

# Rural Cooperatives and Agricultural Energy Efficiency

ACEEE's 2<sup>nd</sup> Forum on  
Energy Efficiency in Agriculture  
Des Moines, Iowa

Paul Gillis, CEM - GEN~SYS Energy





# Gen~Sys Energy

- Cooperative formed in 1997 - Member G&Ts
  - Corn Belt Power Cooperative – Humboldt, IA
  - Dairyland Power Cooperative – La Crosse, WI
- Energy Marketing Services
- Technical Services Group
  - Farm raised and corn fed
  - Backgrounds in production agriculture, farm mechanization, and agricultural commodities

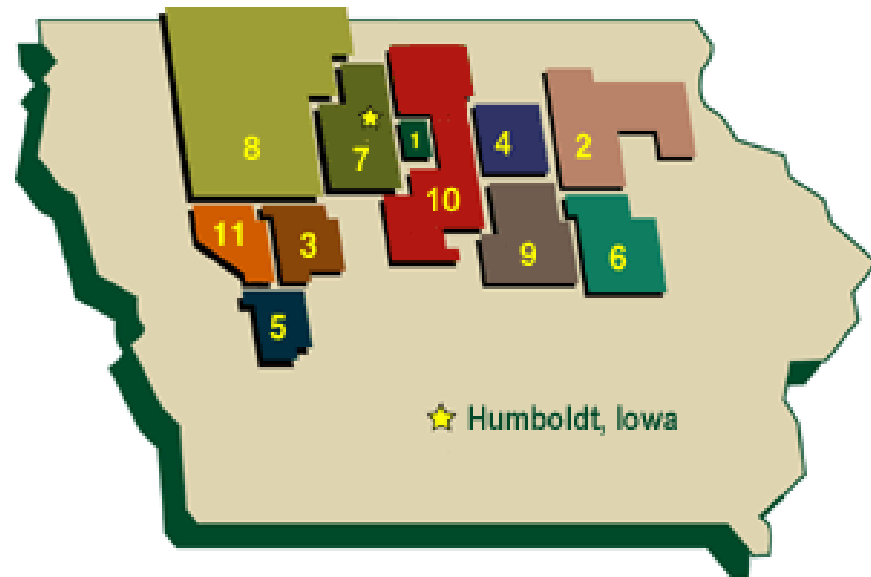


Staff Photo



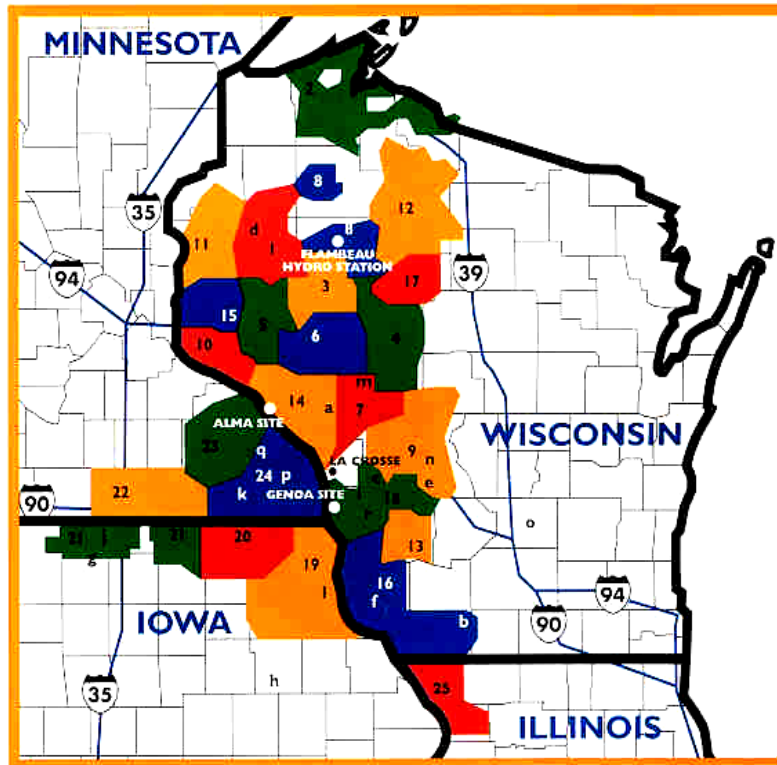
# Corn Belt Power Cooperative

- 11 Member Cooperatives
- 1 Municipal Electric Cooperative
- 295 MW generation
- 1,675 miles of transmission lines
- 142 substations





# Dairyland Power Cooperative



- 25 Member Cooperatives
- 20 Municipal systems
- 1,135 MW generation
- 3,132 miles of transmission
- 325 substations
- 230,000 Class A meters
- 600,000 consumers
- 600,000 dairy cows
- 2,000,000 pigs
- 10's of millions of poultry



# DPC's 3-Pronged Approach

- Energy Efficiency
  - ACEEE State Scoring – MN 9<sup>th</sup>, WI 12<sup>th</sup>, IA 13<sup>th</sup>
  - Minnesota energy savings requirement - 1.5% of retail
  - Iowa debate continues
  - Wisconsin Public Benefits
- Load Management
  - Delays future generation needs
  - Improves efficiency/lowers cost of existing generation
- Renewable Energy
  - Commitment to environmental stewardship
  - Meet or exceed States Renewable Portfolio Standards



# DPC Energy Efficiency Programs

- Residential and agricultural water heaters
- Compact fluorescents - \$1 million effort
- Air conditioners, air source & geo heat pumps
- Energy Star appliances
- Retrofit HID & fluorescent lighting
- Custom incentives for agriculture and C&I
- Distribution cooperatives use DPC offerings to enhance their own local programs



# Residential & Agricultural Water Heaters

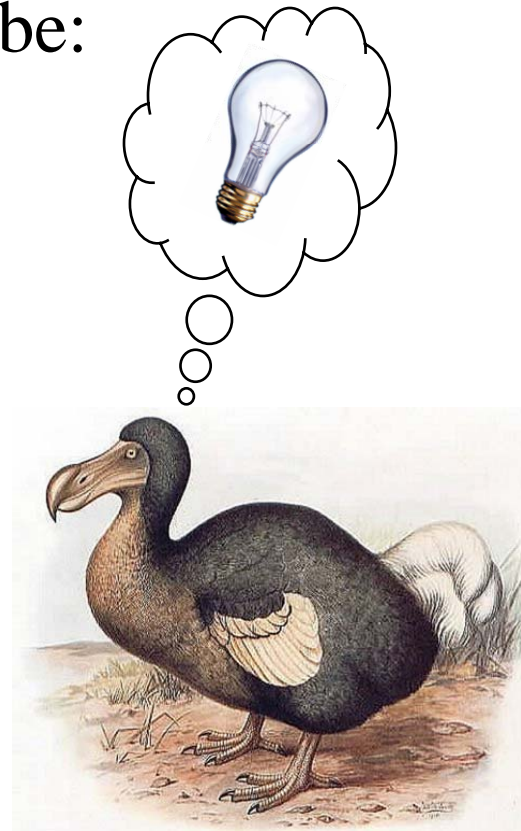
- High energy factor electric units
- Incentive based on storage capacity/recovery
- Co-ops offer free service &/or monthly credits
- Includes incentives for dairy heat recovery, HPWHs, and solar units
- Tied to load management programs
  - Dairy water heater schedule – evenings only
  - Allows full recharge before the next milking





# CFLs - Incandescent Extinction?

- 2007 Energy Independence and Security Act mandates light bulbs be:
  - 25-30% more efficient by 2014
  - 70% more efficient by 2020
- Replacing two lamps per member across the Dairyland system will reduce load by over 12 MW
- CFLS can be used in many agricultural applications







# Custom Agricultural Incentives

- Incentives are based on Dairyland's avoided wholesale power costs
- Distribution cooperatives balance their energy efficiency programs to benefit the program participant, their membership as a whole, and the environment
  - SnapShot incentive analysis tool helps distribution cooperatives determine an appropriate level of program enhancement
- Certain limits apply



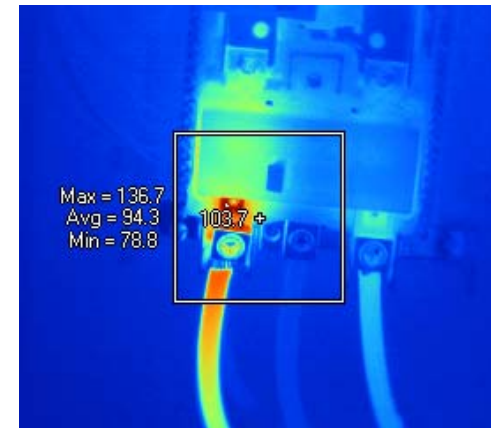
# Custom Incentive Examples

- Dairy heat recovery
- Plate coolers
- Variable frequency drives
- Scroll refrigeration compressors
- Lighting and ventilation retrofits
- Low energy/no energy livestock waterers
- Compressed air upgrades
- Low pressure irrigation
- Environmental controls



# Other Agricultural Offerings

- Farm audits/USDA audits
- Thermal imaging
- Farm expansion plans
- Research & demonstration
- Lighting and ventilation design assistance
- Standby generator sizing & procurement
- Power quality investigation
- UPS and surge suppression equipment

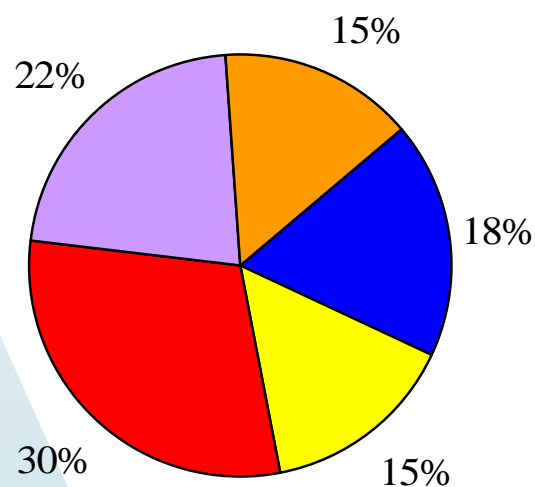




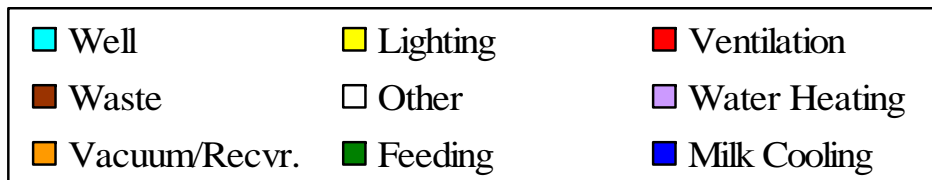
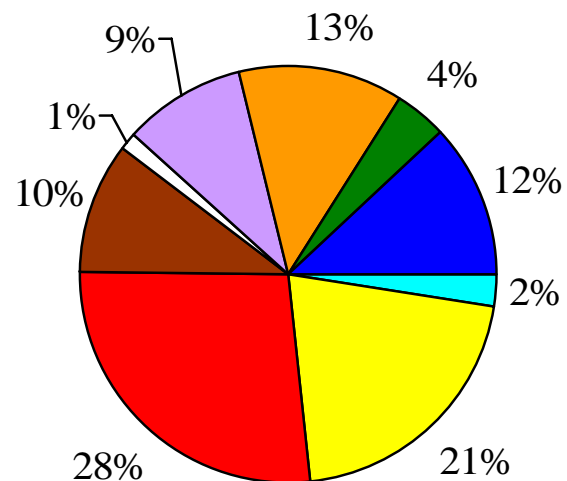
# Level I and II Farm Audits

## Electric Energy Consumption by End-Use

Typical Wisconsin Dairy Farm

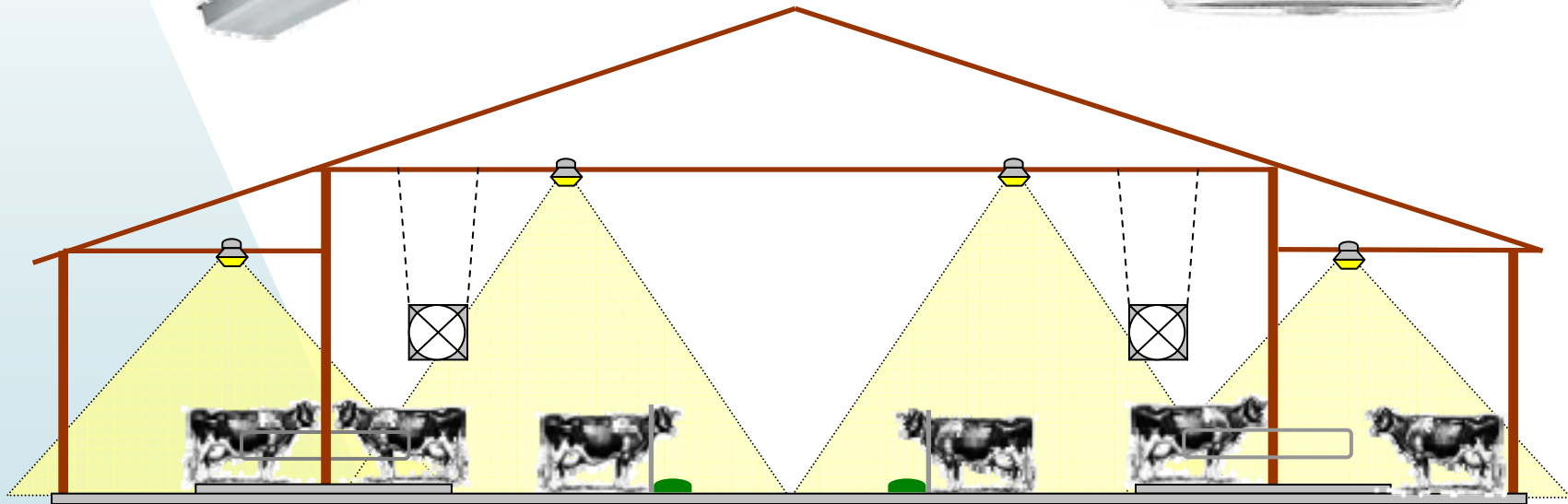


XYZ Dairy Farm





# Extended Daylighting





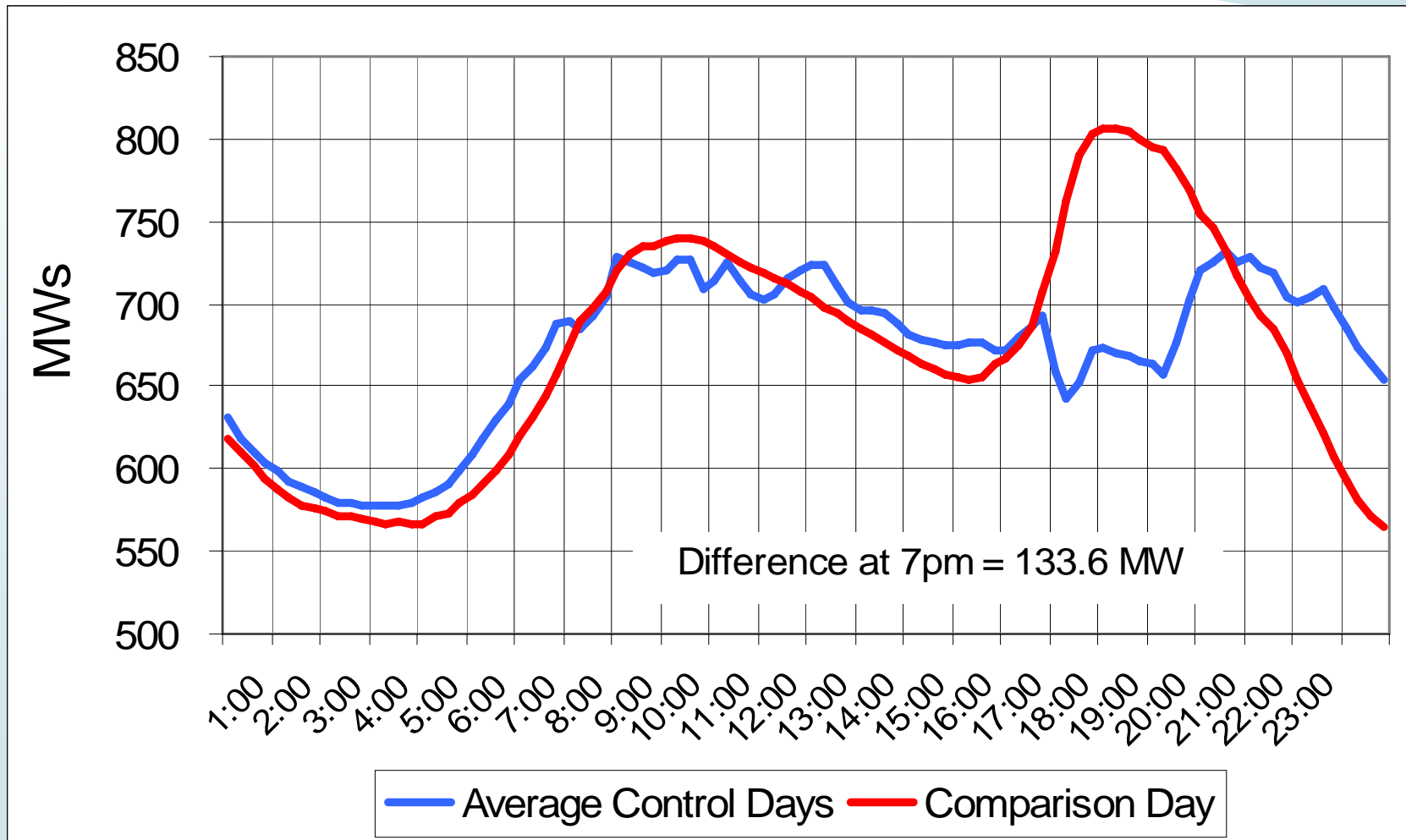
# Load Management

- Central control of loads
- 90,000 receivers in the field
- Demand Response
  - 70 MW summer
  - 155 MW winter
- Economic dispatch
- Annual savings over \$10.5 million





# Class A Winter Full Load Control





# Controlled Agricultural Loads

- Water heaters
- Electric space heat
- Grain dryers
- Irrigation systems
- Sawmills & feedmills  
(voluntary load shed)
- Standby generators







# Renewables

- Hydro 24 MW
- Wind 23 MW
- Landfills 11 MW
- Anaerobic Digesters 2.4 MW





# DPC Renewable Plan

- *Evergreen* renewable energy blocks
- Net metering for small scale producers
- Additions
  - Medium-scale anaerobic digester and LFG sites
  - Utility-scale wind and biomass
- Meet or exceed regulatory requirements
- Diversify - intermittent and dispatchable resources
- Reduce fuel price risk and volatility
- Couple with efficiency programs to reduce RPS
- Bolster rural economic development



Questions?

