Farmers Electric Cooperative

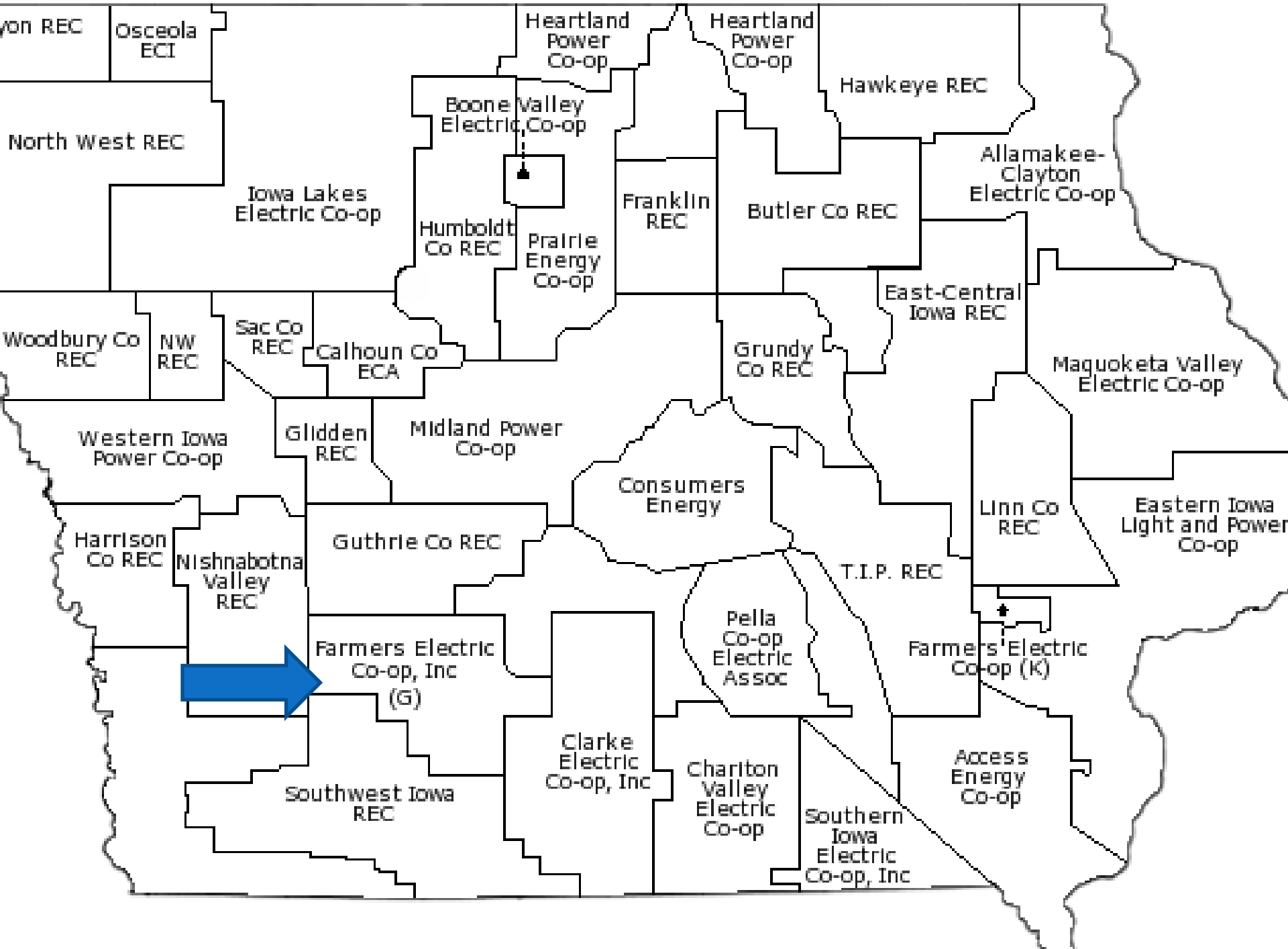
Nebraska Wind Conference

October 23, 2012

Clarence Moshier Jr. PE
EVP/General Manager

Touchstone Energy® Cooperatives

REC
Farmers Electric
Cooperative, Inc.
A Touchstone Energy® Cooperative


yon REC
Osceola ECI
Heartland Power Co-op
Heartland Power Co-op
Hawkeye REC
Boone Valley Electric Co-op
North West REC
Iowa Lakes Electric Co-op
Humboldt Co REC
Prairie Energy Co-op
Franklin REC
Butler Co REC
Allamakee-Clayton Electric Co-op
East-Central Iowa REC
Woodbury Co REC
NW REC
Sac Co REC
Calhoun Co ECA
Grundy Co REC
Maquoketa Valley Electric Co-op
Western Iowa Power Co-op
Glidden REC
Midland Power Co-op
Consumers Energy
Linn Co REC
Eastern Iowa Light and Power Co-op
Harrison Co REC
Nishnabotna Valley REC
Guthrie Co REC
T.I.P. REC
Pella Co-op Electric Assoc
Farmers Electric Co-op, Inc (G)
Farmers Electric Co-op (K)
Clarke Electric Co-op, Inc
Chariton Valley Electric Co-op
Access Energy Co-op
Southwest Iowa REC
Southern Iowa Electric Co-op, Inc

Farmers Electric Cooperative

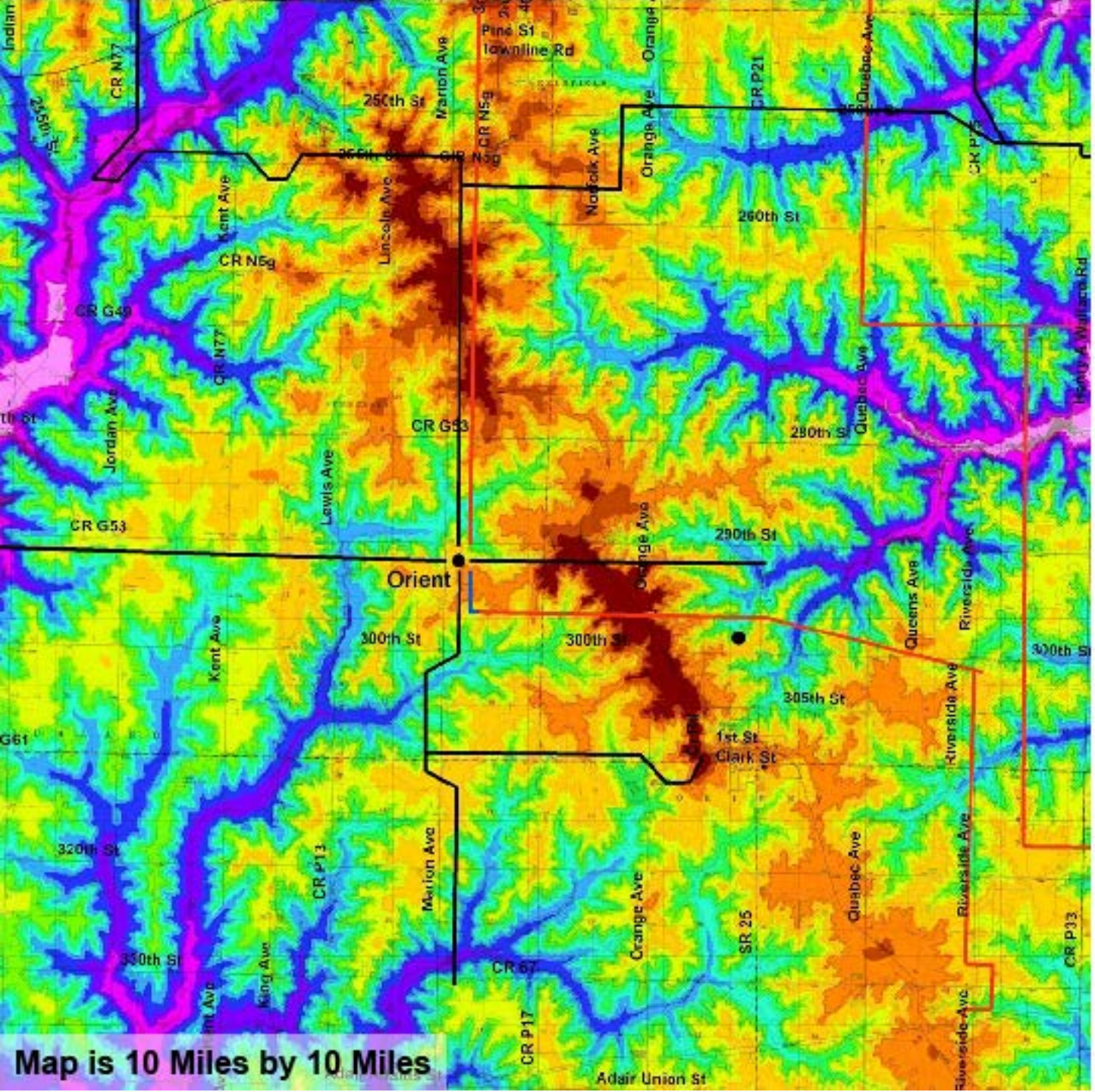
- ~ 4900 meters
- 1820 miles of line
- 14 substations
- 24 employees
- 12,470/7,200 volt system

The Beginning

- Started in 2007
- Community project
- Common vision
- All members of Farmers Electric
- Looked at small turbines

The Beginning (cont.)

- Brought in Tom Wind
- Settled on larger units
- Used USDA grant and Investment Tax Credit Grant
- Total cost ~ $6,400,000



Orient Area

Land Elevation in Meters

- 421 - 425
- 416 - 420
- 411 - 415
- 406 - 410
- 401 - 405
- 396 - 400
- 391 - 395
- 386 - 390
- 381 - 385
- 376 - 380
- 371 - 375
- 366 - 370
- 361 - 365
- <= 360

- Substation
- Distribution Lines
- 34.5 kV Lines
- 69 kV Lines

This map shows the ground elevation and is based on Digital Elevation Model data released by the United States Geological Survey.

Map is 10 Miles by 10 Miles

The Project

- Bulldog & Wolverine

The Project

- Bulldog & Wolverine
- 1.5 MW GE wind turbines
- 77 meter sweep
- 80 meter tower
- Greenfield & Orient Subst.

The Project (Cont.)

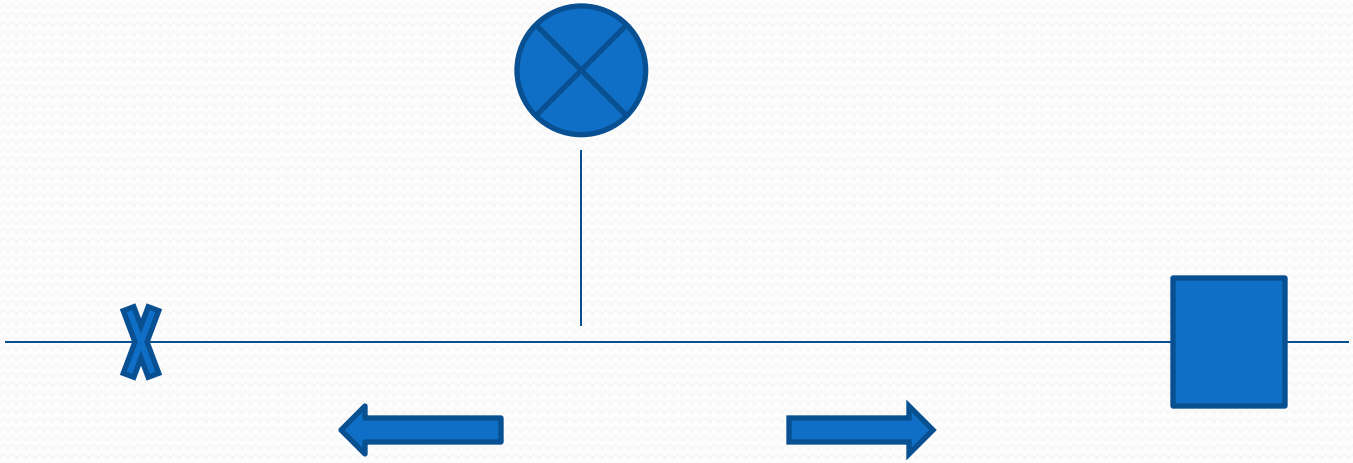
- 3,750 kVa subst. transformers
- 1.5 & 5.5 miles from subst.
- Feeder load ~ 500 kW
- Connected to 12,470 system
- Farmers Electric buys output
- Worked closely with group

2nd Project

- Wiota
- 1.6 MW GE wind turbine
- 82 meter sweep
- 80 meter tower
- Wiota Substation

The Challenges

- Cost of studies
- Power supplier acceptance
- 3-phase OCR coordination
- Substation regulators



The Benefits

- Long term power supply
- Unique PPA agreement
- Good for members, county, cooperative and investors
- 80% of subst. loads, 7.5% of coop load

The Future

- Added second turbine at Bulldog and Wolverine sites
- Currently do not purchase power from Meadow Ridge and Cumberland Rose

24 Hour Profile - WG7305

24 Hour Profile - WG7302

~~Customer Information~~

Customer Information

Name: Meadow Ridge WG
Address: Farmers Electric

Name: Greenfield WG
Address: Farmers Electric

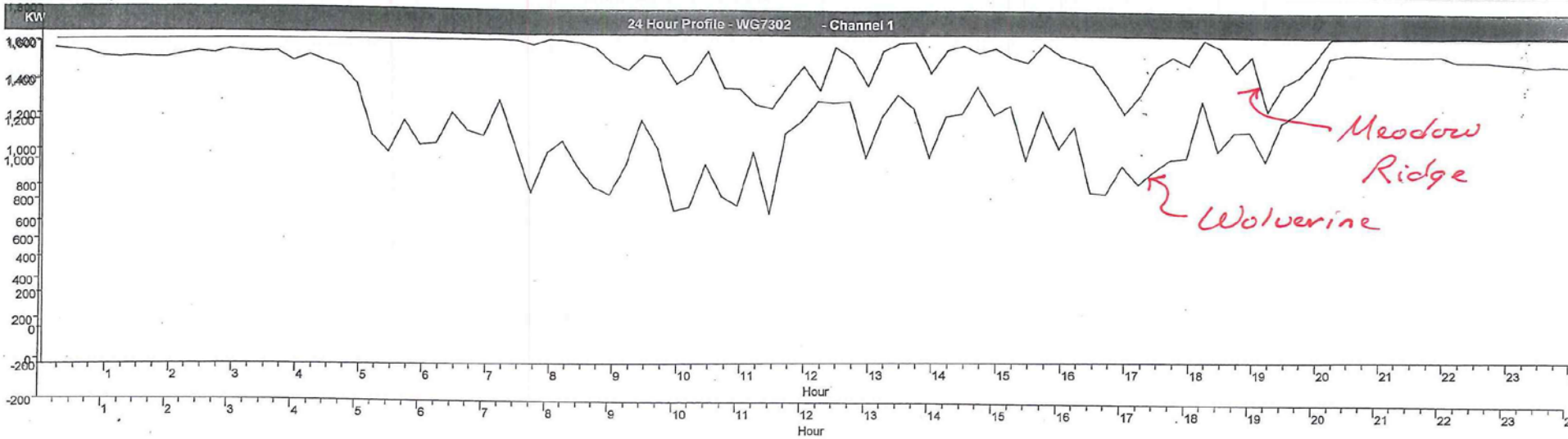
Meter No: KW GENERATED
Acct. No:

Data for Tue Sep 11 2012

Total Usage: 36,761.66 KWH
Peak Demand: 1,610.98 KW

Data for Tue Sep 11 2012

Occurred On: Sep 11 2012 00:15
Total Usage: 30,210.86 KWH
Load Factor: 95.09 %
Peak Demand: 1,560.58 KW
Date Range: Sep 1 To Sep 12
Occurred On: Sep 11 2012 00:15
Load Factor: 80.66 %



Peak kw @ 1610.9 — Meadow Ridge - 95% Load Factor

Peak kw @ 1560.6 — Wolverine - 80.7% Load Factor