

SMART GRID DATA PRIVACY

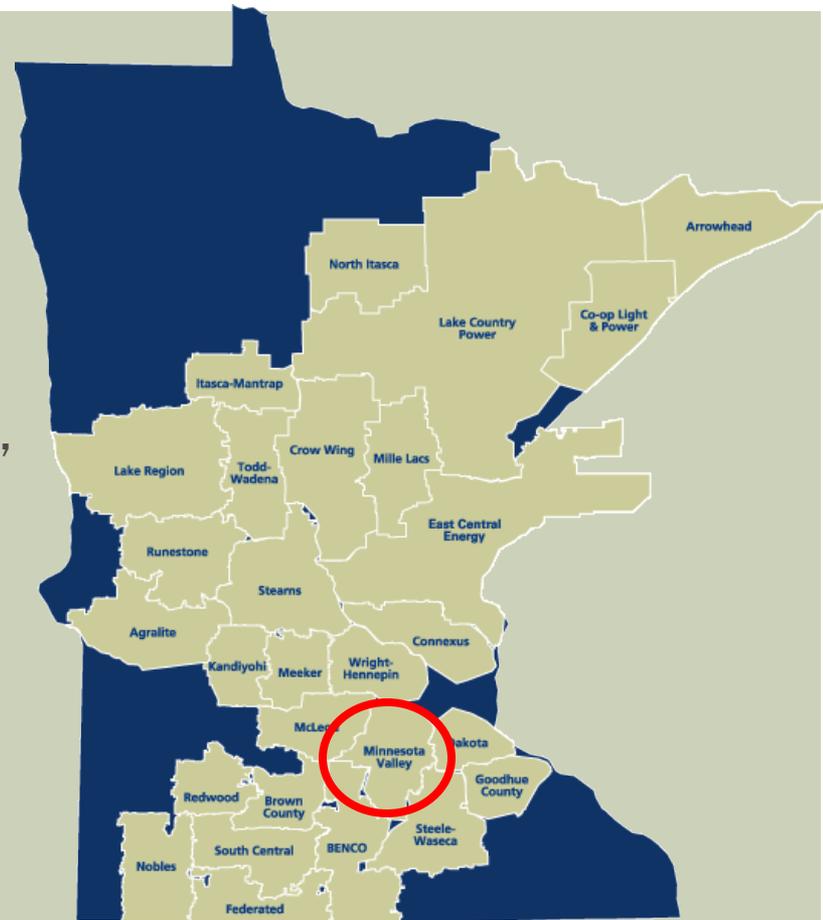
Ryan Hentges
Vice President Corporate Services
Minnesota Valley Electric Cooperative

OVERVIEW

- Overview - Minnesota Valley Electric Cooperative
- Address Following Questions
 - What technological capabilities do AMR and AMI provide?
 - What type of data is now being collected, and how is the level of detail of data expected to change with smart grid technologies?
 - Once the data is collected, how is it used?
 - How long is it retained?
 - What requests for data are utilities getting from third parties?

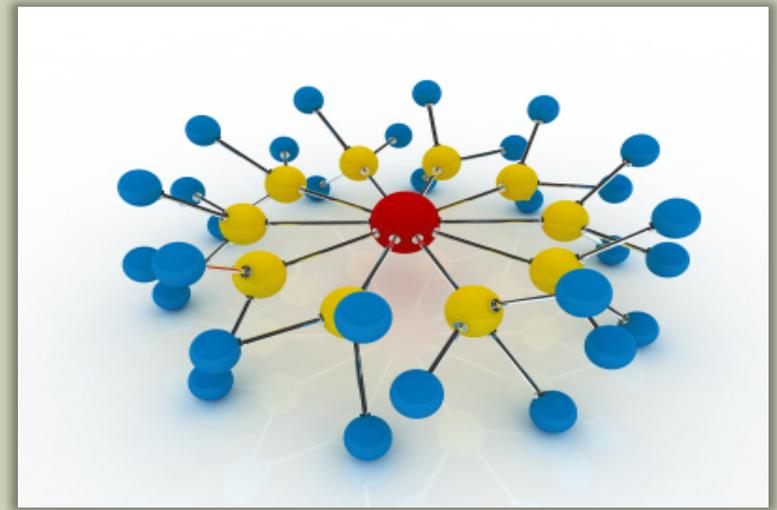
MVEC OVERVIEW

- **Distribution Cooperative**
 - Purchase wholesale power from Great River Energy and Basic Electric
- **Headquartered in Jordan, MN**
- **Serves 34,000 members**
 - Blue Earth, Carver, Dakota, Hennepin, Le Sueur, Rice, Scott, Sibley, and Waseca counties
- **Currently 41,000 “smart meters”**
- **American Customer Satisfaction Index (ACSI) Score of 86**



WHAT TECHNOLOGICAL CAPABILITIES DO AMR AND AMI PROVIDE? WHAT TYPE OF DATA IS NOW BEING COLLECTED?

- Remotely obtain data from electric meters
 - MVEC utilizes Power Line Carrier communications
 - Hourly consumption
 - Daily consumption
 - Voltage (instantaneous)
 - “Blinks”
 - Outage information
- What is not being collected
 - Electrical current
 - In-home appliance usage



HOW IS THE LEVEL OF DETAIL OF DATA EXPECTED TO CHANGE WITH SMART GRID TECHNOLOGIES?

- Before AMI

- 480,000

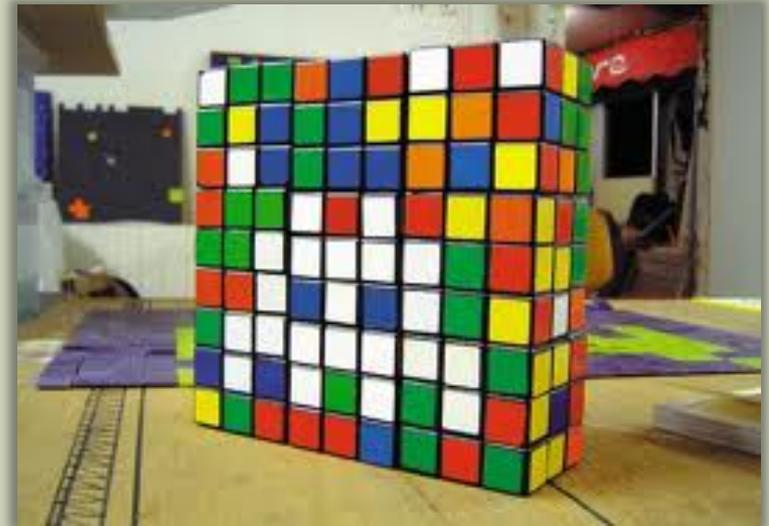
- Data points per year



- After AMI

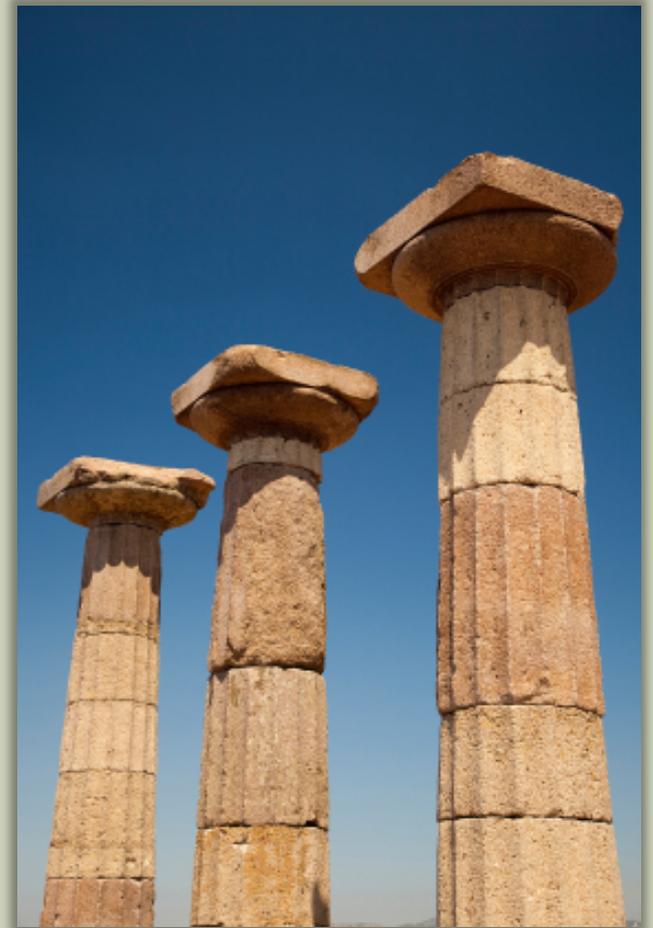
- 480,000,000

- Data points per year



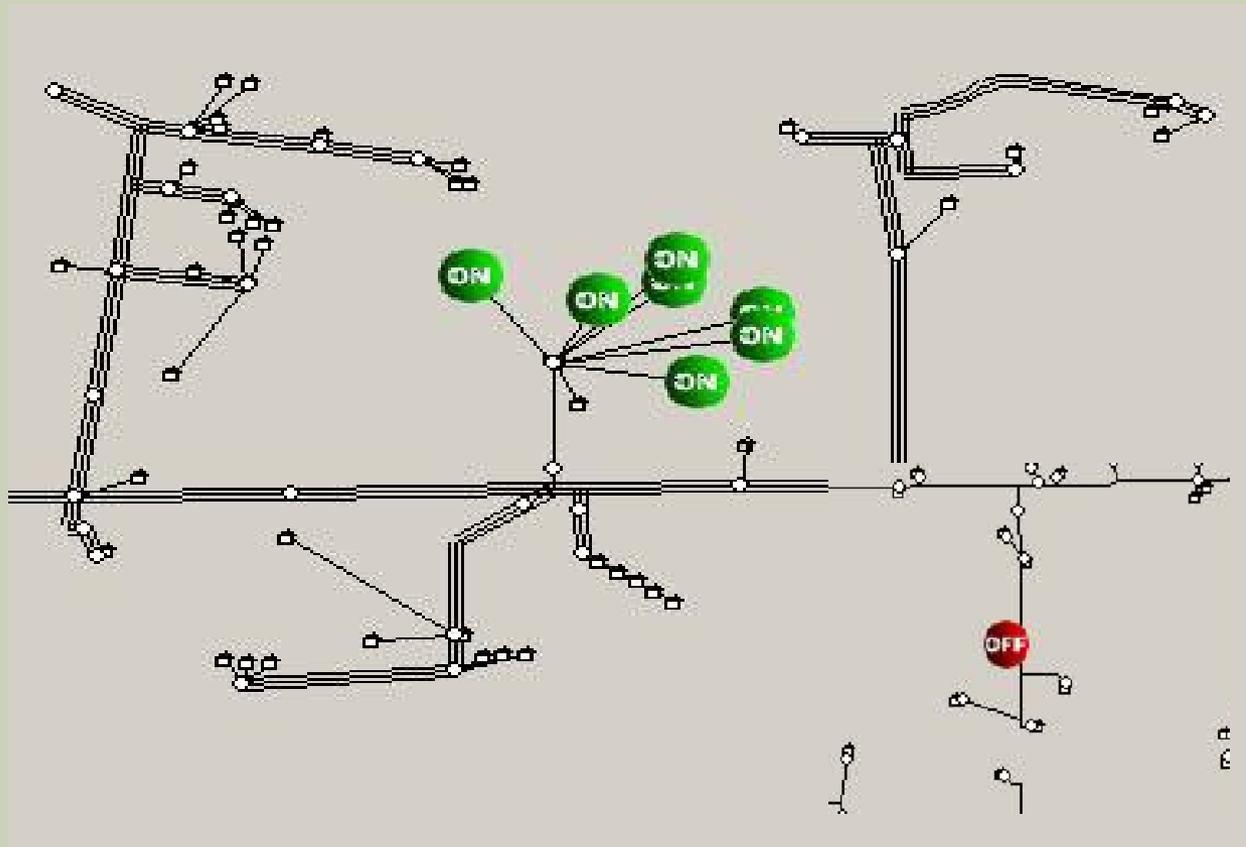
ONCE THE DATA IS COLLECTED, HOW IS IT USED?

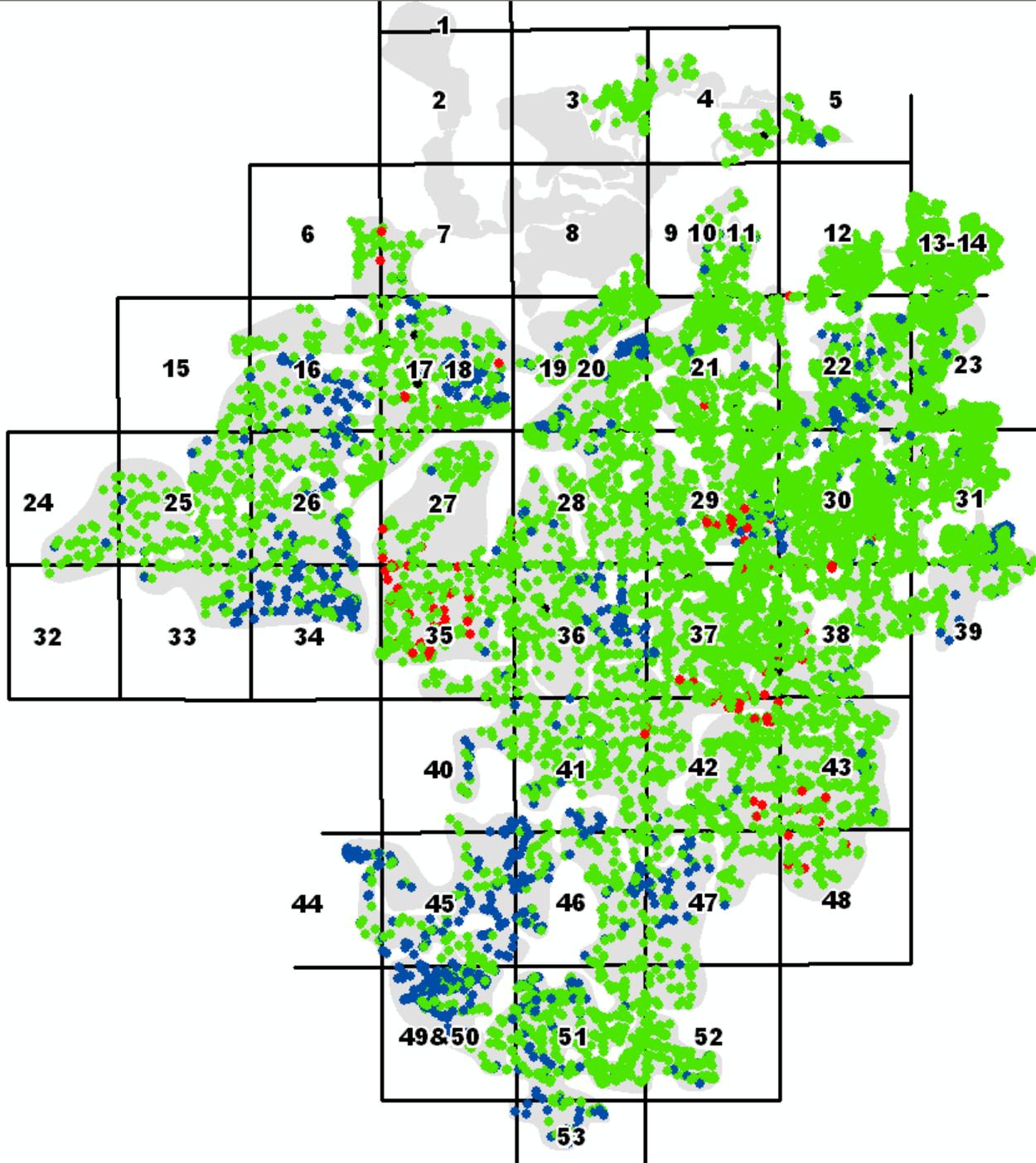
- Reliability
- Options
- Information

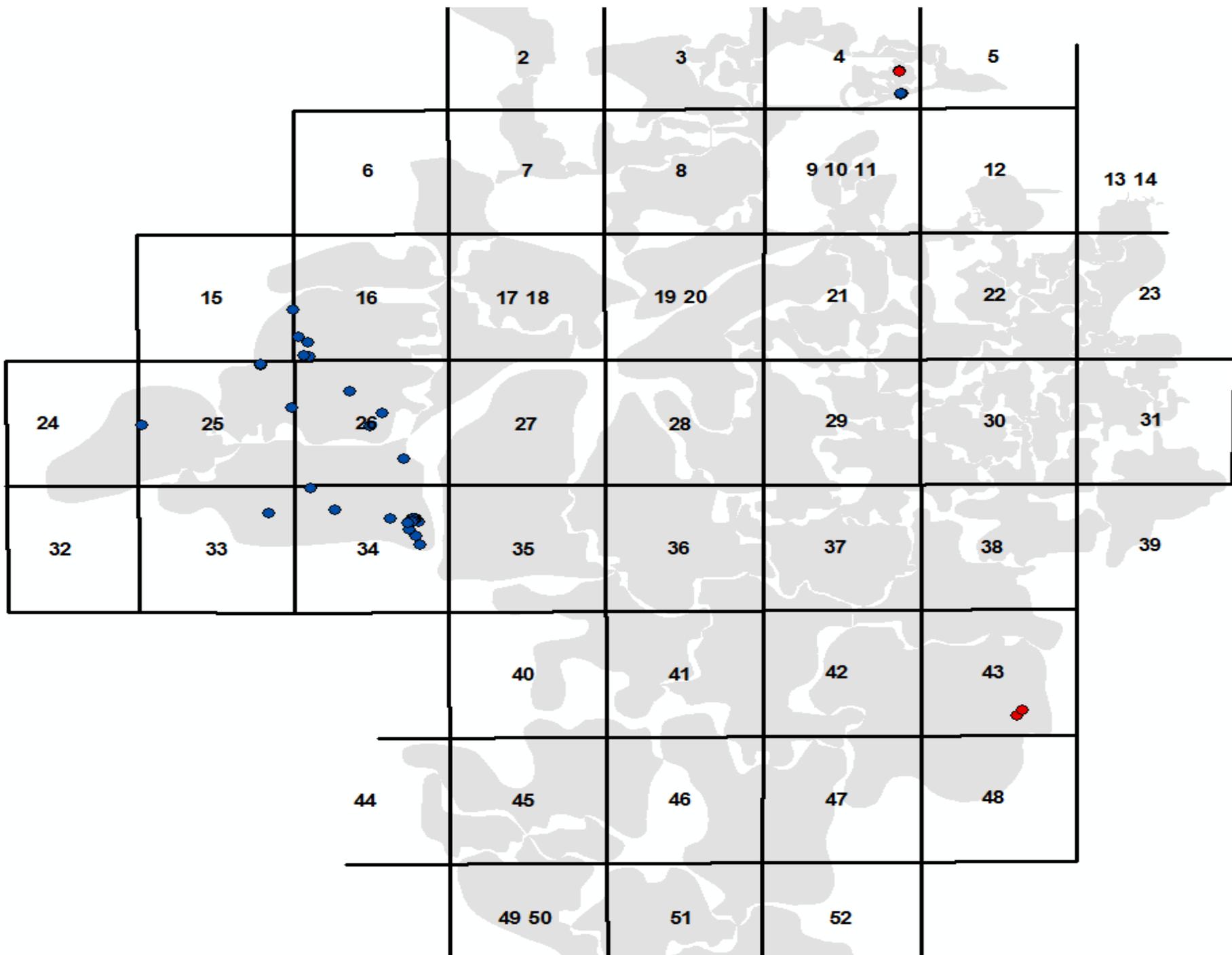


RELIABILITY OUTAGE MANAGEMENT

- Quicker resolution of outages







RELIABILITY TRANSFORMER LOADING

7/15/2011	123	124	127	137	131	119	104	114	97
7/16/2011	149	139	148	135	131	189	202	150	127
7/17/2011	189	169	178	184	199	199	209	178	136
7/18/2011	162	183	222	225	238	241	249	179	154
7/19/2011	168	184	195	182	203	221	203	199	175
7/20/2011	190	175	194	219	209	217	204	156	144
7/21/2011	130	129	173	180	170	137	141	170	118
7/22/2011	138	176	222	202	187	168	187	193	165
7/23/2011	153	175	230	191	169	182	145	115	112
7/24/2011	153	176	178	208	168	161	143	117	84
7/25/2011	145	141	150	161	138	152	129	111	108
7/26/2011	121	125	165	182	156	132	136	134	102
7/27/2011	160	183	183	177	146	172	192	145	129
7/28/2011	131	126	149	135	127	203	168	141	113
7/29/2011	140	153	148	151	136	158	132	133	141
7/30/2011	140	147	184	219	181	177	185	151	133
7/31/2011	138	148	186	138	151	228	176	168	130

RELIABILITY BLINK ANALYSIS

- Blinks reviewed daily
 - Dispatch reviews every blink (momentary outage)
 - Identify if its from known or unknown issue
 - Proactively resolves issues



OPTIONS

- **Pay as you Go (Prepay pilot)**
 - 250 members participating
 - 90% satisfaction rating
- **Dynamic Pricing Research**
 - Possibly in the future
- **Load Management**
 - Around 50% of our members currently participate in a load management program.

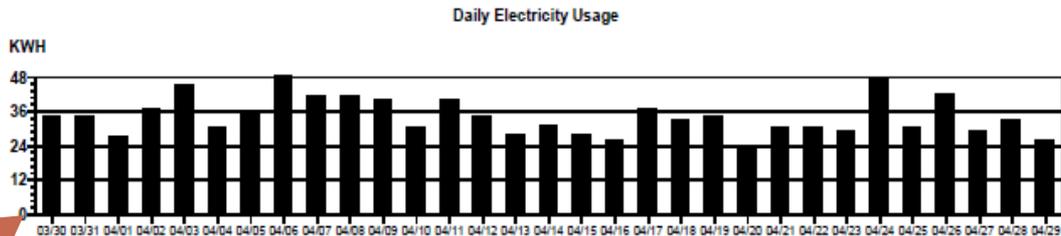


OPTIONS LOAD MANAGEMENT ANALYSIS

<u>Date</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>Total</u>
12/12/2010	4.80	4.16	5.12	4.16	5.44	4.16	5.44	4.16	5.12	113.60
12/13/2010	5.12	4.16	6.08	5.44	4.80	4.80	5.12	4.80	4.48	128.00
12/14/2010	5.44	5.12	4.48	4.80	5.12	4.16	4.80	4.80	5.12	129.28

<u>Date</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>Total</u>
01/19/2011	5.76	3.52	0.00	0.00	0.00	0.32	6.08	8.00	8.32	119.36
01/20/2011	5.44	4.16	0.00	0.00	0.00	0.00	3.20	9.60	8.00	130.56
01/21/2011	5.76	4.48	0.00	0.00	0.00	0.00	3.84	8.96	8.00	141.12

Daily Electric Usage



What does the graph mean to me?

The daily energy usage graph above shows you how much energy you used on each specific day. Some things to look for:

- Factors that influence your energy use: behavior of household members, appliances, number of people within your household and weather conditions can all change your monthly energy usage.
- Use this graph to track the impact of conservation efforts and investments you are making to achieve greater energy efficiency. Ask MVEC how you can receive reduced electric rates or bill credits by joining Energy Wise programs. Plus receive rebates and financing.
- Online resources coming soon! MVEC will be offering free online energy management tools so you can check monthly, daily and hourly energy usage.

YOUR ELECTRIC BILL AND THE COMPONENTS INVOLVED

The cost of your electricity comes from two main categories: generating the power (**Wholesale Power**), and delivering it to your home or location (**MVEC Delivery**). The diagram below helps explain the process and costs. Your electric bill is based on your kilowatt hour (kWh) usage. kWh is a measurement of how much electricity was used over a period of time.

Wholesale Power

You may be surprised to learn MVEC does not generate any electricity -- instead we purchase it from two generation and transmission cooperatives (Basin Electric and Great River Energy). This is termed Wholesale Power.

The costs to purchase electricity from these two suppliers appear under the "Wholesale Power" portion on the front of this bill. All costs are billed based upon total kWh usage on each meter for that billing period.

In the Wholesale Power category the **Main Meter** contains a **Wholesale Power Cost Adjustment (WPCA)**. This cost has been included on your electric bill since 2000. The WPCA is a monthly rate adjustment allowing MVEC to react to real time changes in wholesale power costs (increases and decreases) without formally adjusting the rates. It is a direct pass through to members based on wholesale billings and MVEC does not retain any of this revenue.

Participation in Energy Wise programs help reduce the need to build power plants, and saves you money. For more information, call 800-282-6832 or visit us on-line at www.mvec.net

MVEC Delivery

Once the electricity is transmitted to MVEC's substation, the cooperative assumes responsibility for delivering the electricity to your location. Costs in this category include poles, meters, line, substations, equipment and administrative costs.

Costs associated with this delivery appear in the "MVEC Delivery" portion on the front of this bill. Some costs are billed on a fixed monthly basis (**Basic Monthly Service Charge**), while others are billed based upon how much electricity you used during the billing period.

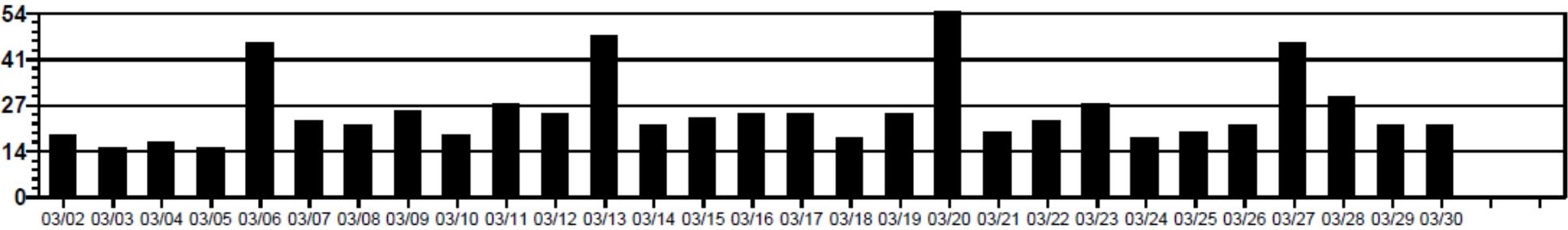
The amount of energy used is measured by the meter on the side of your house and shows up under **Main Meter** on the front of your bill. If you participate in MVEC's Energy Wise programs (where you receive a reduced electric rate), the amount of energy you used in the month shows up under the **Energy Wise Meter**.

MVEC continues to work hard to keep delivery costs in-line. Our operating costs compare favorably not only in this region, but across the country. For complete rate information, visit www.mvec.net



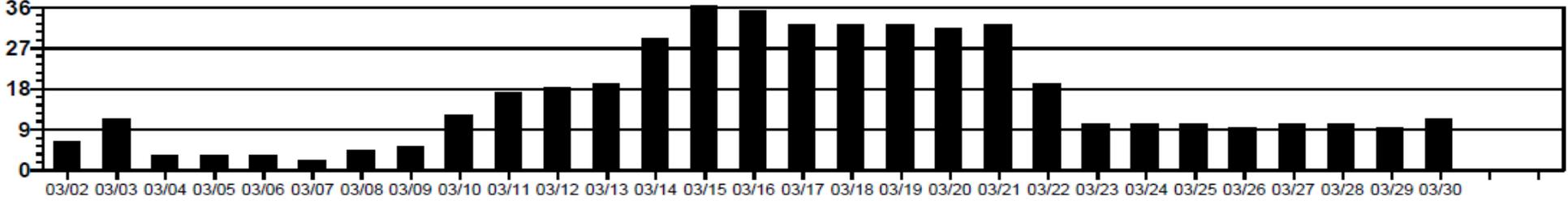
Daily Electricity Usage

KWH



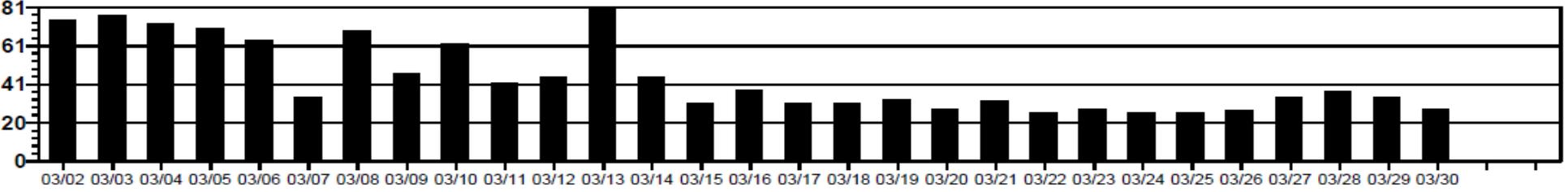
Daily Electricity Usage

KWH



Daily Electricity Usage

KWH



GOOGLE POWERMETER COMMENTS FROM MEMBERS

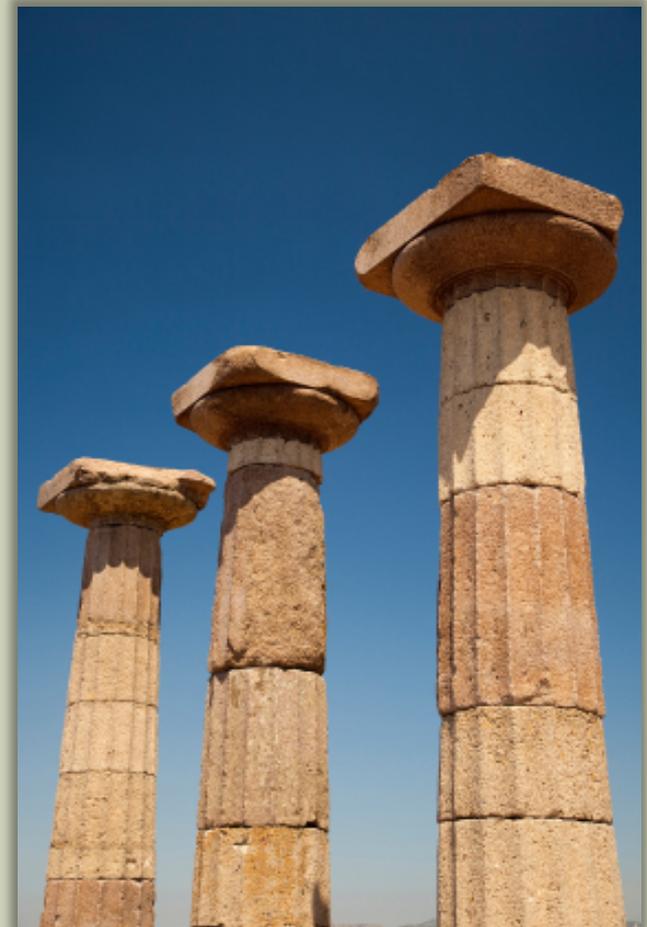
- First, kudos for taking the lead partnering with Google to make this power data much more actionable.
- GPM immediately indicated what I had long suspected, that I have a very high (>1kWh) "always on" load, probably my furnace fan and whole house air exchanger. Already running a few tests to verify.
- That sounds great and what a terrific thing you did by giving us the data early! Kinda interesting to watch the power usage go down in relation to the solar data we're collecting. Thank you so much.
- As you might suspect it leaves a lot to be desired for a guy like me, but it's a start. I like the data connection, and the ability to download to excel.

The logo for Google Powermeter, featuring the word "Google" in its multi-colored font followed by "powermeter" in a blue sans-serif font.

Google™ powermeter

ONCE THE DATA IS COLLECTED, HOW IS IT USED?

- **Reliability**
 - Outage Detection and Restoration
 - Voltage Analysis
 - Blink Analysis
 - Transformer Loading
- **Options**
 - Pay as you Go (Prepay)
 - Dynamic pricing research
 - Load management
- **Information**
 - Daily information on the bill
 - Usage information online



HOW LONG IS DATA RETAINED?

- **Billing (consumption) data**
 - Indefinitely
- **Hourly meter data**
 - Currently 4 years of hourly data

WHAT REQUESTS FOR DATA ARE UTILITIES GETTING FROM THIRD PARTIES?

■ Traditional Requests

- Generally requests come from Government/Cities/Counties
- Generally, requests are for monthly consumption data
- Some requests have come from “Energy Consultants”
- Member authorization required (except in cases of subpoenas)

■ New Requests

- Technology based (Google, Microsoft, myenergy.com)
- Primarily consumer driven
- Members authorization required

SUMMARY

- Smart grid data has value to both utilities and consumers.
- Reasonable steps can be taken to ensure consumer privacy is ensured.