Cooperative Partnership with Renewables

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Japer County REMC

- Jasper County REMC is a cooperative located in Northwest Indiana about halfway between Indianapolis and Chicago
- Provides electricity to 8900 meters
- Has 14 dairies each having 4000 cows
- Works with all but two of these dairies in a cogeneration environment
- Seven of these dairies have anaerobic digesters

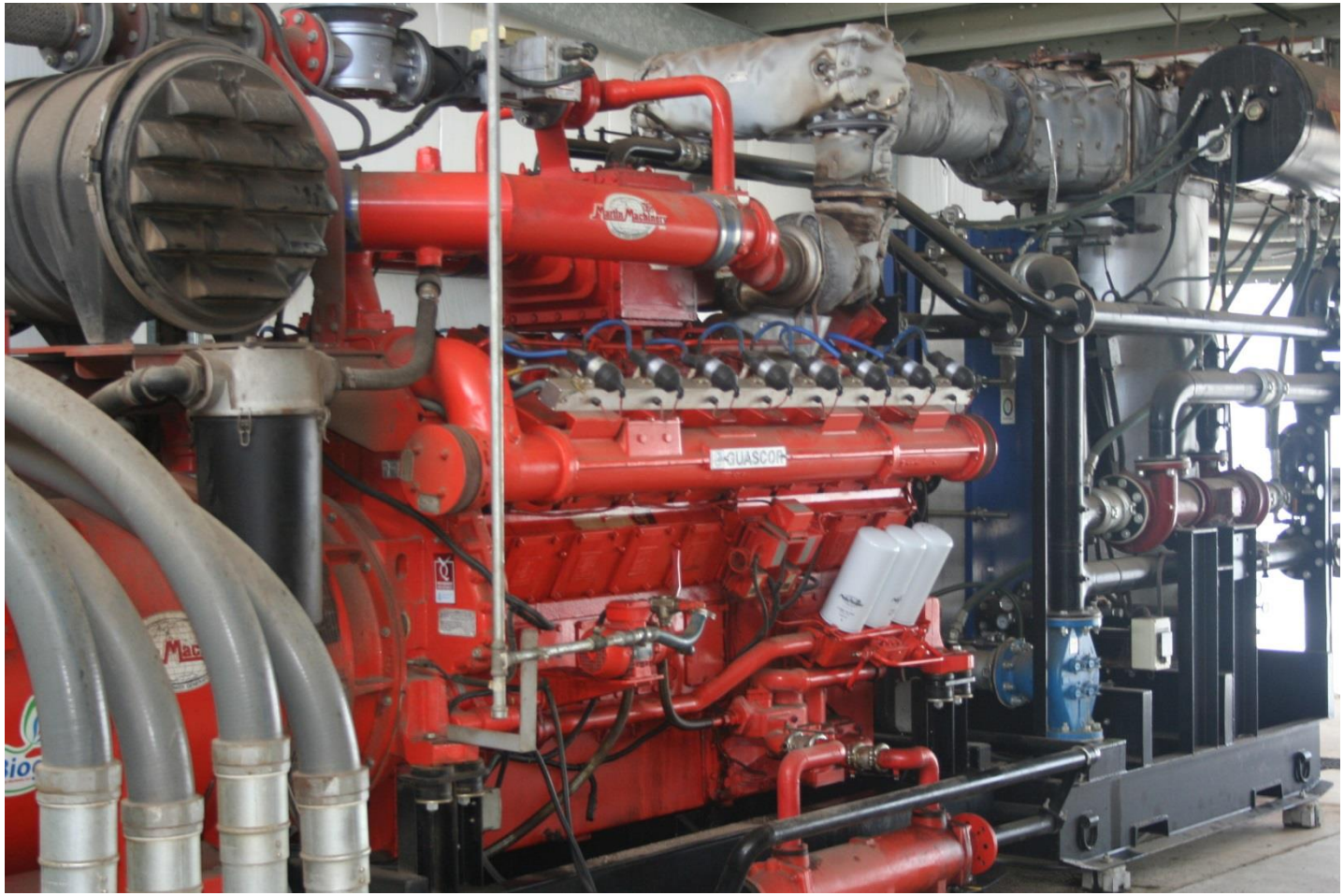
Central Digester

First Manure Dump

Digester

Building with 1.4 Mw's Co Generation

710 KW Generator



By Product

Above Ground Digester

Anaerobic Digesters

- The following is a list of dairies and the size of generation supported by those digesters:
  - Tony Bos 710 KW
  - Tony T Bos 710 KW
  - Fair Oaks Site 2 720 KW (2/360KW Gen sets)
  - Fair Oaks Site 3,4,5,6 1000 KW
  - Windy Ridge 1440 KW
  - Herrema 710 KW
  - Hidden View 720 KW
  - Total 6.1 MW

Why Digesters

- 72,000 Cows in a ten mile radius poses problems:
  - Odor Control
  - Issues with nitrates (IDEM)
  - Issues with fly's
  - Revenue stream for dairy
- Methane is a pollutant that is 21 times more harmful to the atmosphere than carbon
- By product is then used for bedding in some instances

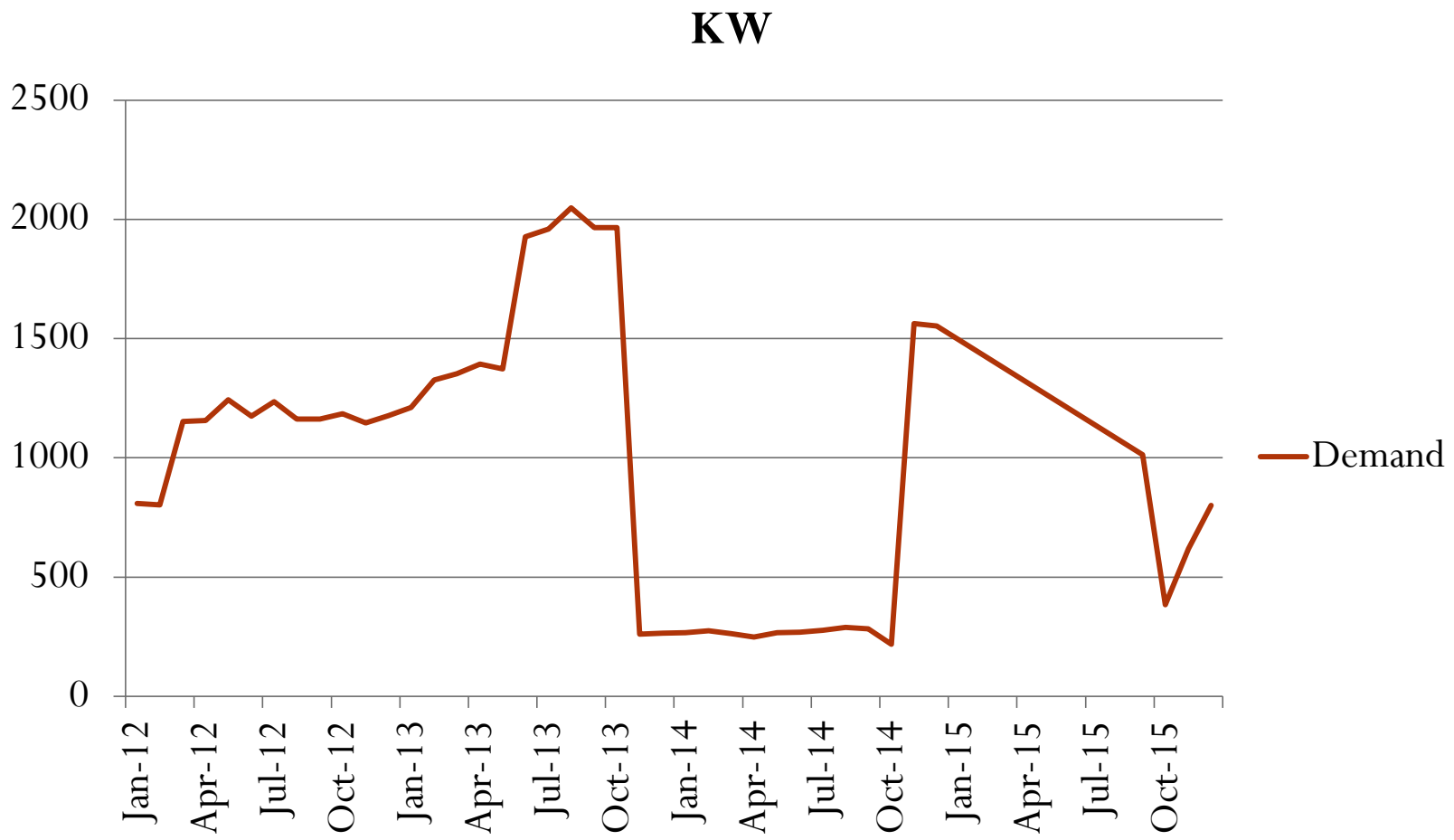
Issues to Overcome

- Interconnection agreement
  - *Worker safety*
    - Islanding
    - Who has control of the distribution system
    - Use a qualified engineering firm when making decisions
      - Always protect with equipment your personnel is familiar with
      - Don't be afraid to ask for protection for your worker
  - Bidirectional metering
  - Business Model
- How your distribution interacts with DG
  - Voltage Regulators
  - Var's
  - Synching Issues
- Bio Gas
  - Hydrogen Sulfide is a very corrosive gas
- All parties must seek resolution to problems in a manner that must be a win-win for all parties

Key Issues to Overcome

- Worker education and safety
  - This includes your workers and the dairy's workers
- All requirements contract
  - We have three business models as a result of this issue
    - Excess Generation goes to another Farm
      - (FERC Lite Rule Applies)
    - Excess Generation goes to G & T
    - No excess, all generation goes to G & T and the dairy's needs continue to be bought at retail rate
- Rates are a huge issue
  - This is one of the biggest issue to overcome with a board and generally the CEO
  - This is not like a central station power delivery in that the technology is new enough that reliability can be a factor

1 Megawatt Generator



Rates

- Our rate usually have the following factors:
  - Energy
  - CP Component
  - NCP Component
  - Facility Charge
- Your rates need to allow for you to overcome the flow of electrons
  - You should not care whether your rates are predicated on the flow of electrons from a central station power or it is flowing back to the grid

Benefits

- Our participation has resulted in the following benefits
  - Dairy can grow
    - Retail load at first diminished but over time continually grows
    - New business have been created
  - Generation resource that you can dispatch
    - If you are positioned correctly with the dairy you can ask them to come on at peak times
  - Has had the effect of putting off the need for additional cooperative resources
    - We were able to put off building an additional substation to run this area for six years
  - Is good for economic growth for our area
    - Additional jobs created
    - Keeps the money local

Summary

- These projects may allow the ag producer to expand into the future
- Provides jobs for the future
- It provides generation that can be dispatched when needed
- Rates are the key to making these viable projects
  - You have to get yourself indifferent to which way the electrons flow
- Worker safety is a key issue
  - Don't be afraid to think outside the box
  - Don't be afraid to put in safety mechanisms that allow for you to assure your workers safety