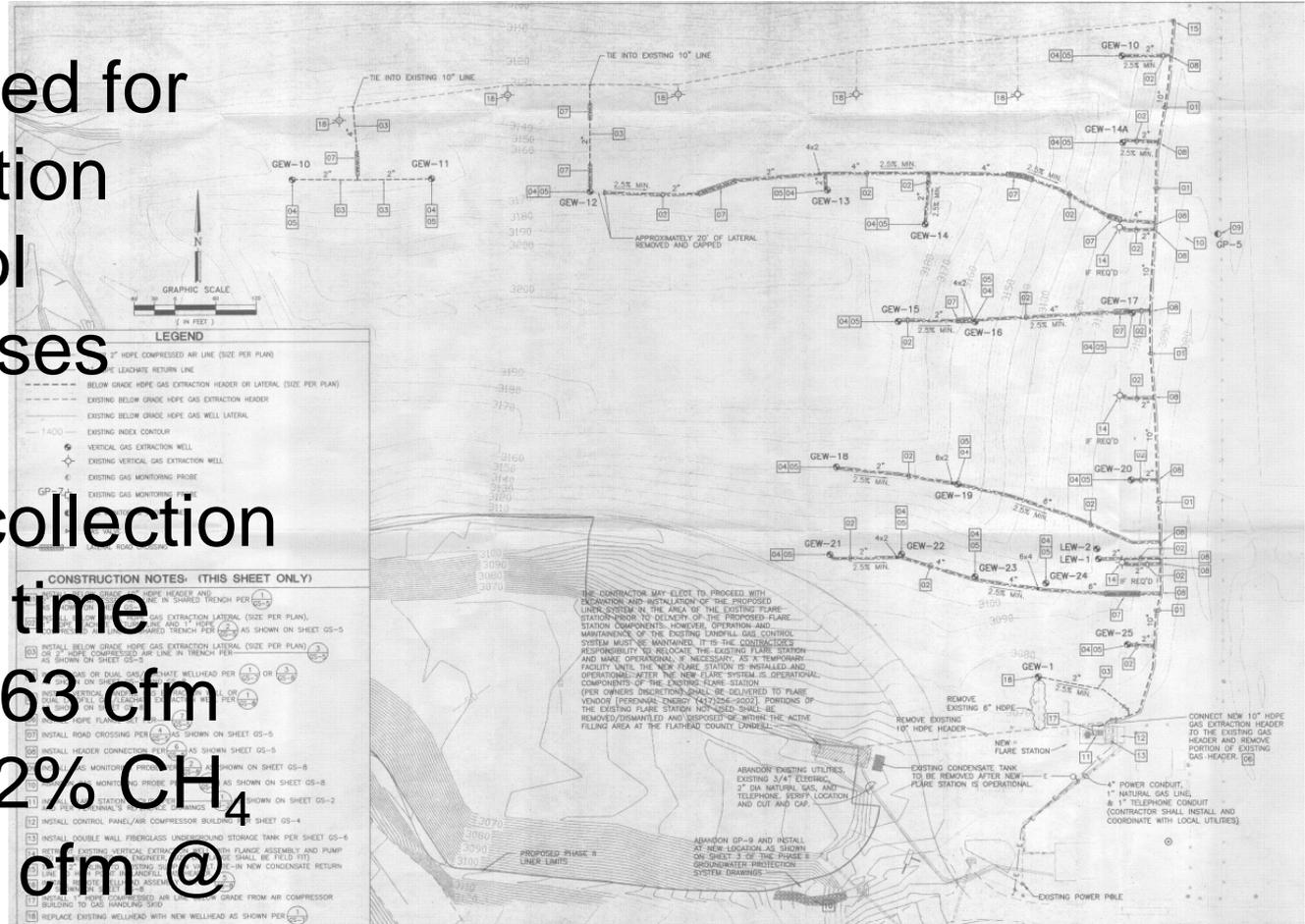
# Flathead County Sanitary LF

- The landfill contained over 2MM tons of waste, and has a capacity of 12MM tons
- The landfill had a partial LFG extraction system and a blower/flare station (BFS)



# Flathead County Sanitary LF

- Installed for migration control purposes
- LFG collection at the time was 263 cfm at 44.2% CH<sub>4</sub> (=233 cfm @ 50%)



# Feasibility Study

- Feasibility study
  - Estimate recoverable LFG
  - Recommend facility capacity/configuration
  - Estimate capital & annual O&M costs
  - Calculate cost of power
  - Develop preliminary schedule
  - Estimate greenhouse gas reductions

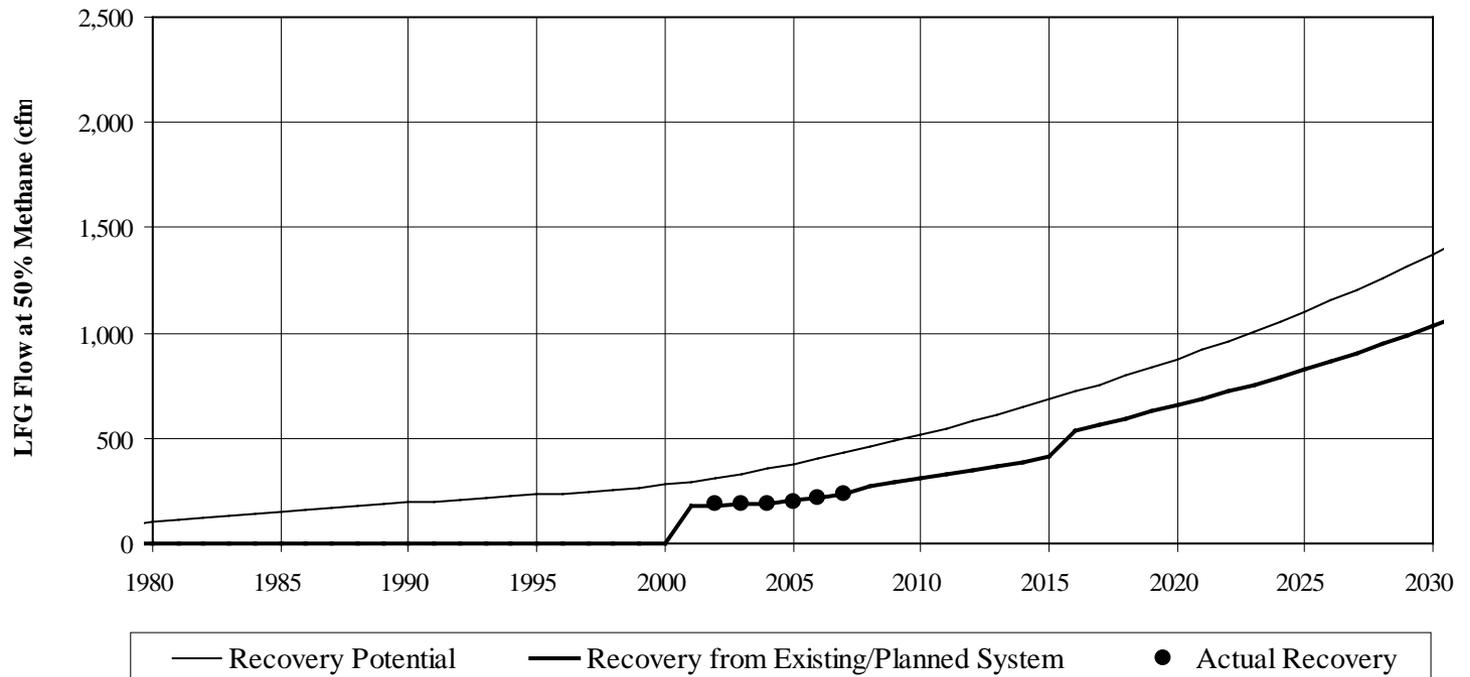
# Feasibility Study

- Recoverable Landfill Gas Estimate
  - With comprehensive system 2007 estimate was 367 cfm at 50% CH<sub>4</sub>
  - Will gradually increase to over 2,000 cfm at landfill closure after 2040



# Feasibility Study

**Figure 1. LFG Recovery Projection**  
**Flathead County Sanitary Landfill - Kalispell, Montana**



# Results

- Facility Capacity/Configuration
  - 2007 extraction was 233 cfm
  - 2007 potential was 366 cfm
  - 800-kW genset needs ~ 270 cfm
  - Two 800-kW gensets or one 1.6-MW genset needs ~ 540 cfm
  - 2016 potential
  - is 539 cfm

# FEC Implementation

- Select facility capacity/configuration
- Negotiate gas usage agreement with County
- Modify site air permits
- Community outreach
- Negotiate greenhouse gas credit monetization agreement
- Select EPC and O&M contractor
- Design interconnect



# Facility Capacity/Configuration

- Upgrade LFG Extraction System
- Option 1
  - Install one 800-kW genset now
  - Design/construct facility to accommodate 800-kW expansion in 2016
- Option 2
  - Install one 1.6-MW genset now

# Option 2 – Facility Configuration

- A 600-cfm fuel pressurization and cooling system
- One 1.6-MW CAT 3520 LFG-fueled genset
- Switchgear, switchgear controls, and step-up transformer
- SCADA system
- Building



# Funding

- Clean Renewable Energy Bonds (CREBs)
- The Energy Tax Incentive Act of 2005 authorized up to \$800,000,000 in CREBs to be issued for certain projects by certain, qualified issuers



# Funding & Agreement

- To use CREBs for wellfield expansion the FEC had to own the wellfield
- FEC & County negotiated transfer of system
- FEC completed bonding process in 2008



# FEC Design/Construction

- EPC contract:
  - LFGE facility design
  - Wellfield expansion design
  - Permitting
  - LFGE facility construction
  - Wellfield construction
  - Start-up
  - LFGE facility and wellfield O&M



# FEC Design/Construction



# FEC Design/Construction



# FEC Operational Status

- Commissioning and start-up work began in April 2009
- Commercial operation began in June 2009



# FEC Operational Status

- Has produced 10,800 MWh of renewable power
- Achieved an uptime of over 96%
- 13,000 hours of operation

