

Conservation Impact of Prepaid Metering

*Motivation and Incentives
for Pre-Pay Systems*

FINAL REPORT | MAY 31, 2014



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The National Rural Electric Cooperative Association

NRECA is the national service organization for more than 900 not-for-profit rural electric cooperatives and public power districts providing retail electric service to more than 42 million consumers in 47 states and whose retail sales account for approximately 12 percent of total electricity sales in the United States.

NRECA's members include consumer-owned local distribution systems — the vast majority — and 66 generation and transmission (G&T) cooperatives that supply wholesale power to their distribution cooperative owner-members. Distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable and affordable electric service.

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NRECA's Cooperative Research Network™ (CRN) manages an extensive network of organizations and partners in order to conduct collaborative research for electric cooperatives. CRN is a catalyst for innovative and practical technology solutions for emerging industry issues by leading and facilitating collaborative research with co-ops, industry, universities, labs, and federal agencies.

CRN fosters and communicates technical advances and business improvements to help electric cooperatives control costs, increase productivity, and enhance service to their consumer-members. CRN products, services and technology surveillance address strategic issues in the areas:

- Cyber Security
- Consumer Energy Solutions
- Generation & Environment
- Grid Analytics
- Next Generation Networks
- Renewables
- Resiliency
- Smart Grid

CRN research is directed by member advisors drawn from the more than 900 private, not-for-profit, consumer-owned cooperatives who are members of NRECA.

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FOREWORD

The National Rural Electric Cooperative Association (NRECA) has organized the NRECA-U.S. Department of Energy (DOE) Smart Grid Demonstration Project (DE-OE0000222) to install and study a broad range of advanced Smart Grid technologies in a demonstration that involved 23 electric cooperatives in 12 states. For purposes of evaluation, the technologies deployed have been classified into three major sub-classes, each consisting of four technology types.

Enabling Technologies:	Advanced Metering Infrastructure Meter Data Management Systems Telecommunications Supervisory Control and Data Acquisition
Demand Response:	In-Home Displays & Web Portals Demand Response Over AMI Prepaid Metering Interactive Thermal Storage
Distribution Automation:	Renewables Integration Smart Feeder Switching Advanced Volt/VAR Control Conservation Voltage Reduction

To demonstrate the value of implementing the Smart Grid, NRECA has prepared a series of single-topic studies to evaluate the merits of project activities. The study designs have been developed jointly by NRECA and DOE. This document is the final report on one of those topics.

DISCLAIMER

The views as expressed in this publication do not necessarily reflect the views of the U.S. Department of Energy or the United States Government.

INTRODUCTION

This document is a review of prepayment programs under development at three distribution cooperatives as a part of the National Rural Electric Cooperative Association-U.S. Department of Energy (NRECA-DOE) Smart Grid Demonstration Project (SGDP). The intent of the document is to provide an overall status for each program, as well as compare and contrast the results of each. The three cooperatives are EnergyUnited (EU), Delta-Montrose Electric Association (DMEA), and Kotzebue Electric Association (KEA).

In June 2012, NRECA published a Prepaid Metering Analytical Report. The intent of the June 2012 report was to give utilities necessary information about defining and running a prepayment program. Considering further the opportunities for cooperatives in prepay programs associated with Smart Grid development, NRECA commissioned an update to the 2012 study, entitled “Electricity Prepayment Program Update for the Cooperative Market,” to focus more specifically on the growth and status of prepayment. Among other things, the findings of this update are that (1) the presence of an AMI solution is a core enabler of prepayment; (2) many if not most of the customer information systems (CIS) now support the offering of prepayment as a payment method; and (3) prepayment in general is growing at a significant pace, perhaps as much as 55% over the past 2 years, and possibly even higher. In concert with the intent of the SGDP research, the Program Update is provided in an appendix to this report as supplemental information to assist cooperatives that are investigating prepayment programs.

EnergyUnited (EU)

EnergyUnited is the second largest provider of residential electricity in North Carolina and among the 20 largest electric cooperatives in the United States. With more than a quarter-million consumers in parts of 19 North Carolina counties, EU is in the fast-growing Piedmont section of North Carolina—including parts of Charlotte, Greensboro, and Winston-Salem. Headquartered in Statesville, NC, with offices in seven cities and towns, EnergyUnited’s service area stretches the entire breadth of the state, from the Virginia border to Mecklenburg County.

EU was formed in 1998, when electrical cooperative members overwhelmingly voted to consolidate Crescent and Davidson Electric Membership Corporations. These two established cooperatives had served members for almost 75 years.

Delta-Montrose Electric Association (DMEA)

Delta-Montrose Rural Power Lines Association was organized in Colorado in August, 1938. Three years earlier, the Rural Electrification Administration (REA) was established by Executive Order 7037, signed by Franklin D. Roosevelt, for the purpose of promoting rural electrification. At that time, only a small percentage of American farms had electricity because power companies located in the city had not found it economically feasible to construct lines to sparsely populated areas. The REA was established to act as a banker, providing low-interest loans and technical assistance to cooperatives.

Electricity first flowed through Delta-Montrose Rural Power Lines Association’s distribution system in May 1939 to serve 250 customers in the Pea Green area of Colorado, near Delta. Customers in the Delta, Hotchkiss, and Paonia areas were added in the following years.

Western Colorado Power Company (WCPC), an investor-owned utility, also provided electricity to the same territory as Delta-Montrose Rural Power Lines Association. Frequently, its secondary and primary lines and those of WCPC ran parallel to one another.

In 1971, the Public Utilities Commission of Colorado ordered an exchange of customers to correct this situation and consolidate certain areas. Two thousand customers were affected in this consolidation.

In May 1975, Delta-Montrose Rural Power Lines Association purchased a portion of the territory being served by WCPC, adding approximately 10,000 customers and 730 miles of line to its system. Because it no longer served only rural areas, the “Rural Power Lines” portion of its name was dropped and the cooperative became Delta-Montrose Electric Association (DMEA).

Kotzebue Electric Association (KEA)

Kotzebue Electric Association in Alaska has been around only since the 1950s. During its time in business, KEA has helped bring electric power to all of Kotzebue. Electric power was first made available via small generators owned and operated by Kotzebue businesses. Arctic Literage, Alaska Communications Systems (now Alascom), Rotman Stores, the hospital, and Archie Ferguson were among those who supplied and sold excess power from their business generators to homes that were located within throwing distance.

Around 1949, a group of Kotzebue individuals began sending out feelers to find out how to start a local electric power cooperative. This group began the process of obtaining a loan from REA.

At around the same time plans were being made to launch KEA, Havenstrike Mining Company of Candle brought generators to Kotzebue. These generators had been used by the company in its gold mining operations. Two generators—75 and 100 kva—were set up. A few distribution lines also were set up by Havenstrike to deliver electricity to several homes that had been without power.

KEA also was beginning to set up its operations. Its first generator—50 kva—was set up near the present Alascom site. In the mid-1950s, KEA started setting its own distribution lines; the first was built to serve members along Front Street.

In late February 1956, KEA signed and executed a loan contract and mortgage with REA. By the end of that year, test runs on generators in KEA’s new plant were completed and 65 consumer/members were on line. Red Mullally became the first General Manager.

At around the same time, KEA bought Havenstrike’s electric business and consolidated the two operations.

Since then, KEA has grown along with its members’ needs. Along the way, an addition was made to the original plant, and new generators have served a growing demand for electricity. In 1987, an office building was added near the plant, and KEA’s main office moved into new quarters.

In recent years, KEA has spent much time and energy on developing new sources of energy. Because of the high costs of fuel and declining support from the state legislature to keep energy costs in rural Alaska at reasonable levels, KEA has worked to become a pioneer in the use of wind energy in an Arctic environment; the wind energy program provides an alternative source of energy, with the potential to keep electric costs at affordable levels.

Today, KEA has 840 members, and generates more than 22 million kWh per year. Getting electricity into the rural areas of Alaska has been a triumph not only of technology, but also of the people involved, both then and now.

PROGRAM OVERVIEWS

The following sections describe the technical, policy, and marketing aspects of the Prepayment Programs at each utility.

EnergyUnited

EU has an active prepayment program, with more than 1,400 current participants. With more than 120,000 members, this level of participation represents roughly 1% of its meter base.

Technical Architecture

The systems involved in offering prepayment to EU members are the Customer Information System (CIS) from Cayenta, a division of N. Harris Computer Corporation, and the advanced metering infrastructure (AMI) solution from Cooper Power Systems. EnergyUnited is also implementing MeterSense, a meter data management solution (MDMS) from North|Star Utilities Solutions, but it is not yet fully implemented and does not play any material role in the prepayment program.

Cayenta was specifically contracted by EU to develop the capability to support prepayment as part of its core CIS offering. EnergyUnited specifically wanted to avoid implementing a third-party system for prepayment that would need to be integrated with and run alongside the Cayenta CIS. The high-level architecture of the system is shown in **Figure 1**.

The figure shows a non-typical approach to disconnects, as most programs are integrated to the point that these operations can be handled automatically, without the need for human intervention. However, EnergyUnited is not comfortable with the reliability of the AMI communications at this time and has elected to process them manually to ensure that the operations are completed correctly.

All prepayment customers have remote disconnect devices installed at their residences. EnergyUnited has a hybrid advanced metering system that includes a combination of power line communication (PLC) and radio frequency (RF) meters. At all PLC meter locations, a remote disconnect collar is installed. These collars are devices installed under the actual service meter and house the disconnect switch. Collars were the first embodiment of remote disconnect before meter manufacturers integrated the disconnect switch into the meter. EnergyUnited will eventually move to these meters with the disconnects under glass. At RF advanced metering locations, EU already uses the remote disconnect under glass.

All communications with the customer are done via email, text messaging, phone calls, and members logging into a portal. Dedicated in-home display devices are not supported.

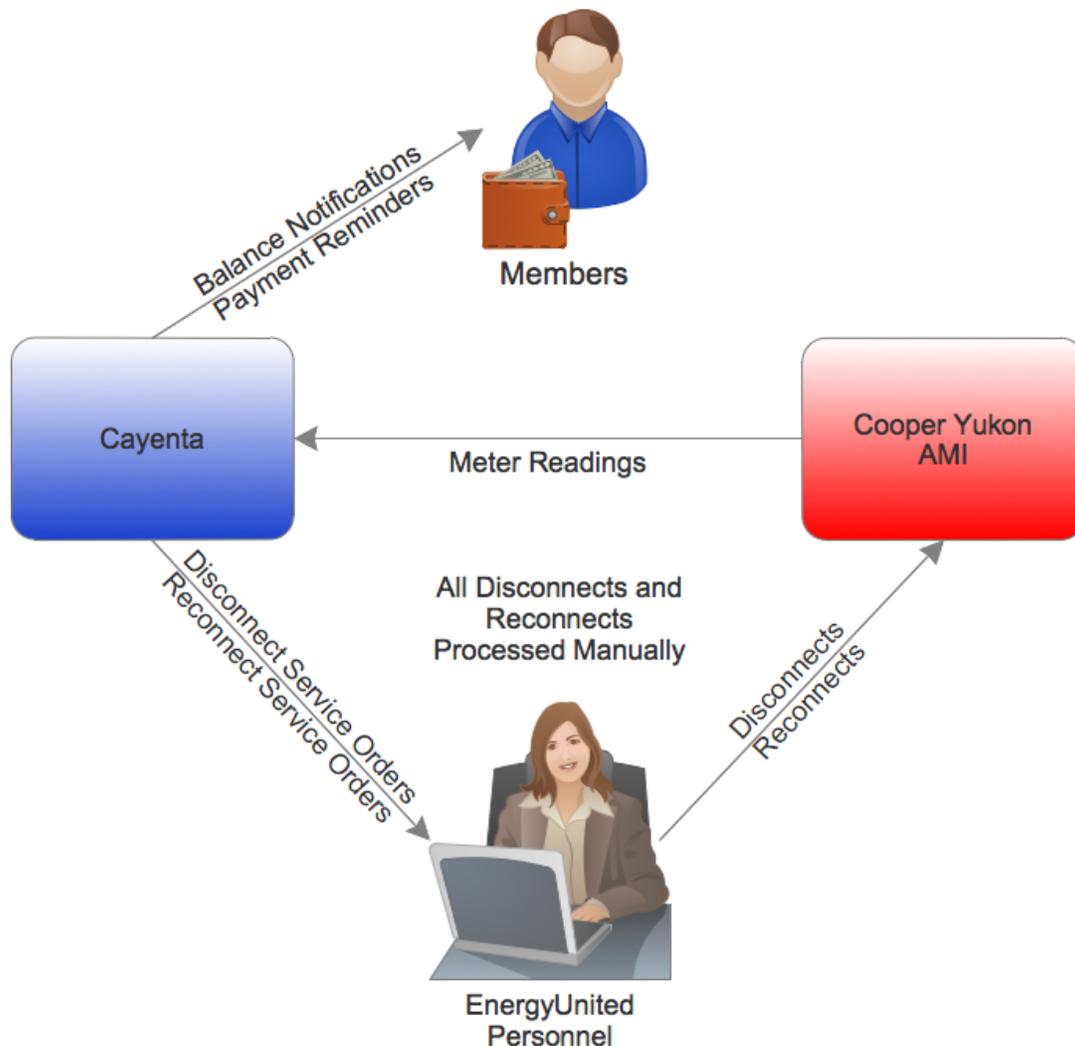


Figure 1. Cayenta/EU CIS High-Level Architecture

Policies

EnergyUnited has taken a unique approach to defining the parameters under which its program operates. Traditionally, prepayment is a program of interest to new members who want to avoid large deposits and those whose accounts are in arrears. When members in arrears move to prepayment, a percentage of each amount tendered is taken and applied to the debt. Members are allowed to pay off their debt in this manner without falling further behind.

EnergyUnited has structured its program to cater to new members virtually exclusively. Existing members with any amounts in arrears must satisfy their debt obligations before being allowed onto prepayment. The incentive for existing members to enroll in the Prepayment Program thus is not present.

EnergyUnited does waive the deposit for new members enrolling in the Prepayment Program. This is a decided advantage over having to pay as much as several hundred dollars to get service. The costs of signing up for prepayment are as follows:

Table 1. Costs of EU Prepayment Sign-Up

Description	Cost
Service must have a minimum balance of \$50 to start	\$50.00
Service fee for disconnect collar installation is waived if member is paying a connection fee. The connection fee is:	\$30.00
Cooperative membership fee	\$5.00
Total Signup Cost	\$85.00

Once service has been established, members receive daily updates on their balances via the update methodologies they choose. When an account gets to within five days or less of depletion based on daily usage, a daily notification is sent via phone call, text message, email, or any combination of these, based on the member’s preferences.

If the account is disconnected due to lack of funds, the member must make the following payment amount to be reconnected:

Table 2. EU Reconnection Costs

Description	Cost
Minimum balance of \$50 for reconnect	\$50.00
Reconnect fee	\$25.00
Payment of any amount below zero balance	\$?
Total Minimum Reconnect Cost	\$75.00

The concept of a reconnect fee associated with prepayment is unusual but not unheard of. The reconnect fee for the Prepayment Program is significantly less than the regular reconnect fee. The reconnect fee and the minimum balance criteria serve to act as a deterrent to disconnects. This is especially important to EnergyUnited, since the disconnect/reconnect processes involve significant manual support. Without these fees, the program might become too labor intensive, given the current support requirements.

Other policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment is not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are performed once daily, with the following stipulations:
 - a. On Monday after all drop-box payments are processed.
 - b. No disconnects on weekends or holidays (because of manual processing of disconnects).
5. Reconnects are performed 24/7 via the utility dispatch center.
6. No disconnects are performed when the temperature is below freezing or above 105 degrees.

Marketing

EnergyUnited has done extensive work in promoting the program. EU has branded the Prepayment Program as the EnergyAdvantage (EA) program. Many utilities have seen this branding as an effective way to reference and market such a program. However, it should be noted that this in no way serves to disguise or hide that it is prepayment. According to member service personnel at EnergyUnited, members readily understand this fact.

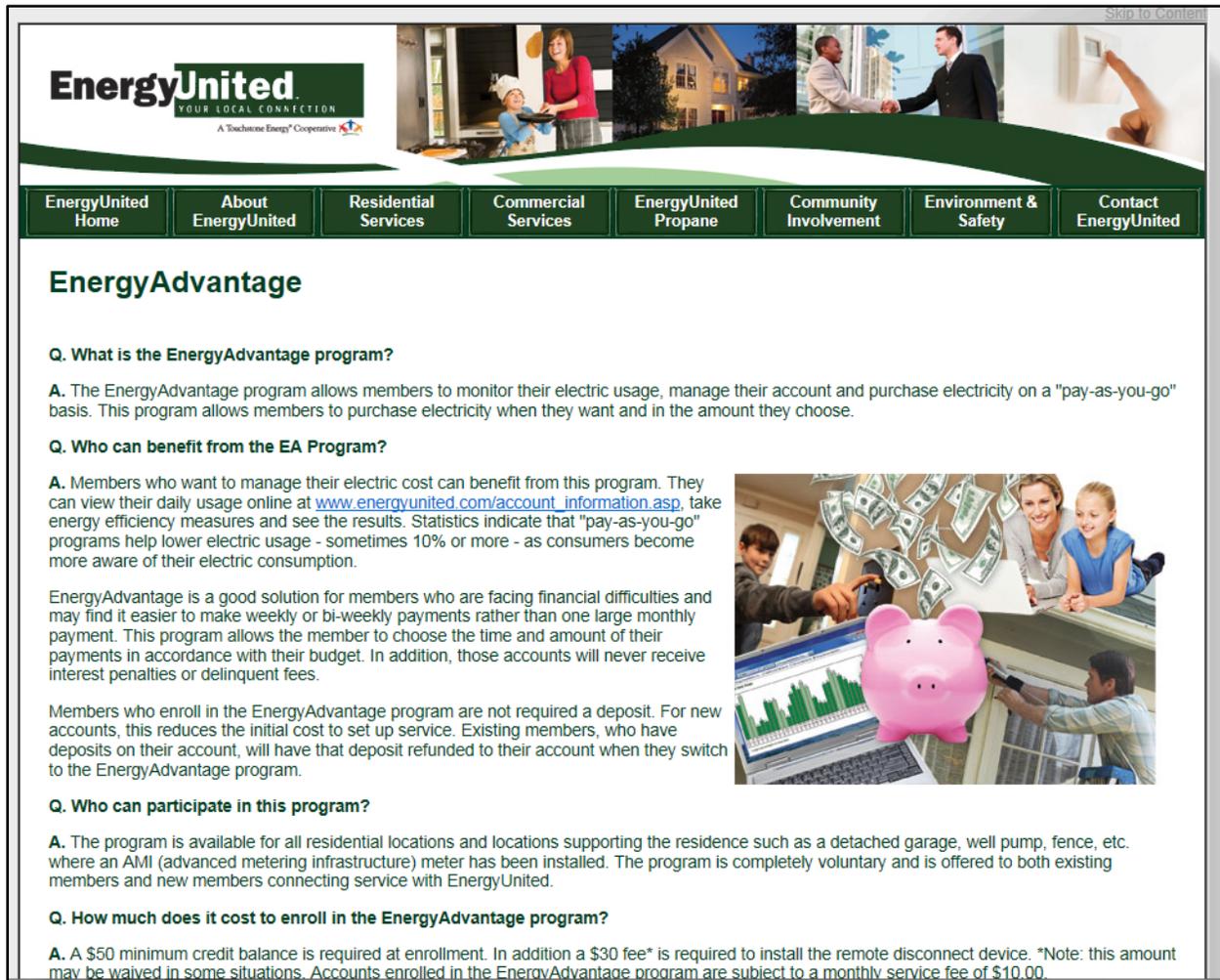
The following are the various ways in which the program has been promoted.

Website

Figure 2 shows the promotion of the Prepayment Program web page on the EU website.

The screenshot displays the EnergyUnited website's homepage. At the top, the EnergyUnited logo is accompanied by the tagline "YOUR LOCAL CONNECTION" and "A Touchstone Energy Cooperative". A navigation menu includes links for Home, About EnergyUnited, Residential Services, Commercial Services, EnergyUnited Propane, Community Involvement, Environment & Safety, and Contact EnergyUnited. The main content area features a large banner for the "Introducing Energy Advantage" program, which includes a list of benefits: monitoring electricity consumption, managing the electric account, and purchasing electricity on a pay-as-you-go basis. To the left of the banner is an "Account Log in" section with fields for Account Number and Password, and buttons for "Create Password" and "Go". Below the login section is a "Press Releases" section with several headlines, including "ENERGYUNITED RIBBON CUTTING CEREMONY ...". To the right of the banner are several utility-related links: "Energy Advantage", "Together We Save", "Storm Center", "Electric Payment Locations", "Find us on Facebook", "FOLLOW US" (with a Twitter icon), "PEV Programs", and "Energy Efficiency Rebates". At the bottom of the banner area, there is a "Latest News" section with tabs for "EnergyUnited Electric", "EnergyUnited Propane", and "EnergyUnited Services". The "EnergyUnited Electric" tab is active, displaying text about the cooperative's structure and history.

Figure 2. EU Prepayment Program Web Page



EnergyUnited
YOUR LOCAL CONNECTION
A Touchstone Energy® Cooperative

[EnergyUnited Home](#) [About EnergyUnited](#) [Residential Services](#) [Commercial Services](#) [EnergyUnited Propane](#) [Community Involvement](#) [Environment & Safety](#) [Contact EnergyUnited](#)

EnergyAdvantage

Q. What is the EnergyAdvantage program?

A. The EnergyAdvantage program allows members to monitor their electric usage, manage their account and purchase electricity on a "pay-as-you-go" basis. This program allows members to purchase electricity when they want and in the amount they choose.

Q. Who can benefit from the EA Program?

A. Members who want to manage their electric cost can benefit from this program. They can view their daily usage online at www.energyunited.com/account_information.asp, take energy efficiency measures and see the results. Statistics indicate that "pay-as-you-go" programs help lower electric usage - sometimes 10% or more - as consumers become more aware of their electric consumption.

EnergyAdvantage is a good solution for members who are facing financial difficulties and may find it easier to make weekly or bi-weekly payments rather than one large monthly payment. This program allows the member to choose the time and amount of their payments in accordance with their budget. In addition, those accounts will never receive interest penalties or delinquent fees.

Members who enroll in the EnergyAdvantage program are not required a deposit. For new accounts, this reduces the initial cost to set up service. Existing members, who have deposits on their account, will have that deposit refunded to their account when they switch to the EnergyAdvantage program.

Q. Who can participate in this program?

A. The program is available for all residential locations and locations supporting the residence such as a detached garage, well pump, fence, etc. where an AMI (advanced metering infrastructure) meter has been installed. The program is completely voluntary and is offered to both existing members and new members connecting service with EnergyUnited.

Q. How much does it cost to enroll in the EnergyAdvantage program?

A. A \$50 minimum credit balance is required at enrollment. In addition a \$30 fee* is required to install the remote disconnect device. *Note: this amount may be waived in some situations. Accounts enrolled in the EnergyAdvantage program are subject to a monthly service fee of \$10.00.

Figure 2. EU Prepayment Program Web Page (continued)

The web page can be accessed at:

https://www.energyunited.com/energy_advantage.asp.

Member Newsletter

Figure 3 shows a news item contained in the April 2012 EnergyUnited newsletter.



VOLUME 14, Nº 4
Published for Member/Owners of ENERGYUNITED
APRIL 2012

Introducing EnergyAdvantage: Pay-As-You-Go Billing Program

Plant
Responsibly
—
30

Cost of
Electricity is
Rising
—
31

Bright Ideas
Program
Kicks Off
—
32

You Get
the Credit
—
32

Food. Gasoline. Even cell phone minutes. We pay for these and other goods and services before we actually use them. EnergyUnited is now offering members the option to pre-pay for electricity through EnergyAdvantage, a new pay-as-you-go program. Pay-as-you-go programs have been around for a long time; however, due in part to the economy, these programs are growing in popularity especially at electric cooperatives. For those who want to take control over their electric costs, a pay-as-you-go program may be of benefit to you. Surveys indicate that 90 percent of those enrolled in similar programs believe they use energy more wisely as a result. In addition, statistics indicate that pay-as-you go programs, such as EnergyAdvantage, help lower electric usage resulting in real savings, sometimes by more than 10 percent, as consumers become more aware of their electric consumption.



The EnergyAdvantage program makes it easy for members to monitor their electric usage through the recently introduced daily energy usage graphs available online. Their energy usage is then used to calculate their daily cost allowing members to better manage and monitor their finances. Under this program, members can purchase electricity in smaller, incremental amounts on an as-needed basis. Purchasing electricity is quick and easy, even on holidays and weekends. Purchases can be made using any of EnergyUnited’s convenient payment options, including bank draft, phone, mail, after-hours deposit facility, in person at any EnergyUnited office or authorized payment agent location, via online banking or through the EnergyUnited website, www.energyunited.com.

Members who elect to participate in the EnergyAdvantage program will be enrolled in our e-billing program and will receive a monthly statement of account by email. With EnergyAdvantage, members can check daily their account credit balance online at www.energyunited.com or by calling our automated account information system at 1-800-636-2371. To ensure easy, efficient account management, members can sign up to receive phone calls, text messages, and/or email alerts concerning their account credit balance and a need for payment to avoid disconnection of electric service.

“Members are empowered to effectively manage their energy use in a way that best suits their individual situation,” said Kathleen Hart, vice president of customer care at EnergyUnited. “Most importantly, when they use less energy, it lowers demand on our entire system, which could save everyone money in the long run.”

Enrollment in EnergyAdvantage is voluntary and available to all residential members. This is just one more way that EnergyUnited is looking out for you – making it easier than ever for you to view your daily usage online, take energy efficiency measures and see the results. To learn more about EnergyAdvantage or to enroll, visit www.energyunited.com or call (800)522-3793.



Holiday Closing: All co-op offices will be closed on Friday, April 6 in observance of Good Friday. Crews will be on call.

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Figure 3. News Story About the Prepayment Program in the EU Newsletter

Bill Insert

Figure 4 shows a bill insert created to promote the EU Prepayment Program.



EnergyAdvantage, our newest billing option, a pay-as-you-go plan

EnergyUnited introduces a new billing option - EnergyAdvantage - that allows members to monitor their electricity usage, manage their account and purchase electricity on a pay-as-you-go basis.

Monitor Electricity Usage

Members may view their daily usage online, take energy efficiency measures and see the results. Statistics indicate that pay-as-you-go programs help lower electric usage - sometimes 10% or more - as consumers become more

aware of their electric consumption.

Account Management

EnergyUnited makes it easy and convenient to monitor both electric usage and the account credit balance online at www.energyunited.com.

To ensure easy, efficient account management, members may sign up to receive phone calls, text messages, and/or email alerts concerning account credit balances and a need for payment to avoid disconnection of electric service.

Purchase Electricity

EnergyAdvantage allows you to purchase electricity when you want and in the amount you choose. Purchasing electricity is quick and easy, even on holidays and weekends. Purchases can be made using any of EnergyUnited's convenient payment options - by bank draft; phone; mail; in person at any EnergyUnited office or authorized payment agent location; via online banking; or the EnergyUnited web site.

At EnergyUnited - we're looking out for you. As times and needs change, we offer innovative ways for you to take control of your electric bill. To learn more about the EnergyAdvantage billing option, contact Customer Care at 800.522.3793.

ENU401

Figure 4. Bill Insert Promoting the EU Prepayment Program

Delta-Montrose Electric Association

DMEA is not very far along in the rollout of its Prepayment Program. Currently, it has three DMEA employees working on prepayment in a test phase.

Technical Architecture

The systems involved in offering prepayment to DMEA members are the CIS from the National Information Solutions Cooperative (NISC) and the AMI solution from Aclara. DMEA is in the midst of transitioning from Aclara’s MDMS solution to the package offered by NISC. However, this system does not play an active role in the prepayment service.

NISC and Aclara are vendors experienced in prepayment and played important roles in the definition of the interface requirements as part of the MultiSpeak specification. Their integrations appear to be solid, with DMEA personnel having a high degree of confidence in the solution. Therefore DMEA expects to allow the technology to automatically process disconnects and reconnects without human intervention or oversight. **Figure 5** shows a simplified high-level diagram of the architecture.

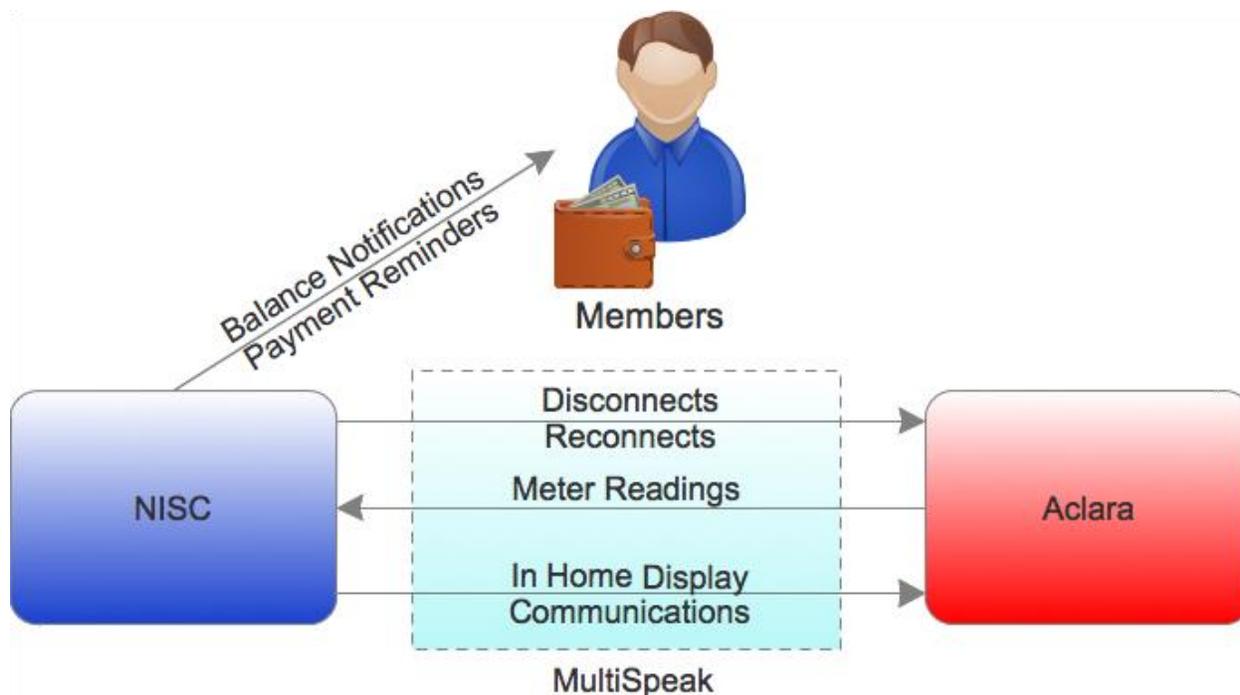


Figure 5. DMEA Prepayment System High-Level Architecture

As can be seen from the figure, DMEA will be utilizing in-home displays (IHD) as an optional communications channel to members. While many programs have eliminated this option in favor of email and text messaging, DMEA has chosen to include it due to the significantly rural aspect of its territory.

In addition to the email, text messaging, and IHD options, NISC offers an app that can be downloaded by iPhone and Android users. For more information, see the following:
<http://www.smarthubapp.com/index.htm>.

This app is in use by the DMEA personnel working on prepayment, with very positive results.

All prepayment customers will have disconnect collars installed at their residences. DMEA would like to eventually move to meters with integrated disconnects, which are currently available.

Policies

Because DMEA is not ready to roll out its program, many of its policies are not yet well formed. However, its positioning of the program would appear to be on the other end of the spectrum from that of EnergyUnited.

DMEA will encourage those members who are in arrears to join the Prepayment Program and allow their debts to be paid off over time by taking a percentage of each amount tendered and applying it to the debt. Conversely, DMEA does not currently have a required deposit to get service. Therefore, it is unclear as to whether new members will elect to sign up for prepayment initially.

Other proposed policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment is not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are to be performed once daily, including weekends. It is as yet unclear if disconnects will be processed on holidays.
5. Reconnects are performed 24/7.
6. No disconnect moratoriums are expected due to weather/temperature extremes. This is consistent with existing disconnect policies.
7. DMEA is considering some incentives for members to increase their level of sign-up to the program.
8. There is not expected to be any additional monthly or reconnect fee associated with the program.

Marketing

Marketing efforts for the program have been the subject of many discussions but the actual plans have not yet been formulated.

Kotzebue Electric Association

KEA is not very far along in the rollout of its Prepayment Program. While the program was anticipated to be rolled out in summer 2013, it likely will not be rolled out until spring 2014.

Technical Architecture

The systems involved in offering prepayment to KEA members are the CIS from PCS and AMI solution from Landis+Gyr. PCS and Landis+Gyr both are vendors experienced in the various aspects of prepayment. KEA expects to allow the technology to automatically process disconnects and reconnects without human intervention or oversight. A simplified high-level diagram of the architecture is shown in **Figure 6**.

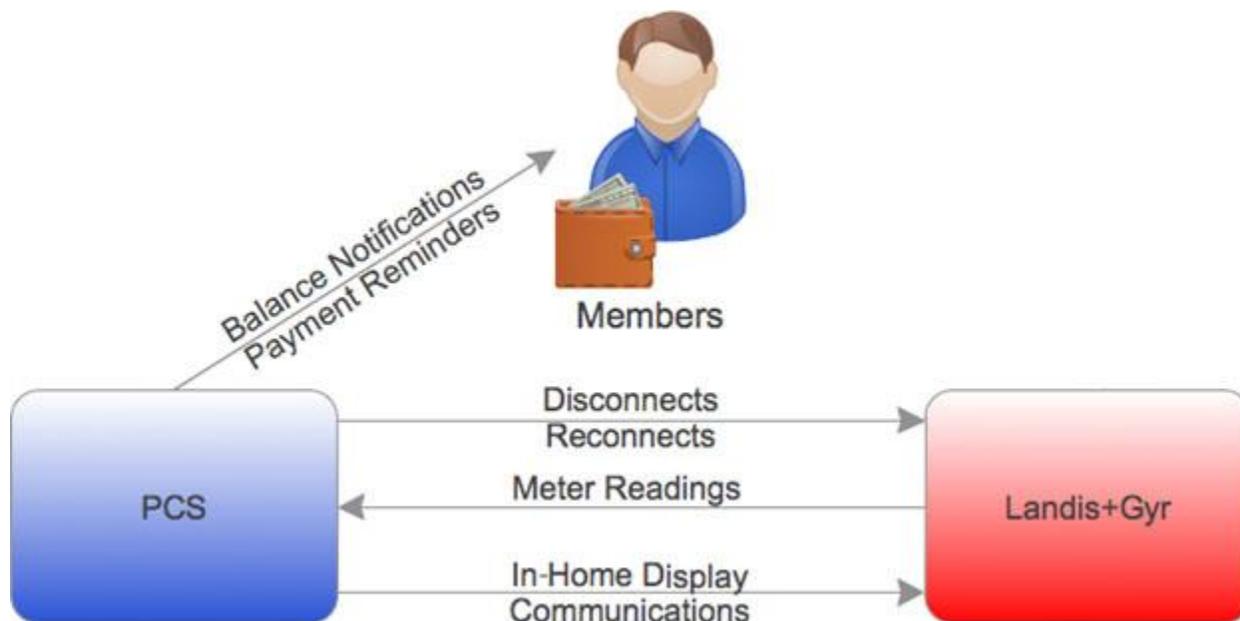


Figure 6. KEA Prepayment System High-Level Architecture

As can be seen from the figure, KEA will be utilizing IHDs as an optional communications channel to members. KEA has chosen to include this option in large part to assist its members in making decisions about their power consumption.

Policies

Because KEA is not ready to roll out its program, many of its policies are not yet well formulated. KEA will encourage those members who are in arrears to join the prepayment program and allow that debt to be paid off over time by taking a percentage of each amount tendered and applying it to the debt. In addition, KEA will encourage temporary residents to utilize the service as an alternative to regular bill payment and thus avoid a deposit.

Due to the weather extremes in the KEA territory, a service limiter feature will be utilized in the winter months in lieu of a hard disconnect. Service limiter functionality works in the following manner:

- ◆ A wattage limit is set for the premise based on historical usage, with the expectation that it will allow basic lifeline service but not unlimited usage.
- ◆ When the wattage level is exceeded, the service is temporarily disconnected.
- ◆ After the prescribed time period, typically a few minutes, the service is reconnected.
- ◆ After reconnection, there is a period of stabilization, typically also a few minutes, to allow the load to level out before the system starts monitoring the wattage level and the process begins all over again.

Other proposed policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment is not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are to be performed once daily, and only during open-office hours.
5. Reconnects are performed during open-office hours.
6. Balance updates likely will be sent to members only on a weekly basis, unless the balance falls within the parameters requiring more frequent notification.
7. No additional monthly or reconnect fee is expected to be associated with the program.

Marketing

Marketing efforts for the program have been the subject of many discussions but the actual plans have not yet been formulated.

STATISTICS – ENERGYUNITED

Because the programs at DMEA and KEA are not yet in operation, we present here some of the statistics gathered on the EA program from EnergyUnited.

Program Size

As of early September 2013, EnergyUnited has implemented 2,554 prepayment contracts. At the same time, there are 1,442 active accounts. As expected, based on the program policies, only five of the 2,554 total contracts were obtained from existing members. All other prepayment contracts are with new members.

The purchase frequency of the accounts is shown in **Figure 7**.

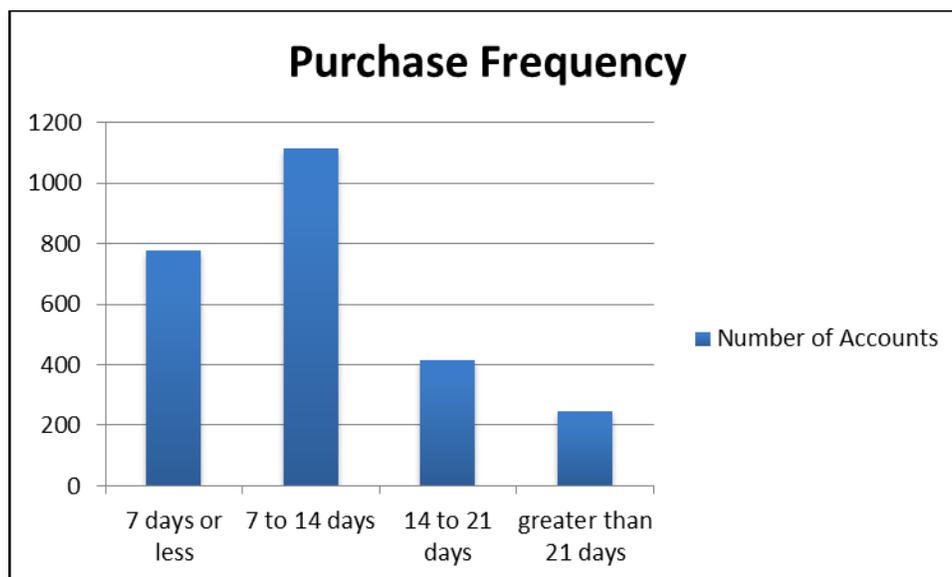


Figure 7. Purchase Frequency of EU Prepayment Program Accounts

As expected in the service of prepayment, and as shown in **Table 3**, very few members make purchases on a monthly basis. Virtually all of the accounts have taken advantage of the ability to make purchases more frequently.

Table 3. Purchase Frequency of EU Prepayment Accounts, Percentage by Time Period

Time Period	Percentage
7 days or less	30%
14 days or less	74%
21 days or less	90%

Disconnects

Because of the implementation of the reconnect fee, EU thought that the members on prepayment might be avoiding disconnects better than those in other programs. However, EnergyUnited is processing, on average, about 141 disconnects per month, with an average of 17 being disconnected more than once per month and no more than three times per month. Members were disconnected more frequently during the hot summer months.

Outbound Communications

With balance updates and low balance reminders being sent to members on a daily basis, EU has a very high volume of daily outbound communications. On some days, as many as 700 phone calls are made.

Payment Types

One of the long-held beliefs regarding prepayment is that a program must have a way to accept cash payments on a 24/7 basis. The reasons are twofold. The 24/7 requirement is based on the fact that a member must have the ability to reconnect at any time. Even in cases when disconnects occur only during regular business hours, EU cannot predict when the member might discover the outage. Therefore, a means of reconnection on demand is deemed essential to a prepayment program.

The issue around being able to accept cash is based on the fact that many members might not have any type of banking relationship and operate strictly on a cash basis. The advent of prepaid credit cards has created opportunities for members to make payments online and via other outlets without a banking affiliation. While the information available for this report does not allow us to draw any conclusions on this issue, it is interesting to note how members are making their purchases in the program.

EU supports four different payment mechanisms:

- ◆ Office locations taking cash, checks, and credit cards
- ◆ Third-party providers (convenience stores) taking cash and checks
- ◆ Interactive Voice Response (IVR) taking checks and credit cards
- ◆ Online systems taking checks and credit cards

Note that debit cards are supported everywhere that credit cards are accepted.

The data set used for the following analysis consisted of daily transaction totals for each type of transaction from May 1, 2012 to August 23, 2013. In the case of office transactions, credit card transactions are broken out separately.

Total Transactions

Figure 8 shows the total amount of transactions for the period by payment mechanism.

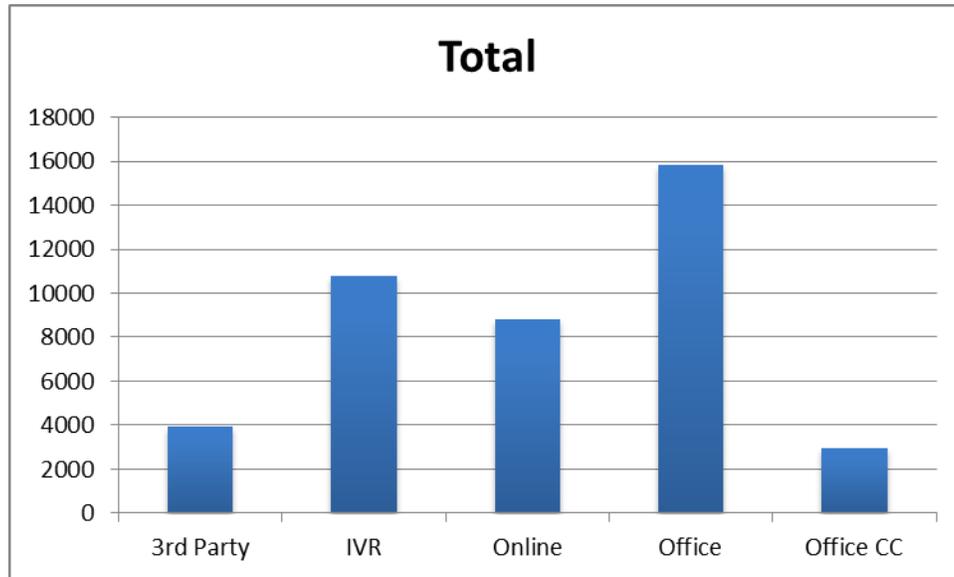


Figure 8. Number of EU Prepayment Program Transactions, by Payment Mechanism

From this figure, we can see that cash and check transactions at office locations exceeded all other transaction types. Also, all of the third-party transactions consisted of either cash or checks. Unfortunately, the data available do not indicate the percentage of these transactions that are cash or checks. However, it is reasonable to assume that prepayment transactions are heavily cash based.

Transaction Trends

Figure 9 shows how transactions have trended in the entire data set.

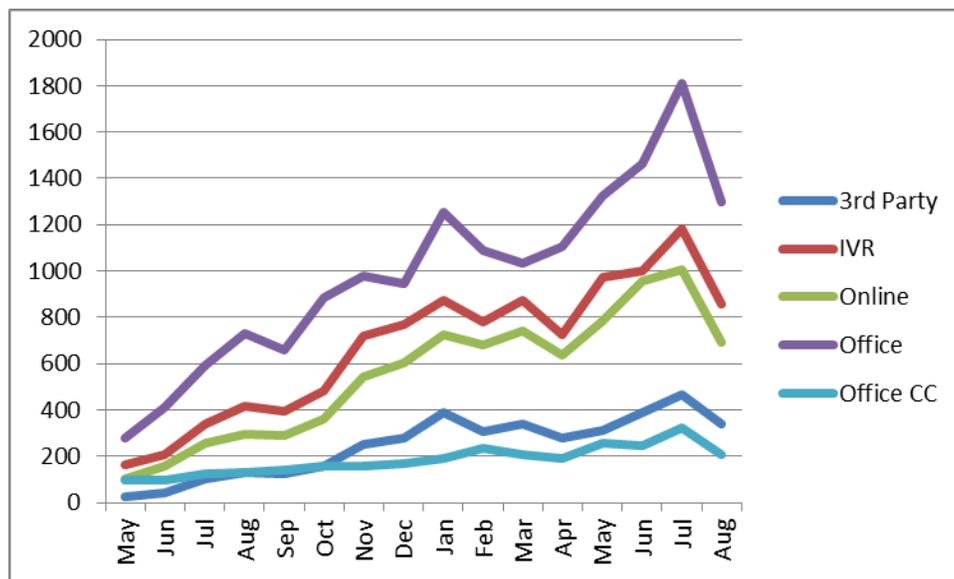


Figure 9. EU Prepayment Program Transaction Trends

It is interesting to note how all of the payment methods trended rather consistently over this time period, with the growth of office credit card payments being somewhat flatter than the others.

Holiday Transactions

The transaction analysis also examined the total transactions for all universally recognized holidays for the period, as shown in **Figure 10**.

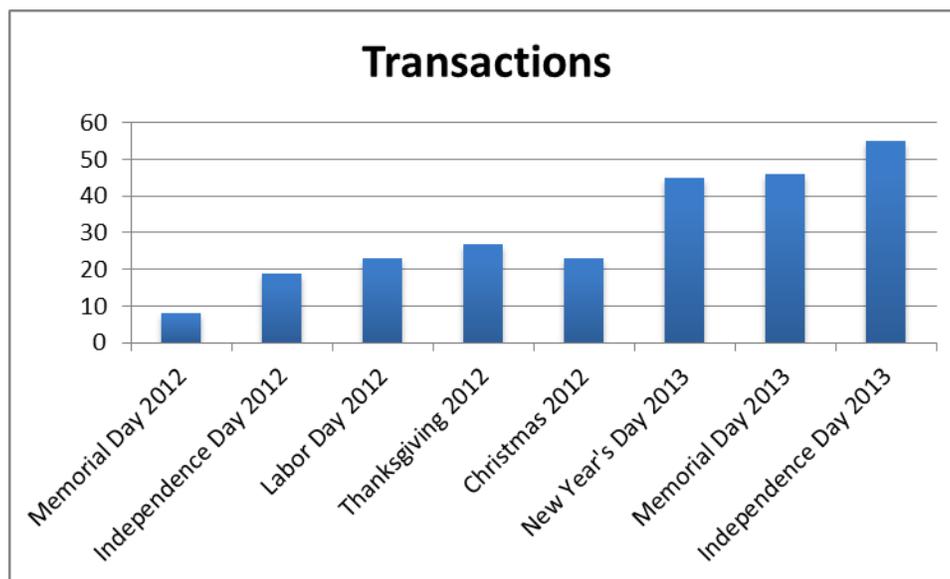


Figure 10. Transaction Trends for the EU Prepayment Program, by Holiday

It is difficult to draw any specific conclusions from these data, other than to say that members will initiate transactions at any time. Holiday transactions must be supported in ways that prevent members from being disconnected. EU's menu of transaction options supports the 24/7 need. As to cash transactions, third-party outlets (convenience stores) handled cash transactions on most of these holidays; some transactions of that type are included in the figure.

Energy Efficiency

The statistical and anecdotal expectations of prepayment have been that the program produces a natural energy conservation effect. The savings typically are somewhere in the 5% to 10% range. The hope was that this program would add to the statistical data showing that prepayment does indeed result in energy efficiency and conservation. However, because of the policies associated with the program, only five existing EnergyUnited members have converted to prepayment. Therefore, there can be no really meaningful conclusions from the data. The lone account that had a reasonable amount of usage both before and after going on prepayment is shown in **Figure 11**.

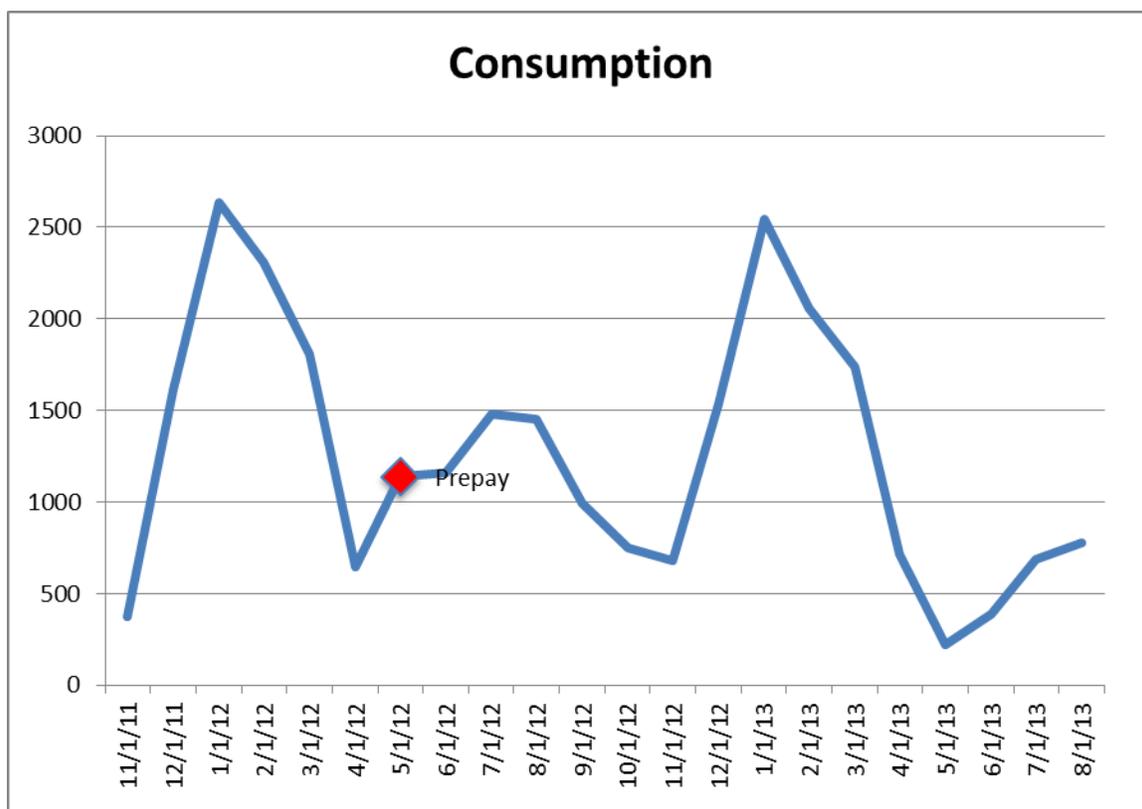


Figure 11. Electricity Consumption of One Account Before and After Joining Prepayment Program

As can be seen, no realistic conclusions can be made other than the usage appears remarkably similar both before and after enrolling in the Prepayment Program.

Customer Survey Results

To investigate the impact of prepayment on customers, a survey was conducted. Customers who were in the EU EnergyAdvantage program were asked to participate. The survey explored areas of satisfaction, as well as likes and dislikes regarding the program. The framework of the survey included the following:

- ◆ Customers making purchases at utility offices that were in the Prepayment Program were asked to complete a survey.
- ◆ No compensation was provided for completion of the survey.
- ◆ No names or account numbers were recorded during the survey, so the results are anonymous.
- ◆ Because of the framework of the survey, there is high certainty that all respondents indeed were EU customers participating in the Prepayment Program.
- ◆ A copy of the survey is included in Appendix A.

Length of Service

The first question on the survey asked how long the customer had been on prepayment. The results are shown in **Figure 12**.

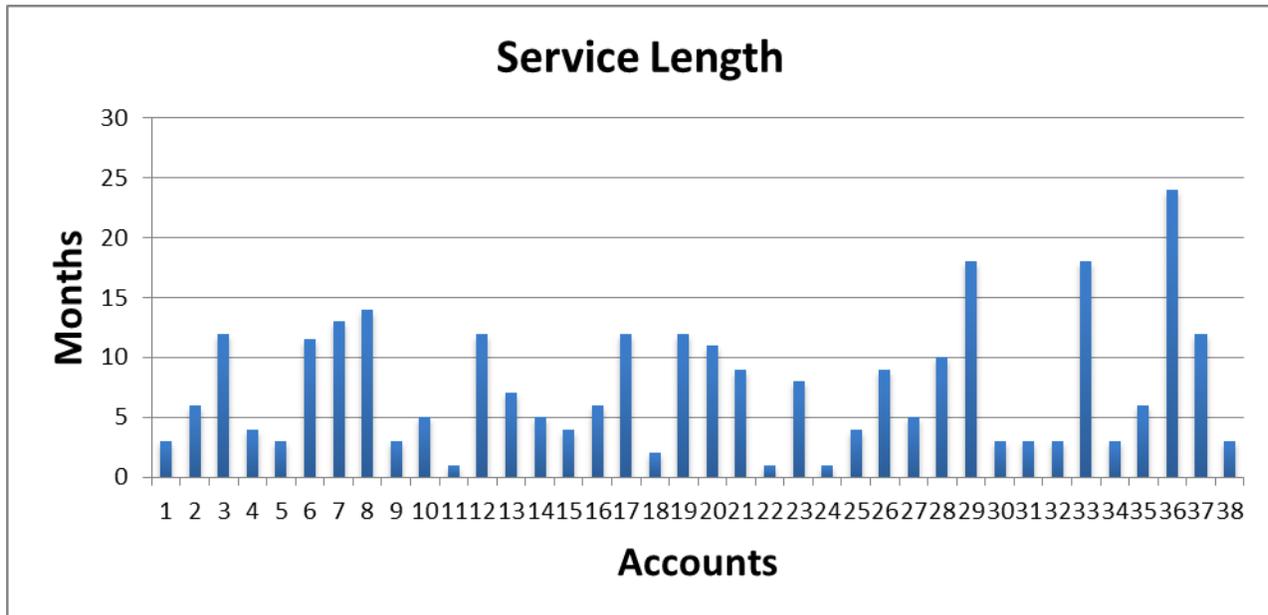


Figure 12. Customer Survey: Time in Prepayment Program

Respondents ranged in service duration from 1 month to 2 years, with the average service period over all the accounts being 7.5 months. Because of the random nature of the sampling and the relatively short time that the program has been offered, this spread of service times was not unexpected.

Overall Satisfaction

The most important question of the survey was to gauge the customer’s overall satisfaction with the program. Respondents were asked to rate their satisfaction from 1 to 5, with 5 being the highest satisfaction and 1 being the lowest. The results from that question are shown in **Figure 13**.

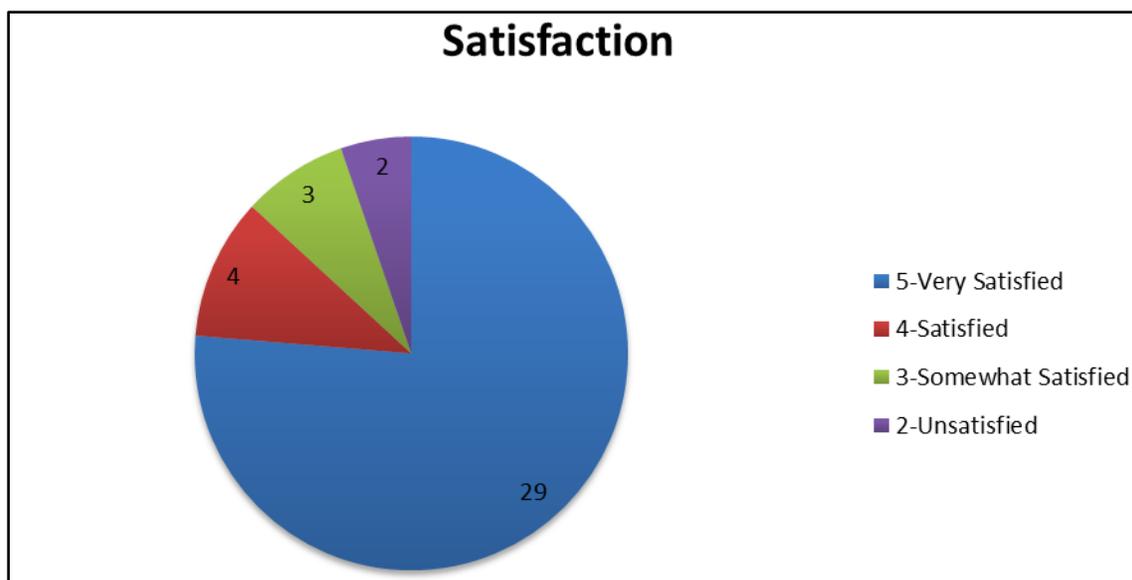


Figure 13. Customer Survey: Overall Satisfaction with Prepayment Program

As shown in the figure, 29 of the 38 respondents were highly satisfied with the program (76%). By combining the Satisfied and Very Satisfied groups, the overall approval numbers go to 33 of 38 (87%). This is in keeping with surveys done by other utilities—overall satisfaction rarely drops below 85%.

Reasons for Choosing Prepayment

The next question attempted to identify the main reason for selecting prepayment as the customer’s billing method. This was an open-ended question, to allow respondents as much leeway as possible to articulate their reasons. The results of the question are shown in **Figure 14**.

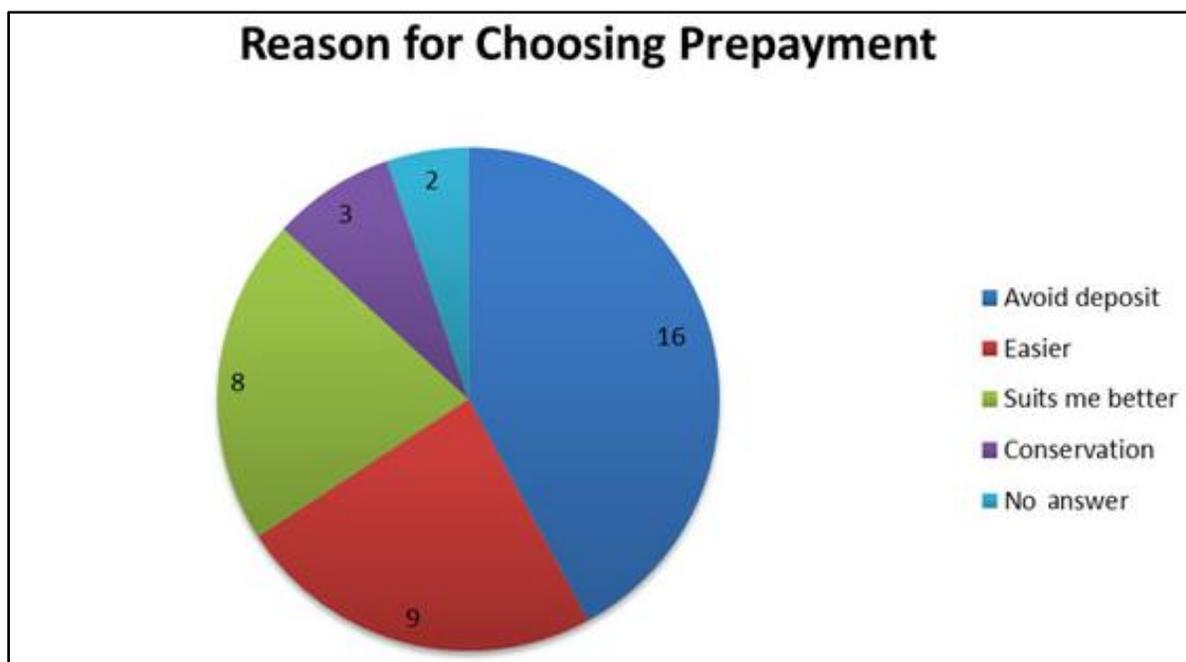


Figure 14. Customer Survey: Reason for Choosing Prepayment Program

Because of the way that EnergyUnited has positioned its program, it is not surprising that the largest number of respondents mentioned the ability to avoid paying a deposit as their main reason for selecting prepayment. It also should be noted that there is likely some overlap with the “Easier” category, in that some respondents considered avoiding a deposit to be easier than having to pay one.

Included in the mix were other noteworthy responses, such as “Conservation” and “Suits me better.” These are important categories; they show that prepayment does allow customers to feel more empowered, and that the utility is providing services that better fit their needs.

Saving Money

The question that is always crops up with prepayment is whether or not customers feel they are saving money. The distinction here is the word feel. Because these responses were anonymous, and the fact that many—if not most—of the customers in the Prepayment Program at EU are new customers, there is no real way to determine whether they are paying less for their electric

service or not. Therefore, the survey sought an understanding of how customers feel about the service. The results of the survey are shown in **Figure 15**.

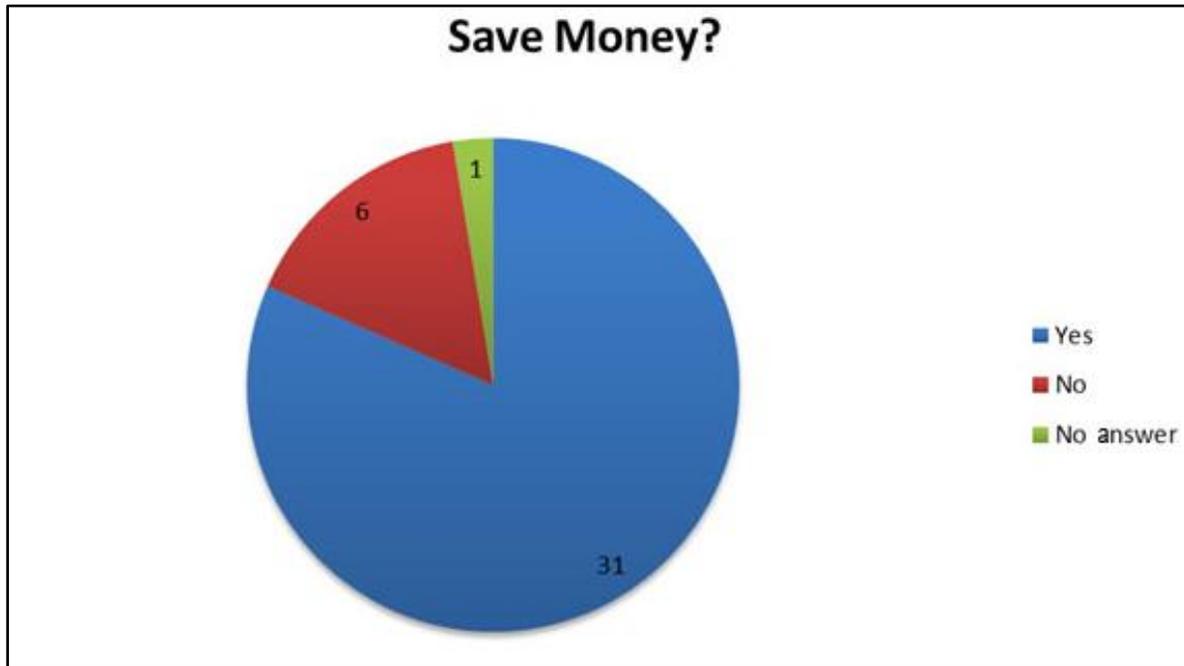


Figure 15. Customer Survey: Perceived Savings Through the Prepayment Program

A total of 31 out of 37 (84%) of respondents said they believed they had saved money through the Prepayment Program. This is a significant response, since EnergyUnited has a reconnect fee of \$25 to resume service after disconnect. It was not expected that the response to this question would be so positive. What is not known is if or how many times any of the respondents have been disconnected and have had to pay the \$25 reconnect fee. However, this perception of saving money is obviously strong.

Easier to Pay

Because one of the benefits of prepayment is seen to be its much more flexible payment schedule, the survey also asked whether the respondents felt that it was easier for them to pay their bills. The results are shown in **Figure 16**.

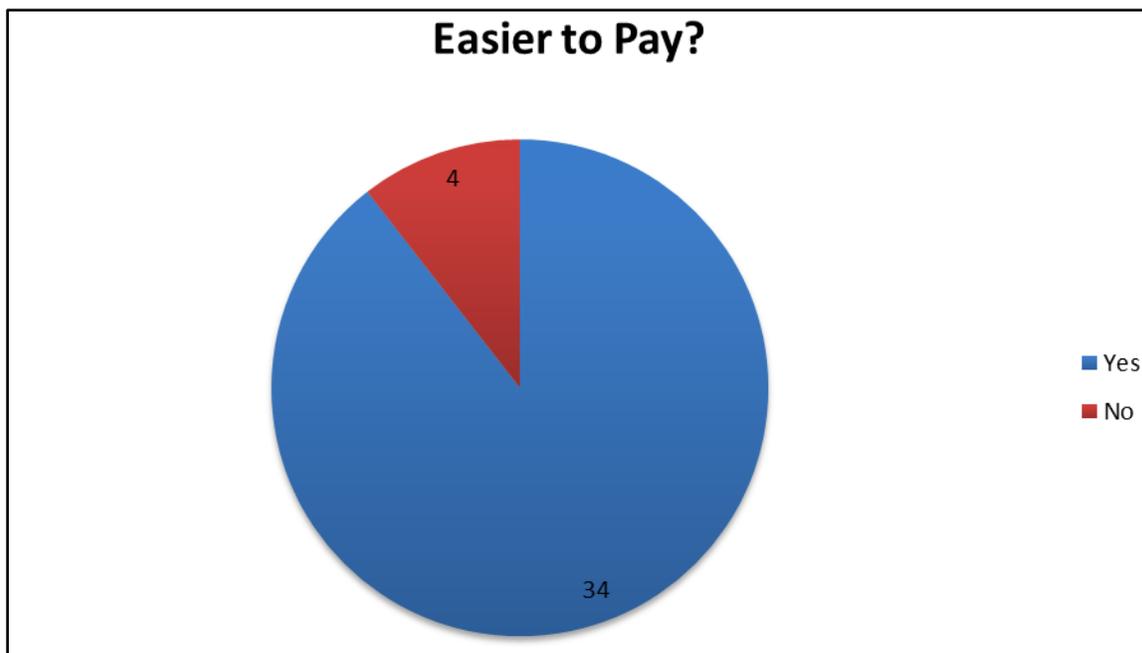


Figure 16. Customer Survey: Ease of Payment Through the Prepayment Program

A total of 34 out of 38 (89%) respondents said that it was easier for them to make payments through the Prepayment Program. This would seem to indicate that even the one respondent who was only “Somewhat Satisfied” with the program in response to the earlier survey question did believe that it was easier to make payments (34 out of 38 thought it to be easier, versus 33 out of 38 who were “Satisfied” or “Very Satisfied”). However, a closer look at the survey results shows that there is actually no correlation between these questions. Of the four respondents who said that it was NOT easier to make payments through the Prepayment Program, their corresponding satisfaction ratings are shown in **Table 4**.

Table 4. Customer Survey: It Was Not Easier to Make Payments Through the Prepayment Program

Respondents Saying it Was NOT Easier to Make Payments
5 – Very Satisfied
4 – Satisfied
4 – Somewhat Satisfied
2 – Unsatisfied

What this means is that three of the respondents to this question did not think it was easier to make payments in the program but still were “Satisfied” or better. It also means that three of the 34 positive respondents to this question still were not “Satisfied” or better in their overall appraisal of the program.

Purchase Frequency

The following data show the purchase frequency of the surveyed accounts. As can be seen from the chart, the survey results very closely mimic the data provided by EnergyUnited. As shown in **Figure 17**, the bulk of the surveyed members purchase either weekly or biweekly.

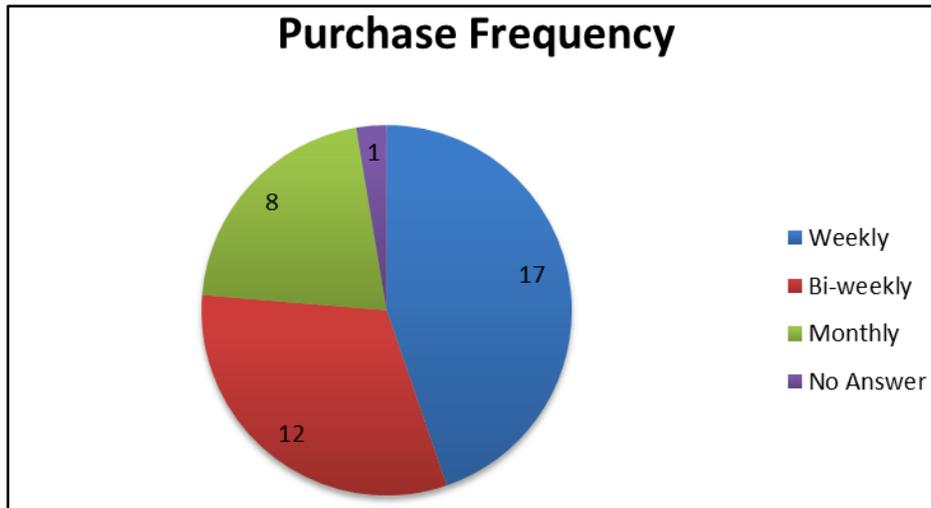


Figure 17. Customer Survey: Purchase Frequency in Prepayment Program

Biggest “Like”

The data in **Figure 18** show the results for the survey question asking about the biggest “like” about the program.

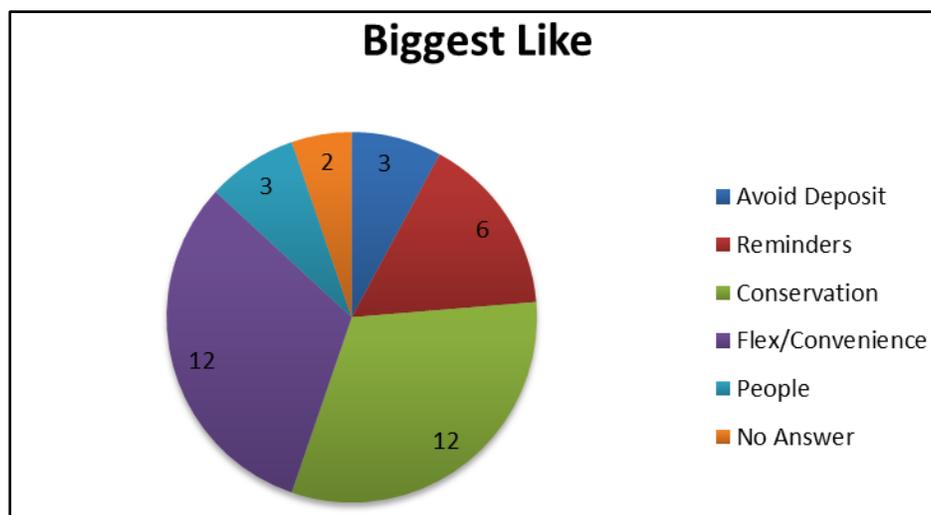


Figure 18. Customer Survey: Biggest “Like” About the Prepayment Program

The interesting thing about the results of this question is that it seems to suggest that, while many people chose prepayment to avoid the deposit, other benefits become apparent that surpass mere deposit avoidance.

Biggest “Dislike”

Figure 19 shows the results of the question asking members to specify their biggest dislike about the program.

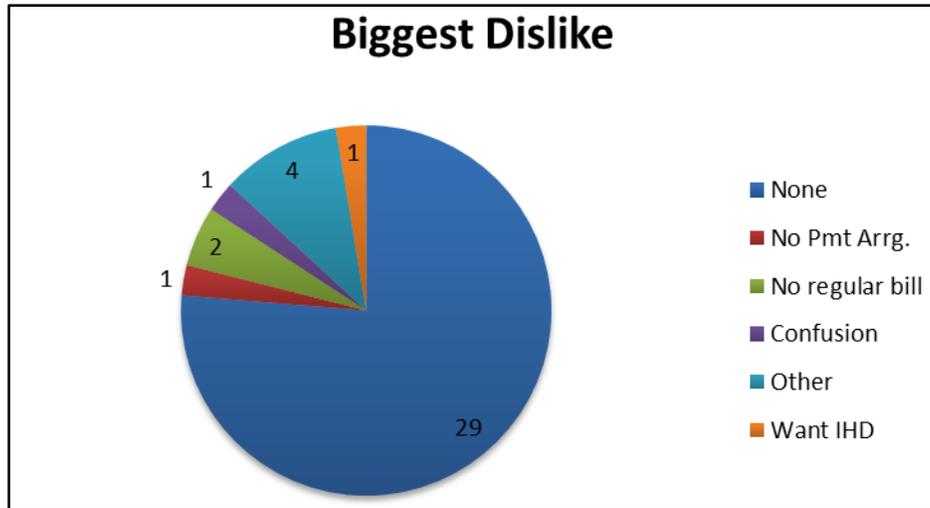


Figure 19. Customer Survey: Biggest “Dislike” About the Prepayment Program

The most significant thing about this result is that, overwhelmingly, members have virtually no complaints about the Prepayment Program. This is especially interesting, given the rules around reconnects, such as fees and minimum balances.

Additional Comments

The last question on the survey simply asked the participants if they had any other comments. The results of this question are as shown in **Figure 20**.

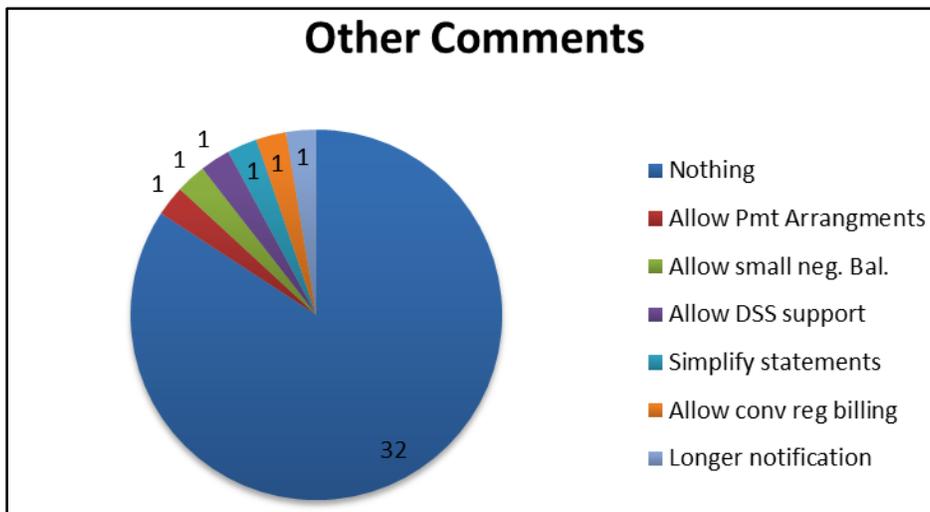


Figure 20. Customer Survey: Additional Comments

Once again, only some of the individual suggestions are noted. Most people surveyed did not make any additional comments.

CONCLUSION

EnergyUnited has created a very effective Prepayment Program that is serving its new members in a way that seems to have generated high levels of satisfaction. While the policies of the program do not necessarily provide a means of debt retirement for existing customers, they do stem the tide of new debt being incurred.

By working with Cayenta, its CIS vendor, to develop prepayment functionality, EnergyUnited chose an implementation methodology that is sustainable, scalable, and avoids additional systems and integrations. For the program to grow much beyond its current size, however, the overhead of manual processing of disconnects and reconnects must be addressed. Most other programs do not have this issue. It is a testament to the diligence of EU personnel that they have been able to keep up with the operations of the program at its current size.

DMEA and KEA are on the cusp of beginning their programs. The proposed policies for these programs are typical when compared to other, more mature prepayment programs at other utilities. The fact that DMEA does not currently have a deposit does cloud the process by which new members would sign up for service.

Conservation Impacts

It is reasonably clear that some customers perceive that they conserve energy AND also save money. However, the data gathered in this study do not prove that premise statistically. Other studies have pointed to energy savings in the range of 8% to 15%. One of the original goals of this study was to show energy savings and efficiency based on customer usage for at least a year before and after switching to prepayment. This timeframe was expected to answer the following questions:

- ◆ Is energy conservation a temporary benefit or does it last beyond the first few months?
- ◆ Is energy conservation seasonal, in that conservation occurs only when customers' bills tend to be higher?
- ◆ What are the energy conservation results with respect to weather variations?

To answer these questions, we will need to take a more controlled approach to the data gathering to make sure that we identify customer accounts that:

- ◆ Have a suitable amount of meter data history prior to switching to prepayment.
- ◆ Do not and have not moved for the duration of the study.
- ◆ Have not materially changed their power usage due to additions or changes in residence infrastructure.
- ◆ Have not significantly changed their lifestyle during the study.

It would be very useful to revisit both the DMEA and KEA programs in 2014 to engage in such a study.

Summary

In general, the results of this investigation further corroborate the basic tenants of prepayment as stated in the Prepaid Metering Analytical Report of June, 2012, including the following:

- ◆ Members have a high degree of satisfaction with the service.
- ◆ Members appreciate the alternative to the typical deposit requirement for new service.

- ◆ Prepayment has become a more implementable option, as existing AMI and CIS vendors now more readily support the service.
- ◆ Prepayment does promote better energy awareness.
- ◆ Prepayment can be effective and successful based on a variety of policy decisions.

What cannot yet be proven or disproven with this set of utilities and this report are the following:

- ◆ Prepayment is an effective tool in the area of energy efficiency and conservation.
- ◆ Prepayment can be effectively implemented regardless of the local weather climate (although prepayment has been present in Alaska and Canada for years).

In summary, the evolution of prepayment has reached the point at which most utilities should at least be considering developing a program. The evidence suggests that utilities can tailor the program to meet their specific needs without compromising its overall success and the satisfaction of the membership.

APPENDIX A – CUSTOMER SURVEY

EnergyAdvantage Program Member Survey

The following is a survey for EnergyAdvantage customers. Information gathered will be used to publish a report on the effectiveness of the program.

1. How long have you been using EnergyAdvantage? _____
2. How would you rate your overall satisfaction with EnergyAdvantage? (1-low, 5-High) 1 2 3 4 5
3. What is the reason that you are on the EnergyAdvantage program?

4. Has EnergyAdvantage allowed you to save money on your bill? (Circle One) Yes No
5. Has EnergyAdvantage made it easier for you to pay for your electric usage? (Circle One) Yes No
6. How often do you make purchases on Energy Advantage? Daily Weekly Two Weeks Monthly
7. What is the biggest thing you like about EnergyAdvantage?

8. What is the biggest thing you dislike about EnergyAdvantage?

9. If possible, what would you change about EnergyAdvantage?

10. Please add any other comments you have about the EnergyAdvantage Program.

**APPENDIX B – SUPPLEMENTAL INFORMATION: ELECTRICITY
PREPAYMENT PROGRAM UPDATE**



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(704) 430-7697

Electricity Prepayment Program Update for the Cooperative Market

Prepayment Status Update for the
Cooperative Research Network

June 12, 2014

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1. Introduction

The intent of this report is to provide an update on the status and penetration of the service of prepayment in the cooperative utility space. The Cooperative Research Network (CRN) published “Prepaid Metering Analytical Report” in June 2012 to offer assistance in the understanding, planning, and implementation of prepayment. This report focuses more specifically on the growth and status of prepayment today.

This report contains the following sections:

- **Vendor Update** – a review of those vendors and their systems that are enabling the service of prepayment
- **Prepayment Trends** – an overview of some of the emerging trends associated with prepayment
- **Utility Survey** – a survey of cooperatives to better quantify the impact and experiences with prepayment
- **Member Survey** – a survey of cooperative members to understand and quantify their experiences with prepayment and, in some cases, contrast them with non-prepayment members

The general conclusions of this report are as follows:

- The presence of an Advanced Metering Infrastructure (AMI) solution is a core enabler of prepayment.
- Many if not most customer information systems (CIS) now support the offering of prepayment as a payment method.
- Prepayment in general is growing at a significant pace. Evidence indicates that the number of prepayment programs has grown by 55% over the past 2 years. Because the surveys conducted as part of this report are not all encompassing, it is likely that this growth rate is even higher.
- Regulatory restrictions continue to be an impediment to prepayment growth in some states.
- Cooperatives offering prepayment recognize the value of the program and would offer it again if given the option.
- Members recognize the value of prepayment, as evidenced by the high satisfaction ratings.

The surveys referenced in this report likely represent some of the more extensive and more exhaustive work done with respect to prepayment. The results, in many aspects, are very revealing with respect to overall member satisfaction.

2. Vendor Update

For today’s prepayment market, there are basically two systems enabling it—AMI vendors and billing engine vendors. Both types of vendors play an important role in offering prepayment.



1.1. AMI Vendors

The AMI vendor provides remote metering and disconnect capabilities. Virtually all of today's AMI vendors are capable of enabling prepayment because the current state of prepayment does not demand anything more from these vendors than what they would normally offer as part of their standard system.

1.1.1. Remote Meter Reading

In today's environment, the AMI system simply needs to provide periodic meter readings back to the billing engine. The only limiting factor in such systems may be the frequency with which these readings are retrieved. Basically, today's systems calculate account balance updates with every meter reading that becomes available. If readings are retrieved once per day, which is the absolute minimum frequency with which to retrieve readings in today's systems, then account balances will be updated once per day. Evidence from a number of existing prepayment programs has shown that this is a suitable update period.

If a utility desires updates more frequent than once per day, this requirement would need to be measured against the existing or proposed AMI infrastructure to determine if the communications needs can be met. This is where some AMI technologies might be stronger than others in their ability to support prepayment.

1.1.2. Remote Disconnect/Reconnect

Since most of the available solid-state meters on the market today support an optional integrated disconnect switch, virtually all AMI vendors can support the need to remotely connect and disconnect prepayment customers. The ways in which some vendors may differentiate themselves are as follows:

- Incremental cost of a meter that includes a disconnect
- Any limitations on frequency of switch operation due to the switch itself or the communications method
- Ability to have positive and reliable feedback as to the successful completion of a switch operation

This last point is extremely important because the reliability of switch operations must be enough so that the process can be automated. Otherwise, additional manual overhead may need to be employed to verify switch operations. From a customer perspective, it is vital to be able to restore power quickly to someone who has made a payment on his or her prepayment account, thus achieving a positive balance or reaching a level deemed acceptable for reconnect.

1.2. Billing Engine Vendors

Billing engine vendors are either the incumbent CIS providers or a third-party system that implements stand-alone prepayment functionality alongside an existing CIS. There are various factors that go into making the billing engine vendor selection. Most of the established CIS that serve the bulk of the cooperative market now offer prepayment. Stand-alone solutions may offer additional flexibility or other features perhaps not found in the legacy CIS prepayment offerings.



Whether the prepayment solution is implemented using the incumbent CIS or utilizes a third-party solution, the development of the MultiSpeak specification has been a huge contributor to making system integrations simpler and more reliable. In most cases, vendors can readily configure their systems to support the necessary interfaces without significant time or expense.

It is beyond the scope of this report to explore the various criteria that might go into a selection solution. This report instead simply will provide vendor information as a resource through which more information can be researched.

1.2.1. Cayenta

Cayenta is a division of N. Harris Computer Corporation. It offers a full-featured CIS that includes prepayment services. Cayenta serves a broad range of utilities, including cooperatives. For more information, go to www.cayenta.com.

1.2.2. Daffron

Daffron is a software company that offers a broad range of software solutions, catering mainly to the cooperative market. It supports a built-in prepayment service capability in its CIS. For more information, go to www.daffron.com.

1.2.3. Exceleron

Exceleron is a company offering a stand-alone prepayment solution that integrates with and operates alongside an existing CIS. Exceleron was one of the early pioneers of a stand-alone prepayment solution. For more information, go to www.exceleron.com.

1.2.4. NISC

NISC is a software company offering a broad range of software solutions, catering mainly to the cooperative market. It supports a built-in prepayment service capability in its CIS. For more information, go to www.nisc.coop.

1.2.5. Nighthawk

Nighthawk essentially is a hardware-based solution offering both meters and disconnect collars that enable the offering of prepayment. By utilizing cellular or other communications, Nighthawk enables surgical deployment of prepayment without having a completely deployed AMI solution. For more information, go to www.nighthawkcontrol.com.

1.2.6. PayGo

PayGo is a stand-alone software company offering a range of payment and billing solutions for utilities. It has had more success in the investor-owned utilities (IOU) market than cooperatives. One of the unique aspects of its system is that it offers the ability to download some firmware to a select group of AMI vendors' meters to perform some level of prepayment functionality at the meter. For more information, go to www.paygoelectric.com.



1.2.7. SEDC

SEDC is a software company offering a broad range of software solutions, catering mainly to the cooperative market. It supports a built-in prepayment service capability in its CIS. For more information, go to www.sedata.coop.

1.2.8. SmartGridCIS

SmartGridCIS is stand-alone software company offering a stand-alone prepayment solution. For more information, go to www.smartgridcis.com.

1.2.9. Others

As mentioned earlier, prepayment has been gaining momentum across the utility landscape. For this reason, most CIS vendors are supporting prepayment in some way. Thus, it is recommended always to check with the incumbent CIS vendor to learn of its capabilities and plans as part of any procurement process. Of course, being able to implement prepayment without needing to support an additional system has its advantages. However, these advantages may be overshadowed by a lack of maturity in the incumbent vendor as to the features, options, and configurability that may be necessary to provide the type of program desired.

Prepayment Trends

The way that prepayment is offered has changed significantly over the past 25 years. Systems have evolved from custom metering hardware solutions to those that leverage standard AMI systems and centralized billing engine solutions. As the demand for prepayment has increased, more innovation has occurred, as well as the evolution and utilization of the service itself. This section will describe some of the more recent trends.

1.3. In-Home Display

Prepayment solutions originally included some form of in-home display to support the provision of balance information to the customer. In today's environment, the trend is away from in-home displays. There are several practical and technological reasons, as follows.

- In-home displays are another piece of equipment that utilities need to manage and support. Eliminating such devices makes the business case for prepayment simpler to prove and the program easier to manage.
- The proliferation of smart phones provides an alternative to a dedicated in-home display that is portable and supported by a third party.
- The ready access to the Internet provides a viable alternative to in-home displays.

1.4. Notification Options

Most prepayment billing engine solutions allow participants to configure notifications to suit their own needs. This configurability relates both to the means of communications and their frequency and thresholds. Today, a program participant potentially can configure the means of notification, including phone calls, emails, text messaging, or any combination of these. The user also can determine the balance levels or other levels and frequencies at which notifications can occur.



These advances in notification configuration provide great flexibility to the member. At the same time, they relieve the utility of trying to manage these notifications for individual members.

1.5. Service Fees

In many prepayment programs, the participant is charged an additional fee for this service. This fee has been shown to be not a significant deterrent to program participation, as the participants perceive that their savings and convenience more than offset the fee. However, as the actual costs to implement and support prepayment have dropped, the trend seems to be toward lowering or even eliminating additional periodic or transaction fees.

1.6. Apps

In addition to the various notification options described above, several vendors now have Apple and Android apps available for download. These apps support prepayment balance monitoring in an easy and convenient manner. Many of these apps provide a range of communications options beyond that of prepayment, and thus have greater appeal to members.

1.7. Energy Conservation

There is a growing trend to recognize prepayment as an energy conservation tool. Several studies have indicated that prepayment can result in 8%–15% energy conservation. However these results must be tempered by understanding the type of member to which prepayment appeals. Some of the incentive for energy conservation is that the program participants are budget conscious. An attempt to market prepayment as an energy conservation tool to other member demographics may not yield the same results, as these participants may not be budget motivated.

1.8. Balance Calculations

While not necessarily a current trend, something expected to occur in the coming years for all CIS and third-party vendors is their development of solutions that move away from batch-based operations and provide more responsive information. In today's environment, most consumers are able to track their cell phone usage to the minute. Likewise, bank customers are able to see transactions made with a debit card virtually instantaneously after making them, via an online portal or app. The wealth of data produced by today's AMI solutions, along with prepayment solutions, would seem to be pushing vendors to move away from batch-based operations in favor of more responsive solutions. This is a major change for most established vendors; it will take time to achieve, but the drivers do seem to be there.

Utility Survey

The utility survey conducted as part of this report was intended to identify as many prepayment programs as possible, as well as their current status. Because many vendors are reluctant either to provide information about their clients or even possibly do not know which clients have active prepayment programs, this report took a more direct approach to identify those cooperatives with prepayment programs. The methodology utilized for this process was as follows:



- A questionnaire was emailed to a high-ranking member services or communications employee at each distribution system to discover if their co-op offers a prepaid meter program, and details on their program if they do offer one.
- A total of 837 invitations were sent out on April 29, 2014. Two reminders were sent to increase participation. A total of 353 invitees completed the survey and are included in these results—a response rate of 42%.
- It is important to note that in some cases the respondents did not answer all questions; this **accounts for** some variability of “n” in the data presented.

1.9. Prepayment Programs Offered

Of the 353 responses, the breakdown of the information collected, shown in Figure 1, is as follows:

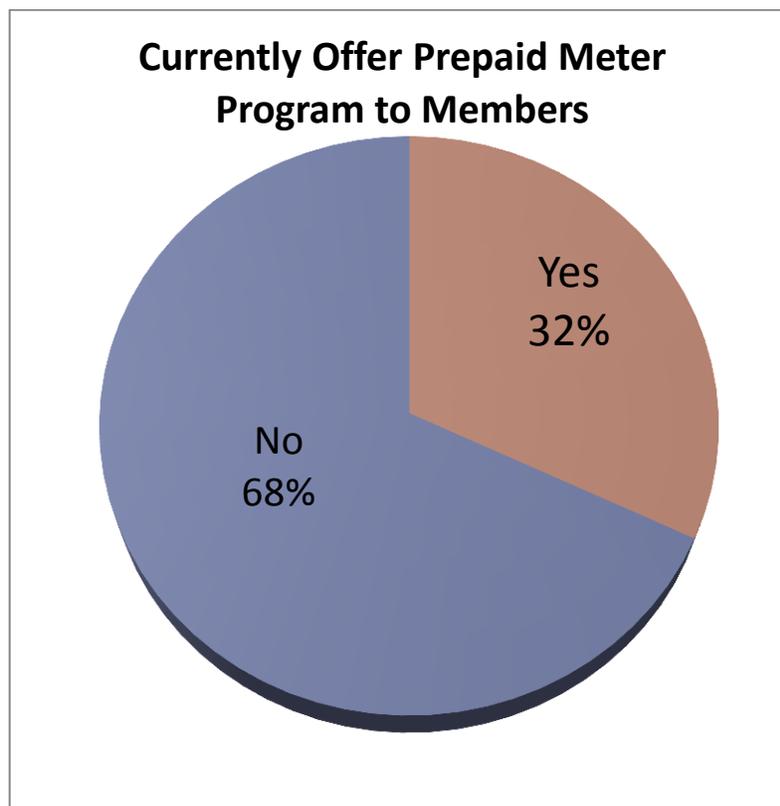


Figure 1. Co-Ops Currently Offering a Prepaid Metering Program to their Members

The data above represents 114 prepayment programs out of 353 cooperative responses. The Prepaid Metering Analytical Report published by CRN in June 2012 reported 95 active prepayment programs. This indicates a growth of 20% in prepayment programs over a 2-year span if we assume that all 95 of the programs identified in that report are included in this survey. A question as to how long a co-op’s prepayment program had been in place, which had 104 respondents, indicates that this cannot be true (see Figure 2).

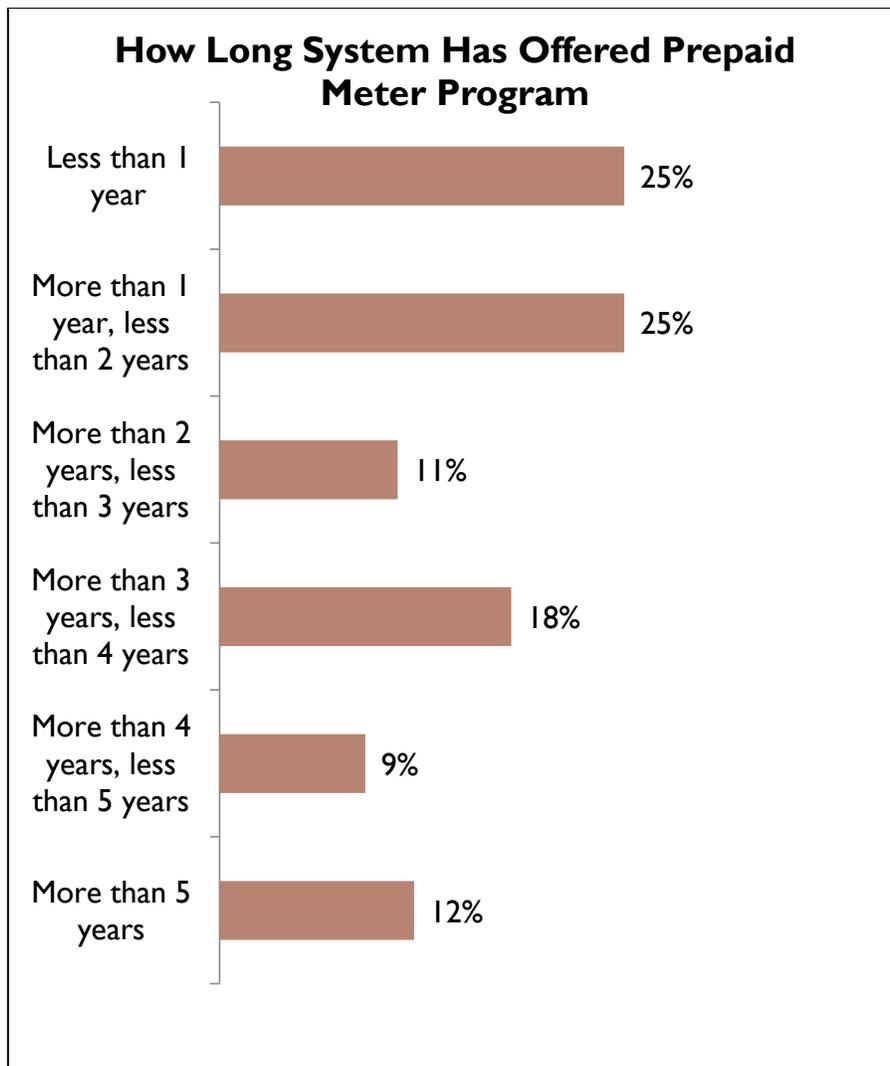


Figure 2. How Long Has the Utility Offered a Prepayment Program?

Since 50% of these 104 respondents said they had prepayment programs that were less than 2 years old, those 52 programs could not have been included in the 2012 report. This information indicates that prepayment programs have increased by at least 55% since 2014.

1.10. Likelihood of Offering Prepayment

For those cooperatives not currently offering prepayment (239), the survey asked a question as to the likelihood of introducing prepayment in the next 24 months. The results, shown in Figure 3, are as follows:

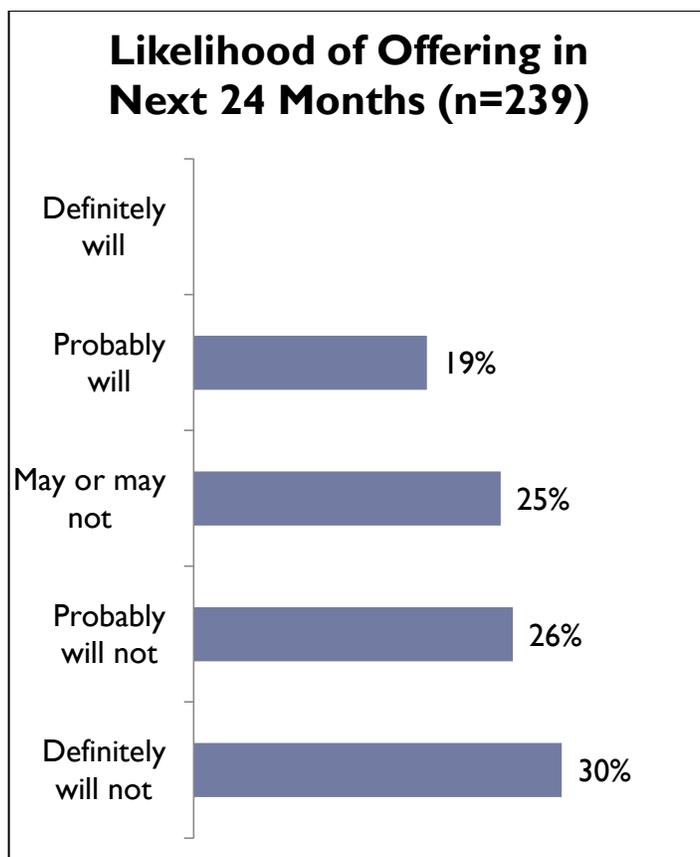


Figure 3. Likelihood of Offering a Prepayment Program in the Next 24 Months

There are several interesting aspects of these data. First of all, none of the 239 cooperatives is definitely committed to offering prepayment in the next 24 months. This is somewhat surprising, given the growth rate of prepayment cited earlier. However, it likely also indicates that the planning and decision-making process for prepayment is still a very slow and deliberate one.

At the same time, 19% of the cooperatives responding (representing 45 co-ops) indicated that they probably will offer prepayment. If these cooperatives follow through, this would represent a growth rate in prepayment over the next 2 years that would match the measured growth over the past 2 years.

1.11. Proportion of Residential Membership

Of the existing prepayment programs, utilities were asked to identify the percentage of residential members the program supported. The results, shown in Figure 4, are as follows.

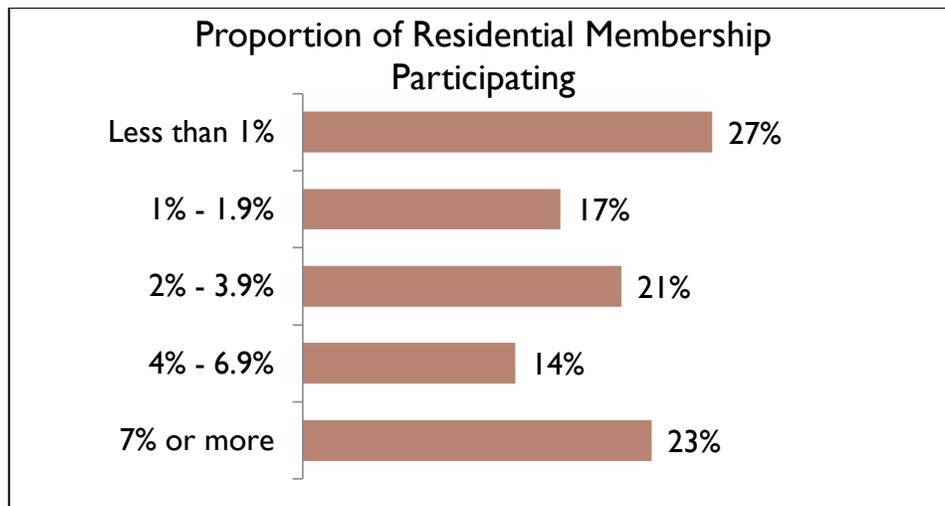


Figure 4. Proportion of Residential Members Participating in a Prepayment Program

Given that 50% of the respondents had programs that had been in place for 2 years or less, the smaller percentages of participation are not surprising. Many factors go into how large a program will become or how fast it will grow. The participation typically expected of residential members in a mature prepayment program is 10%.

1.12. Regulatory Limitations

Of the cooperatives surveyed, 49 indicated that regulatory restrictions play some role in their decision to offer prepayment or not. For those utilities, the responses to whether they would offer prepayment if these restrictions were changed are shown below in Figure 5.

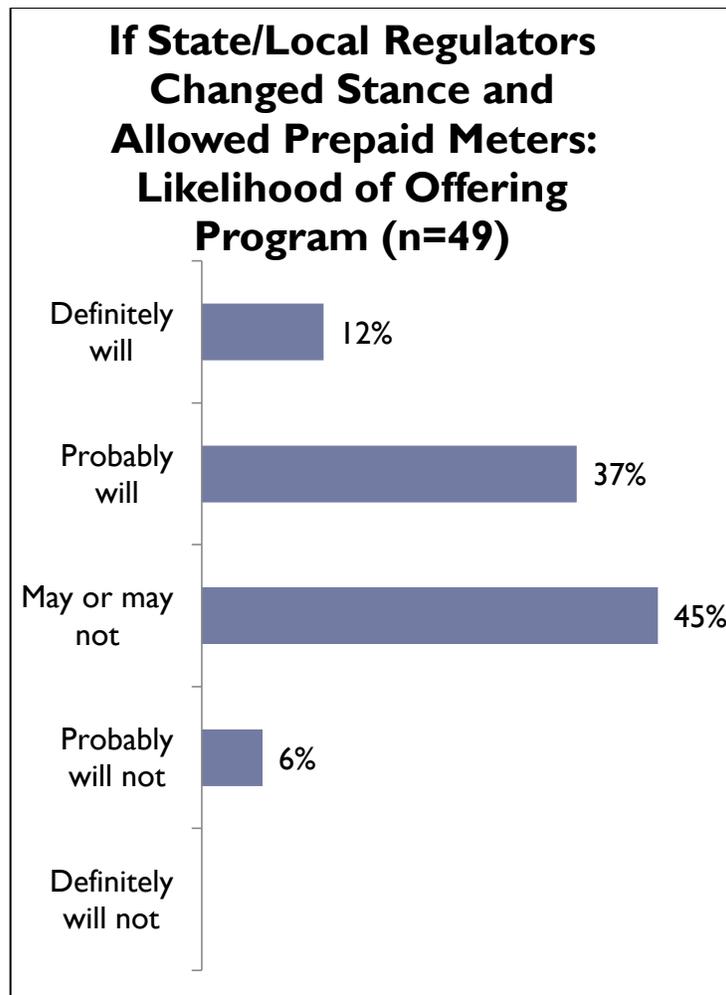


Figure 5. Likelihood of a Co-Op Adopting a Prepayment Program if Regulatory Restrictions Change

These responses indicate that, with regulatory changes, an additional 24 cooperatives either definitely or probably would offer prepayment. In other words, with regulatory changes, the growth of prepayment could potentially double.

1.13. Factors in Prepayment Decision

The survey asked respondents currently not offering prepayment and stating they were not likely to offer it (123 cooperatives) the biggest reasons for their position. The answers are summarized in Figure 6.

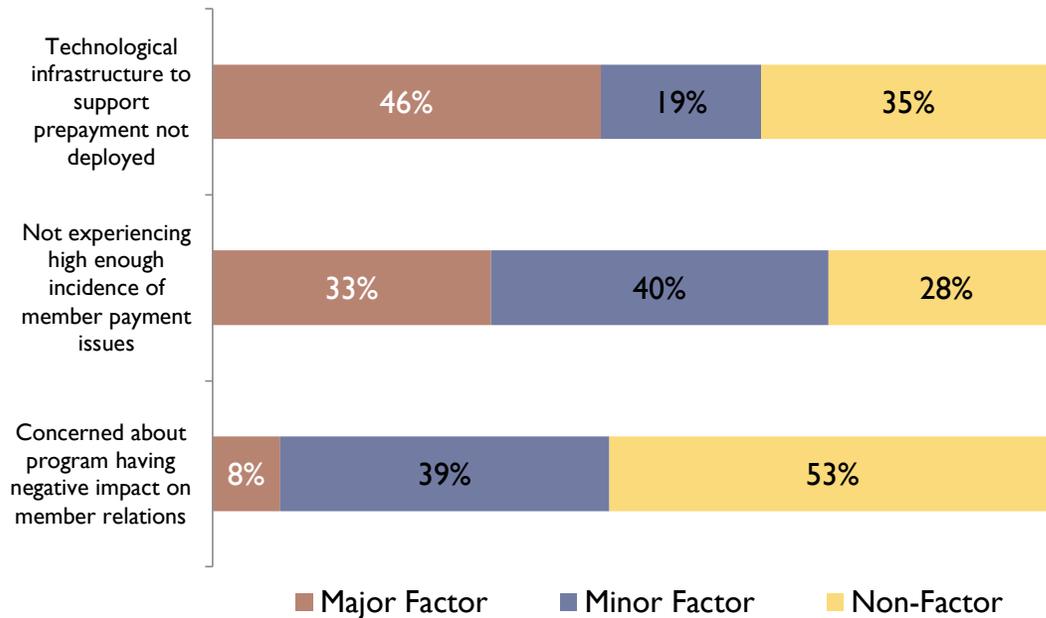


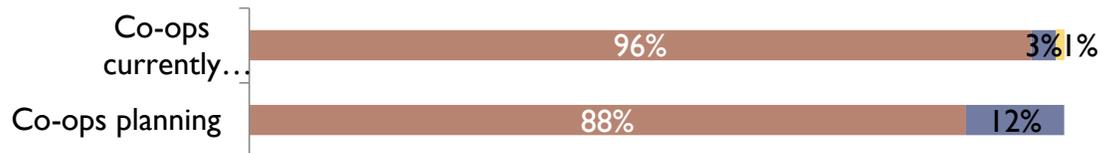
Figure 6. Reasons Co-Ops Do Not Offer Prepayment Programs

The breakdown of the answers regarding the first 2 of the 3 reasons listed above indicate that the technical infrastructure to support prepayment is still a significant impediment to many cooperatives, and the impression is lessening that prepayment will have a negative impact on member relations.

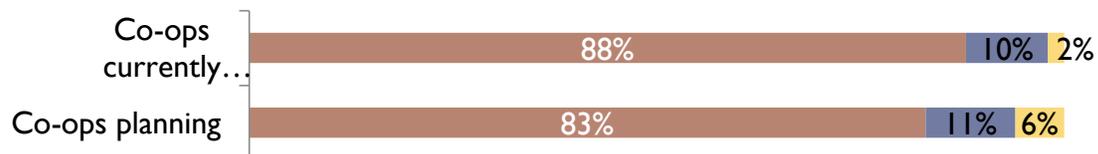
1.14. Factors in Decision to Offer Prepayment

This survey question asked the cooperatives that currently have prepayment programs (114) and cooperatives planning prepayment programs (108) the reasons why. The responses are shown in Figure 7.

To provide an alternative to large service deposits for new members:

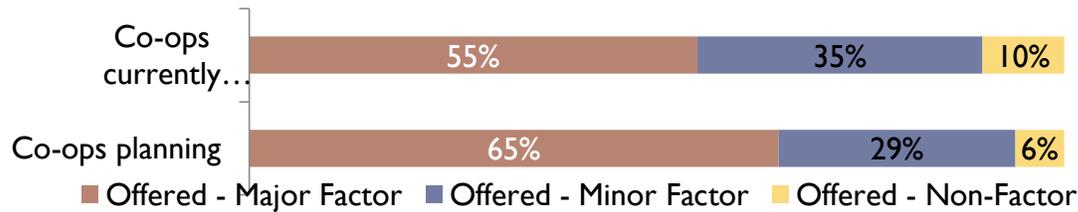


To improve relationships with members having trouble making ends meet:

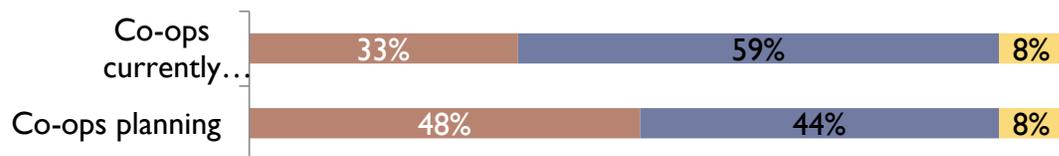




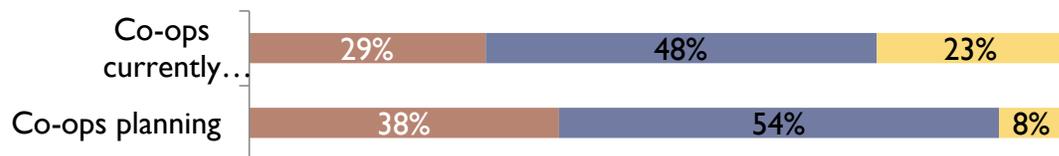
To reduce administrative costs/staff time pursuing delinquent accounts:



As a means to help consumers save energy:



As an option to address high bill complaints:



As a convenient option for transient/seasonal owners:

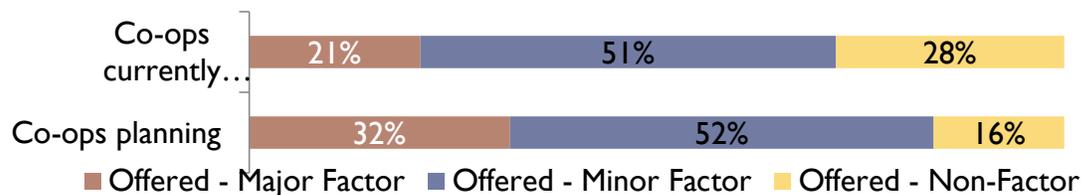


Figure 7. Reasons for Co-Ops to Have or Plan for a Prepayment Program

1.15. Overall Prepayment Program Experience

The following figures indicate responses from cooperatives indicating their overall experience with prepayment.

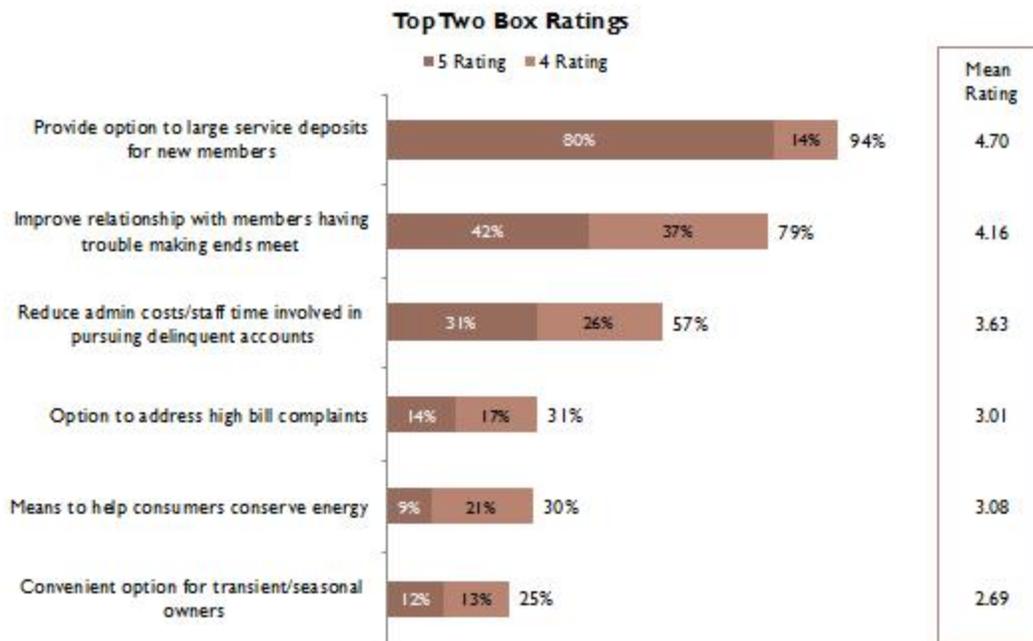
1.15.1. Level of Benefit

The results shown above are typical of other survey results. The ability of a utility to offer an alternative to high deposits has emerged as by far one of the main motivations for offering prepayment, as shown in Figure 8.



Level of Benefit in Offering Prepaid Program

1-5 Scale: 1 = Not At All a Benefit, 5 = Major Benefit (n=100)



To date, what have been the biggest benefits to the co-op of offering the prepay program?



Figure 8. Level of Benefit in Offering a Prepayment Program

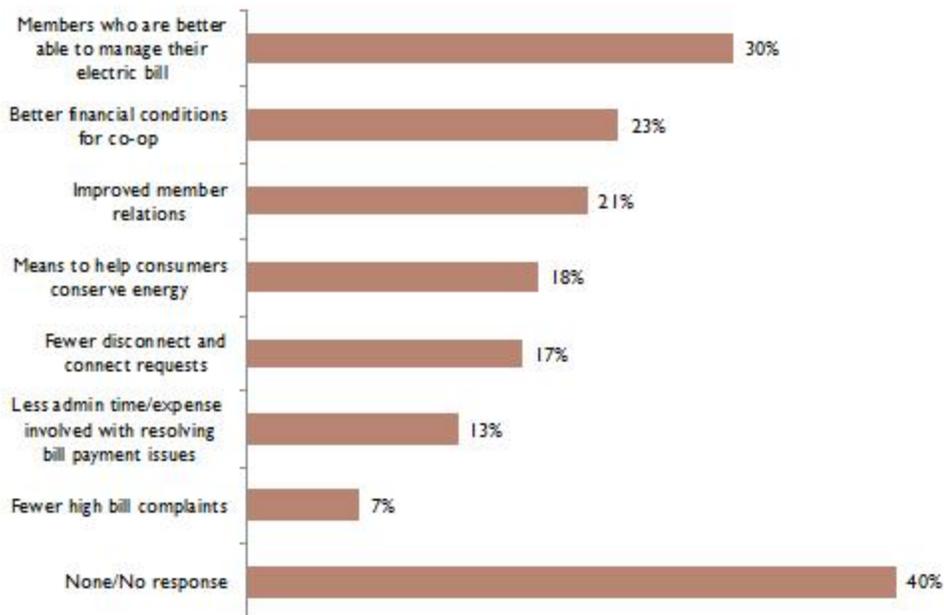
1.15.2. Unexpected Benefits

The unexpected benefits of prepayment are shown in Figure 9. The top answer to this question is an important consideration. Many people, both in the utility and regulatory areas, are skeptical regarding the ability of prepayment to help members better manage their bills. Evidence and other surveys have shown that creating an alternative to regular monthly billing allows for a new dynamic with respect to keeping current on energy costs.



Unexpected Benefits

Multiple Responses Possible (n=114)



Which, if any, of these were unexpected benefits?



Figure 9. Unexpected Benefits from Offering a Prepayment Program

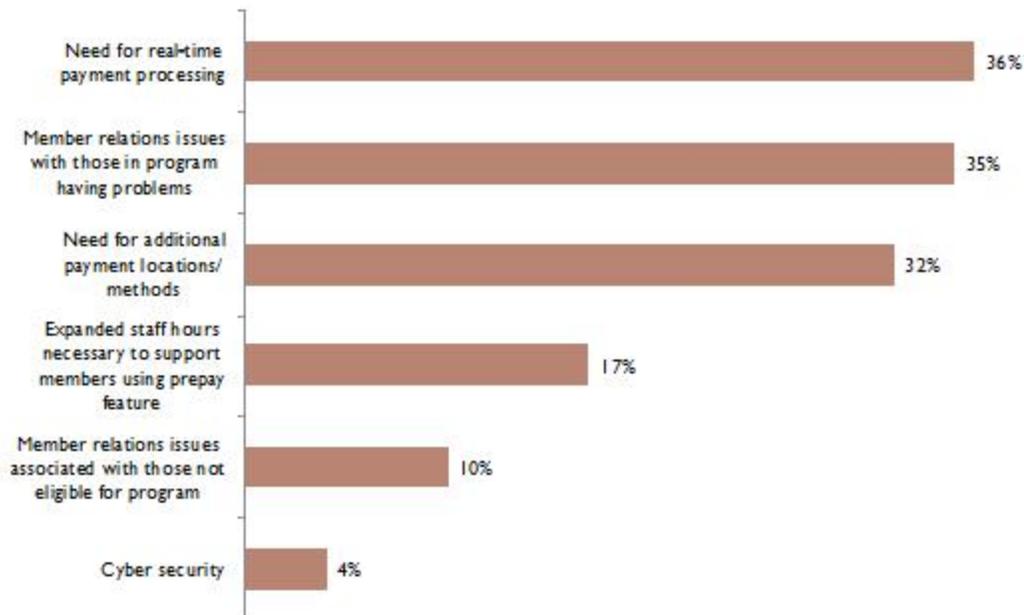
1.15.3. Biggest Challenges

The challenges in starting a prepayment program are shown in Figure 10. The top challenge identified by this question is very typical for most utilities. Most traditional utility payment solutions operate in a batched mode that is incompatible with prepayment because payments must be processed when they are received so that members can get credit for the purchase. Any purchase could be responsible for initiating a reconnection, which the member would expect to occur as soon as possible.



Biggest Challenges

Multiple Responses Possible (n=81)



On the other hand, what have been the biggest challenges the co-op has encountered as a result of offering the prepay program?

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Figure 10. Biggest Challenges in Starting a Prepayment Program

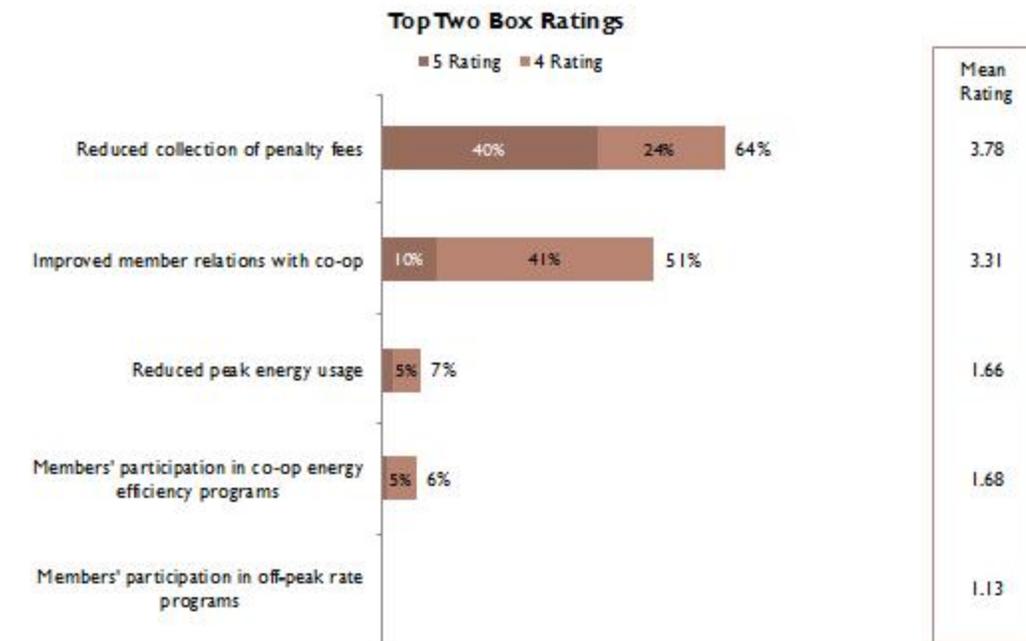
1.15.4. Changes Noticed by Co-Ops

The degree to which co-ops have noticed changes due to a prepayment program are shown in Figure 11. The reduction of collection of various types of penalty or reconnection fees is a typical result of prepayment. From a business case standpoint, this loss of fee revenue needs to be considered, as well as whether there are corresponding savings to offset this loss.



Degree Have Noticed Change Among Consumers Participating in Prepaid Program

1-5 Scale: 1 = No Discernible Change; 5 = Very Significant Change (n=96)



To what degree have you noticed a change in the following among consumers participating in the prepaid meter program?

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Figure 11. Consumer Notice of Changes due to a Prepayment Program

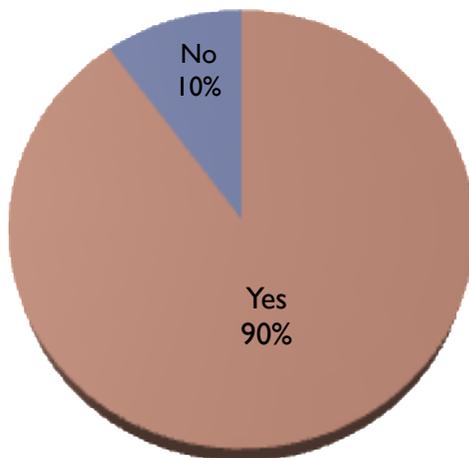
1.15.5. Participation Eligibility

Prepayment typically is offered to the entire residential population or to those businesses served by a 200-amp service because most systems support only a single-phase 200-amp disconnect switch. Certainly, as indicated below in Figure 12, locations involving life support or other medical considerations are not viable candidates for traditional prepayment. However, cooperatives could consider offering prepayment without the automatic disconnection to provide the convenience of payments based on the member's schedule.



Eligibility To Participate (n=100)

Prepayment Program Offered to All Residential Members



Among the 10 respondents saying that prepayment is not offered to all residential members, the segments most often mentioned as being excluded include those with health issues and those who do not have meters to support the program or live in areas that are unable to support the program.

Is prepayment offered to all residential members? If no, what member segments are excluded?

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Figure 12. Eligibility to Participate in a Prepayment Program

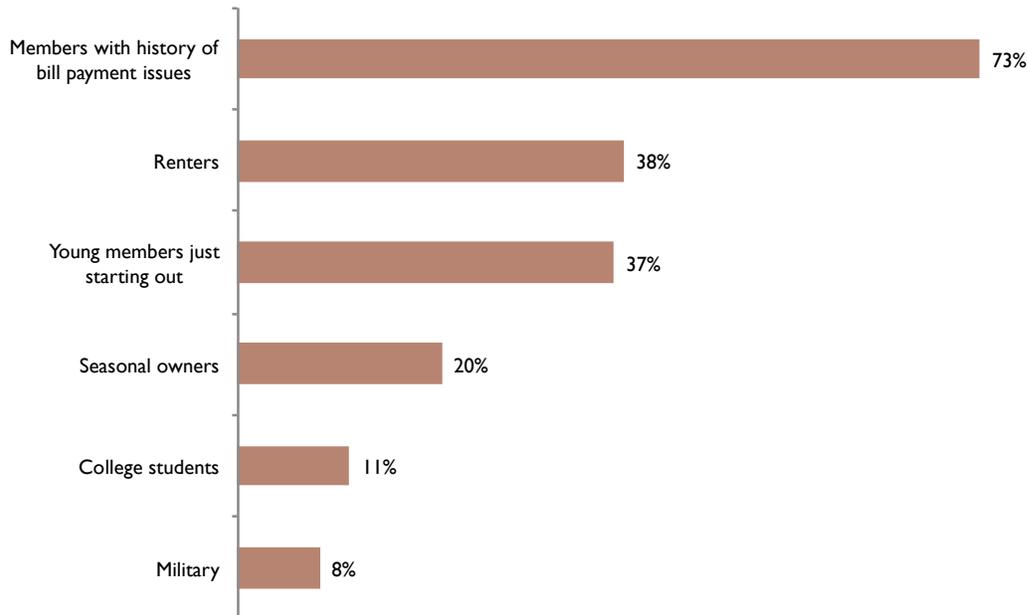
1.15.6. Member Segment Marketing

Historically, prepayment requires minimal marketing activity, although some utilities do elect to brand and market the service in some way. Bill payment issues and avoidance of deposit fees are typically the two main motivators for enrolling in prepayment. Thus, the most effective marketing tool is a well-trained staff of service representatives and call center personnel that can readily recognize the **best fit for members** and make recommendations to **them** regarding prepayment. Market segments to which co-ops can market prepayment are shown in Figure 13.



Member Segments Actively Marketed To

Multiple Responses Possible (n=79)



Does your co-op actively market its prepaid meter program to any particular member segments?

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Figure 13. Market Segments to Which Co-Ops Can Market Prepayment

1.15.7. Prepayment Operation Restrictions

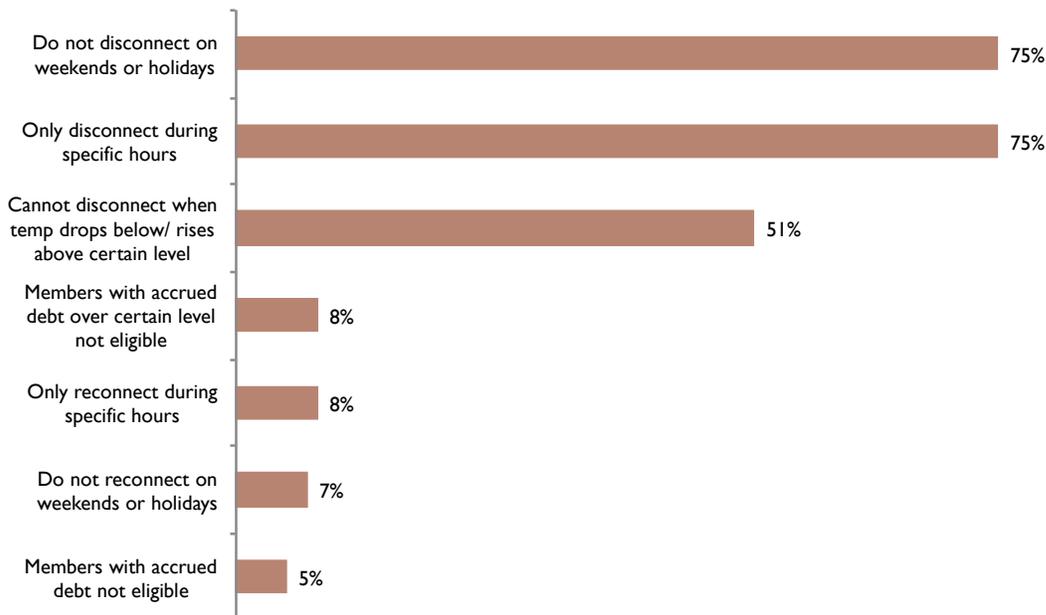
Restrictions on participation in a prepayment program are shown in Figure 14. The bottom 4 items in the graph below are very surprising. While it is not uncommon to perform disconnects only during specific days or hours, the generally accepted premise is that reconnects should be able to occur on all days and at all hours. It would be interesting to investigate the reasoning behind these policies. The likely reasoning is that these utilities do not yet have the level of automation in their systems to support this function.

The other interesting item in these 4 restrictions is that members with debt are not eligible. Prepayment typically is designed and offered so that debt can be paid off gradually as part of the service. However, cooperatives that either have a low incidence of debt or prefer a more direct approach to debt recovery have chosen to disallow these members from participating in prepayment. In these cases, the program typically is focused on new rather than existing members.



Restrictions on How Prepay Meters Are Used

Multiple Responses Possible (n=93)



Are there any restrictions on how prepay meters are used at your co-op?

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Figure 14. Restrictions on Participation in a Prepayment Program

1.15.8. Prepayment Program Fees

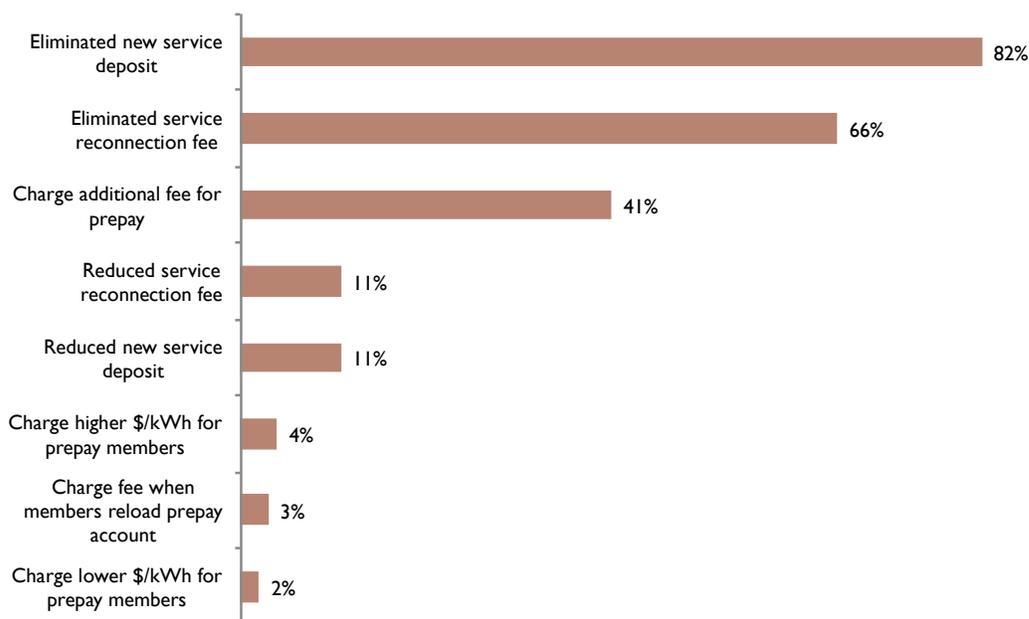
Flexibility in offering a prepayment program is significant. The fees and rates structures are shown in Figure 15. The policies at one cooperative versus another can be significantly different while both attain high member satisfaction.

One of the interesting things in these data is that 66% of the respondents say that the service reconnect fee has been eliminated. This means that 34% of the respondents still charge a reconnect fee of some kind. To understand why cooperatives continue to charge a reconnect fee requires some additional investigation. Many utilities still do this to cover the deployment costs of disconnect switches or as an attempt to minimize disconnect/reconnect transactions overall. The latter reason may be due to the additional manual processes necessary to verify switch operation.



How Fees/Rates Structured For Prepaid Program

Multiple Responses Possible (n=99)



How has your co-op structured its fees and rates for members participating in prepaid meter programs?

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Figure 15. How Fees/Rates Are Structured for Prepaid Program

1.15.9. Likelihood of Offering Again or Recommending

The likelihood of either re-offering or recommending a prepayment program is shown in Figure 16. These results are very compelling for the validation of prepayment as a service. It is unlikely that a utility could get such a consensus on many other issues.



Likelihood Of:

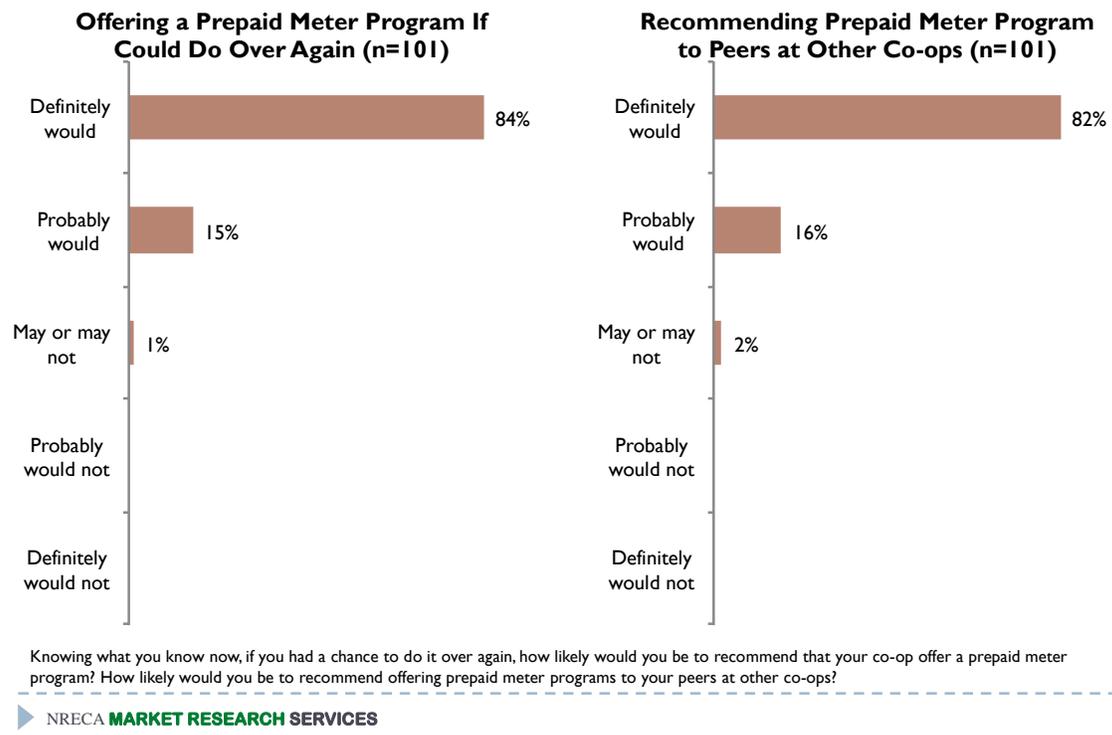


Figure 16. Likelihood of Re-Offering or Recommending a Prepayment Program

Member Survey

To understand the issues and impacts of prepayment from the member perspective, surveys of members from several different cooperatives were conducted. These surveys included groups of members that were and were not participating in prepayment programs. The results of these surveys are summarized in the following sections.

The specifics of the survey data are as follows:

- The member survey data was collected across 4 cooperatives:
 - Wood County Electric Cooperative in Texas
 - Minnesota Valley Electric Cooperative in Minnesota
 - Jefferson Energy Cooperative in Georgia
 - Jackson Energy Cooperative in Kentucky



- A total of 361 surveys were collected from prepayment program participants:
 - 279 by phone
 - 82 online
- A total of 316 surveys were collected from non-prepayment program participants:
 - 271 by phone
 - 45 online

It is interesting to note that, of the 4 cooperatives surveyed, Wood County is still using a smart card-based solution that relies on custom hardware rather than AMI communications. It is one of the last cooperatives that still utilizes this technology in its program. One of the larger cooperative prepayment programs, at Brunswick EMC in North Carolina, converted from custom hardware to an AMI-based solution a couple of years ago without any significant member complaints. (Note that the biggest issue in conversion is that balance updates go from real time, in the case of custom hardware, to periodic updates as seldom as once daily. For cooperatives that have never offered repayment using custom hardware, this balance update frequency is not a problem. Programs that have utilized custom hardware solutions can convert, and the benefits of an AMI-based system typically outweigh the loss of the real-time updates for the members.)

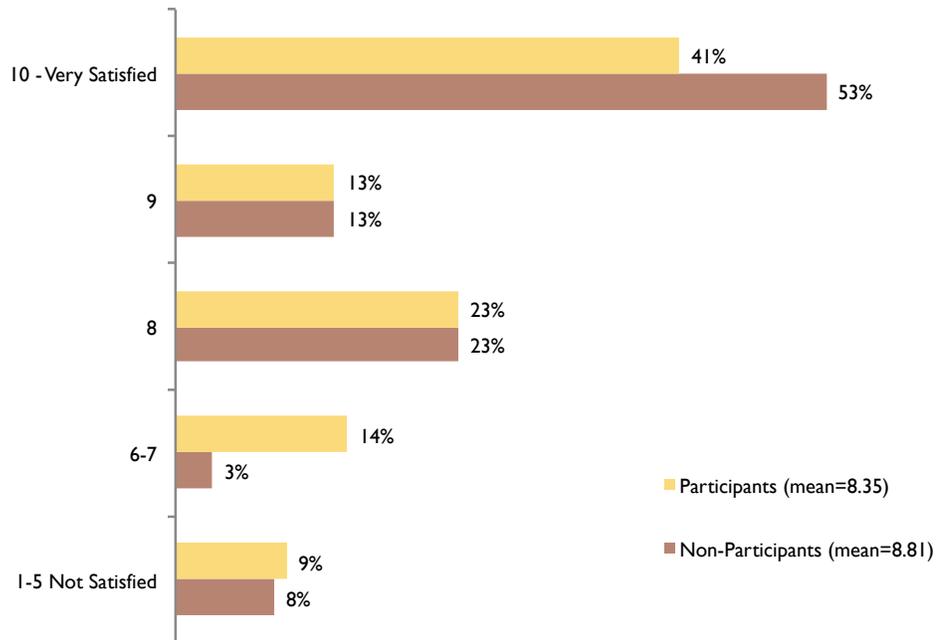
Another issue is that all 4 of the cooperatives surveyed apparently offer an in-home display as an option for balance and alert notifications. As mentioned earlier in this report, most programs today do not offer in-home displays as an option.

1.16. Overall Satisfaction

The data below, shown in Figure 17, indicate that prepayment participants are slightly less satisfied with their co-op than non-participants. However, what cannot be surveyed, although it would clarify this finding, is what the satisfaction score would have been prior to the enrollment in prepayment. The expectation is that it would have been much lower. Some of the other satisfaction metrics later in this report support that conclusion.



Overall Satisfaction With Co-op



Using a 10-point scale where 1 is "very dissatisfied" and 10 is "very satisfied," how satisfied overall would you say you are with [Co-op Name]?

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Figure 17. Overall Satisfaction with Co-Op

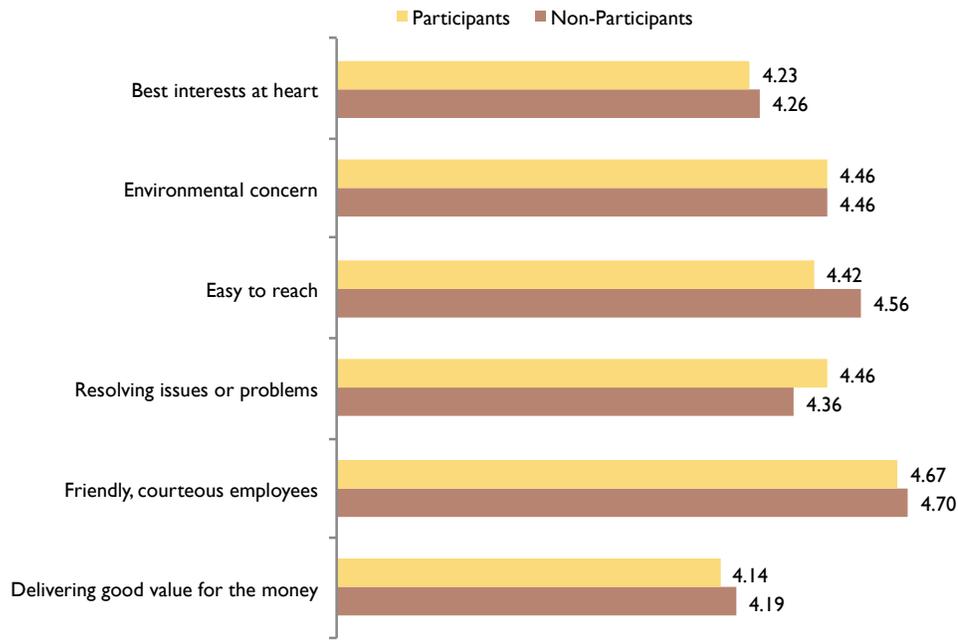
1.17. Performance Attributes

Figure 18 shows 12 aspects of cooperative performance. It is not surprising to see that cooperatives perform well in these areas. The conclusion is that prepayment does not adversely impact these perceptions. In fact, because prepayment might tend to serve a segment of the membership that may be less satisfied with cooperative performance, these data are encouraging because they show that these members have opinions on a par with others. It would be interesting to determine the overall impact of prepayment on the aggregate score of member satisfaction. However, the variables associated with such a study would make this difficult to prove.



Performance Attributes

Mean Ratings Graphed Based on a 5-Point Scale: 1 = Very Poor; 5 = Excellent



On a 5-point scale where 1 means "very poor" and 5 means "excellent," how would you rate [Co-op Name] on the following:

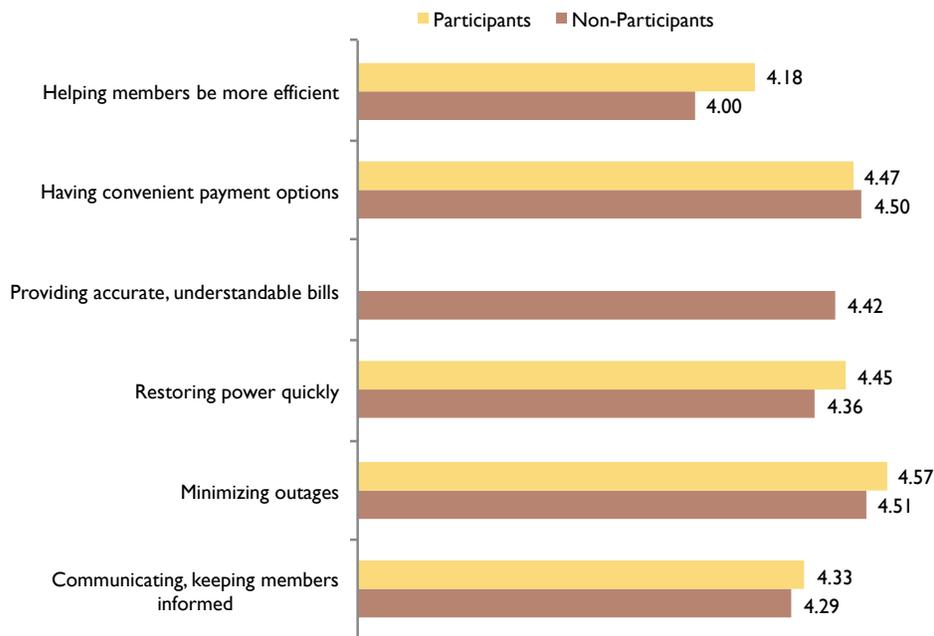
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Figure 18. Co-op Performance Attributes



Performance Attributes

Mean Ratings Graphed Based on a 5-Point Scale: 1 = Very Poor; 5 = Excellent



On a 5-point scale where 1 means "very poor" and 5 means "excellent," how would you rate [Co-op Name] on the following:

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Figure 18. Co-op Performance Attributes (continued)

1.18. Prepayment Evaluation

Figure 19 shows member satisfaction with prepayment programs. These results are very consistent with other satisfaction ratings from other surveys. In general, most programs have an 85% or better score, with members rating the program as "good" or "excellent."



Overall Evaluation of Prepaid Meter Program

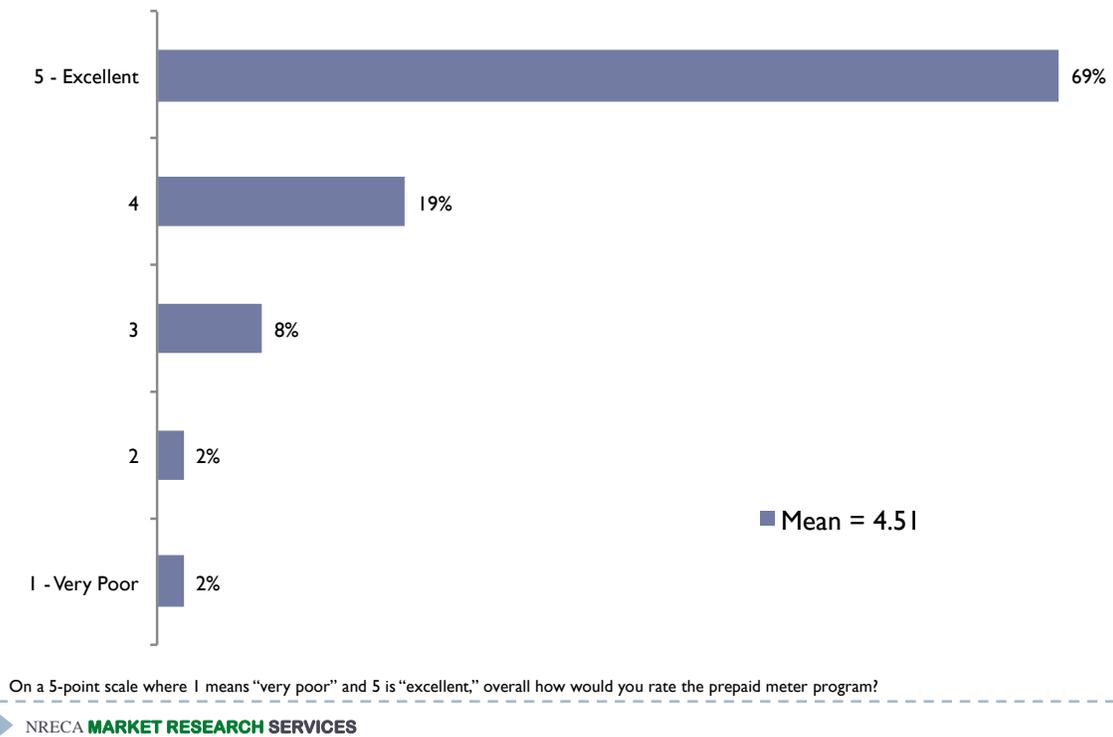


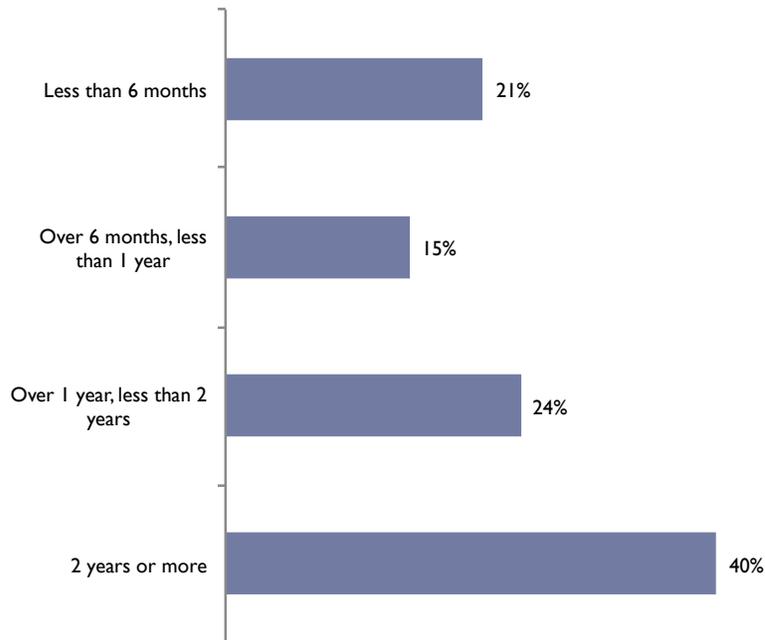
Figure 19. Member Satisfaction with Prepayment Programs

1.19. Length of Participation

Figure 20 shows the length of participation in a prepayment program. The data below are relatively indicative of the cooperatives surveyed and the length of time their programs have been offered. It is not uncommon for members of cooperatives that have been offering prepayment for longer periods of time to have been participants for 5 or 10 years. One of the interesting things to survey in the future would be to ascertain how frequently members move from prepayment back to regular billing.



Length of Participation



For about how long have you been participating in the prepaid meter program?

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Figure 20. Length of Participation in a Prepayment Program

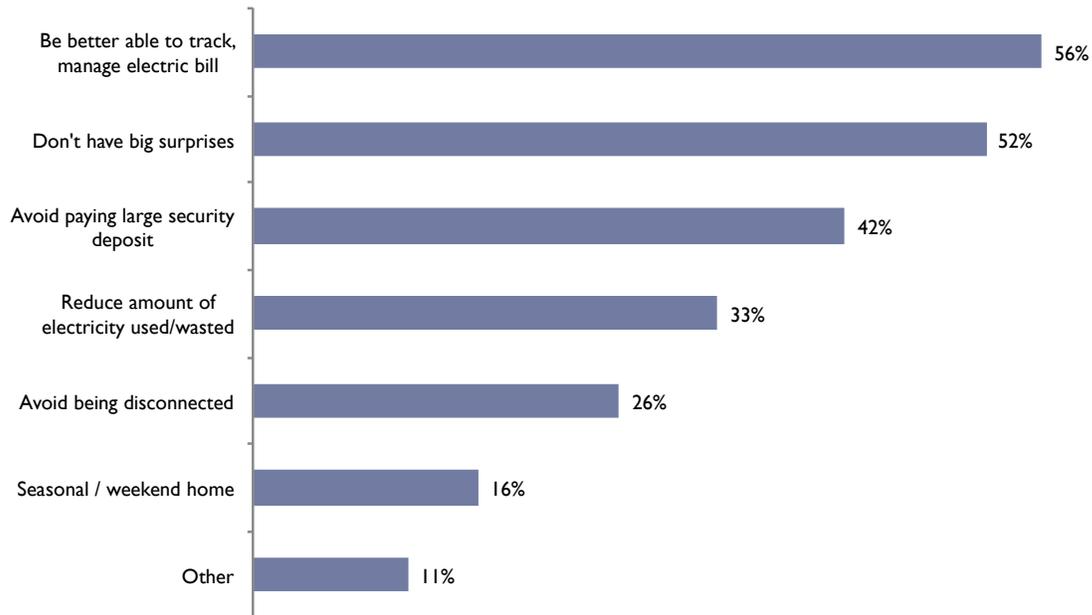
1.20. Reasons for Participation

The reasons for participation shown below in Figure 21 cover a broad spectrum of issues. Two surprises in these data are that “Be better able to track, manage electric bill” was the highest-rated reason and “Seasonal/weekend home” was a significant contributor. In many programs, the ability to avoid a high deposit seems to be the prime motivation.



Reasons Chose to Participate

Multiple Responses Possible



Which of the following were the main reasons why you chose to participate in the prepaid meter program?

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Figure 21. Reasons for Participating in a Prepayment Program

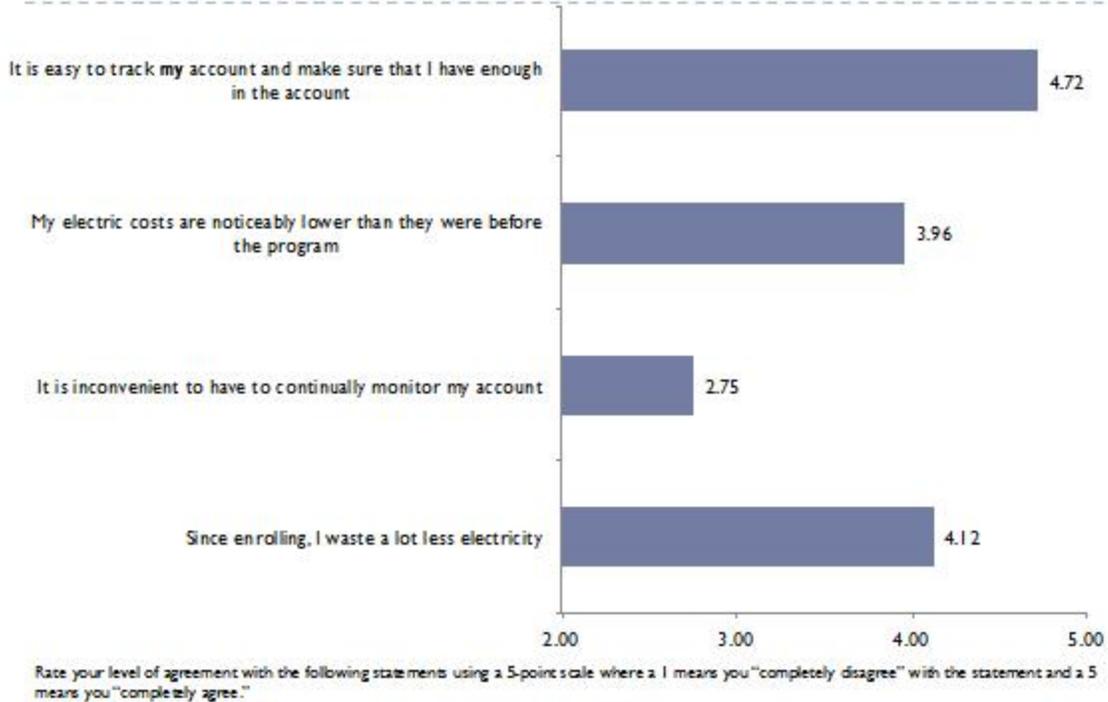
1.21. Experiences with Prepayment

Figure 22 represents ratings of 8 different aspects of the prepayment experience. Six of them have a rating higher than 4 on a 5-point scale. One of the aspects has a rating slightly lower than 4 (3.96). The final aspect has a rating of 2.75. However, the rating for “It is convenient to have to continually monitor my account” may be related to the way the question was phrased.



Experiences with Prepay

Mean Ratings Graphed Based on a 5-Point Scale:
1 = Completely Disagree; 5 = Completely Agree



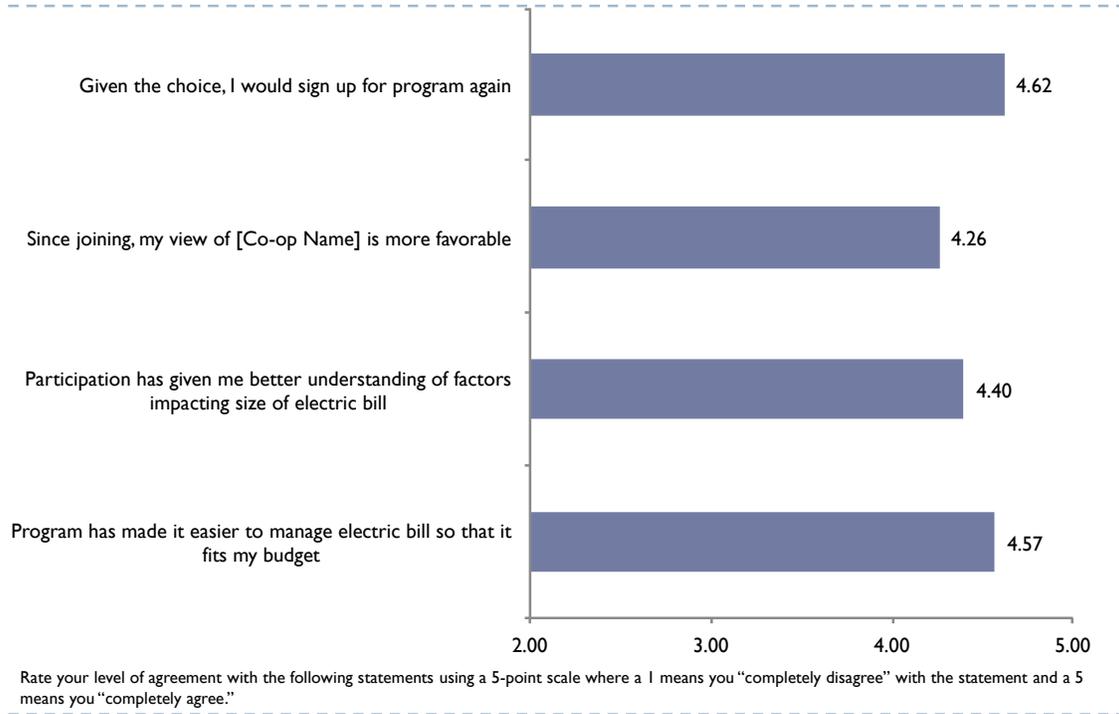
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Figure 22. Experiences with Prepayment Programs



Experiences with Prepay

Mean Ratings Graphed Based on a 5-Point Scale:
1 = Completely Disagree; 5 = Completely Agree



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Figure 22. Experiences with Prepayment Programs (continued)

1.22. Balance Monitoring

Methods used to monitor balances are shown in Figure 23. Although it was reported in the Prepayment Trends section of this report that in-home displays were waning in both need and popularity, the data above show significant usage. This is because one of the cooperatives at which members were surveyed automatically provides an in-home display as part of the service.



Methods Used to Monitor Balance

Multiple Responses Possible

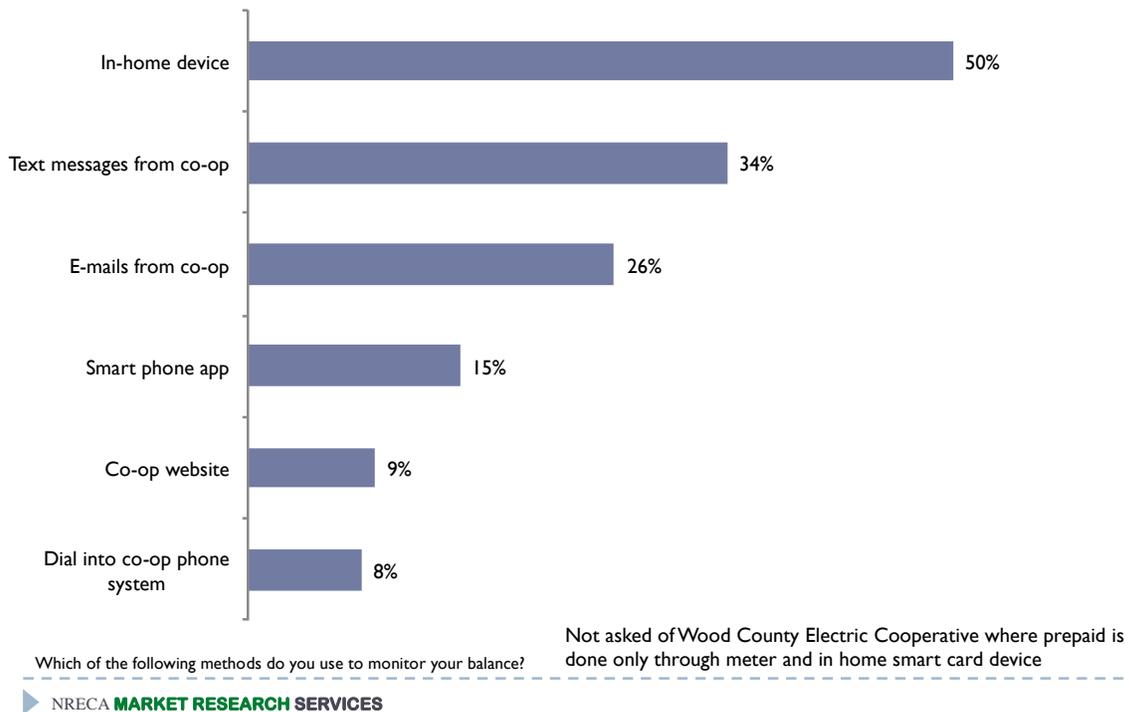


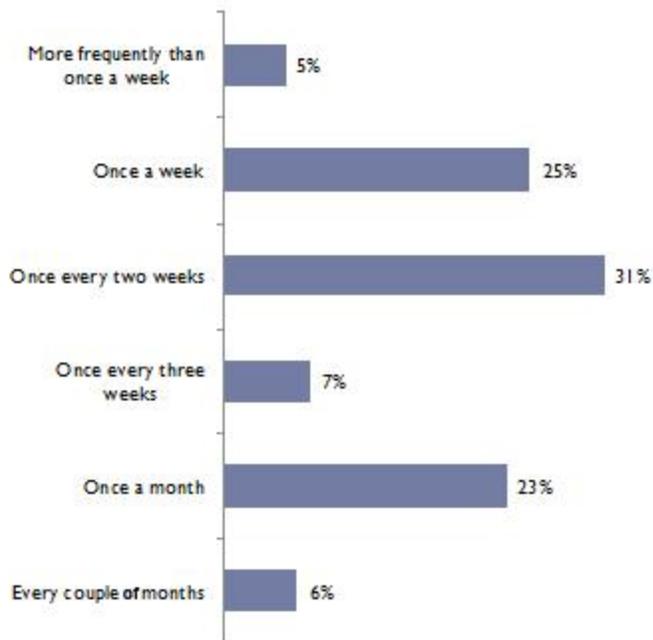
Figure 23. Methods Used to Monitor Balances

1.23. Purchase Frequency

Purchase frequency is an important aspect from both the member and cooperative perspectives. The data shown in Figure 24 regarding how often members put money into their accounts indicate that most (68%) will make purchases more frequently than once per month. This creates a significant change in the number of financial transactions the utility must make. It is important for the utility to ensure that this volume of transactions can be handled. While it is not shown in these data, the typical transaction window for many program participants is Friday afternoon, as that coincides with their getting paid. Thus, being able to handle a large volume of transactions over a relatively short period of time is critical to program success.



How Frequently Put Money in Account



About how often do you put money in your account?

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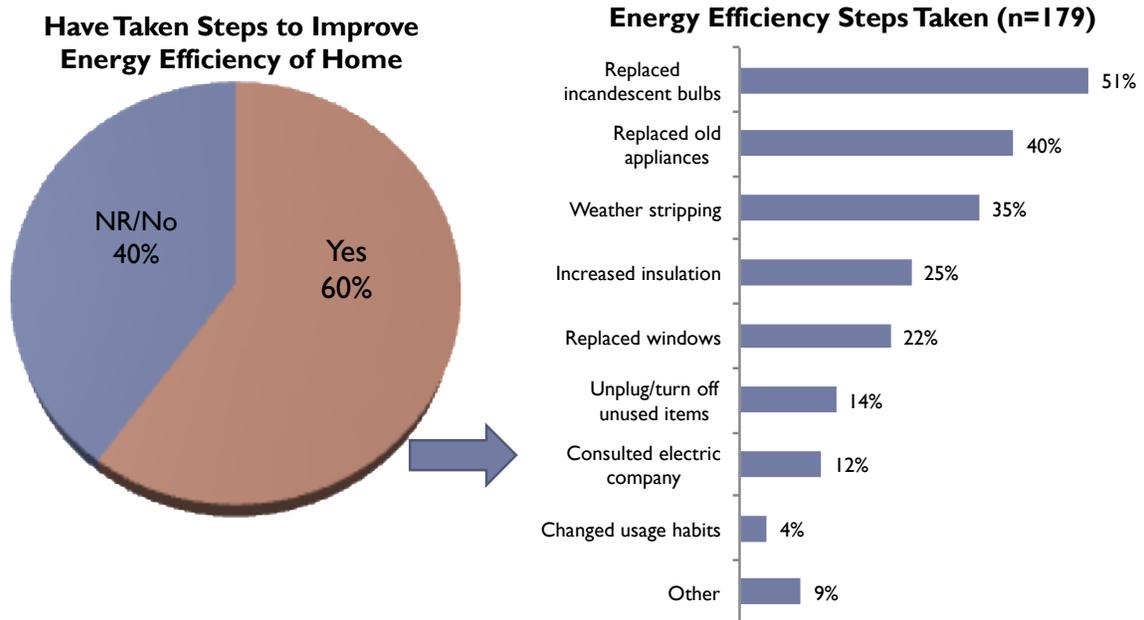
Figure 24. Members' Purchase Frequency

1.24. Energy Efficiency Impacts

Figure 25 shows activities taken by prepayment program participants with respect to energy efficiency. In general, these activities indicate that members whose usage is visible on a more granular basis (at least daily balance updates) do seem to be induced to increase conservation efforts. At the same time, it should be recognized that a significant portion of participants (40%) took no action at all.



Energy Efficiency Steps



Since enrolling in the program, have you taken any steps to improve the energy efficiency of your home? If yes, which of the following steps have you taken?

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Figure 25. Activities Taken by Prepayment Program Participants with Respect to Energy Efficiency

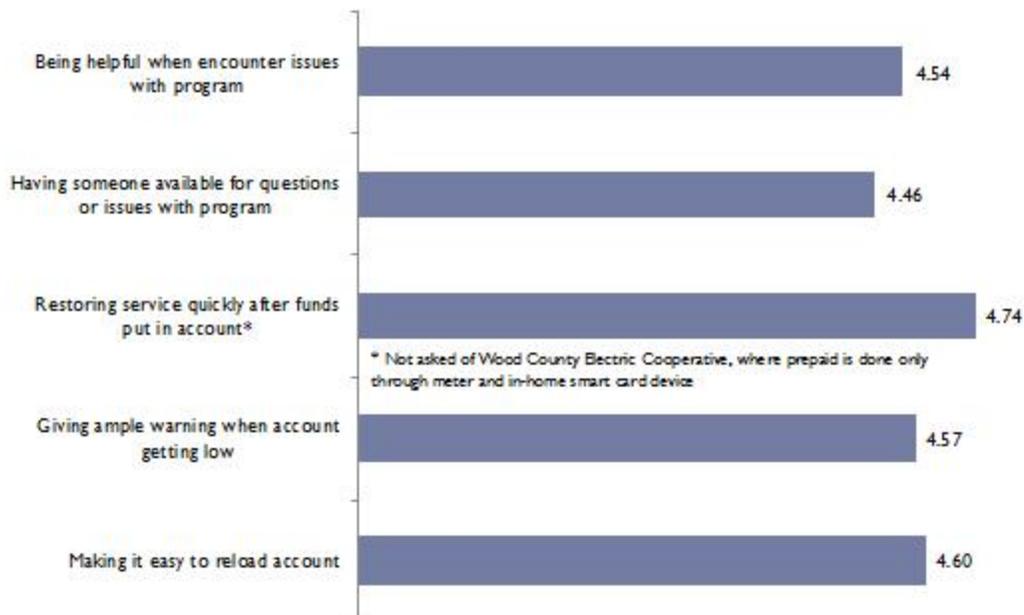
1.25. Program Evaluation

The data in Figure 26 show very high satisfaction with cooperatives' ability to address issues and support members on prepayment. Cooperatives, more so than other types of utilities, are very customer (member) focused. The takeaway from these survey data is that, although prepayment tends to allow members to operate more autonomously, it does not diminish the need or ability of the cooperative to provide excellent customer service.



Evaluation of Aspects of Program

Mean Ratings Graphed Based on a 5-Point Scale: 1 = Very Poor; 5 = Excellent



How would you rate the prepaid meter program for the following? Use a scale from 1 to 5 where 1 is "very poor" and 5 is "excellent."

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Figure 26. Evaluation of Prepayment Programs

1.26. Respondent Demographics

This section provides demographic information on the survey group.

1.26.1. Housing

The type of housing utilized by the survey group is shown in Figure 27. As can be seen, prepayment program participants tend to lean more toward mobile homes and rental locations than single-family homes. Because prepayment typically appeals to those for whom budgets are a concern, these results are not surprising.

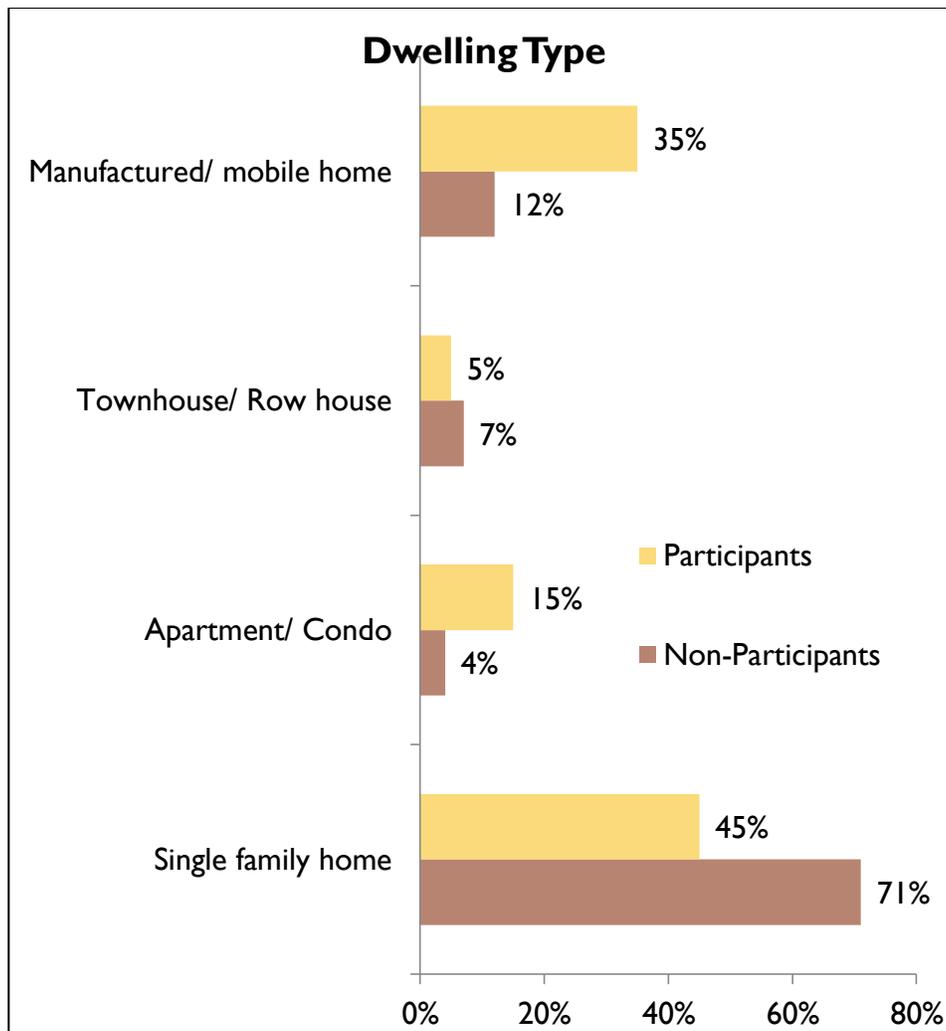


Figure 27. Types of Housing Utilized by the Survey Group

Figure 28 shows the types of housing for which the prepayment account is being used. The biggest surprise in these data is that 7% of those surveyed on prepayment used it for a dwelling that is a secondary or vacation home. The preference for prepayment in this context may be two-fold. The “secondary home” may be one that does not really require continuous power, so having the power disconnected can be a cost savings or even a safety solution. On the other end of the spectrum, some people prefer to make lump-sum payments and utilize the notification methods in the prepayment program to trigger additional purchases rather than receiving a monthly bill.

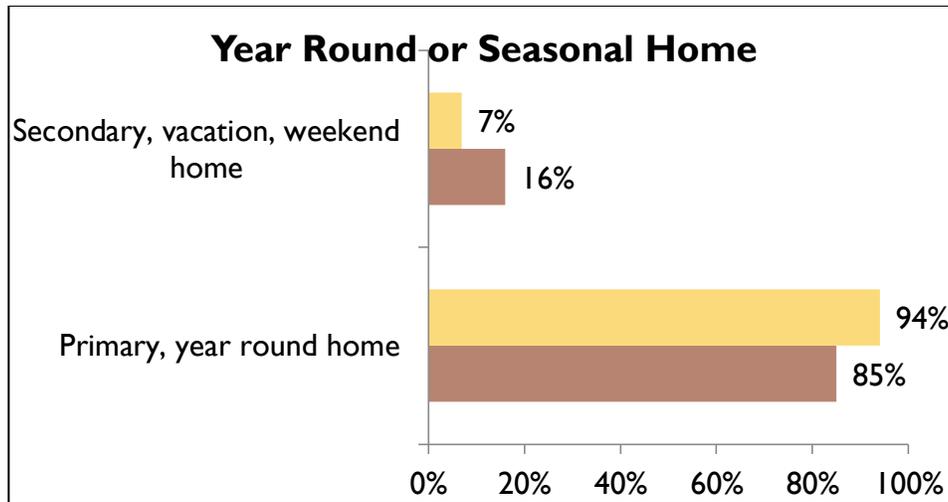


Figure 28. Types of Housing for which the Prepayment Account Is Being Used by the Survey Group

The last aspect of the demographic data is whether the members own or rent their residences, as shown in Figure 29. Although it would be reasonable to expect a large percentage of prepayment participants to be renters, it is still surprising to learn that more than half (54%) own their residences.

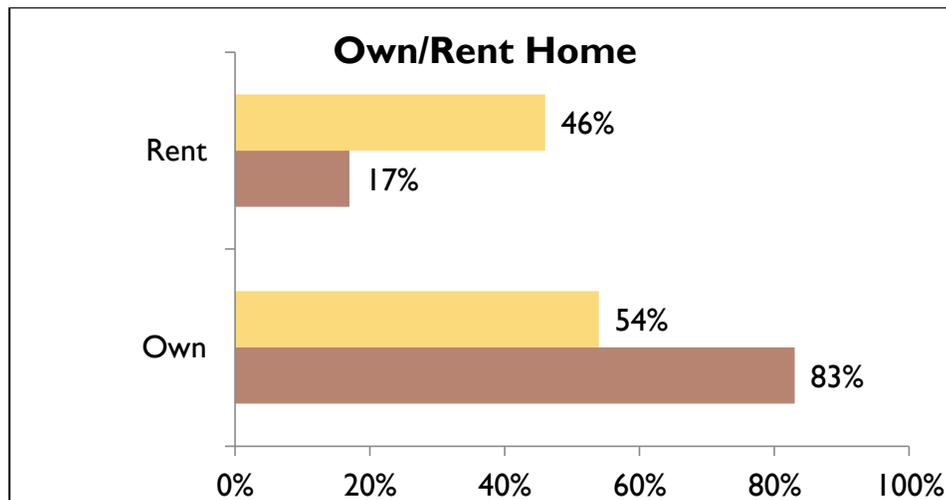


Figure 29. Survey Members' Home Ownership vs. Renting

1.26.2. Member Information

Figure 30 represents the ages of prepayment versus non-prepayment participants in the survey. These data bear out that prepayment typically appeals to younger members. This may be partly that one of the advantages of prepayment is avoiding the deposit. Younger members who are just starting out often are those who typically are subject to these deposits.

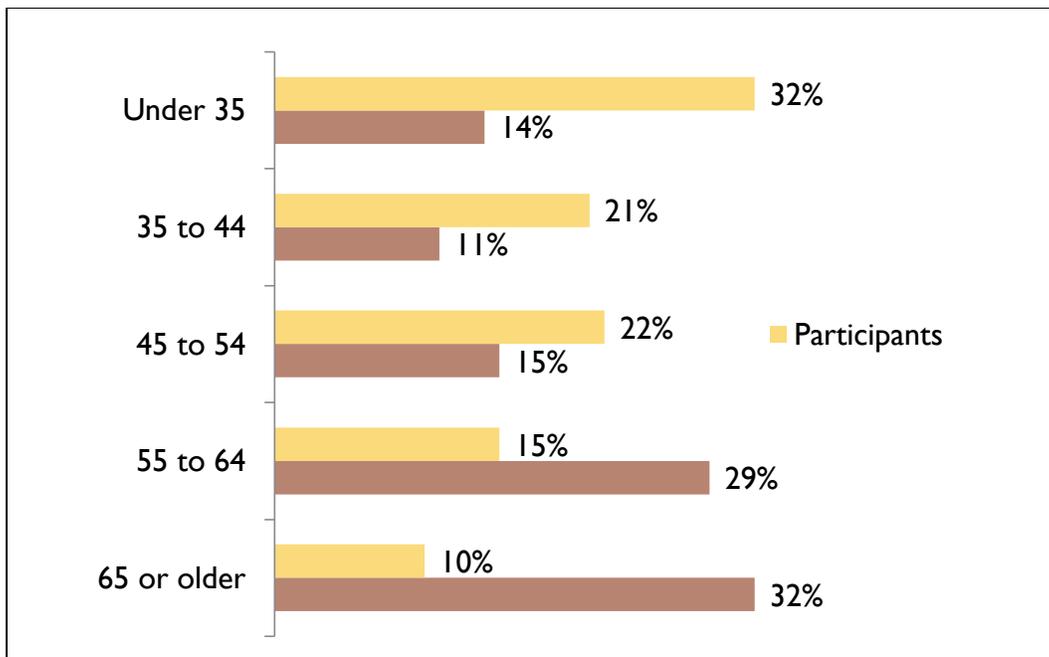


Figure 30. Ages of Participants vs. Non-Participants in Prepayment Programs

Figure 31 shows the employment statistics of the survey group. Most of these data align well with expectations. A slight oddity is that there were no active military personnel on regular bill payment. This could be for a number of reasons. Active members of the military tend to be more transient; for this reason, the utility serving military housing may encourage or provide incentives for choosing prepayment.

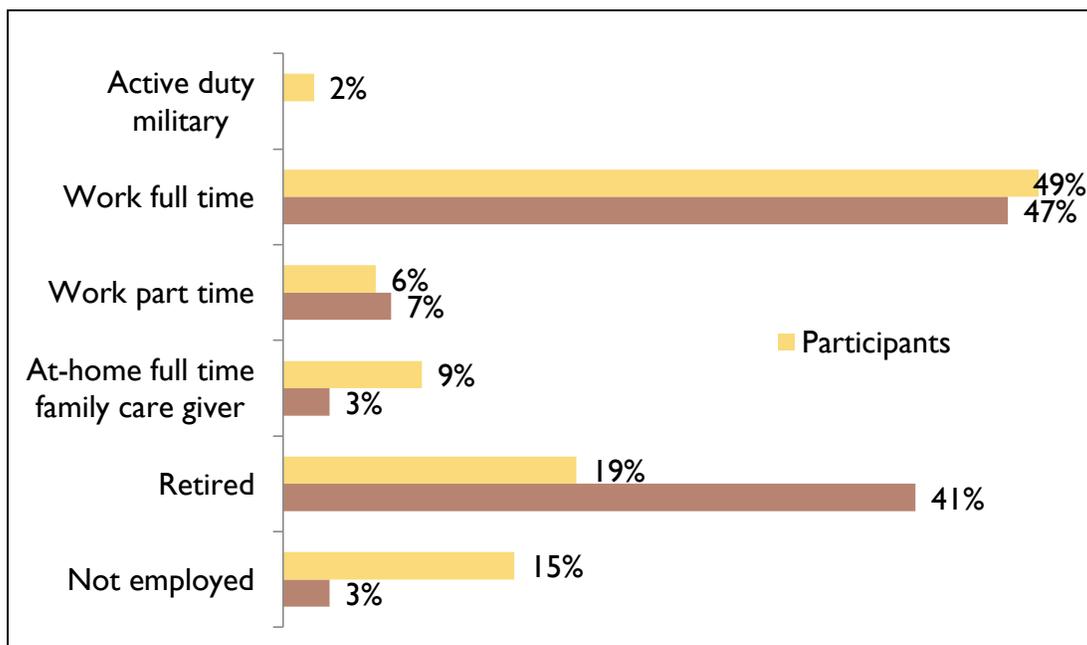


Figure 31. Employment Statistics for the Survey Group Members



The last aspect of member demographics has to do with household income, as shown in Figure 32. These data fall in line with expectations. Lower-income households tend to choose prepayment more often than higher-income households. However, it should be noted that some higher-income households also choose prepayment.

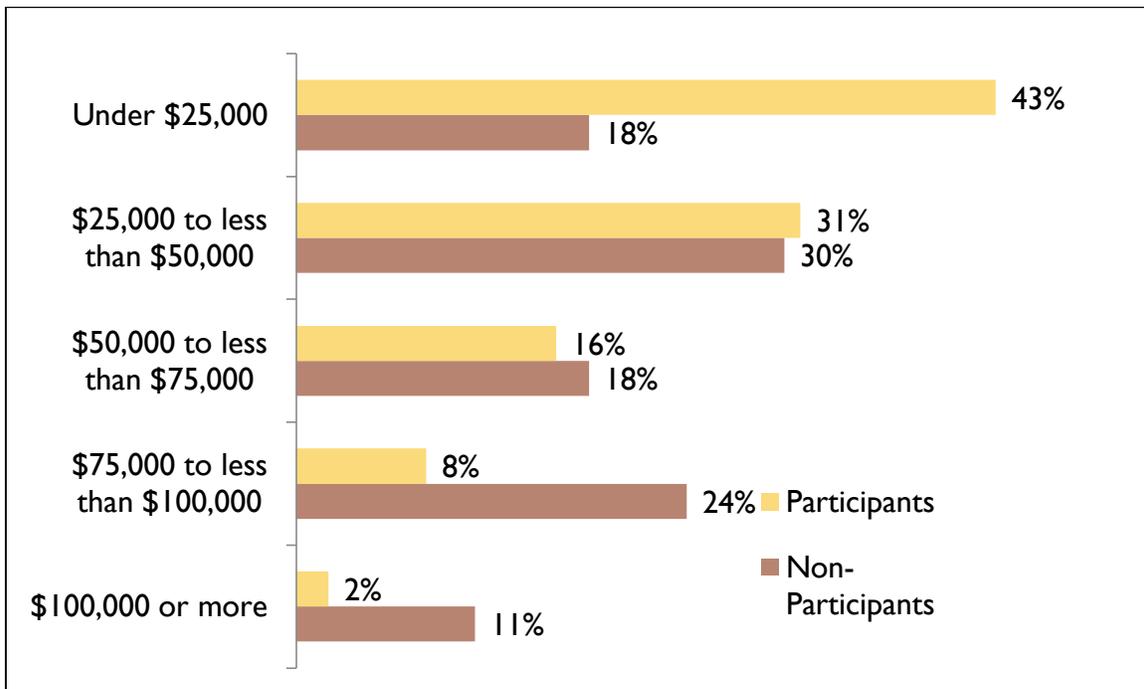


Figure 32. Income of Survey Group Members

Elected Outages

One concern of regulatory or other advocacy groups regarding prepayment is that members will be disconnected and not able to be reconnected in a reasonable timeframe. Figure 33 shows the number of times that the survey group has been disconnected.

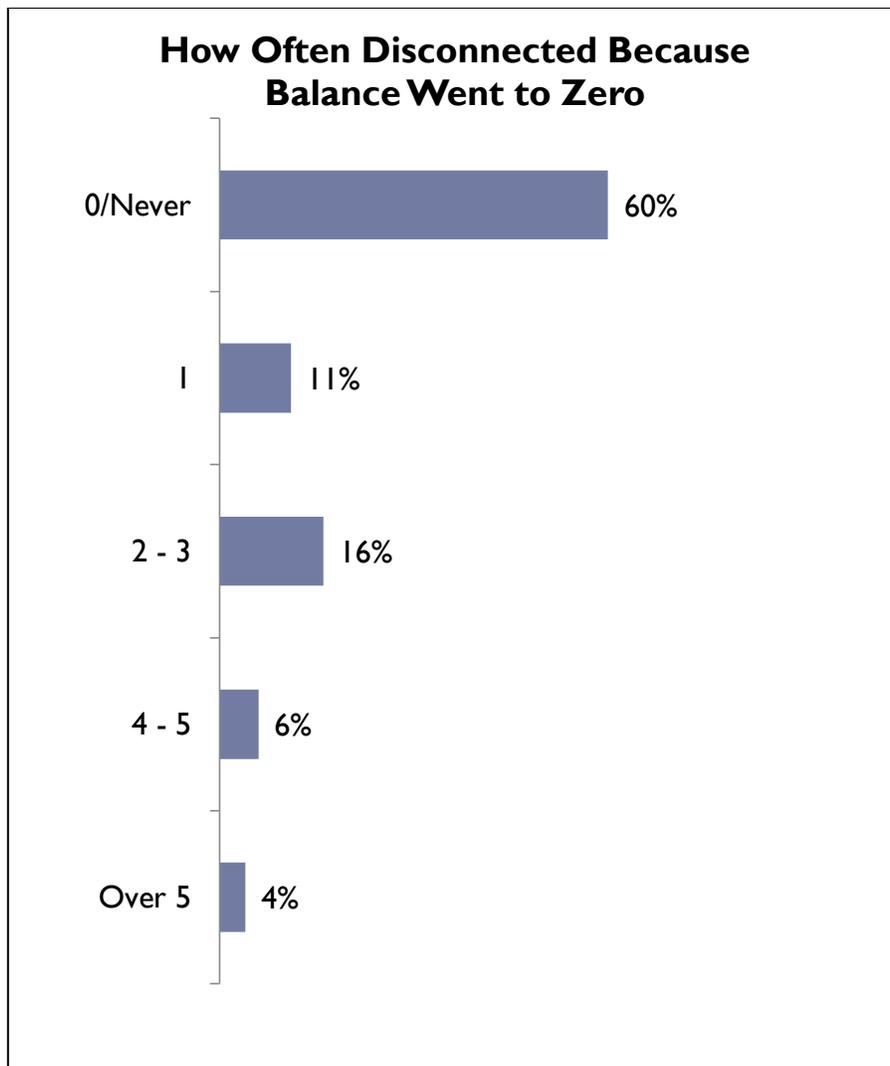


Figure 33. Number of Times Survey Group Members Were Disconnected

These data support the premise that having the convenience of being able to make purchases on members' schedules rather than receiving monthly bills is enough to help them avoid difficult payment situations. Well more than half of the members surveyed (60%) have never been disconnected. At the same time, less than 4% appear to have experienced recurring disconnections. This in and of itself should not necessarily be considered as a problem, as some members use the disconnect as the "final notification" that a purchase needs to be made. Since most programs do not have a reconnection fee (some prepayment programs still do have one), there is no real penalty, other than inconvenience, for a disconnection.



Summary

As with any exercise involving surveys, there are likely various aspects of the overall question list suggesting that additional questions might have been advisable, or that possibly a question may have been misunderstood. However, the overall results of these surveys and the general state of the market suggest the following:

- Prepayment has become a desirable and effective service to offer to co-ops' membership.
- Vendors have responded to the need by developing repayment solutions.
- The overhead for offering prepayment has been greatly diminished through the utilization of AMI.
- Member satisfaction is very high, regardless of the various nuances of the prepayment program offering.
- The only cooperatives that have no motivation for offering prepayment are those that:
 - Have a low incidence of unrecoverable debt
 - Do not charge a deposit
 - Have not yet implemented AMI
 - Are restricted from offering prepayment due to regulatory rules

It has taken approximately 25 years for prepayment to go from a curiosity to a recognized and beneficial program. In that time, advances in technology and utility systems have addressed the negatives of a prepayment solution, so the business case has become much easier to prove.