



Market Progress Evaluation Report
Drive Power Initiative, No. 3

prepared by
Pacific Energy Associates, Inc.

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DRIVE POWER INITIATIVE

MARKET PROGRESS EVALUATION REPORT #3 Final Report

Funded By:



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Table of Contents

Executive Summary.....	I
A. Introduction.....	I
B. Initiative Progress to Date.....	III
C. Key Recommendations	IV
I. Introduction.....	1
II. Initiative Progress.....	5
A. One-on-One Customer Motor Management Services.....	5
Number, Types, and Geographic Distribution of Customers Contacted ..	6
End-User “Success Stories”	6
Customer Targeting and Planning.....	8
B. Summary of Second Round Participant Interview Results.....	10
C. Work with Motor Service Centers	10
Summary of Motor Service Center Interview Results	12
D. Motor Management Seminars	13
Summary of Seminar Assessment.....	15
E. Motor Management Tool Kit	16
F. Overview of Progress to Date	17
III. Participant and Seminar Attendee Interview Results..	25
A. Introduction.....	25
B. Methodology and Approach.....	26
Population and Sample.....	26
Disposition of Interviews by Sector and State	28
C. Detailed Findings of Phone Interviews	29
Changes Made to Motor Management Practices	29
Purchase of Premium Motors and/or Establishment of Premium Purchase Policy	31
Current Motor Management Practices	34
Barriers to Change	40
Assessment of Assistance Received	43
Suggestions for Additional Assistance, Especially on Motor Systems ..	46

Table of Contents

IV. Motor Service Center Interview Results	49
A. Introduction.....	49
B. Methodology and Approach.....	50
C. Detailed Findings	50
Size of Motor Service Centers	50
Services Offered.....	52
Customer Demand for Quality Repairs.....	56
Customer Assistance With Repair/Replace Decisions	58
Recent Industry Changes.....	59
Marketing of Motor-Related Services.....	60
Interest in Offering Expanded Motor-Related Services.....	60
Program Awareness	62
V. Drive Power Cost Effectivity Update.....	65
A. Cost-Effectiveness Assumptions	65
B. Recommendations for Changes to Assumptions	66
C. Energy Conservation Measures.....	68
D. Energy Savings.....	69
E. Non-Energy Benefits.....	70
F. Cost-effectiveness Recommendations	70
Coordination.....	70
Alignment of Cost-effectiveness Analysis.....	71
Market Effects Data Collection	71
VI. Findings and Recommendations	75
A. Targeting and Planning	75
B. Customer Motor Management Practices.....	76
C. Momentum and Exit Strategy	78
D. Repair Shop Strategy	79
E. Motor Management Seminars.....	81
F. Toolkit.....	83
G. Cost-effectiveness Analysis	84

Executive Summary

A. Introduction

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit group of electric utilities, state governments, public interest groups, and industry representatives committed to bringing affordable, energy-efficient products and services to the marketplace. The *Drive Power Initiative* (the Initiative) is a market transformation venture funded by the Alliance and administered by the Electric League of the Pacific Northwest (the League). The League began work on the Initiative in January 1999, and their renewed contract is to continue through December 31, 2003. Pacific Energy Associates, Inc. (PEA) is the evaluation contractor for the Initiative.

This report comprises the third Market Progress Evaluation Report (MPER) on the Northwest Energy Efficiency Alliance's *Drive Power Initiative*. This report covers the six-month period of August 2000 through January 2001. The first two MPEs covered the nine-month period between January 1999 and September 2000, and the ten-month period between October 2000 and July 2000, respectively. The purpose of the Market Progress Evaluation Reports is to track changes in the regional motor services market that may demonstrate market transformation over the course of the Initiative. The reports also provide "adaptive management" feedback to help the Initiative in making mid-course modifications.

The Initiative's primary objective has been to influence customers' decisions regarding what to do when an existing motor fails. The Initiative also seeks to influence the practices of motor service shops to support customer requests for improved repairs and other services. In its First Contract Phase, through December 2000, the Initiative offered two main services: 1) a broad customer education program including a newsletter, *Motor Management Tool Kit*, and customer seminars; and 2) tailored one-on-one customer technical support to address specific motor management issues and improve practices.

To leverage their work with individual customers (as well as repair shops), the Initiative has been publicizing "success stories" – resulting from the one-on-one assistance – to influence the practices of other customers within and across industries.

Executive Summary

The Initiative's objectives as described in the League's first statement of work for activities through December 2000 were as follows:

- Increase the operating efficiency of in-service electric motors by assisting customers with comprehensive motor management;¹
- Increase the number of motors that are replaced with new efficient models, instead of being reconditioned, by helping customers with repair/replace decision-making;
- Increase quality reconditioning by educating customers, providing repair guidelines, and working to assure an adequate supply of qualified repair shops; and
- Support the national use of the Consortium for Energy Efficiency (CEE) standard for premium motors.

This third MPER builds on the first two. Its purposes are to:

- Provide an overview of the Initiative's progress through January 2001, in relation to the "early" indicators described by PEA in its workplan: 1) delivery of Initiative services to customers and motor services businesses; 2) the positive opinion of participating customers and vendors about the services; and 3) awareness among customers and motor service businesses of premium efficiency motors, quality rewinds, and improved management practices.²
- Provide an overview of the Initiative's progress through January 2001, in relation to the first two key "progressive" indicators described by PEA in its workplan: 1) customers report changes in motor management practices and attribute them to the Initiative; and 2) motor service centers report a change in customers' demand for quality repairs.

¹ Motor management practices include, but are not limited to: inventory of fleet motor age, efficiency, and rewind history; implementation of repair/replace policies; active use of high-quality repair specifications; predictive/preventive maintenance practices; and stocking guidelines for on-site replacement.

² Progress on this third indicator is based only on program participants for the first three MPERs. Potential increases in nonparticipant awareness will be assessed in later reports.

- Describe findings and recommendations regarding “adaptive management” issues related to Initiative strategy, focus, and activities.

To complete MPER #3, PEA conducted the following activities:

- A second round of interviews with sixteen customers who have worked one-on-one with the Initiative’s field consultants (referred to in this document as “participants”).
- Interviews with nineteen motor seminar attendees and observation of a third motor management seminar in Portland, Oregon.
- Telephone and in-person interviews with 24 motor service centers.
- A detailed review of end-user trip reports from visits conducted since June 2000.
- Further review of the tool kit materials with a focus on tools to help in the repair/replace decision.
- A review of the League’s new workplan for 2001.

B. Initiative Progress to Date

As in the previous MPER, it is important to provide some context before describing the Initiative’s progress. Change in motor management practices, both for individual customers and for the market as a whole, is inherently incremental and slow. Substantial and sustainable change at medium and large industrial plants may take two years or more. Change at the broader market level is likely to take much longer.

The two previous MPERs found that the program has been progressing (albeit more slowly than anticipated) towards one of its most critical goals: developing a series of “success stories” which will provide a fulcrum for more broad market changes. While PEA has suggestions for further focusing and targeting marketing and presentations, *Drive Power* services are being well received by customers and are resulting in their making changes to their motor management practices.

The following is a brief distillation of key findings and recommendations for this third MPER. These are then detailed in *Table ES-1*. Note that the table also includes, where applicable, goals and objectives for 2001, as described in the League's new workplan.³

Through January 2001, the Initiative field consultants have contacted 77 end-users and 26 repair shops across the Pacific Northwest. Four end-users' "success stories" have been completed. Nineteen motor management seminars and other types of events have been held. Overall, the Initiative appears to be influencing customers' motor management practices, and customers are positive about the services:

- > Among the 35 end-users interviewed for this report,⁴ about 58% had made, or were planning to make changes to their motor management practices, and attributed their decision to the Initiative.
- > The reported changes included: changes/upgrades to repair/replace decision-making; creating a motors inventory; establishing a premium purchase policy or changing purchase practices; and developing/using a repair specification.
- > Respondents rated the assistance they received highly, whether one-on-one or in the seminars.

C. Key Recommendations

Interviews with customers and repair shops, as well as other data, indicate potential for improvement in the following areas:

- > The field consultants should create and periodically update (e.g., quarterly) more specific action plans for "closing the sale" on customer actions that will produce substantial savings with large end-users (250 motors or more, or at least 20 motors over 50 HP).

³ Northwest Energy Efficiency Alliance, *Drive Power Initiative II, 2001 Workplan*. Prepared by Kevin Madison, Project Manager, Electric League of the Pacific Northwest. March 13, 2001.

⁴ A combination of end-users working one-on-one with the field consultants, and end-users who attended the seminars.

Executive Summary

Increased savings should be more feasible now that preliminary projects have established relationships with some customers.

- > The four success stories developed so far show progress and are well presented. However, to be most effective as a key marketing tool for motivating other customers, the stories need to show more dramatic bottom-line energy and costs savings. An exception is the Kaiser story, although this plant is now closed, as is another success story plant (see *Table 1* in report for story descriptions). While the *Drive Power* team could not have predicted the closures, it limits the appeal of the case studies and precludes follow-up work for more substantial savings.
- > Only 20% of end-users interviewed for this report say they are using operational costs in their repair/replace decisions. The Initiative needs to address the issue of operational cost more effectively and aggressively through its one-on-one customer work, seminars, and the tool kit, as we believe this is a critical strategic market lever.
- > About half of customers with inventories do not appear to use them for repair/replace decision-making, and many simply use them to track spares. Field consultants and seminar trainers may need to clarify the definition of inventory and provide more information on how to use the inventory for energy and productivity benefit.
- > Repair shops are helping customers make repair/replace decisions, and customers report relying on shops for this help, but none of the shops interviewed said they consider operational costs. Shops need to be persuaded to do this and be provided with tools and information; and/or, customers need to make the “first-stage” repair/replace decision themselves, using operational costs as a key criterion. We recommend pursuing both approaches in hopes of creating a synergistic effect.
- > The League plans to work more deliberately with repair shops on business planning, which will help create a market structure. This is a valuable goal. The League should take care to assure that this assistance is responsive to the needs of highly diverse motor services businesses. Many motor shops survive by finding niche groups of customers and serving their needs through unique

Executive Summary

marketing and services. It remains to be seen whether there are any generic business models for success.

- > As the League moves forward with its plan to more widely broadcast a message of “quality” repair, it needs to make sure quality is clearly defined in marketing materials, particularly regarding motor efficiency.
- > The League should keep abreast with, and disseminate information from, other regional and national programs and initiatives on motor efficiency. These include the NEMA *Premium Motor* designation and CEE’s *Motor Decisions Matter*.
- > The cost-effectiveness analysis for the *Drive Power Initiative* does not closely reflect the activities, the market changes, and the approach of the Initiative. The alignment between the analysis and Initiative should be improved, along with coordination between the Initiative and the analysis, and Initiative documentation could help assess energy and non-energy impacts.

Table ES - 1: Early Indicators of Motor Services Market Change

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
<i>EARLY INDICATOR 1: LEAGUE'S PROGRESS COMPARED TO GOALS IN DELIVERY OF INITIATIVE SERVICES</i>				
UTILITY CONTACTS	Inform utilities, work to identify customer leads, plan motor seminars.	Field consultants (FCs) have met in-person with over 60 utilities throughout the region. Ten utilities have sponsored seminars.	No specific goals set.	For future Alliance efforts, focus on utilities with the greatest potential to provide definite customer leads that meet size and other criteria.
TOOL KIT	Create <i>Motor Management Tool Kit</i> for use by end-users and field consultants.	The first version of the Tool Kit was complete in July 2000. Completion in April 2000 of repair spec was a critical addition. New simplified motor management software has been developed by the League and is still evolving.	In 2001 League plans to: <ul style="list-style-type: none"> • Add material from CEE's <i>Motor Decisions Matter</i> campaign⁵ and DOE OIT's⁶ <i>Best Practices</i> (pulp and paper). • Remove products that are out of date or do not meet program-marketing objectives. 	Create two new tools, flag them, and provide concrete instruction on how to use them: <ul style="list-style-type: none"> • A simple table showing operational costs • A flowchart-type tool to create repair/replace guidelines that include operational costs
<i>Continued</i>				

⁵ CEE's campaign strategy is to develop a high-level business message that translates the benefits of motor management into terms that senior plant and corporate management will find compelling, and direct these managers to local motor management resources and programs such as *Drive Power*.

⁶ Department of Energy Office of Industrial Technologies.

Executive Summary

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
“SUCCESS STORIES”	Original goal: 25 by end of contract period. Goal reduced to 15.	Four success stories have been completed.	In 2001, the League plans to: <ul style="list-style-type: none"> • Complete 10 more success stories (in addition to the 4 completed so far). Six will be from customers previously contacted, and 4 from new customer contacts. • Develop plan for marketing the success stories. 	The stories developed so far show progress and are well presented. However, to be most effective as a key marketing tool for motivating other customers, the stories need to show more dramatic bottom-line energy and costs savings. An exception is the Kaiser story.
MOTOR MANAGEMENT SEMINARS	No specific goals set.	Nineteen seminars and forums held, with 331 attendees representing 58 manufacturing companies, 46 other end-user types (wastewater, irrigators, hospitals, office buildings, etc.), and 27 repair shops.	In 2001, the League plans to: <ul style="list-style-type: none"> • Offer three seminars aimed at all customer sizes. • Work with the sponsoring motor service center to develop their capabilities to provide follow-up resources to attendees. 	<ul style="list-style-type: none"> • Focus on “selling the idea,” especially regarding operational costs. Use best success stories as illustrations. • Reduce technically-oriented information. • Incorporate hands-on exercises. • Provide coaching to trainers on effective presentations. • Use participant pool more deliberately to market one-on-one services.

Continued



Executive Summary

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
SERVICE SHOP CONTACTS	No specific goals set.	Twenty-six shops contacted. Type and depth of services provided has varied.	In 2001, the League plans to: <ul style="list-style-type: none"> • Develop two business models to help motor service centers expand their services. • Recruit one large sophisticated shop and one medium shop; develop and publicize success stories. • Widely publicize consistent message about the importance of quality repair. 	<ul style="list-style-type: none"> • Assistance to motor service centers needs to be flexible to respond to market diversity. • Develop business models through close work with a specific shop (or shops) so they are not abstract. • In marketing materials, define “quality,” especially vis-à-vis maintaining energy efficiency. • Encourage the use of operating costs in motor repair/replace recommendations, and provide the tools and information to do so.
EARLY INDICATOR 2: OPINION OF PARTICIPATING CUSTOMERS ABOUT THE SERVICES				
PARTICIPATING CUSTOMERS’ OPINION OF SERVICES	Goal is for participating customers to have positive opinion of initiative services.	A great majority of participants had a high opinion of field consultants. Tool kit materials did not stand out in customers’ minds. Four customers who declined the survey had no recollection of their field consultant.	N/A	<ul style="list-style-type: none"> • Strengthen tool kit per recommendations above. • Be selective in what materials are left with customers. • Lack of recollection of field consultant visits should be explored by League project manager.
<i>Continued</i>				



Executive Summary

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
SEMINAR PARTICIPANTS' OPINION OF SERVICES	Goal is for seminar participants to have positive opinion of Initiative services.	Of the 19 attendees surveyed, all but three gave a rating of 4 or 5 (1 to 5 rating of seminar's effectiveness in giving them tools and knowledge to improve practices). Attendees are making changes (see below).	N/A	Key attendee suggestions: <ul style="list-style-type: none"> • Longer seminar. • More on analysis of operating costs. • More on "real world" performance and sizing of premium motors.
EARLY INDICATOR 3: INCREASE IN AWARENESS AMONG CUSTOMERS AND VENDORS OF PREMIUM EFFICIENCY MOTORS, QUALITY REWINDS AND MANAGEMENT PRACTICES				
CUSTOMER AWARENESS	Goal is increased awareness from "baseline" due to Initiative.	Not surprisingly, awareness has increased among customers with direct program contact. However: <ul style="list-style-type: none"> • Few are using operational costs in repair/replace decisions. • Half of the end-users said they do not use their inventories as a tool in repair/replace decisions. 	N/A	<ul style="list-style-type: none"> • Incorporate hands-on exercises on operational costs into the seminars. • Add an <i>operational cost table</i> and a <i>decision flow chart</i> to tool kit; assist customers in using them to formulate guidelines. • Do more hands-on work with customers on: 1) How/why to create a "strategic" inventory that focuses on critical motors; 2) How to use an inventory to make better decisions.
<i>Continued</i>				



Executive Summary

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
<p>MOTOR SERVICE CENTER (MSC) AWARENESS</p>	<p>Goal is increased awareness from “baseline” due to initiative.</p>	<p>Only twelve of the 24 MSCs interviewed recalled receiving the repair spec. Most MSCs indicate awareness of quality rewinds, but awareness not clearly attributable to the Initiative. Definition of “quality” varies.</p> <p>There is a marked “split” in the market between more and less sophisticated MSCs.</p> <p>All MSCs say they help customers with repair/replace decisions but none use operating costs.</p>	<p>N/A</p>	<ul style="list-style-type: none"> • Make sure MSCs receive the spec and point out the value of it as a customer education tool. • Specifically define “quality reconditioning” in marketing efforts, particularly regarding motor efficiency. • Develop strategy for overcoming the “split” in the market. • Work with MSCs on why and how to use operational costs as a criterion, and/or have customers make the “first-stage” repair/replace decision themselves, considering operational costs. Provide both with tools and information.



Table ES - 2: Progressive Indicators of Motor Services Market Change

GOAL	PROGRESSIVE INDICATOR	PROGRESS THROUGH JANUARY 2001	EVALUATION TEAM RECOMMENDATIONS
PROGRESSIVE INDICATOR 1: CUSTOMERS REPORT CHANGES IN MOTOR MANAGEMENT PRACTICES AND ATTRIBUTE THOSE TO THE INITIATIVE			
SUMMARY OF MOTOR MANAGEMENT PRACTICE CHANGES	Customers make substantive changes to their motor management practices and attribute them to the Initiative.	Overall, the Initiative has made significant progress in influencing end-users' practices: 58% of interview respondents ⁷ are making changes and attributing them to the Initiative.	Interview findings indicate customers could be making more in-depth and concrete changes in the area of repair/replace decision-making (<i>see below</i>).
SET UP AND USE OF MOTOR INVENTORIES	Customers set up inventories and use them to make better repair/replace decisions.	58% of interview respondents said they have set up, or are setting up, inventories, although only half of those say they are using them to make repair/replace decisions.	<ul style="list-style-type: none"> • Clarify with end-users how the Initiative is defining the content and function of inventories. • Provide more customer training on how to use inventories most effectively for energy and productivity benefit.
ESTABLISH OR IMPROVE REPAIR/REPLACE GUIDELINES	Customers establish repair/replace guidelines based on the operational cost of alternatives.	Generally respondents are not setting up "guidelines" per se, but 40% said they are making changes to their decision-making. However, only 20% say they are using operational costs as a decision criterion.	<ul style="list-style-type: none"> • Put more emphasis on developing repair/replace practice based on operational costs and other key criteria. See suggestions for toolkit improvements, above.
<i>Continued</i>			

⁷ Combination of interviews with customers doing one-on-one work with field consultants, and customers who have attended the seminars.

Executive Summary

GOAL	PROGRESSIVE INDICATOR	PROGRESS THROUGH JANUARY 2001	EVALUATION TEAM RECOMMENDATIONS
ESTABLISH OR IMPROVE PREMIUM PURCHASE GUIDELINES	Customers establish premium purchase guidelines based on the operational cost of alternatives.	Twenty-six percent of respondents say they are increasing their purchase of premium motors or changing their purchase specifications.	<ul style="list-style-type: none"> As discussed above, make sure operational costs are part of the decision.
USE OF REPAIR SPEC	Customers adopt the program's or another repair specification, or make changes/improvements to an existing specification.	<p>Fourteen percent of respondents reported this practice change. Another 6% reported visiting or working with their motor service center.</p> <p>Regarding the program specification:</p> <ul style="list-style-type: none"> Forty-six percent remembered receiving the repair spec and had reviewed it. Of those, 23% planned to have their shop use it (note that there may be overlap between this group and the group that reported making a change). 	<ul style="list-style-type: none"> Customer recall and review of the repair specification could be higher. Make sure it is distributed and discussed. A piece on what to look for in a repair shop might be a good addition to the tool kit.
<i>PROGRESSIVE INDICATOR 2: MOTOR SERVICE CENTERS REPORT CHANGE IN CUSTOMERS' DEMAND FOR QUALITY REPAIRS</i>			
CUSTOMER DEMAND FOR QUALITY REPAIRS PER MOTOR SERVICE CENTERS	Motor service centers report change in customers' demand for quality repairs.	Results of motor service center interviews ambivalent. 58% said customer demand for quality has increased, but at same time, 63% say customers "rarely" or "never" ask about repair quality; 28% say customers sometimes do; 8% said they often or always do.	<ul style="list-style-type: none"> Continue to create customer "push" through education and one-on-one work.



Executive Summary



I. Introduction

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit group of electric utilities, state governments, public interest groups, and industry representatives committed to bringing affordable, energy-efficient products and services to the marketplace. The *Drive Power Initiative* (the Initiative) is a market transformation venture funded by the Alliance and administered by the Electric League of the Pacific Northwest (the League). The League began work on the Initiative in January 1999, and their renewed contract is to continue through December 31, 2003. Pacific Energy Associates, Inc. (PEA) is the evaluation contractor for the Initiative.

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The Initiative's objectives, as described in the League's first statement of work for activities through December 2000 were as follows:

I. Introduction

- Increase the operating efficiency of in-service electric motors by assisting customers with comprehensive motor management;⁸
- Increase the number of motors that are replaced with new efficient motors, instead of being reconditioned, by helping customers with repair/replace decision-making;
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I. Introduction

- Describe findings and recommendations regarding “adaptive management” issues related to Initiative strategy, focus, and activities.

To complete MPER #3, PEA conducted the following activities:

- A second round of interviews with sixteen customers who have worked one-on-one with the Initiative’s field consultants (referred to in this document as “participants”).
- Interviews with nineteen motor seminar attendees and observation of a third motor management seminar in Portland, Oregon.
- Telephone and in-person interviews with 24 motor service centers.
- A detailed review of end-user trip reports from visits conducted since June 2000.
- Further review of the tool kit materials, with a focus on tools to help in the repair/replace decision.
- A review of the League’s new workplan for 2001.

I. Introduction

II. Initiative Progress

As in the previous MPER, it is important to provide some context before describing the Initiative's progress. Change in motor management practices, both for individual customers and for the market as a whole, is inherently incremental and slow. Substantial and sustainable change at medium and large industrial plants may take two years or more. Change at the broader market level is likely to take much longer.

The two previous MPERs found that the program has been progressing (albeit more slowly than anticipated) towards one of its most critical goals: developing a series of "success stories" which will provide a fulcrum for broader market changes. While PEA has suggestions for further focusing and targeting marketing and presentations, *Drive Power* services are being well received by customers and are resulting in customers making changes to their motor-management practices.

Overall, based on observations made during site visits and on the review of trip reports, the evaluation team has found the field consultants knowledgeable and very capable. Their entrepreneurial spirit and willingness to be "self-starters" are great assets to the Initiative. Their credibility and knowledge were rated very positively in the customer surveys, as described in the section on participant survey results.

A. One-on-One Customer Motor Management Services

A primary approach of the Initiative is to have field consultants work one-on-one with customers. To leverage this work, the Initiative plans to publicize these "success stories" through formal channels (i.e., publications and presentations), as well as through ongoing one-on-one contact and vendor dissemination to customers, so as to influence the practices of other customers within and across industries. We believe the one-on-one customer approach is appropriate and valuable, and that the success stories are a critical fulcrum for the Initiative to influence the broader market.

II. Initiative Progress

Number, Types, and Geographic Distribution of Customers Contacted

The field consultants have made in-person visits with 77 motor end-users in the region. End-users visited by the field consultants are representative of the cross section of regional motor users:

- Industries include: pulp and paper (8), wood products (20), water and wastewater (7), primary metals and metals manufacturing (6), food processing (12), chemical and petroleum (3), microchip (2), and other (19).
- Customers vary in size ranging from 30 to 5,000 installed motors.
- Customers contacted so far are in each state of the region: Eastern Washington (31%), Oregon (26%), Western Washington (22%), Idaho (16%), and Western Montana (1%).¹⁰

End-User “Success Stories”

Through January 2001, four success stories have been completed, as shown in *Table 1* below.

As illustrated by these success stories, customers are taking concrete actions to change their motor management practices. However, as a major publicity tool to motivate other customers, future success stories should try to identify more dramatic energy and costs savings (of the magnitude of those at Kaiser) that are directly related to motor management.

The selection of success stories is critical and has risks when plants do not continue operation. The “big picture” of benefits could include “what if?” scenarios for all the motors in a plant and also the non-energy benefits such as reduction of unscheduled downtime.

¹⁰ The total does not sum to 100% as two were in Utah and one was in Nevada.

II. Initiative Progress

Table 1: End-User Success Stories

FIRM NAME	TYPE	ACTION TAKEN	ENERGY AND NON-ENERGY BENEFITS
WOODGRAIN MILLWORK	Wood products	<p>Evaluated motor operational costs and found savings opportunities.</p> <p>Began setting up motors inventory to track spares, document rewind history, and make repair/replace decisions. Using the Initiative's <i>Electric Motor Management (EMM)</i> software and <i>PalmPilot</i>.</p>	<p>Replacing a 250 HP motor with an energy-efficient motor at failure resulted in a net \$600 annual savings. Failed motor was costing \$52,000 per year, running 6 days/week, 24 hours/day.</p> <p>Company expects to identify other savings opportunities.</p>
KAISER ALUMINUM <i>(Plant has suspended operations)</i>	Aluminum manufacturer	Used <i>MotorMaster+</i> to analyze motor operating costs	<p>Analysis resulted in:</p> <ul style="list-style-type: none"> • Annual electricity savings of \$2,562 from replacement of fourteen older 20 HP fan motors with new energy-efficient ones. Kaiser planned to replace 40 more. • Expected annual electricity savings of \$8,256 from planned replacement of eight older 125 HP motors with new energy-efficient ones. • Recognition by accounting department of benefit of life-cycle cost analysis for future motor equipment purchases. • Connected load reduction of 45.6 kW.
<i>Continued</i>			
WASHINGTON STATE CAPITOL <i>(Software compatibility issues have put this project on hold.)</i>	Administrative offices	<p>Developing an 800-motor inventory to help with spare location and repair/replace decision-making.</p> <p>Plans to update boilerplate for motor purchase and repair.</p>	<p>Expects inventory will help with quicker response at failure and improved motor efficiency and reliability.</p> <p>No specific energy and cost savings yet.</p>

II. Initiative Progress

FIRM NAME	TYPE	ACTION TAKEN	ENERGY AND NON-ENERGY BENEFITS
ENTERPRISE LUMBER <i>(Plant has since been sold, shut down, and dismantled.)</i>	Wood products	Compressed air system improvements (internal project – not directly related to the Initiative). Implementing a motor inventory to help in repair/replace decisions that include life cycle cost analysis.	\$41,000 annual savings from compressed air system improvements. No specific energy and costs savings from motor management practice change.

Customer Targeting and Planning

Based on the market analysis performed in the first MPER, the evaluation team recommended that the Initiative target medium (2 to 10 MW) and large (over 10 MW) customers that have fewer motor management practices in place and are generally receptive to improving their motor management practices. Customers in these size categories would probably have at least 250 motors or at least 20 motors over 50 horsepower.

The number of motors for each participating end-user was analyzed. Data were available from the trip reports on 61 of 77 customers contacted through January 2001. As shown in *Table 2* below, it was found that for customers contacted through May 2000 for which data were provided, 34%¹¹ had 250 or fewer motors total and did not have over 20 motors of 50 HP or greater. For customers contacted June 2000 through January 2001, it is 27%. However, it is difficult to draw a conclusion about improvements in marketing focus since there are relatively few contacts for the June 2000 through January 2001 period.

¹¹ Note that in the second MPER, an estimate of 42% was provided. Since then, the field consultants have provided more information in subsequent trip reports.

II. Initiative Progress

Table 2: Size of Customer in Terms of Numbers of Motors

NUMBER OF MOTORS	CUSTOMERS CONTACTED THROUGH MAY 2000	CUSTOMERS CONTACTED JUNE 2000 THROUGH JANUARY 2001	TOTAL CUSTOMERS
500 OR MORE	24	2	26
250 TO 449	5	2	7
100 TO 249	7	0	7
FEWER THAN 100	10	3	13
FEWER THAN 250, BUT 20 OR MORE OF 50 HP OR GREATER¹²	4	4	8
NO DATA AVAILABLE¹³	12	4	16
TOTAL	62	15	77
FEWER THAN 250 MOTORS AND FEWER THAN 20 OF 50 HP OR GREATER	17 (34%)	3 (27%)	20 (33%)

As a general recommendation, the Electric League staff should continue to direct the field consultants to focus on the most promising sizes and types of customers, particularly since there is a new field consultant working in Western Washington.

Just as important, field consultants need to continue to focus on converting “good prospect” contacts into successes, while fitting new contacts and other activities around this priority in an effort to avoid spreading the field consultants too thin (a concern also expressed by the evaluation team in the second MPER). The League’s agenda for 2001 and beyond, as described in its new workplan, continues to be quite ambitious regarding

¹² More customers may fall into this category, but data were not provided in the field consultants’ trip reports to make this determination.

¹³ More data on the number of motors was obtained for this MPER than for the second MPER because additional trip reports had been completed by the field consultants.

II. Initiative Progress

one-on-one customer work. It has a goal of contacting 50 new customers and providing technical assistance to twelve, as well as re-contacting 30 customers, including those from seminars.

B. Summary of Second Round Participant Interview Results

To assess the impact of one-on-one meetings with customers, a second round of interviews was conducted in March and April 2001 with sixteen participants (defined as end-users working one-on-one with field consultants). Brief highlights of the interview findings and recommendations are provided here. *Section III* provides a detailed description.

Overall, the Initiative is making progress in influencing end-users' practices and the program is generally receiving good feedback. Forty percent of respondents indicated they had made changes to their practices as a result of the Initiative, including changes to their repair/replace decision-making.

However, only 31% of respondents are using operational costs in their repair/replace decisions, and only 43% say they are using their inventory to make such choices. These findings suggest that:

- Field consultants need to place more emphasis on development of repair/replace guidelines that have a clear, documented understanding of operational costs.
- Field consultants may need to clarify with end-users how the Initiative defines the content and function of inventories, and provide more information on how to use the inventory for energy and productivity benefit, as well as in decision-making.
- Some additional tools might also help (see *Section F* below).

C. Work with Motor Service Centers

So far, the League has not had a specific strategy for motor service centers (also called motor repair shops). The primary activities have been:

II. Initiative Progress

- Field consultants have visited 26 motor service centers (MSCs) to introduce them to the program and provide repair specifications.
- Field consultants have been working to develop stronger relationships between customers and MSCs. At least one MSC is providing expanded services to customers in the areas of inventory and repair/replace decision-making.
- A number of MSCs have co-sponsored motor management seminars and/or offered their facilities for a seminar participant walk-through.

The League's 2001 workplan describes working more deliberately with MSCs to develop their capabilities for offering broader services. The League plans to:

- Develop two business models to help MSCs expand their services.
- Recruit one large sophisticated shop and one medium shop to participate in the service expansion.
- Develop and publicize success stories.

Because the League is planning a more deliberate and aggressive strategy for working with MSCs in 2001, specific progress in this area will be reported in the next MPER.

In the new workplan, the League also states that it intends to "be more energetic about promoting the benefits of, and basic practices to achieve high quality motor repairs." The planned strategy includes:

- A campaign promoting the high quality repair message.
- Individualized assistance on request.
- Channeling motor service centers into the business planning activities described above.
- Providing tools such as the repair specification and *Motor Challenge* products.

II. Initiative Progress

Summary of Motor Service Center Interview Results

A first round of interviews was conducted with 24 motor service centers in December 2000 and January 2001. We have several recommendations regarding the above strategy based on these interviews. These are briefly highlighted below and described in more detail in *Section V*.

This industry is in retreat as repair revenues are declining. It also is dealing with substantial inertia. While the time is good to offer business-planning assistance, shops' interest in, and capability to take advantage of this assistance are highly variable. Based on these findings:

- > Assistance to shops needs to be flexible to respond to variations in the market.
- > Business models need to be grounded in close work with a specific shop so they are not abstract.
- > The Initiative needs to make sure that the term "quality" is well defined in program materials and communications, particularly as it applies to energy efficiency.

All but one MSC interviewed say they assist customers in making repair/replace decisions, but none of the MSCs said they use operational cost as a primary decision criterion; all said they use first cost. In turn, a majority of the participating end-users interviewed say they rely on their repair shops when making repair/replace decisions. Thus, it appears that operational costs are rarely considered in deciding between motor replacement and repair. It appears that there is a significant market barrier to efficient repair/replace practices; many customers traditionally rely on MSC recommendations, and those shops are not highly motivated to consider operational costs and do not have the information at hand to do so. There could be two approaches to improving this situation:

- > Persuade shops to incorporate operational costs into their advice to customers and provide tools and information to help them do this.
- > Customers make the first-stage decision themselves, using operational costs. This would require that *Drive Power* convince customers to impose their own judgment on that of the repair shop, which for many customers would go against custom and habit.

II. Initiative Progress

Neither approach appears to present good chances of a quick, major change. We recommend pursuing both in hopes of creating a synergistic effect.

D. Motor Management Seminars

The Initiative held nineteen seminars and forums with 331 attendees representing 58 manufacturing companies, 46 other types of end-users (e.g., wastewater, irrigation, offices, and hospitals), and 27 repair shops.

Table 3 below provides a list of seminars and forums conducted to date. These results show significant attendance for manufacturing companies, however attendance is still modest for these types of customers compared to similar efforts in other areas of the county.

Table 3: Motor Management Events Held to Date

EVENT TYPE AND FORMAT	DATE AND LOCATION	NUMBER OF ATTENDEES	NUMBER OF END USERS & MSCs REPRESENTED	SPONSOR(S)
NEEC LUNCH FORUM	10/27/99 Seattle, WA	19 various	No information available	Northwest Energy Efficiency Council
HANDS-ON MOTOR ASSEMBLY AND REASSEMBLY	11/16/99 Boise, ID	7 Idaho Power Agriculture Reps	Not applicable	Idaho Power
MOTOR EFFICIENCY PLANNING	12/99 Eureka, MT	4 attendees	1 manufacturing co. * 3 misc.	Lincoln Electric Coop
MOTOR EFFICIENCY PLANNING	12/99 Pasco, WA	6 attendees	3 manufacturing co. 3 misc.**	Franklin PUD
<i>Continued</i>				
PUD FORUM – HALF DAY PRESENTATION	2/15/00 Pasco, WA	36 attendees	5 manufacturing co. 7 other end-users*** 2 motor service co. 6 misc.	Franklin PUD

II. Initiative Progress

EVENT TYPE AND FORMAT	DATE AND LOCATION	NUMBER OF ATTENDEES	NUMBER OF END USERS & MSCs REPRESENTED	SPONSOR(S)
MOTOR EFFICIENCY PLANNING – HALF-DAY PLUS SHOP TOUR	4/12/00 Seattle, WA	26 attendees	5 manufacturing co. 6 other end-users 2 motor service co. 2 misc.	Seattle City Light
MOTOR EFFICIENCY PLANNING – HALF-DAY	4/26/00 Everett, WA	16 attendees	5 manufacturing co. 4 other end-users 3 motor service co. 1 misc.	Snohomish PUD
MOTOR EFFICIENCY PLANNING – HALF-DAY	5/2/00 Portland, OR	43 attendees	9 manufacturing co. 6 other end-users 6 motor service co. 4 misc.	PacifiCorp
MOTOR EFFICIENCY PLANNING – HALF-DAY	5/4/00 Tacoma, WA	26 attendees	2 manufacturing co. 9 other end-users 1 motor service co. 1 misc.	Tacoma Power
MOTOR EFFICIENCY PLANNING – HALF-DAY	6/20/00 Missoula, MT	6 attendees	3 manufacturing cos. 3 misc.	Montana Power
MOTOR EFFICIENCY PLANNING – HALF-DAY	6/21/00 Bozeman, MT	6 attendees	1 manufacturing co. 5 misc.	Montana Power
MOTOR EFFICIENCY PLANNING – HALF-DAY	9/12/00 Spokane, WA	21 attendees	4 manufacturing cos. 5 other end-users 1 misc.	Franklin PUD Avista Grand Eagle
MOTOR EFFICIENCY PLANNING – HALF-DAY	9/26/00 Billings, MT	20 attendees	1 manufacturing co. 2 repair shops 3 misc.	Montana Power
MOTOR EFFICIENCY PLANNING – HALF-DAY	10/9/00 Pocatello, ID	10 attendees	1 manufacturing co. 3 motor service cos. 1 misc.	Idaho Power Company
				<i>Continued</i>
MOTOR EFFICIENCY PLANNING – HALF-DAY	10/11/00 Twin Falls, ID	21 attendees	6 manufacturing cos. 2 motor service cos. 3 other end users 2 misc.	Idaho Power Company

II. Initiative Progress

EVENT TYPE AND FORMAT	DATE AND LOCATION	NUMBER OF ATTENDEES	NUMBER OF END USERS & MSCs REPRESENTED	SPONSOR(S)
MOTOR EFFICIENCY PLANNING – HALF-DAY	10/11/00 Boise, ID	15 attendees	4 manufacturing cos. 2 motor service cos. 2 other end users 2 misc.	Idaho Power Company
MOTOR EFFICIENCY PLANNING – HALF-DAY	10/11/00 Baker City, OR	14 attendees	1 manufacturing co. (Ashgrove Cement)	Ashgrove Cement
MOTOR EFFICIENCY PLANNING – HALF-DAY	11/14/00 Portland, OR	20 attendees	2 manufacturing cos. 2 other end-users 2 repair shops 2 misc.	Portland General Electric Grand Eagle
MOTOR EFFICIENCY PLANNING – HALF-DAY	5/2/01 Blackfoot, MT	15 attendees	5 manufacturing cos. 2 motor service cos. 2 other end-users 1 misc.	Idaho Power Company
TOTAL		311 attendees	58 manufacturing co. 46 other end-users 27 motor service cos. 40 misc.	

* Event was snowed out so attendance was very low.

** Miscellaneous includes utility representatives, design engineers, consultants, etc.

*** Other end-user types include irrigators, wastewater, hospitals, office buildings, etc.

Summary of Seminar Assessment

The evaluation team assessed the seminars in several different ways:

- Exit surveys were completed by participants in four motor management seminars held in the spring of 2000.
- Members of the evaluation team attended three seminars.
- In February and March 2001, phone interviews were conducted with nineteen seminar attendees.

II. Initiative Progress

Most exit surveys gave the events high ratings. Attendees also were generally very positive in rating their likelihood to implement the motor management practices advocated in the seminars. Some attendees thought the presentations were overly technical and theoretical and would have liked more hands-on exercises.

Fifteen of nineteen respondents to the phone interviews said they had made a least one change in their motor management practices and said the seminar played a role in their decision to make those changes, a very positive indicator that the seminars are resulting in practice changes.

However, other interview responses, as well as the team's observations at the seminars, indicate that the sessions could be more effective in helping end-users understand the importance of operational costs in developing repair/replace guidelines (for example, only two interview respondents said they consider operational costs).

Some of the evaluation team's key recommendations are:

- > Emphasize simple messages about actions and resulting cost savings; reduce technical information.
- > Incorporate hands-on exercises on operational costs.
- > Add an operational cost table and decision flowchart to the tool kit; work with customers on the basics of how to use them.
- > Do more basics on: 1) How and why to create a "strategic" inventory that focuses on critical motors; and 2) how to use an inventory to make better decisions.

These findings and recommendations are described in detail later in *Section IV*.

E. Motor Management Tool Kit

The *Motor Management Tool Kit* is an important element of the Initiative's educational efforts. It is used in both the seminars and as an aid in one-on-one customer work.

II. Initiative Progress

An extensive review of the tool kit was conducted for the second MPER. Based on interview results indicating that many customers are not using operational costs in their decision-making, and that key tools don't stick out in customers' minds, we recommend the following:

- > Flag key tools and materials.
- > Consider only giving customers selected and relevant items rather than the whole kit.
- > Remove overly complex or conflicting materials.
- > Add the following tools:
 - A simple table that shows operational costs and a simple equation to estimate gross electricity use to give customers a sense of why it is critical to consider this. The table values would be based on assumptions about efficiencies and average operating hours.
 - A better analytic tool to help customers formulate a simple repair/replace guideline. The tool needs to be responsive to their typical informal approach, while including enough analytic capacity to make good decisions. A suggested form for the repair/replace decision tool is a flowchart with multiple branches and decision-point values tied to particular participant characteristics.

F. Overview of Progress to Date

Below are *Tables 4* and *5*, which show the Initiative's progress to date and summarize the key recommendations. These key results are further detailed in the final section of the report.

II. Initiative Progress

Table 4: Early Indicators of Motor Services Market Change

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
<i>EARLY INDICATOR 1: LEAGUE'S PROGRESS COMPARED TO GOALS IN DELIVERY OF INITIATIVE SERVICES</i>				
UTILITY CONTACTS	Inform utilities, work to identify customer leads, plan motor seminars.	Field consultants (FCs) have met in-person with over 60 utilities throughout the region. Ten utilities have sponsored seminars.	No specific goals set.	For future Alliance efforts, focus on utilities with the greatest potential to provide definite customer leads that meet size and other criteria.
TOOL KIT	Create <i>Motor Management Tool Kit</i> for use by end-users and field consultants.	The first version of the Tool Kit was complete in July 2000. Completion in April 2000 of repair spec was a critical addition. New simplified motor management software has been developed by the League and is still evolving.	In 2001 League plans to: <ul style="list-style-type: none"> • Add material from CEE's <i>Motor Decisions Matter</i> campaign¹⁴ and DOE OIT's¹⁵ <i>Best Practices</i> (pulp and paper). • Remove products that are out of date or do not meet program-marketing objectives. 	Create two new tools, flag them, and provide concrete instruction on how to use them: <ul style="list-style-type: none"> • A simple table showing operational costs • A flowchart-type tool to create repair/replace guidelines that include operational costs
<i>Continued</i>				

¹⁴ CEE's campaign strategy is to develop a high-level business message that translates the benefits of motor management into terms that senior plant and corporate management will find compelling, and direct these managers to local motor management resources and programs such as *Drive Power*.

¹⁵ Department of Energy Office of Industrial Technologies.

II. Initiative Progress

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
“SUCCESS STORIES”	Original goal: 25 by end of contract period. Goal reduced to 15.	Four success stories have been completed.	In 2001, the League plans to: <ul style="list-style-type: none"> • Complete 10 more success stories (in addition to the 4 completed so far). Six will be from customers previously contacted, and 4 from new customer contacts. • Develop plan for marketing the success stories. 	The stories developed so far show progress and are well presented. However, to be most effective as a key marketing tool for motivating other customers, the stories need to show more dramatic bottom-line energy and costs savings. An exception is the Kaiser story.
MOTOR MANAGEMENT SEMINARS	No specific goals set.	Nineteen seminars and forums held, with 331 attendees representing 58 manufacturing companies, 46 other end-user types (wastewater, irrigators, hospitals, office buildings, etc.), and 27 repair shops.	In 2001, the League plans to: <ul style="list-style-type: none"> • Offer three seminars aimed at all customer sizes. • Work with the sponsoring motor service center to develop their capabilities to provide follow-up resources to attendees. 	<ul style="list-style-type: none"> • Focus on “selling the idea,” especially regarding operational costs. Use best success stories as illustrations. • Reduce technically-oriented information. • Incorporate hands-on exercises. • Provide coaching to trainers on effective presentations. • Use participant pool more deliberately to market one-on-one services.

Continued



II. Initiative Progress

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
SERVICE SHOP CONTACTS	No specific goals set.	Twenty-six shops contacted. Type and depth of services provided has varied.	In 2001, the League plans to: <ul style="list-style-type: none"> • Develop two business models to help motor service centers expand their services. • Recruit one large sophisticated shop and one medium shop; develop and publicize success stories. • Widely publicize consistent message about the importance of quality repair. 	<ul style="list-style-type: none"> • Assistance to motor service centers needs to be flexible to respond to market diversity. • Develop business models through close work with a specific shop (or shops) so they are not abstract. • In marketing materials, define “quality,” especially vis-à-vis maintaining energy efficiency. • Encourage the use of operating costs in motor repair/replace recommendations, and provide the tools and information to do so.
EARLY INDICATOR 2: OPINION OF PARTICIPATING CUSTOMERS ABOUT THE SERVICES				
PARTICIPATING CUSTOMERS' OPINION OF SERVICES	Goal is for participating customers to have positive opinion of initiative services.	A great majority of participants had a high opinion of field consultants. Tool kit materials did not stand out in customers' minds. Four customers who declined the survey had no recollection of their field consultant.	N/A	<ul style="list-style-type: none"> • Strengthen tool kit per recommendations above. • Be selective in what materials are left with customers. • Lack of recollection of field consultant visits should be explored by League project manager.
<i>Continued</i>				



II. Initiative Progress

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
SEMINAR PARTICIPANTS' OPINION OF SERVICES	Goal is for seminar participants to have positive opinion of Initiative services.	Of the 19 attendees surveyed, all but three gave a rating of 4 or 5 (1 to 5 rating of seminar's effectiveness in giving them tools and knowledge to improve practices). Attendees are making changes (see below).	N/A	Key attendee suggestions: <ul style="list-style-type: none"> • Longer seminar. • More on analysis of operating costs. • More on "real world" performance and sizing of premium motors.
EARLY INDICATOR 3: INCREASE IN AWARENESS AMONG CUSTOMERS AND VENDORS OF PREMIUM EFFICIENCY MOTORS, QUALITY REWINDS AND MANAGEMENT PRACTICES				
CUSTOMER AWARENESS	Goal is increased awareness from "baseline" due to Initiative.	Not surprisingly, awareness has increased among customers with direct program contact. However: <ul style="list-style-type: none"> • Few are using operational costs in repair/replace decisions. • Half of the end-users said they do not use their inventories as a tool in repair/replace decisions. 	N/A	<ul style="list-style-type: none"> • Incorporate hands-on exercises on operational costs into the seminars. • Add an <i>operational cost table</i> and a <i>decision flow chart</i> to tool kit; assist customers in using them to formulate guidelines. • Do more hands-on work with customers on: 1) How/why to create a "strategic" inventory that focuses on critical motors; 2) How to use an inventory to make better decisions.
<i>Continued</i>				



II. Initiative Progress

EARLY INDICATOR	EARLY INDICATOR GOAL	PROGRESS THROUGH JANUARY 2001	GOAL FOR 2001 AS SPECIFIED IN NEW LEAGUE WORKPLAN	EVALUATION TEAM RECOMMENDATIONS
MOTOR SERVICE CENTER (MSC) AWARENESS	Goal is increased awareness from "baseline" due to initiative.	<p>Only twelve of the 24 MSCs interviewed recalled receiving the repair spec. Most MSCs indicate awareness of quality rewinds, but awareness not clearly attributable to the Initiative. Definition of "quality" varies.</p> <p>There is a marked "split" in the market between more and less sophisticated MSCs.</p> <p>All MSCs say they help customers with repair/replace decisions but none use operating costs.</p>	N/A	<ul style="list-style-type: none"> • Make sure MSCs receive the spec and point out the value of it as a customer education tool. • Specifically define "quality reconditioning" in marketing efforts, particularly regarding motor efficiency. • Develop strategy for overcoming the "split" in the market. • Work with MSCs on why and how to use operational costs as a criterion, and/or have customers make the "first-stage" repair/replace decision themselves, considering operational costs. Provide both with tools and information.

II. Initiative Progress

Table 5: Progressive Indicators of Motor Services Market Change

GOAL	PROGRESSIVE INDICATOR	PROGRESS THROUGH JANUARY 2001	EVALUATION TEAM RECOMMENDATIONS
PROGRESSIVE INDICATOR 1: CUSTOMERS REPORT CHANGES IN MOTOR MANAGEMENT PRACTICES AND ATTRIBUTE THOSE TO THE INITIATIVE			
SUMMARY OF MOTOR MANAGEMENT PRACTICE CHANGES	Customers make substantive changes to their motor management practices and attribute them to the Initiative.	Overall, the Initiative has made significant progress in influencing end-users' practices: 58% of interview respondents ¹⁶ are making changes and attributing them to the Initiative.	Interview findings indicate customers could be making more in-depth and concrete changes in the area of repair/replace decision-making (<i>see below</i>).
SET UP AND USE OF MOTOR INVENTORIES	Customers set up inventories and use them to make better repair/replace decisions.	58% of interview respondents said they have set up, or are setting up, inventories, although only half of those say they are using them to make repair/replace decisions.	<ul style="list-style-type: none"> • Clarify with end-users how the Initiative is defining the content and function of inventories. • Provide more customer training on how to use inventories most effectively for energy and productivity benefit.
ESTABLISH OR IMPROVE REPAIR/REPLACE GUIDELINES	Customers establish repair/replace guidelines based on the operational cost of alternatives.	Generally respondents are not setting up "guidelines" per se, but 40% said they are making changes to their decision-making. However, only 20% say they are using operational costs as a decision criterion.	<ul style="list-style-type: none"> • Put more emphasis on developing repair/replace practice based on operational costs and other key criteria. See suggestions for toolkit improvements, above.
<i>Continued</i>			

¹⁶ Combination of interviews with customers doing one-on-one work with field consultants, and customers who have attended the seminars.

II. Initiative Progress

GOAL	PROGRESSIVE INDICATOR	PROGRESS THROUGH JANUARY 2001	EVALUATION TEAM RECOMMENDATIONS
ESTABLISH OR IMPROVE PREMIUM PURCHASE GUIDELINES	Customers establish premium purchase guidelines based on the operational cost of alternatives.	Twenty-six percent of respondents say they are increasing their purchase of premium motors or changing their purchase specifications.	<ul style="list-style-type: none"> As discussed above, make sure operational costs are part of the decision.
USE OF REPAIR SPEC	Customers adopt the program's or another repair specification, or make changes/improvements to an existing specification.	<p>Fourteen percent of respondents reported this practice change. Another 6% reported visiting or working with their motor service center.</p> <p>Regarding the program specification:</p> <ul style="list-style-type: none"> Forty-six percent remembered receiving the repair spec and had reviewed it. Of those, 23% planned to have their shop use it (note that there may be overlap between this group and the group that reported making a change). 	<ul style="list-style-type: none"> Customer recall and review of the repair specification could be higher. Make sure it is distributed and discussed. A piece on what to look for in a repair shop might be a good addition to the tool kit.
<i>PROGRESSIVE INDICATOR 2: MOTOR SERVICE CENTERS REPORT CHANGE IN CUSTOMERS' DEMAND FOR QUALITY REPAIRS</i>			
CUSTOMER DEMAND FOR QUALITY REPAIRS PER MOTOR SERVICE CENTERS	Motor service centers report change in customers' demand for quality repairs.	Results of motor service center interviews ambivalent. 58% said customer demand for quality has increased, but at same time, 63% say customers "rarely" or "never" ask about repair quality; 28% say customers sometimes do; 8% said they often or always do.	<ul style="list-style-type: none"> Continue to create customer "push" through education and one-on-one work.

III. Participant and Seminar Attendee Interview Results

A. Introduction

From January through March 2001:

- Second-round interviews were conducted with sixteen Initiative participants (defined as customers working one-on-one with field consultants).
- First-round interviews were conducted with nineteen end-users that had attended one of the program's motor management seminars.

The interviews assessed:

- Changes made to motor management practices by participants over the last year or so, and the degree to which participants attribute those changes to assistance they received from the Initiative.
- Participants' current motor management practices including repair/replace decision-making, use of inventories, and use of repair specifications.
- Participants' opinion of the assistance they received.
- Data on participants' motor populations: number, size, type, etc.

The primary objectives were to:

- Assess the percentage of end-users that are making changes to their practices as a result of their involvement with the Initiative; and for those who are, assess the depth of that change.
- Gather information to provide insights into how one-on-one field consultant work, the motor management seminars, and other aspects of the program that might be more effective.

The findings regarding the seminars are also based on observations by three different evaluation team members who attended motor management seminars on the following dates:

III. Participant and Seminar Attendee Interview Results

- April 12, 2000 – Seattle, Washington
- May 2, 2000 – Portland, Oregon
- November 14, 2000 – Portland, Oregon

B. Methodology and Approach

Population and Sample

Participant Interviews

The interview sample was drawn from a total population of 60 participants. The first step was to assess if these participants were in the target market according to program criteria. Based on information gathered in the first-round interviews and/or from the field consultant trip reports, 33 of the 60 were eliminated as potential interview candidates. The reasons for elimination are shown in *Table 6* below.

The original intent was to complete 20 second-round interviews. However, because the remaining population after the initial cut was relatively small (27), and because it proved difficult to both reach customers and convince them to respond, only sixteen second-round interviews were completed.

Another intent for the second round interviews was to interview as many first-round respondents as possible. However, for the same reasons as described in *Table 1* above, only six of the 21 first-round respondents were interviewed in the second round (thirteen were eliminated in the initial cut detailed in *Table 1*; two declined to be interviewed).

It was very difficult to reach these participants and complete interviews. To achieve most completes, multiple calls had to be made, and respondents were reluctant to take time because they are extremely busy, and often plants are understaffed. Respondent fatigue may be another reason. We do not believe this population of participants should be contacted again for interviews.

III. Participant and Seminar Attendee Interview Results

Table 6: Reasons for Participant Elimination from Population

PRIMARY REASON FOR ELIMINATION	NUMBER ELIMINATED
SMALL NUMBER OF MOTORS (2 WITH UNDER 200; 13 WITH UNDER 100)	15
PARTICULAR CIRCUMSTANCES AT PLANT ¹⁷	11
APPARENT LACK OF INTEREST IN THE INITIATIVE	3
UNIQUE INDUSTRY, NOT REPRESENTATIVE ¹⁸	2
RECENTLY INTERVIEWED ¹⁹	2
TOTAL	33

Seminar Attendees

The interview respondents were selected randomly from lists obtained from the Electric League. The lists contained names and contact information of participating end-users for eight seminars held in various Northwest locations between April and October of 2000.²⁰

The participant lists used for sample selection consisted of end-users only. Other participants such as motor repair shops, utility personnel, and consultants were removed from consideration prior to sampling. The list of end-users was then categorized into four types according to an inspection of company name: industrial, commercial/institutional, wastewater treatment, schools, and irrigation districts.

¹⁷ Primarily based on round-one findings, e.g., plant undergoing major, multi-year expansion; trip reports indicated little staff interest or management support, etc.

¹⁸ A casino and a shipyard.

¹⁹ Seminar follow-up, SAV-AIR.

²⁰ April 12 – Seattle, WA; April 26 – Everett, WA; May 2 – Portland, OR; May 4 – Tacoma, WA; September 12 – Spokane, WA; September 26 – Billings, MT; October 11 – Twin Falls, ID; October 12 – Boise, ID. Other seminars have been held, but participant lists were not available.

III. Participant and Seminar Attendee Interview Results

Disposition of Interviews by Sector and State

Table 7 below shows the disposition of completed interviews by sector.

Table 7: Disposition Interviews by Sector

SECTOR	PARTICIPANTS		SEMINAR ATTENDEES ²¹	
	INTERVIEWS	PERCENT	INTERVIEWS	PERCENT
WOOD PRODUCTS	4	25%	2	11%
CHEMICAL	3	19%	0	0%
FOOD PROCESSING	3	19%	1	5%
PULP AND PAPER	2	13%	3	16%
PRIMARY METALS	2	13%	0	0%
PETROLEUM	0	0%	1	5%
WASTEWATER	0	0%	2	11%
IRRIGATION	0	0%	1	5%
COMMERCIAL, INSTITUTIONAL	1	6%	5	26%
OTHER INDUSTRIAL	1	6%	4	21%
TOTAL	16	101%²²	19	100%

Table 8 shows the distribution of completed interviews by state.

²¹ While the final disposition of seminar attendees interviewed is markedly different from that for participants, the seminar sample, in fact, fairly closely matches the distribution of the population.

²² Totals more than 100% due to rounding.

III. Participant and Seminar Attendee Interview Results

Table 8: Disposition of Second-Round Participant Interviews by State

STATE	PARTICIPANTS		SEMINAR ATTENDEES	
	INTERVIEWS	PERCENT	INTERVIEWS	PERCENT
OREGON	6	37%	4	21%
EASTERN WASHINGTON	4	25%	4	21%
WESTERN WASHINGTON	3	19%	7	37%
IDAHO	3	19%	3	16%
MONTANA	0	0%	1	5%
TOTAL	16	100%	19	100%

C. Detailed Findings of Phone Interviews

Changes Made to Motor Management Practices

Participant Interviews

While sixteen participants were actually interviewed, six declined to be interviewed, and of those six, four gave responses indicating they did not make changes. Therefore, as shown in *Table 9*, below, we consider a total of 22 responses for this first general question about whether changes were made. Thus, nine of 22 (41%) said they had made changes and either strongly or weakly attributed those changes to the Initiative.

Seminar Attendees

Fifteen of nineteen seminar attendees interviewed (79%) said they had made at least one change to their motor management practices since the seminar, and either strongly or weakly attributed the change to their participation. Two respondents said they had made changes, but not because of the seminar.

These results are summarized in *Table 9* below.

III. Participant and Seminar Attendee Interview Results

Table 9: Reported Practice Changes and Attribution

CHANGES MADE AND ATTRIBUTION	PARTICIPANTS	SEMINAR ATTENDEES
CHANGES MADE AND STRONGLY ATTRIBUTED TO INITIATIVE ²³	7	13
CHANGES MADE AND WEAKLY ATTRIBUTED	2	2
CHANGES MADE BUT ATTRIBUTED TO FACTORS OTHER THAN THE INITIATIVE	3	2
NO CHANGES MADE	4	2
DECLINED AND INDICATED NO CHANGES MADE	4	N/A
DECLINED – NOT KNOWN IF CHANGES MADE	2	N/A
TOTAL	22	19

For the analysis of changes made, we included the first two categories of respondents in *Table 9*, above (those nine participants and those fifteen seminar attendees that strongly or weakly attributed their changes to the Initiative). Cumulatively, these 24 respondents reported making 54 specific changes of various types. It should be noted, however, that some changes were more involved than others. Therefore, the sheer number of changes is not necessarily indicative of the degree or depth of change.

Table 10 summarizes the reported changes by category for the participants and the seminar attendees. Following the table is a description of the specific changes made.

²³ Strong attribution was a 4 or 5 on a 1 to 5 scale; weak attribution was a 2 or 3.

III. Participant and Seminar Attendee Interview Results

Table 10: Categories of Practice Changes

CHANGE CATEGORY	PARTICIPANTS	SEMINAR ATTENDEES
CHANGING PREMIUM PURCHASE PRACTICES	6	3
CREATING MOTOR INVENTORY ²⁴	5	5
CHANGES/UPGRADES TO REPAIR/REPLACE DECISION-MAKING	4	10
DEVELOPING OR USING A REPAIR SPECIFICATION	3	2
OTHER	6	11
TOTAL	24	31

Purchase of Premium Motors and/or Establishment of Premium Purchase Policy

The following changes were noted:

- Buying more premium motors than before – three seminar attendees.
- Pursuing the idea of establishing a policy – two participants.
- Working with a motor service center on premium purchase decisions – one participant.
- Using data from the *Electric Motor Management* inventory software to determine where it makes sense to buy premium – one participant.
- Shifted specification to call for Toshiba motors that are premium efficiency – one participant.
- Has a statewide program in place that has been updated – one participant.

²⁴ All five participants said they believed their inventories would be done within six months to a year.

III. Participant and Seminar Attendee Interview Results

Motor Inventory

- In the process of completing a motors inventory database – five participants; five seminar attendees (how respondents use or plan to use their inventories is discussed later in the section).

Motor Decision-Making

- Established a size or first-cost threshold for repair/replace decisions, or generally increased frequency of replacement versus repair – two participants and three seminar attendees.
- Using “compare” function in *MotorMaster+* to compare brands and efficiencies when making purchase decisions – five seminar attendees.
- Working with a motor service center on repair/replace policy decisions, with a particular emphasis on predictive maintenance – one participant.
- EMM inventory will be used as tool to show management benefits of repair/replace – one participant.
- Started using energy costs as criteria for repair/replace decisions – one seminar attendee.
- Changing out motors to more efficient ones *before* existing motor fails – one seminar attendee.

Repair Specification

- Have updated or developed internal repair specifications – two participants.
- Using Initiative specification – one participant.
- In process of developing or enhancing their repair spec for shop’s use – two seminar attendees.

III. Participant and Seminar Attendee Interview Results

- (In addition, later in the survey when asked if they planned to have their shops use the program repair specification, six seminar attendees said they did.)

Other Changes

Comments regarding other management changes:

Participants

- Proactively changing out older, inefficient motors.
- Motor replacement based on economics – to eventually go all-premium for operating motors – but as is, they can only change upon failure.
- Involved in corporate project for ten plants to do “large motor care program” that will include repair and maintenance – predictive, preventive, vibration, electrical, etc.
- Working towards an acceptance test on new or repaired motors for vibration and other parameters.
- Working on rectifying warranty issues with motor manufacturers, particularly Reliant – the warranty of a new motor put into inventory will eventually expire, even if never used.
- Need to work more with higher quality bearings at a lower price – “80% of our motor failures are bearings.”

Seminar Attendees

- Changes in air compressor management – two respondents.
- More focus on correcting power factor problems – two respondents.
- More cautious about where to use VFDs – one respondent.

III. Participant and Seminar Attendee Interview Results

- More aware of advantages of VFDs (but hasn't been able to convince management) – one respondent.
- Generated report to management on how to cut consumption through better motor management – one respondent.
- Increased staff training on motor issues – one respondent.
- General improvements to motor maintenance practices – one respondent.

Current Motor Management Practices

While the above data strongly indicate that respondents are making concrete changes, it is also important to compare these reported changes to responses to other questions asked in the survey,²⁵ specifically the following:

- *Let's say a motor fails in your plant. How do you decide whether to replace it with a new motor or repair it? Do you use operating costs as a criterion?*
- *Thinking about your critical motors, would you say you have a plan for each of them in terms of what to do when they fail?*
- *How do you use, or plan to use, your motors inventory?*

These comparisons indicated that:

1. Most respondents still do not appear to be making systematic and economically-based repair/replace decisions. Specifically, only 20% of respondents (31% of participants and 11% of seminar attendees) said they consider operational costs in their decisions. Furthermore, some respondents indicated their use of this criterion was inconsistent. The factors most often cited included quick turnaround, spare availability, size, repair shop recommendation, and first cost.

²⁵ These comparisons were for all sixteen participant respondents and all nineteen seminar-attendee respondents.

III. Participant and Seminar Attendee Interview Results

2. Most are not using, or planning to use, their inventories and associated tools such as *MotorMaster+* to the depth they could in decision-making.

Repair/Replace Decisions and Planning for Motor Failure

When asked how they decide whether to repair or replace a motor in their plant when it fails, respondents cited the criteria shown below in *Tables 11* and *12* (results for participants and seminar attendees reported separately).

Table 11: Factors in Repair/Replace Decisions – Participants

CRITERION	PARTICIPANTS
QUICK TURNAROUND	16
AVAILABILITY OF SPARE	16
SIZE THRESHOLD	14
RECOMMENDATION FROM REPAIR SHOP	13
FIRST COST OF REPAIR VERSUS REPLACEMENT	11
RUN-TIME HOURS	5
LIFE-CYCLE COST ANALYSIS	3
OPERATING COSTS	2
USE ELECTRIC MOTOR MANAGER SOFTWARE TO COMPARE	1
OTHER	6

III. Participant and Seminar Attendee Interview Results

Table 12: Criteria Used for Repair/Replace Decisions

CRITERION CATEGORY	NUMBER OF RESPONDENTS
FIRST COST OF REPAIR VERSUS REPLACEMENT	7
AGE OF MOTOR	7
AVAILABILITY OF NEW MOTOR AT TIME OF FAILURE	6
TURNAROUND TIME	6
HORSEPOWER THRESHOLD*	5
CONDITION AT FAILURE (I.E. IF CAN BE REPAIRED)	4
COST THRESHOLD**	2
APPLICATION OR LOCATION	2
REPAIR HISTORY	2
OPERATING COSTS	2 (future)

* Two respondents (industrial plants) used horsepower thresholds of 10 HP; two used 1 HP (school district and institution), one said “small” (an industrial plant).

** Both respondents (one industrial customer, one institutional customer) said if cost to repair was more than 40% of cost to replace, they would replace.

Five of sixteen participants (31%) said either they do life-cycle cost analysis or use operating costs; two of nineteen seminar attendees (11%) said they consider operating costs; but none mentioned life-cycle cost analysis. While operational cost is obviously not the only criterion end-users should consider when deciding whether to repair or replace, other criteria cited by respondents indicate a lack of specific and advanced planning for what to do when a motor fails.

Respondents were also asked the question: *“Thinking about your critical motors, would you say you have a plan for each of them in terms of what to do when they fail?”*

III. Participant and Seminar Attendee Interview Results

Participants

Ten of sixteen participants said they had a plan for some of their critical motors and one said they had a plan in place for all. One said they were in the process of developing one. Of these twelve:

- Seven said their approach was to have spares on hand.
- Two said their plan was based on their repair/replace decision approach.
- Three were not specific about their plan.

Seminar Attendees

Six of nineteen seminar attendees said they had a plan, and one said they were planning to develop a plan. Of these seven:

- Three said they have spares, usually for larger motors.
- One said they or their shop has spares for most, but that they are also now beginning to consider specifically whether to repair or replace at failure.
- One said they use their inventory to decide whether to repair or replace, but was not specific about how they use it.
- One said they replace before failure.
- One said they did not have plans but were going to develop them after an inventory was complete that considered criticality, accessibility, difficulty in replacing, energy cost, and application. (This was the same respondent who mentioned operating costs as a criterion for repair/replace decisions.)

Among the bulleted responses above, the last four do indicate that some respondents are moving towards a more deliberate plan for what to do at failure.

III. Participant and Seminar Attendee Interview Results

Inventory Use

Information on whether respondents have inventories is shown in *Table 13* below.

Table 13: Motor Inventory Status

INVENTORY	PARTICIPANTS	SEMINAR ATTENDEES
HAVE AN INVENTORY	7	5
ACTIVELY DEVELOPING AN INVENTORY	7 ²⁶	5
PLAN TO DEVELOP AND INVENTORY	0	2
DO NOT HAVE AN INVENTORY	2	7
TOTAL	16	19

Table 14 summarizes responses to the question of how end-users use or plan to use their motor inventories. Overall, 50% of those who either have an inventory, or are actively developing one, gave responses indicating they plan to use them for repair/replace decision-making.

As shown in *Table 14*, only three respondents explicitly stated they were using their inventories to make repair/replace decisions. However, three indicated using them to track repairs, which could help in decision-making. Therefore, we report that six of the fourteen (43%) with an inventory, or actively developing one, use it for repair/replace decision-making.

Table 15 summarizes responses of seminar attendees as to the use of their motor inventories. The responses in the table's first, second and fifth rows indicate that at least six respondents out of the ten (60%) who have an inventory, or are actively developing one, are using, or plan to use, their inventories to help make repair/replace decisions. (Note, nine total

²⁶ Note that in the earlier discussion of changes made, only five respondents were described as developing an inventory. This is because only five attributed (weakly or strongly) this change to the Initiative. Here we are reporting for all respondents.

III. Participant and Seminar Attendee Interview Results

responses were given, but three of those nine gave more than one response indicating uses other than decision-making).

Table 14: Motor Inventory Uses – Participants

INVENTORY USE	NUMBER OF RESPONSES
TRACK AND SELECT SPARES	6
TRACK REPAIRS	3
TO MAKE REPAIR/REPLACE DECISIONS	3
TRACK INSTALLED MOTORS (LOCATION, WHEN INSTALLED, ETC.)	2
COMPARE MM TO REPAIR SHOP RECOMMENDATION	1
TRACK FAILURES	1
DON'T KNOW	2
TOTAL	19

Table 15: Motor Inventory Uses – Seminar Attendees

INVENTORY USE	NUMBER OF RESPONDENTS
TRACKING REPAIR/REWIND HISTORY TO HELP IN REPAIR/REPLACE DECISIONS	4
MAKING REPAIR/REPLACE DECISIONS	3
TRACKING AND SELECTING SPARES	3
PLANNING PREVENTATIVE MAINTENANCE/ DIAGNOSING MOTOR PROBLEMS	3
ASSESSING ENERGY SAVINGS OPPORTUNITIES	2
DECIDING MOTOR TYPE/BRAND TO BUY WHEN MOTOR FAILS	2
MAKING SURE LIKE IS REPLACED WITH LIKE	2
OTHER*	2

* Assessing number, location, application, run times of critical motors, and tracking why production hours are down.

III. Participant and Seminar Attendee Interview Results

It is interesting that participants are not using their inventory to assess energy saving opportunities or preventative maintenance. Other possible uses of the inventory system, like reduction of downtime, moving to predictive maintenance, or motor downsizing, were not mentioned. It should be emphasized that the sample size for these interviews is small, and much of the information is qualitative in nature. In addition, the very nature of motor management and decision-making is complex, making interpretation of responses difficult. Nevertheless, responses to the question about inventory use generally seem to indicate that about half of end-users are not using, or planning to use, their inventories and associated tools such as *MotorMaster+* to the depth they could in repair/replace decision-making and for other motor fleet management.

Barriers to Change

Respondents were asked what the main barriers are to changing their motor management practices. Their responses are shown below:

- Time/staffing – ten participants and twelve seminar attendees.
- Management buy-in – No participants; five seminar attendees.
- Cost – two participants; three seminar attendees.
- Other – two participants (software compatibility; plant has not been running); two seminar attendees (training maintenance staff; finding a UL-listed shop).

As shown, time and staffing are perceived as the greatest barrier. It is also interesting to note that none of the participants interviewed mentioned management buy-in, while five seminar attendees did. This is probably because a greater number of participants interviewed were in a management-level positions, as compared to seminar attendees interviewed (87% versus 63%, respectively).

Respondents were also asked if they are recognized more for controlling long-term operational costs such as energy, or for reducing short-term costs, such as maintenance costs or capital expenditures. This also may be an indicator of barriers to considering operational cost savings versus first-cost savings when deciding whether to repair or replace a motor. Responses are shown below:

III. Participant and Seminar Attendee Interview Results

- Short-term – nine participants and ten seminar attendees.
- Long-term – two participants and four seminar attendees.
- Both – three participants and four seminar attendees.
- Neither – one participant.
- Keep plant running – three participants (one also said both short and long, and one said short).
- N/A – one respondent (question not included in pilot survey).

Two participants also remarked that the short-term focus on maintenance costs may be changing to a more long-term focus because of energy costs.

Motor Management Policies

As shown in *Table 16*, most respondents do not have formal repair/replace or premium motor purchase policies.

Further, based on the tone of responses, the term “policy” is not one that respondents relate to. Although some have what might be called “general rules of thumb,” such as a horsepower threshold below which they replace, it is usually not documented, nor would they consider it a “policy,” or even generally a formal procedure. It is more along the lines of “the way things are done,” with a few staff or one particular staff person carrying this knowledge and being the arbiter of repair/replace decisions.

Table 16: Motor Management Policies

POLICY	PARTICIPANTS	SEMINAR ATTENDEES
REPAIR/REPLACE POLICY		
FORMAL	1	2 ^c
INFORMAL	6 ^a	4 ^c
DEVELOPING A POLICY/PROCEDURE	4	1

III. Participant and Seminar Attendee Interview Results

NONE	5	12
PREMIUM PURCHASE POLICY		
FORMAL	3	5
INFORMAL	5 ^b	1
DEVELOPING A POLICY/PROCEDURE	3	0
NONE	5	13

^a Usually participants' informal policies were based on a fairly low cost or size threshold (e.g., 10-20 HP).

^b Informal policies were usually described as "we buy them when we can" or "where it makes sense."

^c One of the "formal" and three of the "informal" policies were described only as having spares on hand.

Use of Repair Specification

Table 17 provides a summary of recall of program repair specifications.

Table 17: Recall and Use of Program Repair Specification

RECALL LEVEL AND USE	PARTICIPANTS	SEMINAR ATTENDEES
REMEMBER RECEIVING PROGRAM REPAIR SPECIFICATION	6	15
REVIEWED IT	3 ^b	13
USING IT TO DEVELOP THEIR OWN (SAME 3 AS ABOVE)	3	1
PLAN TO HAVE THEIR SHOP USE IT	2	6 ^a

^a For the seven that did not plan to use it with their shop, two planned to develop a specification of their own, two felt their repair shop already had a good specification, one said they expect their shop to follow the manufacturer's specification, one said he had no time, and one did not give a reason.

^b The participant who had reviewed it, but did not plan to use it said their shop already does good work.

III. Participant and Seminar Attendee Interview Results

Assessment of Assistance Received

The following information is reported separately for participants and seminar attendees, as the questions asked were different. Overall, both sets of respondents gave the Initiative high marks.

Participants

Participants were first asked what kind of assistance they received. *Table 18* shows their responses.

Assistance with setting up and building a motors inventory, in one form or another, dominated the responses. There were some cases of providing information and materials, and helping sell ideas to management. It is notable that none of the respondents mentioned assistance with calculating and understand operational costs, and using this to make better decisions, although perhaps some of this instruction and information was included in the other assistance provided, such as with inventory. It is important to recognize that on-the-spot recollection is likely to be spotty.

Table 18: Type of Assistance Provided

TYPE OF ASSISTANCE	NUMBER OF RESPONDENTS
PROVIDED INVENTORY SOFTWARE AND HELPED SET IT UP	7
HELPED WITH INVENTORY	5
PROVIDED USEFUL INFORMATION AND MATERIALS	4
HELPED THEM SELL IDEAS/PROJECTS TO MANAGEMENT	3
HELPED THEM BETTER UNDERSTAND PREMIUM EFFICIENCY MOTORS	2
CONDUCTED A CLASS FOR STAFF	1
PROVIDED PALM PILOT AND HELPED SET IT UP	1
HELPED WITH COMPARING EFFICIENCIES OF MOTORS	1
PROVIDED INFORMATION ON REPAIRING AND REBUILDING MOTORS	1
DID NOT PROVIDE ANY ASSISTANCE AFTER FIRST VISIT.	1

III. Participant and Seminar Attendee Interview Results

DON'T RECALL	1
NO ANSWER	2

As noted earlier in this report, respondents were asked how important the assistance they received was to their decisions to make changes. Of the twelve respondents who reported practice changes, seven strongly attributed the change to Initiative assistance and two weakly attributed it. Respondents were also asked to rate the overall quality of the assistance they received from the Initiative using the rankings excellent, very good, fair, and poor. The responses were as follows:

- Excellent – four respondents
- Very good – eight respondents
- Fair – one respondent
- No answer – one respondent
- Don't know – two respondents

The one respondent who answered “fair” remarked that, *“The help was okay, but the information just didn't jump out and grab you.”*

Respondents were also asked if they receive the *Windings* newsletter. Seven said they did, and nine said they did not. However, of those nine, six were on the League's mailing list, so it appears that they were receiving it, but did not remember it. Thus only three were not receiving the newsletter.

Seminar Attendees

All but three attendees gave the seminar a rating of 4 or 5 out of 5 to describe how effective they felt the seminar was in giving them the tools and knowledge needed to improve their motor management practices. Two gave responses of 3, with one saying the seminar should be longer and the other saying more time should be spent on rotor failures. One gave a response of 1 because they felt they were already doing most of the practices.

III. Participant and Seminar Attendee Interview Results

When asked what they found most effective or useful, respondents said the following:

- He knew they needed to make changes from information from manufacturers, publications, and supply places, but he when came back from the seminar and talked to management, he could use the seminar as a backup and to lend legitimacy.
- Good information on rebates for energy-efficient motors was the main thing.
- The seminar helped reassure him that industry is concerned and involved. Second opinions and outside information are useful.
- The seminar got him steered in right direction.
- He would not have thought of looking at energy costs rather than equipment costs.
- The class was very important – his boss was there and it's easier now to sell him on new ideas.
- He had heard about *MotorMaster+* but attended the seminar and that got him going.
- *MotorMaster+* was main thing.
- *MotorMaster+* to compare efficiencies and purchase cost was the most useful.
- The seminar got us excited.
- Information on temperatures and rewinding to maintain efficiency was important.
- The seminar laid the whole thing out.
- The class was helpful overall, especially information on availability of motors and new repair procedures.

Respondents gave the following suggestions for improvements:

III. Participant and Seminar Attendee Interview Results

- The seminar focused on stator failures rather than rotor failures. He believes the latter are far more prevalent, but having a technical resource for motor information has been useful.
- Wished it were longer to get more in-depth on power factor correction, analysis on operating costs so he can sit down and do analysis of old versus new motors when making repair/replace decisions. It would have helped with ammunition for management.
- Would have liked it to be longer – two respondents.
- Would like one-on-one help.
- New high-efficiency motors require upping the size of the motors; they are overrated for what they say they can do. In the "real world" energy-efficient motors work differently than the engineers say they do. Cover this.
- There should be more about pricing for repairs – a recommendation for what to include in the repair spec regarding providing repair prices.

Suggestions for Additional Assistance, Especially on Motor Systems

Finally, respondents were asked what additional assistance might be useful to them, particularly in the area of motor systems analysis. They provided the following responses:

- Sizing motors to load – five respondents.
- General motor systems analysis – three respondents.
- Defining load requirements – two respondents.
- Matching motors to applications – two respondents.
- Effect of heat on systems – one respondent.
- VSD/motor compatibility – one respondent.

III. Participant and Seminar Attendee Interview Results

- Most efficient way to couple loads – one respondent.
- Options on upgrading systems to soft start controls – one respondent.

III. Participant and Seminar Attendee Interview Results

IV. Motor Service Center Interview Results

A. Introduction

During December 2000 and January 2001, six in-person and eighteen phone interviews were conducted with motor service centers, often self-described as motor repair shops. This was the first round of shop interviews conducted since the program began in January 1999.

The interviews targeted larger shops, those doing 500 or more repairs per year. *Table 19* shows the final interview disposition. Seventeen of the shops interviewed had received a visit from a program field consultant, and seven had not.

Table 19: Disposition for Completed Repair Shop Interviews

LOCATION	IN-PERSON INTERVIEWS	PHONE INTERVIEWS	TOTAL
WESTERN WASHINGTON	2	4	6
EASTERN WASHINGTON	2	3	5
OREGON	2	4	6
MONTANA	0	1	1
IDAHO	0	6	6
TOTAL	6	18	24

The interviews assessed:

- Key baseline practices indicative of quality (e.g., use of repair specifications, testing, and documentation).
- Services offered and relative sales from each, with a focus on comprehensive services (e.g., inventory, warehousing of spares, etc.).

IV. Motor Service Center Interview Results

- Level of interest in, and specific plans to expand service offerings.
- If and how service centers assist customers with repair/replace decisions.
- Recent change in the repair industry and to what the change is attributed.
- Program awareness.

The primary objectives were to:

- Describe “baseline” practices and services as a basis for comparison in subsequent interviews.
- Gather market intelligence to inform the next phase of the *Electric Motor Management* program, as well as provide insight for other motor management efforts.
- Determine baseline program awareness.

B. Methodology and Approach

The interviews targeted larger shops, those doing 500 or more repairs per year. *Table 20* shows the final interview disposition. Seventeen of the shops interviewed had received a visit from a program field consultant, and seven had not.

C. Detailed Findings

Size of Motor Service Centers

Only about two-thirds of respondents knew how many repairs their shops do each year, surprising given that all but three were either owners or managers, and on average had been in business for 40 years. Most of those who did report said they do 1,000 repairs per year (the interview targeted larger shops).

IV. Motor Service Center Interview Results

The 70% of shops with repair data accounted for about 31,000 repairs in total.²⁷ On average, respondents reported that 40% of repairs involved rewinds. Thus the interviews accounted for about 12,400 rewinds.

Table 20 shows ranges of number of repairs and employees. As shown, almost half of the respondents reporting said they do over 1,000 repairs per year.

Table 20: Number of Repairs and Employees

RANGE	NUMBER OF SHOPS	PERCENT OF SHOPS INTERVIEWED
NUMBER OF REPAIRS		
OVER 2,000	3	13%
1,000 TO 2,000	8	33%
400 TO 999	6	25%
DON'T KNOW	7	29%
TOTAL	24	100%
NUMBER OF EMPLOYEES²⁸		
20 OR MORE	7	30%
10 TO 19	9	37%
1 TO 9	8	33%
TOTAL	24	100%

²⁷ A combination of data collected through this survey and data collected by PEA.

²⁸ Overall, respondents said about 70% of their employees do repair.

IV. Motor Service Center Interview Results

Services Offered

Table 21 shows the percentage of respondents who reported each type of service described.

Table 21: Services Offered

SERVICE DESCRIPTION	PERCENT OFFERING
MOTOR REPAIR AND RECONDITIONING	100%
SALES OF NEW MOTORS	96%
SALES OF MOTOR SYSTEM PARTS & EQUIP (E.G. PUMPS, DRIVES, COUPLINGS)	96%
MOTOR TESTING	92%
SALES OF USED MOTORS	83%
MOTOR MAINTENANCE	71%
MOTOR SIZING	71%
ALIGNMENT	67%
CUSTOMER EDUCATION/TRAINING SEMINARS	63%
MOTOR INSTALLATION	54%
DESIGN OR REDESIGN OF MOTOR SYSTEMS	50%
SELLING CUSTOMERS' SURPLUS OR USED MOTORS ON CONSIGNMENT	42%
COMPREHENSIVE MOTOR MANAGEMENT (INVENTORY, MAINTENANCE, WAREHOUSING OF SPARES, ETC.)	29%
ENERGY AUDITS	8%

Shops were also asked if they do no-load testing of motors after rewind. All but two said they do (one said “seldom” and one was unreported).

One finding of interest is that about 30% (seven total) say they offer “comprehensive motor management” services defined in the survey as “inventory, maintenance, warehousing of spares, etc.” Four were located in Oregon, two in Idaho, and one in western Washington. Another finding of interest was that 50% said they do “design or redesign of motor

IV. Motor Service Center Interview Results

systems.” However, one must be cautious in interpreting these results. For example, for the most part, the shops offering “comprehensive” services had only one or two major accounts that used that service, and most only offered a portion of what we described as comprehensive motor services. Further, other motor-related services make up a small portion of overall sales.

Shops were asked how their sales break down among six categories of services. These results are shown in *Table 22* below. As shown, repairs and sales of new motors account for almost 80% of sales on average, while other motor-related services make up only 3%. Sales of other non-motor related services are as high as they are (8%) only because two shops did substantial machine work of other types (50% of all sales).

Table 22: Sales Breakdown by Service

SERVICE DESCRIPTION	PERCENT OF TOTAL SALES
MOTOR REPAIR	56%
NEW MOTOR SALES	23%
USED MOTOR SALES	5%
SALES OF MOTOR SYSTEM EQUIPMENT	5%
OTHER MOTOR-RELATED SERVICES	3%
OTHER NON-MOTOR RELATED SALES AND SERVICES [WELDING, ELECTRICAL, ETC.]	8%

Use of a Repair Specification

About 70% of respondents (seventeen total) said they always use a repair specification. For the remaining 30% (seven total), three use a specification or checklist (but only for “large” motors), two use a checklist only, and two use neither a checklist nor a repair specification.

Eight shops said that “a few” customers provide their own specification. Two others said customers provide their own one-third to one-half the time. Shops said customers usually create their own unique specification,

IV. Motor Service Center Interview Results

often focusing on vibration, balance, and appearance. Several shops said customers draw on sources such as IEEE or EASA. Most shops felt that their own in-house specification exceeded customer requirements.

The sources of repair shops' specifications are shown below in *Table 23*, with EASA being by far the most common.

Table 23: Sources of In-House Specifications

SPECIFICATION SOURCE	NUMBER OF SHOPS USING SOURCE	PERCENT OF SHOPS ^a
EASA	17	71%
SHOP DEVELOPED	8	33%
INDUSTRY SPECIFICATION	5	21%
NEMA	3	12%
UL	1	4%

^a Does not sum to 100% because many shops have specifications formulated from a number of sources.

All but two of the shops that use a specification said they had been doing so for at least ten years; two reported doing so for three years.

Also of note is that twenty shops (83%) reported that they are EASA members. One of those also reported they were a Underwriters Laboratory (UL) shop. The remaining four were UL shops only.

The association of a shop with the three institutions NEMA, UL, and EASA mean different things. NEMA is the National Electric Manufacturers Association; they coordinate specifications for things such as physical dimensions, horsepower ratings, and connection numbering. Most motors would meet NEMA standards after repair since they are very straightforward. Underwriters Laboratory allows manufacturers and repair facilities to add a nameplate to explosion-proof motors to indicate tested ability to contain a spark. EASA is the Electrical Apparatus Service Association, a trade group for motor service centers. They have published a set of recommended repair practices and standards.

IV. Motor Service Center Interview Results

Other Technical Practices

Shops were asked about a number of other technical aspects of their repair operations. These are documented in *Table 24* below. It is noteworthy that two large shops only control temperature manually, and that one-fifth do not do core loss testing before and after. However, almost all do no-load testing of motors.

Table 24: Other Technical Aspects of Repair Practices

ITEM	NUMBER OF SHOPS	PERCENT OF SHOPS
TEMPERATURE CONTROL		
THERMOSTAT*	21	88%
WATER MIST	15	63%
OTHER (OXYGEN CONTROL)	2	8%
MANUAL	2	8%
CORE LOSS TESTING BOTH BEFORE AND AFTER		
ALWAYS	9	38%
30-50% OF THE TIME	4	17%
10-30% OF THE TIME	4	17%
DO NOT DO CORE LOSS	5	20%
NOT REPORTED	2	8%
No-Load Testing		
ALWAYS	22	92%
SELDOM	1	4%
UNREPORTED	1	4%

* About half reported using analog and the other half digital thermostats.

All the shops said they provide “written documentation” of the work they had done on customers’ motors. Their descriptions varied greatly, but this

IV. Motor Service Center Interview Results

was self-reported so differences are not particularly meaningful. However, six shops (25%) were clear that they only provide itemized invoices of work performed. Reported documentation content for the remaining shops is shown in *Table 25* below.

Table 25: Documented Items

ITEM	NUMBER OF SHOPS
INTAKE CONDITION	8
FAILURE REPORT	3
TEST RESULTS	
BALANCE, ALIGNMENT, VIBRATION	9
UNSPECIFIED	6
NO LOAD	6
CORE LOSS	3
SURGE	3
HIPOT	1

Customer Demand for Quality Repairs

As shown in *Table 26*, respondents reported that customers' interest in quality was small, even if it was increasing.

Table 26: How Often Customers Ask About Repair Quality

HOW OFTEN	NUMBER OF RESPONSES
NEVER	6
RARELY	9
SOMETIMES	7

IV. Motor Service Center Interview Results

OFTEN	1
ALWAYS	1

As shown in *Table 27*, over half of respondents (58%) say interest in quality repairs has increased, but even more respondents (63%) say customers rarely or never ask about repair quality.

Table 27: Change in Customers' Interest

CHANGE IN INTEREST	NUMBER OF RESPONSES	PERCENT OF SHOPS
INCREASE	14	58%
DECREASE	1	4%
NO CHANGE	9	38%

The shops were consistent in their impressions that in the minds of customers, low bids and low first-cost are foremost. Most shops felt that they offered a high quality service, and that it was other shops undercutting motor repair bids by sacrificing quality. The interviews also shed further light on how difficult it is to define or communicate (or for customers to understand) “quality” in repairs. Further, even if it can be defined, there will always be those customers who only want the ruined motor to run, and those that are satisfied with throwaway motors, and this contingent will remain large.

When asked why they believe customers' interest in quality repairs has increased at all, they provided the following responses:

- Customers, particularly industrial, are becoming more sophisticated – five respondents.
- There is a general effort to reduce costs by getting quality repairs that last longer – two respondents.
- There is an increase in predictive maintenance – two respondents.

IV. Motor Service Center Interview Results

- Seminars and organizations are raising awareness – two respondents.
- Increased competition among shops – one respondent.
- Energy efficient motors are raising awareness – one respondent.
- There is a general increase in interest in efficiency – one respondent.
- We generate interest by asking customers about it – one respondent.

Customer Assistance With Repair/Replace Decisions

All but one respondent said they help customers decide whether to repair or replace their motors. When asked how they help customers do this, they provided the responses shown in *Table 28* below. What is striking is that *none* mentioned operating costs or life-cycle cost analysis as a decision basis. One mentioned operating hours as a basis for choosing an efficient motor if replacement is recommended, but the primary criterion for that decision is first cost. The vast majority (88%) said comparing repair versus replacement cost (i.e., first cost) is a primary criterion.

Table 28: Criteria for Shop Repair/Replace Recommendations

CRITERION	NUMBER OF SHOPS USING CRITERION	PERCENT OF SHOPS*
COMPARE FIRST COST OF REPAIR VERSUS REPLACEMENT**	21	88%
CONDITION OF MOTOR	8	33%
SIZE OF MOTOR	3	13%
TYPE OF MOTOR (I.E., SPECIALTY)	2	8%

* Many respondents said they use multiple criteria.

** Seven of these 21 said that if repair costs exceed 50% of replacement costs, they recommend replacement.

IV. Motor Service Center Interview Results

Recent Industry Changes

Respondents were asked if they have noticed any changes in the motor repair industry or practices over the last year. Two said “no,” two said “don’t know,” and twenty said “yes.” For any changes they described, they were asked why they thought those were occurring. The responses are described below.

As shown, most remarks were negative, with the vast majority focusing on decreases in repair business, and/or shops are going out of business (thirteen remarks). One respondent said that “the repair industry is dying,” and another commented “no one can make it as a traditional repair shop anymore.” Only a few remarks were positive, citing broadening of services (three respondents), increased awareness of energy efficiency (one respondent), and a general increase in the repair industry (one respondent).

- **Amount of repair business is decreasing** (eight respondents). *Reasons cited:* customers are smarter about planning; motors are running longer because of predictive maintenance; it is becoming more cost-effective to replace rather than repair; and declines in the wood products industry.
- **More shops are going out of business** (five respondents). *Reasons cited:* customers are getting smarter about planning, so less repair business; shop owners are retiring; shops are not staying current and upgrading equipment; EPACT; and “repair is a dying industry.”
- **Ethics of competitors is declining** (three respondents).
- **Quality of repairs is declining** (two respondents). *Reasons cited:* competition, underbidding, customer focus on first cost; and declining industry ethics.
- **Shops are adding and/or broadening services** (three respondents).
- **Awareness of energy efficiency increasing** (one respondent).
- **Repair business increasing** (one respondent).

IV. Motor Service Center Interview Results

Marketing of Motor-Related Services

Customers offering other motor-related services (besides repairs or sales of new/used motors and motor system equipment) were asked how they market these services. Their responses indicate that they primarily market their services through their sales people (eleven respondents), in response to customer demand (five respondents), through seminars (three respondents), or through word of mouth (two respondents). Three said they do not market them. Only three mentioned assigning some kind of value of the services to customers, or benefits versus costs.

With the exception of the responses indicating assignment of value (e.g., looking at decreased operating costs, increased productivity, etc.), it appears that the marketing approach is relatively unsophisticated, casual, or not proactive (i.e., responding to customer demand, through word of mouth, or not marketing at all).

Interest in Offering Expanded Motor-Related Services

As shown in *Table 29*, customers are interested in offering a number of different motor-related services, with the most interest expressed in comprehensive motor management and energy audits.

Table 29: Interest in Offering Expanded Motor-Related Services

SERVICE	ALREADY OFFERING	SOMEWHAT OR VERY INTERESTED IN OFFERING	NOT INTERESTED	N/A
COMPREHENSIVE MOTOR MANAGEMENT	7	10*	9	
ENERGY AUDITS	2	9	11	
DESIGN OR REDESIGN OF MOTOR SYSTEMS	12	4	7	1
ALIGNMENT	16	3	5	
MOTOR INSTALLATION	13	2	9	
MAINTENANCE	17	2	5	

IV. Motor Service Center Interview Results

SIZING	17	1	6	
TESTING	22	0	2	
CUSTOMER EDUCATION/SEMINARS	15	0	9	

* Four of the shops who expressed interest in offering comprehensive services in this question had already said they offered them in a previous question, indicating their interest in expanding these services either in scope or in customers.

Customers were also asked if they had any current plans for expansion or product diversification in the next two years. As can be seen from the descriptions below, while eleven shops said they had plans, at least four could not describe them with much specificity nor did most appear to have a long-term, strategic plan. Verbatim comments include:

- *Building a facility for an inventory of spares.*
- *Don't know what. Try to keep up with times. No one can make it as a traditional motor shop these days. Recently we've added VPI systems. Monitoring equipment, including vibration and thermography are new here.*
- *Beginning to sell VSDs; may do engineering for others.*
- *Nothing specific, will just take opportunities as offered. Considering powder coating.*
- *Certified for VFD installation and repair. Electrician on staff. Looking for warehouse tenant for new building site.*
- *Expanding the motor shop. Now representing Reliance drives and motors.*
- *To build custom controls (have UL 508 listing for controls). We're expanding as you can't make money with motor repairs.*
- *Everything day by day. But recently offering a partnership on VSD and softstarts. Have four motor lines to sell. Are warranty service center for many other motor manufacturers.*

IV. Motor Service Center Interview Results

- *Always looking for ways to bring more value to customers, but it is often a hard sell.*
- *General plans. We are enlarging the area for pump service/sales and mechanical services.*

Program Awareness

Twenty-one respondents had heard of at least one program in the Northwest to encourage customers to improve their motor management practices. *Table 30* shows the programs mentioned.

Table 30: Program Awareness

PROGRAM	NUMBER OF RESPONSES
UTILITY PROGRAMS*	14
<i>ELECTRIC MOTOR MANAGEMENT</i>	8
<i>MOTORMASTER+</i>	2
PROGRAM OFFERED BY SHOPS	1
<i>MOTOR CHALLENGE</i>	1
OTHER	1
DON'T KNOW	2

* Most of the utility programs referred to were former rebate programs.

In the next question, when directly asked if they had heard of the *Electric Motor Management* program, eight (75%) said they had. This is not too surprising since most of the shops interviewed had received a visit from a program field consultant. Thus, this may not be representative of the entire population of motor repair shops.

Only twelve of the repair shops said they had received a copy of the shortened repair specification developed by the program (following the interviews a copy was sent to those who requested a copy). Among those

IV. Motor Service Center Interview Results

who had received it, eight had reviewed it and had the following verbatim comments:

- *Can't remember. It's way too deep for most of our customer requirements.*
- *I think it's a very good basic procedure. It's a minimum. I helped Dennis Bowns write it.*
- *Our spec is better.*
- *Our specs are same. We have a very strong interest in maintaining image of quality.*
- *Similar to our own already.*
- *We already use EASA.*
- *At first a little concerned, but found that it's all reasonable and follows EASA guidelines.*
- *Shortsighted in calling for watermist. O₂ control works as well. Core loss issue didn't make sense, if there isn't an original spec to test it against. Leaves a gaping hole by wording it that way. Without knowing slot size, it's impossible to determine Watts/pound anyway. (This respondent did not have watermist in the burnout oven or a core-loss tester.)*

None of the shops said they would adopt it as their shop specification per se. However, as shown by the comments, some will use it for customer education, or if customers ask, and one used it to modify their existing specification:

- *Redundant with or not as good as our spec – seven respondents*
- *Will use it for customer education – three respondents*
- *Will use it if customers ask for it – two respondents*
- *Won't use it in its entirety but made a modification to our spec based on the spec – one respondent*

IV. Motor Service Center Interview Results

- *Specs are good, but should be shown around to all before being finalized* – one respondent
- *We need a core-loss tester to meet spec* – one respondent

Thirteen said they did not recall receiving the *Windings* newsletter. Their names were submitted to the Electric League to make certain they were on the distribution list for *Windings*.

V. Drive Power Cost Effectivity Update

As part of the evaluation of the *Drive Power Initiative*, recommendations regarding the assumptions of the cost-effectiveness analysis are presented here. Some minor recommendations include consideration of including more industries in the analysis and revision of some variables. More importantly, the recommendations include reworking the alignment between the analysis and the initiative approaches, the potential for coordination between the initiative and the cost-effectiveness analysis, and expansion of documentation to augment energy impact assessment.

A. Cost-Effectiveness Assumptions

The full set of cost-effectiveness assumptions used for this initiative are too extensive and complex to be presented here. They include energy use, hours of operation, motor life, and other variables for each of eight industries and for eight motor sizes. However, a summary of the most critical values that are the essential condensation of the complete set of assumptions are provided in *Table 31*.

Table 31: Summary of Cost-Effectiveness Assumptions

VARIABLE	INPUT VALUE
ESTIMATED TOTAL NUMBER OF HP, 1999	12,822,147
ESTIMATED TOTAL NUMBER OF HP, 2010	26,933,283
MEASURE LIFETIME, YEARS	7.9
NON-ENERGY BENEFITS	None considered
ANNUAL O&M COST	\$0
TOTAL RESOURCE FIRST COST, PER HP	\$7.08
MEASURE SAVINGS, KWH/YEAR PER HP	52.9
AFFECTED HP, 1999-2000	0
AFFECTED HP, 2001-2002	946,368
AFFECTED HP, 2003-2010	7,499,132

In support of the costs and benefit assumptions, the Northeast Energy Efficiency Partnerships (NEEP) used similar values for two key inputs for

VI. Drive Power Cost Effectivity Update

their *Motor Initiative* program. They used a motor incremental cost of \$7.90 per HP and motor energy savings of 37 kWh/year per HP for upgrade of motors from EPACT efficiency to premium efficiency.

B. Recommendations for Changes to Assumptions

Eight industries were included in the cost-effectiveness analysis. The included industries and their respective motor energy use are shown in *Table 32*.

Table 32: Cost-Effectiveness Industries and Energy Use

SIC CODE	SIC DESCRIPTION	MOTOR ENERGY USE GWh
INCLUDED INDUSTRIES		
26	PULP & PAPER	10,083
28	CHEMICALS	4,259
29	PETROLEUM	1,481
3874	MICROELECTRONICS	1,250
4971	IRRIGATION	6,278
10 & 14	MINING	4,030
372	AIRCRAFT & PARTS	1,420
4941 & 4982	WATER & WASTEWATER	2,100
NOT INCLUDED INDUSTRIES		
24	LUMBER & WOOD PRODUCTS	2,865
20	FOOD PRODUCTS	2,747

Additional industries should perhaps be included in the analysis. Although the eight that are included are all significant in the region, two other industries have higher motor energy use than some included in the analysis. These industries are lumber and wood products, and food products. In addition, it is possible that the microelectronics industry might be assumed to already have more comprehensive motor

VI. Drive Power Cost Effectivity Update

management practices because of their interest in reliability, and therefore might be excluded on that basis. In any case, the industries included in the analysis should be those that are part of the Initiative’s marketing approach.

The cost-effectiveness assumptions in terms of the details of industry activity also have a regional SIC industry growth rate. The values used in the cost-effectiveness assumptions are all positive and are shown in *Table 33*. However, recent anecdotal evidence suggests that a few of these industries are likely in retreat, with plant closings throughout the region. Although this review did not identify alternative values to the ones used, information on year-over-year employment growth in Oregon is provided in the table for selected industries as a proxy for regional growth values.

Table 33: Regional Growth Rate Assumptions

SIC CODE	SIC DESCRIPTION	REGIONAL GROWTH RATE USED	OREGON EMPLOYMENT GROWTH
26	Pulp & Paper	1%	-3.6%
28	Chemicals	6%	
29	Petroleum	2%	
3874	Microelectronics	8%	
4971	Irrigation	4%	
10 & 14	Mining	4%	-4.5%
372	Aircraft & Parts	3%	
4941 & 4982	Water & Wastewater	1%	
24	Lumber & Wood Prod.		-5.8%
20	Food & Kindred		1.1%

The detailed assumptions for cost-effectiveness include estimates of the portion of the population accepting energy conservation measures in each of eight motor size ranges. The lowest size ranges may have lower motor replace versus repair rates than actually occur in industry. For example, in

VI. Drive Power Cost Effectivity Update

the 21 to 50 HP size, 81% are assumed to accept repair. However, in the most recent participant interviews, about half of the end-users could describe the repair/replace horsepower cutoff used in their plant. For 43% the cutoff was replacement above 47 HP, for the remaining 57% it averaged replacement above 11 HP.

C. Energy Conservation Measures

The energy conservation measures or energy efficiency activities undertaken as a result of the market transformation initiative only roughly correspond to the energy conservation measures modeled in the cost-effectiveness analysis. This issue is discussed below, and is the impetus for the recommendation on alignment between the cost-effectiveness analysis and the Initiative.

Four very specific energy conservation measures were used in the cost-effectiveness analysis. These are:

- High quality motor reconditioning in lieu of standard quality
- New EPACT motor in lieu of standard quality reconditioning
- New CEE premium motor in lieu of standard quality reconditioning
- New CEE premium motor in lieu of new EPACT standard motor

As observed and interpreted by the evaluation team, the energy conservation measures being promoted by the *Drive Power Initiative* to date have been:

- Establishment of a repair versus replace policy
- Establishment of a premium motor purchase policy
- Development of a motor inventory for proactive motor management
- Adoption of a high quality motor repair specification

VI. Drive Power Cost Effectivity Update

While the energy conservation measures used in the cost-effectiveness analysis are in general relevant to the measures being promoted by the Initiative, there is not a direct correlation between the two groups of measures. It is recognized that changes in the policies of end-users will not always map perfectly to distinct actions on the ground that can be modeled as energy effects. Still, a closer alignment of the cost-effectiveness approach to Initiative activities would make modeling of program cost-effectiveness more valuable.

The second list of measures above, based on the observations of the evaluation team, corresponds reasonably well to the 1998 goals of the *Drive Power Initiative* as summarized by the Electric League:

- To establish the importance of repair versus replace decisions; and
- To promote the value of motor inventory for motor management decisions.

However, neither list of energy conservation measures corresponds with the stated 2001 goals of the *Drive Power Initiative*:

- Connecting industry with motor management resources (i.e., motor service centers); and
- Begin the promotion of the opportunities of motor systems efficiency.

The differences between these goals and the current cost-effectiveness analysis have led to the recommendation on alignment between the analysis and the Initiative that is described below.

D. Energy Savings

The energy savings estimated in the cost-effectiveness analysis, as described below, appear to be a reasonable achievement for a market transformation initiative. The *2001 Drive Power Workplan* does not contain any goals for energy savings, so the analysis and the Initiative cannot be compared directly.

The cost-effectiveness analysis shows a cumulative post-Initiative savings of 58 aMW in the year 2010. This is a significant fraction (31%) of the

VI. Drive Power Cost Effectivity Update

potential savings estimated by a study by Easton/Xenergy.²⁹ Their estimate of savings for motor efficiency upgrades and rewind improvements for the eight industries included in the cost-effectiveness analysis is 185 aMW. This savings is about 5% of the total estimated motor energy use for those industries.

E. Non-Energy Benefits

The cost-effectiveness analysis did not include any non-energy or production benefits. If anecdotal or qualitative information on non-energy benefits becomes available through the evaluation or the Initiative case studies, it could be used to quantify non-energy benefits. The most likely non-energy benefits will be productivity-related, with higher reliability attributed to motors included in a motor-management plan.

F. Cost-effectiveness Recommendations

Recommendations for *Drive Power* cost-effectiveness include improving the alignment between the analysis and the initiative approaches, taking advantage of the potential for coordination between the Initiative and the cost-effectiveness analysis, and expansion of documentation to augment assessment of energy impacts.

Coordination

The next version of the cost-effectiveness analysis might benefit from close coordination between the Alliance, Initiative staff, and perhaps also the evaluation team. This coordination could have benefits to the Initiative, as cost-effectiveness analysis can help point out the best markets or approaches to take.

²⁹ Easton/Xenergy *Opportunities for Industrial Motor Systems in the Pacific Northwest*, December 1999.

VI. Drive Power Cost Effectivity Update

Alignment of Cost-effectiveness Analysis

Relating the market effects of the Initiative's approach to the cost-effectiveness analysis could be an outcome of coordination. Either the analysis could be realigned with what the program has achieved, or perhaps more importantly, be reworked to reflect the current and future program directions. Using the same descriptions for energy conservation measures would be the first step in this alignment.

Market Effects Data Collection

The data collection vehicles that are part of this evaluation are not able to reflect the energy effects of the Initiative. The details required to assess market effects have not been consistently available from end-users during telephone interviews, and problems with respondent fatigue have been significant in this area.

Elsewhere in this report there are recommendations that field consultants formalize planning for each of the end-users that they approach. With the close relationship and time spent with end-users, the field consultants could also document changes in practices or policies that could be used to support determination of energy impacts. This data collection could also contribute to improvements in case study development, as concrete information on savings would be more readily available without the extensive post-implementation research sometimes required.

For example, while working with end-users the field consultants might document the following information for each plant:

- Total number and number of motors larger than 50 HP;
- Existing motor repair/replace and premium upgrade criteria; and
- Revised motor repair/replace and premium upgrade criteria (if any).

VI. Drive Power Cost Effectivity Update

VI. Findings and Recommendations

To date, the Initiative field consultants have contacted 77 end-users and 26 repair shops across the Pacific Northwest. Four end-users “success stories” have been completed. Nineteen motor management seminars and other types of events have been held. Overall, the Initiative appears to be influencing customers’ motor management practices, and customers are positive about the services:

- Among the 35 end-users interviewed for this report,³⁰ about 58% had made or were planning to make changes to their motor management practices and they attributed their actions to the Initiative.
- The reported changes included: changes/upgrades to repair/replace decision-making; creating a motors inventory; establishing a premium purchase policy or changing purchase specifications; and developing/using a repair specification.
- Respondents highly rated the assistance they received, whether one-on-one or in the seminars.

Interviews with customers and repair shops, and other data also indicate potential for improvement in the following areas:

- > Field consultants need to create more specific action plans for “closing the sale” on customer actions that will produce substantial savings with large end-users (250 motors or more, or at least 20 motors over 50 HP). Increased savings should be more feasible now that preliminary projects have established relationships with some customers.
- > The four success stories developed so far show progress and are well presented. However, to be most effective as a key marketing tool for motivating other customers, the stories need to show more dramatic bottom-line energy and costs savings. An exception is the Kaiser story, although this plant is now closed, as is another success story plant (see *Table 1* for story descriptions). While the

³⁰ A combination of end-users working one-on-one with the field consultants, and end-users who attended the seminars.

VI. Findings and Recommendations

Drive Power team could not have predicted the closures, it limits the appeal of the case studies and precludes follow-up work for more substantial savings.

- > Only 20% of end-users interviewed for this report say they are using operational costs in their repair/replace decisions. The Initiative needs to address this more effectively and aggressively through its one-on-one customer work, seminars, and the toolkit, as we believe this is a strategic market lever.
- > About half of customers with inventories do not appear to use them for repair/replace decision-making, and many simply use them to track spares. Field consultants and seminar trainers may need to clarify the definition of inventory and provide more information on how to use it.
- > Repair shops are helping customers make repair/replace decisions, and customers report relying on shops for this help, but none of the shops interviewed said they consider operational costs. Shops need to be persuaded to do this, or customers need to make “first-stage” repair/replace decisions themselves.
- > The League plans to work more deliberately with repair shops on business planning, which will help create a market structure. This is a valuable goal. The League should take care to assure that this assistance is responsive to the needs of highly diverse motor services businesses. Many motor shops survive by finding niche groups of customers and serving their needs through unique marketing and services. It remains to be seen whether there are any generic business models for success.
- > As the League moves forward with its plan to more widely broadcast a message of “quality” repair, it needs to make sure quality is clearly defined in marketing materials, particularly regarding motor efficiency.
- > The League should keep abreast with and disseminate information from other regional and national programs and initiatives on motor efficiency. These include the NEMA *Premium Motor* designation and CEE’s *Motor Decisions Matter*.

VI. Findings and Recommendations

These key findings and recommendations are further detailed below.

A. Targeting and Planning

Finding: In the second MPER (December 2000), the PEA evaluation team found that for customers contacted by the field consultants through May 2000, about one-third had less than 250 motors. The concern was that given the goal of targeting large end-users (defined by the Alliance as those end-users that constitute a significant portion of the electrical load and consumption in the region) and with limited resources available, the Initiative needed to better focus their efforts. Based on analysis of data available for customers for June 2000 through January 2001, about one-quarter had less than 250 motors (although there are relatively few contacts for this period so it is difficult to draw conclusions about improvements in marketing focus).³¹

- > **Recommendation A:** The League project manager should continue to emphasize to the field consultants the goal of contacting large end-users, particularly with a new field consultant working in Western Washington. While hard and fast rules are not advisable, the Initiative should target customers in the range of 250 motors and/or that have at least 20 motors of 50 horsepower or larger. Even more importantly, it should emphasize focusing on “good prospects” that can be converted into substantial successes, and fit new contacts and other services around this priority.

Adding a streamlined approach to provide services to smaller end-users that are not good candidates for *Drive Power* services could include referrals to the *Energy Ideas Clearinghouse*, telephone-only assistance from the field consultants, or where there are appropriate programs, introductions to the serving electric utility.

- > **Recommendation B:** The outreach strategy in the League’s recent workplan (dated March 13, 2001) could be more specific in describing targets for customer size and SIC, and why these are important. Regarding the workplan’s goals to specifically target

³¹ Note that with more complete and detailed data from field consultants, these numbers might change.

VI. Findings and Recommendations

small and medium end-users through the motor management seminars, the Alliance and the League might want to rethink this plan, given the evaluation team's finding that the seminars are having an impact among both large small end-users attending.

Finding: Review of the most recent trip reports indicated that the field consultants are still not developing thorough action plans for each customer.

- > **Recommendation:** The field consultants should create and periodically update (e.g., quarterly), more specific action plans for "closing the sale" on customer actions which will produce substantial savings with large end-users. Increased savings should be more feasible now that preliminary projects have established relationships with some customers.

The plans should include short- and long-term goals, strategies, and timelines. The documentation approach should be consistent among the field consultants, but need not be voluminous or onerous. The benefits to field consultants could be substantial, and it should improve the Initiative's ability to manage this diverse effort.

B. Customer Motor Management Practices

Finding: Overall, the evaluators found that there has been progress in the programs' influence of end-users' practices, and the program is generally receiving a positive response. This is based on interviews conducted during January and February 2001 with customers working with the field consultants³² (16 interviews) and seminar attendees (19 interviews). These interviews indicated that between these two groups, about 58%³³ had made or were planning to make changes to their motor management practices, and they attributed their actions to the Initiative. The reported changes included: changes/upgrades to repair/replace decision-making (fourteen respondents); creating a motors inventory (ten respondents);

³² Those customers working one-on-one with field consultants are referred to as "participants."

³³ Nine of 22 participants (41%) and fifteen of nineteen of seminar attendees (79%).

VI. Findings and Recommendations

establishing a premium purchase policy or changing purchase specifications (nine respondents); and developing/using a repair specification (three respondents). Respondents also highly rated the assistance they received, whether one-on-one or in the seminars.

- > **Recommendation:** Continue the one-on-one work and seminars, but consider the following additional findings and recommendations.

Finding: It appears that the concept of “operating cost of motors” could be presented more strongly and clearly to customers. Analysis of the survey responses indicated that among participants and seminar attendees, only 20%³⁴ said they consider operational costs in their repair/replace decisions. Respondents reported that the factors most often used in decisions were quick turnaround, spare availability, first cost, motor size, and repair shop recommendations (in order of frequency). Some respondents said they use a horsepower or cost threshold. While we cannot state what the optimal level is for any particular facility, the cutoffs appeared in most cases to be too low. In general, any calculation or analysis for repair/replace is rare.

- > **Recommendation:** We believe consideration of operational costs is a critical strategic lever for market change. The field consultants and seminar presenters need to put more emphasis on end-users’ development of repair/replace guidelines that have a clear, documented understanding of the operational costs of alternatives. More specific recommendations regarding program approach and tools are provided below in the sections on the seminars and toolkit.

Finding: While most participants have specific plans for some or all of their critical motors when they fail, the plan is usually focused on having a spare on hand, rather than on having a plan based on operational costs for whether to repair or replace, and whether to install a premium efficiency motor. Only two said their plan was based on a repair/replace decision approach. Plans based on having a spare backup does insure against installation of an inappropriately-sized motor and, to the extent that a

³⁴ Five of sixteen participants (31%) and two of nineteen seminar attendees (11%).

VI. Findings and Recommendations

premium purchase policy is in place, against emergency purchase of a less efficient motor. However, more savings are possible if inventories are used to plan ahead before a motor fails (and possibly a production line goes down), to rationally determine whether each motor will be rewound or replaced, and if replaced, whether an efficient motor will be used.

- > **Recommendation:** As above, the field consultants may need to work more intensively with customers on developing repair/replace guidelines that enable them to do advanced planning where quick turnaround is a non-issue, rather than a primary driver of action.

Finding: Half of respondents³⁵ are not using their inventories and associated tools such as *MotorMaster+* to the depth they could in motor management decision-making. End-users generally appear to view inventories as a simple tracking mechanism for operating motors, or for finding an appropriate spare.

- > **Recommendation:** At the most basic level, the field consultants and seminar trainers may need to clarify with end-users how the Initiative is defining the content and function of inventories. Perhaps a different term should be used. Customers also appear to need more training on how to use inventories. Finally, there may need to be more emphasis on how to create “strategic” inventories focused on critical motors so customers get the most out of data collection and don’t get bogged down in compiling a comprehensive database.

C. Momentum and Exit Strategy

Finding: In the second MPER, we observed that the Initiative was at a critical point in its momentum, and that the Alliance and League needed to consider how this momentum is to be sustained beyond the end of 2000. We also said that it would be necessary for the Alliance to extend funding to continue to build on successes, and for the League to decide the degree to which it will actively work towards forming a self-sustaining market for motor services.

³⁵ Six of fourteen participants (43%) and six of ten seminar attendees (60%).

VI. Findings and Recommendations

To continue momentum, at the end of 2000, the Alliance extended funding through 2003. In consideration of an exit strategy, the League's new workplan describes working proactively with motor service centers to train them on the Initiative's tools and develop business models to help them expand their service.

- > **Recommendation:** Both developments described above are key steps towards developing a self-sustaining motor services market. We have some further recommendations below on the repair shop strategy.

D. Repair Shop Strategy

Findings: The interviews with motor service shops provided the following insights into the current industry climate which bear on the League's planned approach to provide business development services to shops:

- **The repair industry is vulnerable and in retreat.** Many shops reported a decline in the repair business. At the same time, on average, over half of shops' business (56%) still comes from repairs, while only about a quarter (23%) from new motor sales, and less than 5% comes from "other motor-related services." Further, shops offering "comprehensive" services only had one or two major accounts using the services, and the shops only offered a portion of what we described in the survey as comprehensive.
- **While shops expressed interest in expanding their services, the industry faces substantial inertia.** It is generally heavy on repair staff, but under-staffed for expanding services, and weak in the area of business planning and strategic marketing. Further, shifting to other services may mean reducing demand for repair staff, a sunk cost.
- **There are wide variations in the market.** Based on the interviews, there are only a handful of motor service centers with the wherewithal to expand into more sophisticated and comprehensive services. For less sophisticated shops, it would be a substantial advance if they began to recognize the importance of operational costs in repair/replace decisions, and/or if they were

VI. Findings and Recommendations

willing to enhance their repair spec or make other basic technical changes in their practices.

> **Recommendations:** The League's plan to develop business models to help shops expand their services, and provide more training on how to use the program tools is well timed, particularly because there has been a fair amount of contact between the field consultants and shops. Moving forward with this work, we have the following recommendations:

- The assistance offered to shops should be flexible to respond to variations in the market. While business-planning assistance should be offered to all shops to be fair, smaller and less sophisticated shops may need quite different types of assistance.
- How shops are approached will be key to understanding their point of view and gaining their trust. For example, some shops may be less open to ideas for expansion into other services if it will not keep their repair staff busy.
- If possible, business models should be developed through close work with a specific shop so they do not appear too abstract.
- The program must also carefully assess which shops are truly interested in and able to respond to assistance, so as to use program resources wisely.

Finding: All but one of the 24 repair shops interviewed said they help customers make repair/replace decisions. However, none use operational costs in that decision process. First-cost comparison is the most common approach (88%), followed by condition of the motor (33%) and size of the motor (13%). At the same time, almost all of the customers working with field consultants mentioned the recommendation from their repair shop as a key factor in their repair/replace decisions. (Respondents to the seminar participant survey did not mention this as a factor.)

> **Recommendation:** There could be two approaches with repair shops regarding the analysis of operating costs: 1) Convince shops of the business advantages of doing analysis based on operational

VI. Findings and Recommendations

costs (i.e., increased motor sales) and upgrading the level of services offered to customers (as indicated above, the League plans to do the latter); and 2) have customers make the “first-stage” decision of whether to repair or replace based on operational costs. If the customer decides to repair, the shop would then determine if this were feasible based on the motor’s condition.

Finding: Respondents reported that customers’ interest in quality repairs was small, even if it was increasing. Over half of respondents (58%) say interest in quality repairs has increased, but even more respondents (63%) say customers rarely or never ask about repair quality. The shops were consistent in their impressions that in the minds of customers, low bids and low first cost are foremost.

- > **Recommendation:** The program needs to continue to create market “push” on the customer side for quality repairs and other services. This is particularly important to spurring smaller, less sophisticated shops into improving practices and services. It may be useful to develop a supplemental piece on motor repair covering more basic information on how to assess a shop’s services and repair quality, how to plan a visit, what questions to ask, key elements of a specification, etc.

Finding: Repair shop interviews shed light on how difficult it is to define or communicate (and for customers to understand and assess) “quality” in motor repairs, particularly as it applies to efficiency. Not surprisingly, most shops felt they offered a high quality service, although the repair specifications used by shops varied widely and a number did not have testing equipment.

- > **Recommendation:** As the Initiative moves forward with its plan to widely broadcast a message of “quality” repair, it needs to make sure that the term “quality” is well-defined in program materials and communications, particularly as it applies to energy efficiency.

E. Motor Management Seminars

Finding: Even though the seminars are having an impact on practices, they could be more effective. Interview responses indicate that end-users could be doing more systematic analysis and advanced planning for what

VI. Findings and Recommendations

to do at time of failure for each of their critical motors, and that few are considering operational costs. We observed in the seminar that little time was spent on this.

> ***Recommendations:***

- Spend more time on explaining in simple terms how to use the tools to develop better repair/replacement guidelines that include operational costs.
- Focus on “selling the idea,” especially regarding operational costs, and less on technically-oriented information. Emphasize simple messages about actions and resulting cost savings that attendees would take back to the plant with them. The detail can follow later as technical assistance is provided.
- Incorporate simple hands-on exercises, especially ones comparing operational costs.
- Focus the seminar around the best program success stories.
- Add a segment on how to effectively sell ideas to management.
- Information on motor systems needs to be very specific and grounded in concrete examples.
- Provide training to the presenters by a third-party on effective presentations and seminars.
- Work at effective team building with allies such as motor repair centers and utilities to actively recruit the most promising end-users to attend the seminars.
- The motor management seminars could include a component describing the benefits and ways to go about tracking progress in a motor management program and how to report success to management.

VI. Findings and Recommendations

Finding: It appears that field consultants could do more deliberate follow-up with seminar attendees.

- > **Recommendation:** The program field consultants should follow up with seminar attendees that meet the criteria for promising candidates (e.g., customers with at least 250 motors in targeted market segments) to ferret out the ones that are moving forward with significant practice changes. This will help maximize the market transformation effects from this part of the Initiative, and may result in new success stories.

F. Toolkit

Finding: Customer recollection of the toolkit is not high. This may be because the kit in its entirety contains numerous and diverse pieces of information, and key pieces are not flagged. Furthermore, some pieces could be more effective.

- > **Recommendation:** 1) Flag key tools and materials; 2) consider only giving customers selected and relevant items rather than the entire toolkit; and 3) Remove overly complex or conflicting materials.

Finding: As noted above, customers are generally not using operational costs in their motor decision-making.

- > **Recommendation:** Add the following tools to the tool kit:
 - A simple table that shows operational costs to give customers a sense of why it is critical to consider this. The table values would be based on assumptions about efficiencies and average operating hours.
 - A better analytic tool to help customers formulate a simple repair/replace guideline. The tool needs to be responsive to their typical informal approach, while including enough analytic capacity to make good decisions. A suggested form for the repair/replace decision tool is a flowchart with multiple branches and decision point values tied to particular participant characteristics.

VI. Findings and Recommendations

G. Cost-effectiveness Analysis

Finding: The cost-effectiveness analysis for the *Drive Power Initiative* does not reflect the activities, the market changes, and the approach of the Initiative. Minor recommendations include adding more industries to the analysis and revisions to some variables. These are described in *Section V*. More importantly, recommendations include reworking the alignment between the analysis and Initiative, potential coordination between the Initiative and the analysis, and expansion of documentation to augment energy and non-energy impacts. These are described below.

- > **Recommendation A:** The next version of the cost-effectiveness analysis might benefit from closer coordination between the Alliance, Initiative staff, and perhaps also the evaluation team. This coordination could have benefits to the Initiative, as cost-effectiveness analysis can help point out the best markets or approaches to take. This coordination may result in the following two recommendations being adopted.
- > **Recommendation B:** Relating the market effects of the Initiative approach to the cost-effectiveness analysis could be an outcome of the coordination recommended above. Either the analysis could be realigned with what the program has achieved, or perhaps more importantly, be reworked to reflect the current and future program directions. Using the same descriptions for energy conservation measures would be the first step in this alignment.
- > **Recommendation C:** The data collection vehicles that are part of this evaluation are not able to reflect the energy effects of the Initiative. The details required to assess market effects have not been consistently available from end-users during telephone interviews, and problems with respondent fatigue have been significant in this area. Elsewhere in this report there are recommendations that field consultants formalize planning for each of the end-users that they approach. With the close relationship and time spent with end-users, the field consultants could also document changes in practices or policies that could be used to support determination of energy impacts. This data collection could also contribute to improvements in case study development, as concrete information on savings would be more readily available

VI. Findings and Recommendations

without the extensive post-implementation research sometimes required.

VI. Findings and Recommendations
