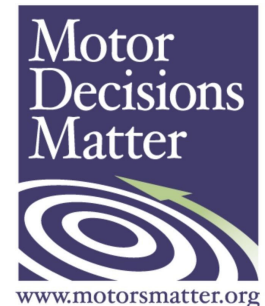


Motor Decisions MatterSM (MDM) Webcast
August 11, 2010
2 - 3 p.m. Eastern

Easy as ***1*2*3*** : Use **MDM Tools to Introduce Motor Management**

Dirk Koechner
Industrial Program Manager
Consortium for Energy Efficiency (CEE)



www.motorsmatter.org

Housekeeping

Audio Portion

- ✓ Dial *0 to speak to a RollCall operator
- ✓ Dial *6 to Mute/UnMute
- ✓ Use the chat feature during presentation; there will be time for questions after the presentation
- ✓ Be sure that hold music is turned off

Web Portion

- ✓ Ensure that your pop-up blocker is turned off and Java is enabled
- ✓ Use browser: IE 6.0 or later, Firefox 1.0.6 or later
- ✓ Minimize the number of applications running
- ✓ Download MDM Tools (www.motorsmatter.org)

Today's Webcast

- MDM Campaign Overview
- Motor Management Concepts
- MDM Tools & Resources
- Tools Demonstration
 - MDM Website
 - Simple Savings Chart
 - 1*2*3 Approach
- Questions/Discussion

Motor Decisions MatterSM

The Opportunity

“Motor-driven systems ... represent 65 percent of total industrial electricity consumption” - “*Unlocking Energy Efficiency in the U.S. Economy*”, McKinsey&Company, July, 2009

MDM Campaign Goals

Increased awareness of motor management opportunities

Increased demand for motor management services

Increased implementation of motor management practices

MDM Sponsors

Efficiency Programs

- Alliant Energy
- BC Hydro
- Efficiency Vermont
- Long Island Power Authority (LIPA)
- MidAmerican Energy Company
- National Grid USA
- New Jersey Office of Clean Energy
- NYPA
- NYSERDA
- Northwest Energy Efficiency Alliance
- NSTAR
- Pacific Gas & Electric (PG&E)
- Southern California Edison (SCE)
- Tennessee Valley Authority (TVA)
- Xcel Energy

Manufacturers – Motor & Drive

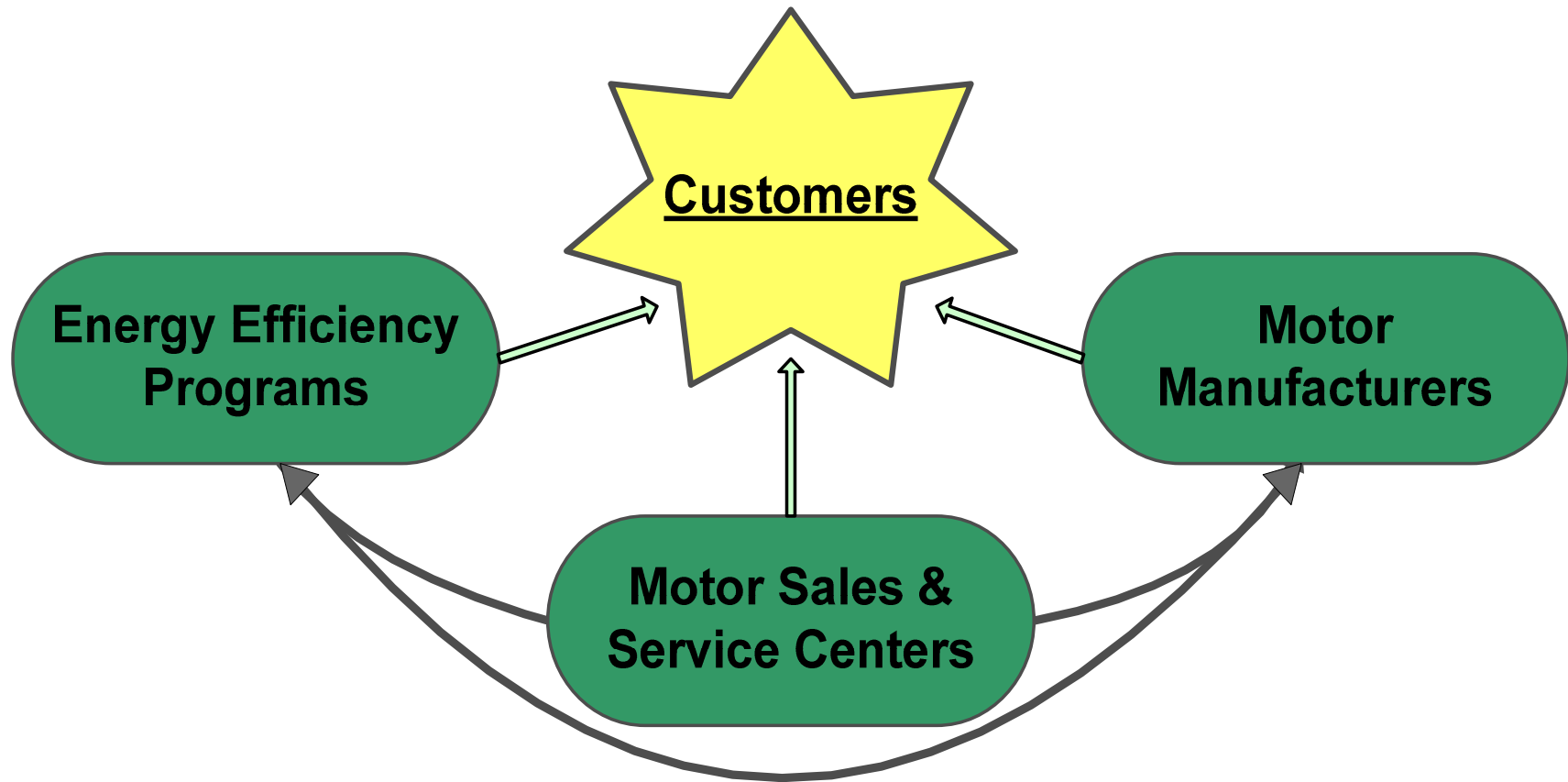
- A.O. Smith
- ABB
- Danfoss
- GE Energy Motors
- TECO-Westinghouse Motor Company

Other Organizations

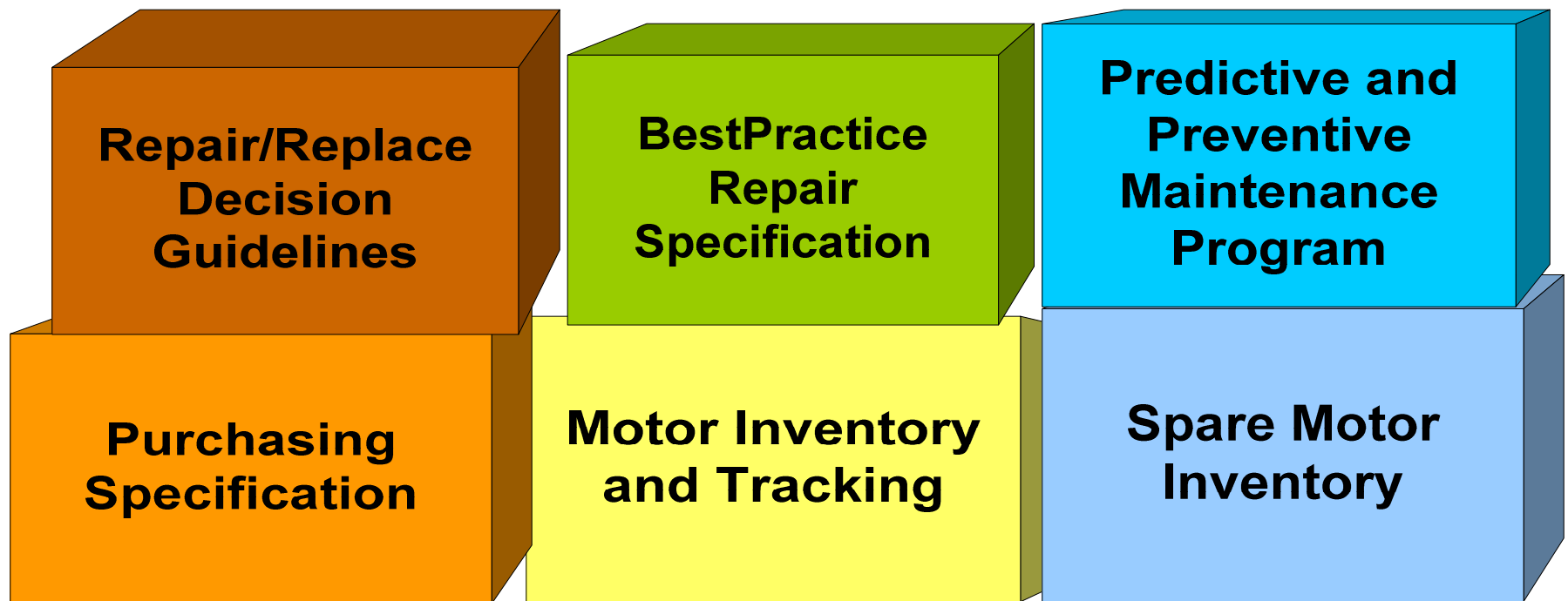
- Advanced Energy
- Copper Development Association, Inc. (CDA)
- Electrical Apparatus Service Association (EASA)

For more information, visit: <http://www.motorsmatter.org/sponsors/>

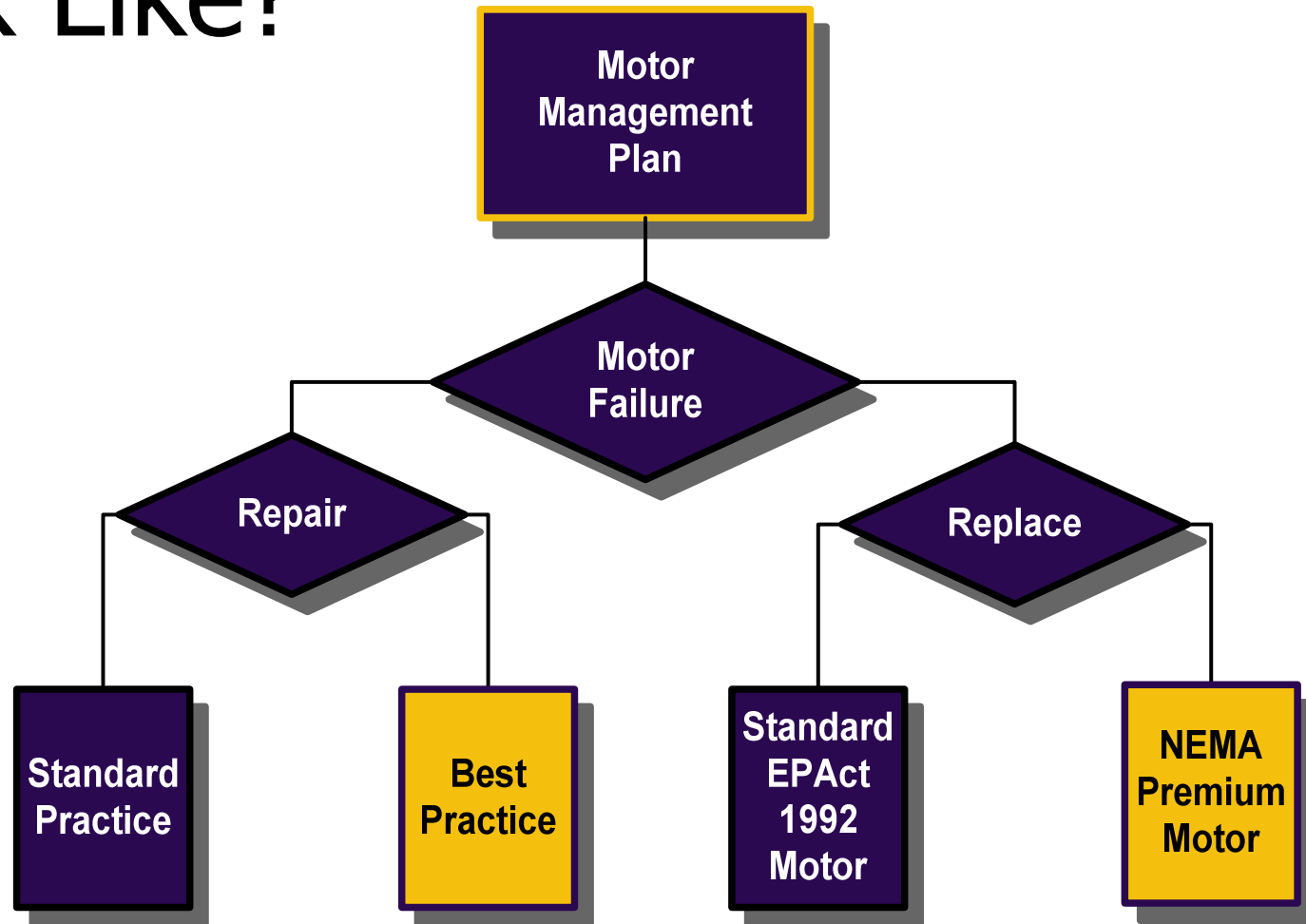
MDM: Collaborate nationally to enhance local effectiveness



What Does Motor Management Include?



What Does Motor Management Look Like?



“Sound” Motor Management in Practice

Proactive Policies & Planning

- Motor Inventories
- Purchasing policies
- Repair/Replace guidelines
- Maintenance programs



What Are the MDM Tools?

Concept Tools

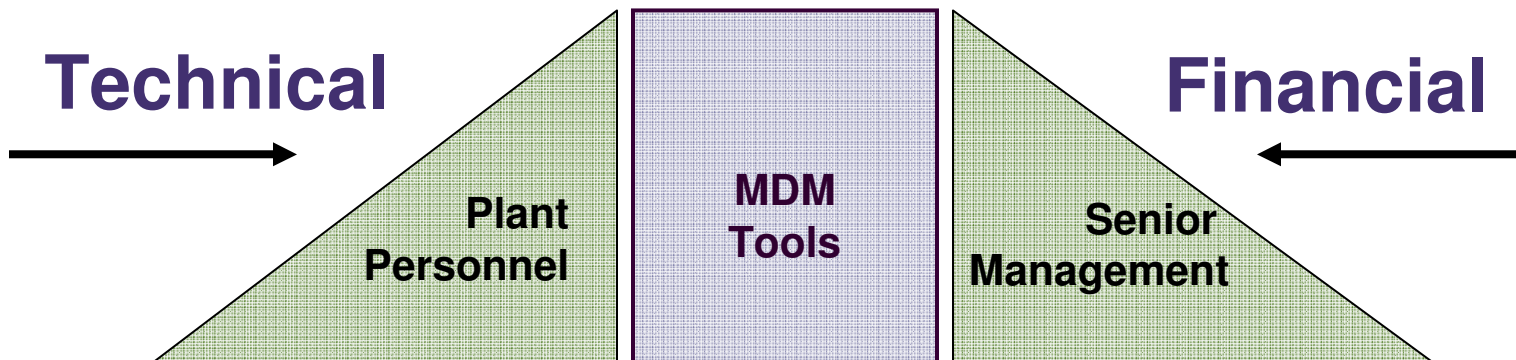
- www.motorsmatter.org
- Motor Planning Kit
- How-to Guide
- Case Studies

Calculation Tools

- *1*2*3* Spreadsheet
- *1*2*3* User's Guide
- Simple Savings Chart
- MotorSlide Calculator

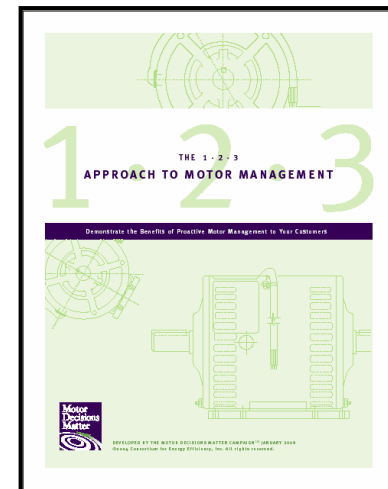
What is the MDM Scope?

To promote **proactive** motor management to both facility and senior-level managers



How Can You Use MDM?

- Download tools and resources and share with staff and customers
- Network with trade allies
- MDM website: information hub

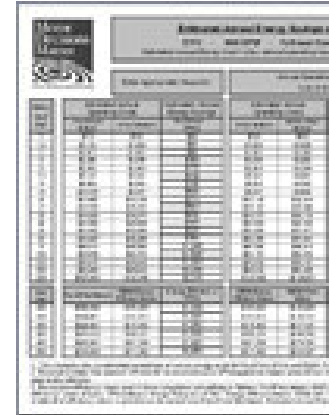


Motor Planning Kit



- Easy-to-read, 20 pages
- Intro. to motor management and planning
 - Details about “building blocks”
 - Tools and templates for getting started
 - Resources for motors and motor systems
 - Success stories
- Region-specific resources

The Simple Savings Chart



The screenshot shows a spreadsheet with columns for 'Motor', 'Annual Operating Hours', 'Blended Cost of Electricity', 'Annual Operating Costs', and 'Annual Cost Savings'. It lists various motor models and their corresponding costs and savings.

A very simple Excel Spreadsheet

Step 1) Enter two pieces of data:

Annual Operating Hours and Blended Cost of Electricity

Step 2) Spreadsheet generates side-by-side comparison of 1-500 hp motors including:

- ◆ Annual Operating Costs and Annual Cost Savings
- ◆ Pre-1997 Motors → EPart
- ◆ EPart → NEMA Premium
- ◆ Pre-1997 Motors → NEMA Premium

The 1*2*3 Approach



Excel Spreadsheet

Step 1) Enter thirteen pieces of data

Nameplate Data, Costs (energy, purchase, repair), Operating Hours

Step 2) Spreadsheet generates side-by-side comparisons of repair/replace options including:

- ◆ Annual Cost and Energy Savings, Simple Payback, and NPV
- ◆ Immediate replacement (upgrade) with NEMA Premium
- ◆ Best practice repair upon failure
- ◆ Replacement with EPart or NEMA Premium at failure

Step 3) Develop Plan of Action for motor management

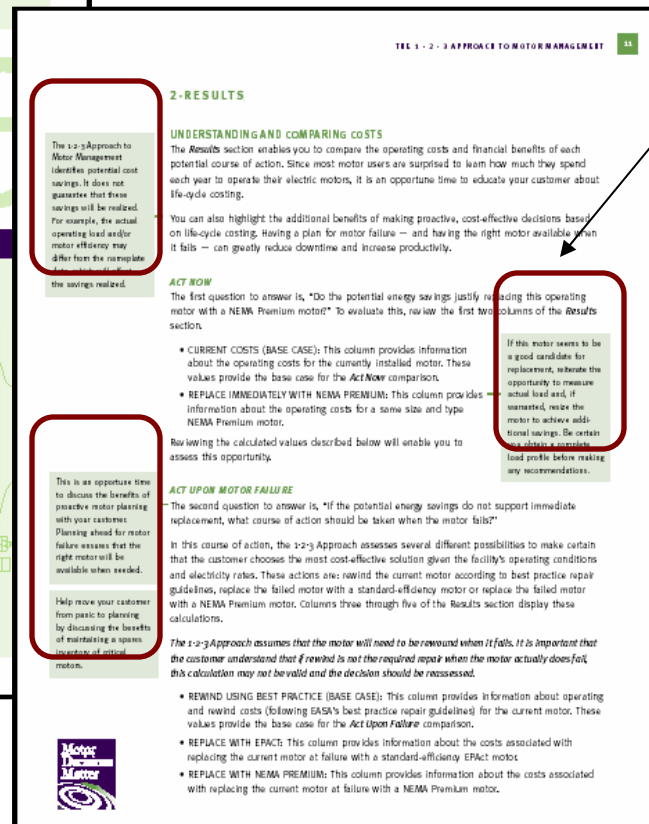
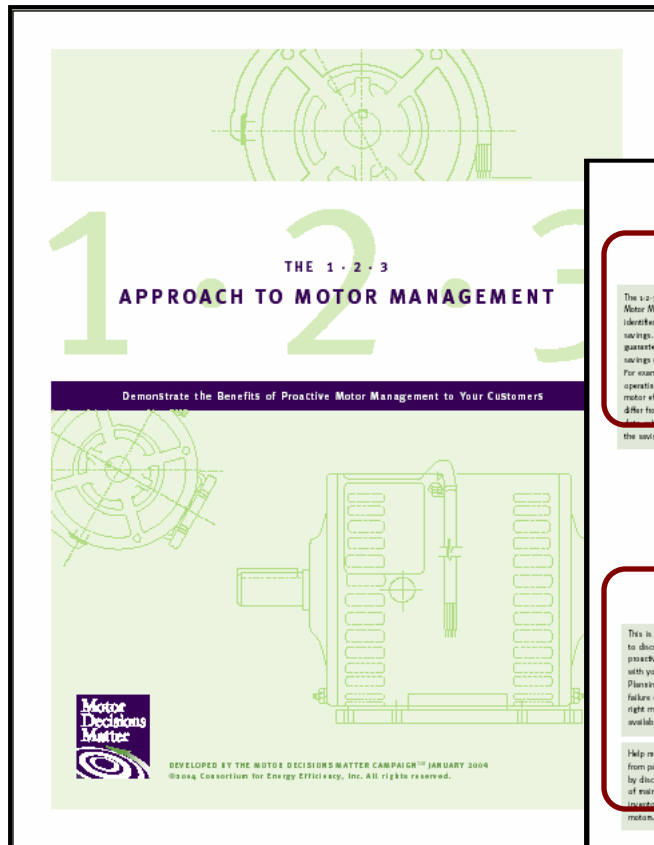
1*2*3 Assumptions

- ◆ Nameplate data & full load efficiency
- ◆ Customer approves all data
- ◆ Best Practice Repair assumes a rewind that will maintain motor efficiency

1*2*3 Process

- ◆ Review motor population - choose samples and gather basic data (energy price, motor price, operating hrs., etc.)
- ◆ Input data, and click to calculate cost factors involved in decision to repair or replace
- ◆ Use calculations to consider appropriate motor management strategies

1*2*3 Users Guide



Motor issues identified as talking points.

Questions so far?

Next: MDM Website, Simple Savings Chart, and *1*2*3* Spreadsheet Demonstration

The MDM Website: www.motorsmatter.org

The screenshot shows the homepage of the Motor Decisions Matter website. The browser address bar displays <http://www.motorsmatter.org/>. The website header features the logo and the title "Motor Decisions Matter". A navigation menu includes links for HOME, SPONSORS, MDM EVENTS, MDM TOOLS, PRESS ROOM, CASE STUDIES, and HELPFUL RESOURCES. A banner below the menu reads "Management & Planning make the DIFFERENCE".

The main content area is divided into several sections:

- MDM IN THE NEWS:** A link to a June 2009 article titled "Maintenance Technology: 'Your Motor Inventory: A Cost Effective Resource'" and a link to "All recent articles".
- UPCOMING MDM EVENTS:** A list of events including a webcast on August 5, a DOE Midwest Industrial Efficiency Exchange in Detroit, MI (September 9-10), and an EASA Region 7 event in Reno, NV (September 10-12). A link to the "Full MDM Event Calendar" is provided.
- MDM E-NEWSLETTER:** A form with an "Email:" label and a "Subscribe" button.
- MDM TOOLS:** Two promotional boxes: "The 1*2*3 Approach >>>" with a graphic showing the numbers 1, 2, and 3, and "The Motor Planning Kit >>>" with a "Click Here" button.

A central message states: "Start today. Because managing a plan is easier than managing a crisis." The text below this message explains that every facility manager would like to reduce energy costs, increase productivity, and reduce GHG emissions, and that sound motor management can help achieve these goals. It also notes that the website contains information to develop a motor management plan and offers support through partnerships with local sales and service centers, vendors, utilities, and other energy-efficiency representatives. The Motor Decisions MatterSM (MDM) campaign and its sponsoring organizations are mentioned as being here to help.

MDM Tools

The screenshot shows the Motor Decisions Matter website. The navigation bar includes HOME, SPONSORS, MDM EVENTS, MDM TOOLS (circled in blue), PRESS ROOM, CASE STUDIES, and HELPFUL RESOURCES. The MDM Tools section is active, displaying a list of tools: MDM Tools, The 1*2*3 Approach, Motor Planning Kit, and How-To Guide. A 'Sponsor Sign In' form is visible on the left. The main content area features a section titled 'The 1*2*3 Approach to Motor Management' with three sub-sections: 'Spreadsheet (xls)', 'User's Guide (pdf)', and 'MotorSlide Calculator'. Each sub-section includes a brief description and a small image of the respective tool. The 'Motor Planning Kit' section is also visible below the spreadsheet section.

Motor Decisions Matter

HOME SPONSORS MDM EVENTS **MDM TOOLS** PRESS ROOM CASE STUDIES HELPFUL RESOURCES

MDM Tools

The Motor Decisions MatterSM Sponsors have developed several tools to demonstrate the financial benefits of life cycle costing and to help you develop a plan that's right for your company. These tools are available below.

The [Helpful Resources](#) tab also provides additional resources.

The 1*2*3 Approach to Motor Management

Spreadsheet (xls)

This simple, step-by-step calculation tool for getting started in motor management can help motor service centers, vendors, utilities, energy-efficiency organizations, and others convey the financial benefits of sound motor management to their customers.

User's Guide (pdf)

This step-by-step guide explains how to use the 1*2*3 Spreadsheet. It also suggests a process for using the results to convey the financial benefits of sound motor management to your customer's management team.

MotorSlide Calculator

This cardboard slide rule calculates annual energy costs and annual energy savings based on electricity costs, motor size, motor efficiency, and hours of operation. Available on-line and in print.

Motor Planning Kit (pdf)

This booklet provides a comprehensive overview of motor management. It details the goals and opportunities available, and describes how to pursue a variety of plans ranging from generic purchasing policies to total motor inventory.

Tagging your motors lets everyone know what to do when a motor fails.

Motor Planning Kit

How-To Guide

Motor Decisions Matter

HOME SPONSORS MDM EVENTS **MDM TOOLS** PRESS ROOM CASE STUDIES HELPFUL RESOURCES

MDM Tools

The 1*2*3 Approach

Motor Planning Kit

How-To Guide

Determine Services

Connect to Tools

Build Partnerships

Develop a Plan

Test-Drive with Customers

Sponsor Sign In

Sign In

Bringing Motor Management to Your Customers

A How-To Guide

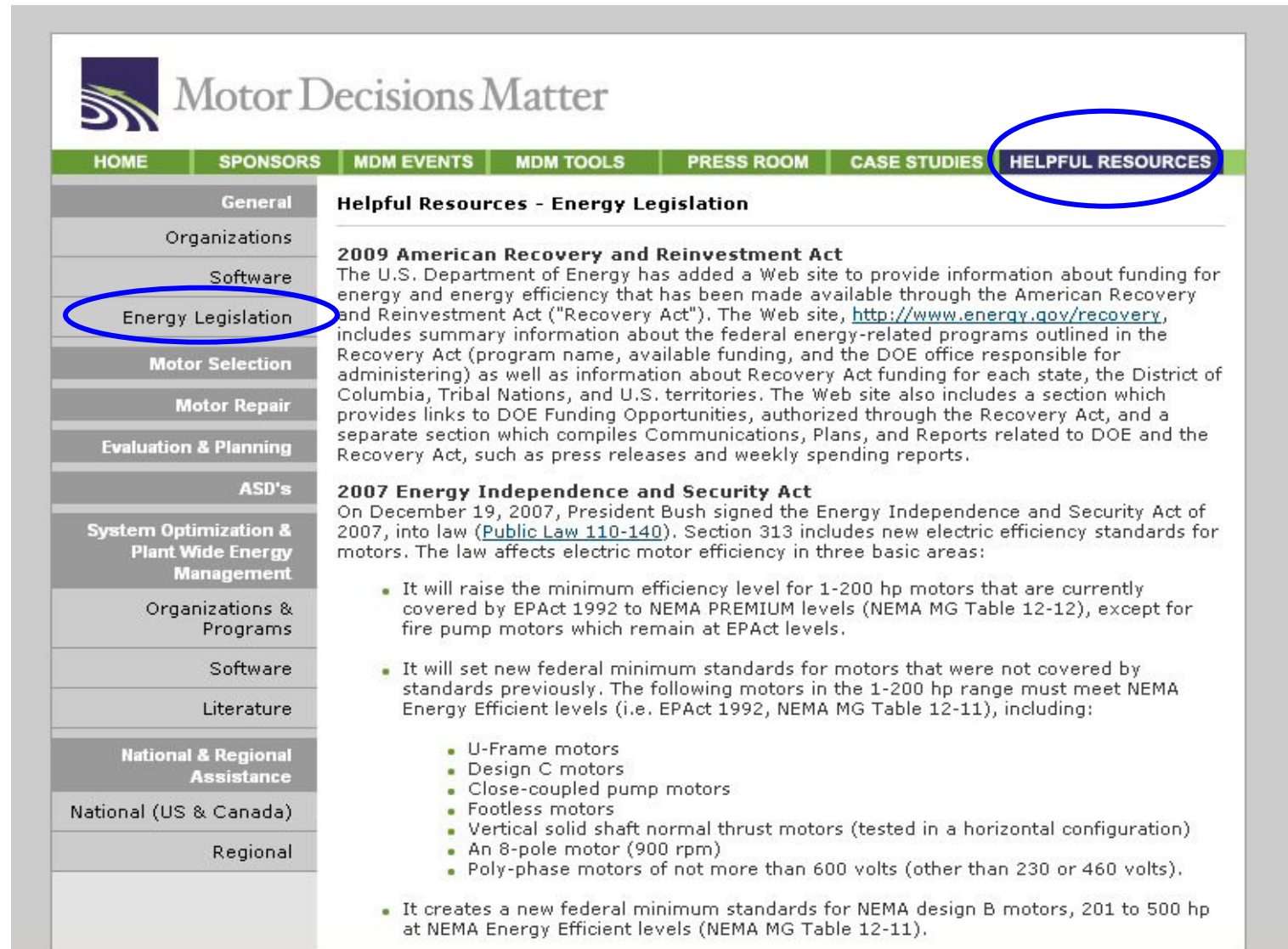
Helping your customers better manage their motors can increase their profitability... and yours. Use this guide to get started.

What is motor management?

- Determine what services you will offer to your customers.
- Connect to MDM tools and other resources.
- Build partnerships with local trade allies and energy-efficiency programs.
- Develop a plan for delivering motor management to your customers.
- Test-drive your plan with a few customers.

Last revised: March 8, 2007

Helpful Resources



Motor Decisions Matter

HOME SPONSORS MDM EVENTS MDM TOOLS PRESS ROOM CASE STUDIES **HELPFUL RESOURCES**

General

- Organizations
- Software
- Energy Legislation**
- Motor Selection
- Motor Repair
- Evaluation & Planning
- ASD's
- System Optimization & Plant Wide Energy Management
 - Organizations & Programs
 - Software
 - Literature
- National & Regional Assistance
 - National (US & Canada)
 - Regional

Helpful Resources - Energy Legislation

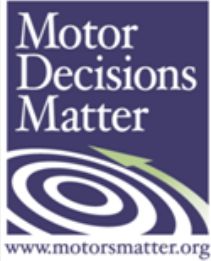
2009 American Recovery and Reinvestment Act
The U.S. Department of Energy has added a Web site to provide information about funding for energy and energy efficiency that has been made available through the American Recovery and Reinvestment Act ("Recovery Act"). The Web site, <http://www.energy.gov/recovery>, includes summary information about the federal energy-related programs outlined in the Recovery Act (program name, available funding, and the DOE office responsible for administering) as well as information about Recovery Act funding for each state, the District of Columbia, Tribal Nations, and U.S. territories. The Web site also includes a section which provides links to DOE Funding Opportunities, authorized through the Recovery Act, and a separate section which compiles Communications, Plans, and Reports related to DOE and the Recovery Act, such as press releases and weekly spending reports.

2007 Energy Independence and Security Act
On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007, into law ([Public Law 110-140](#)). Section 313 includes new electric efficiency standards for motors. The law affects electric motor efficiency in three basic areas:

- It will raise the minimum efficiency level for 1-200 hp motors that are currently covered by EAct 1992 to NEMA PREMIUM levels (NEMA MG Table 12-12), except for fire pump motors which remain at EAct levels.
- It will set new federal minimum standards for motors that were not covered by standards previously. The following motors in the 1-200 hp range must meet NEMA Energy Efficient levels (i.e. EAct 1992, NEMA MG Table 12-11), including:
 - U-Frame motors
 - Design C motors
 - Close-coupled pump motors
 - Footless motors
 - Vertical solid shaft normal thrust motors (tested in a horizontal configuration)
 - An 8-pole motor (900 rpm)
 - Poly-phase motors of not more than 600 volts (other than 230 or 460 volts).
- It creates a new federal minimum standards for NEMA design B motors, 201 to 500 hp at NEMA Energy Efficient levels (NEMA MG Table 12-11).

MDM Simple Savings Chart: TEFC Page

Motor Size ² (hp)	Estimated Annual Operating Costs		Estimated Annual Energy Savings	Estimated Annual Operating Costs		Estimated Annual Energy Savings	Estimated Annual Operating Costs		Estimated Annual Energy Savings
	Pre-EPAct Motors	EPAct Motors	Pre-EPAct → EPAct	EPAct Motors	NEMA Prem Motors	EPAct → NEMA Prem	Pre-EPAct Motors	NEMA Prem Motors	Pre-EPAct → NEMA Prem
1	\$778	\$723	\$55	\$723	\$698	\$25	\$778	\$698	\$80
1.5	\$1,132	\$1,066	\$66	\$1,066	\$1,035	\$31	\$1,132	\$1,035	\$97
2	\$1,477	\$1,421	\$56	\$1,421	\$1,380	\$41	\$1,477	\$1,380	\$97
3	\$2,200	\$2,046	\$153	\$2,046	\$2,000	\$46	\$2,200	\$2,000	\$197
5	\$3,582	\$3,410	\$172	\$3,410	\$3,334	\$76	\$3,582	\$3,334	\$244
7.5	\$5,235	\$5,001	\$234	\$5,001	\$4,881	\$120	\$5,235	\$4,881	\$354
10	\$6,964	\$6,668	\$296	\$6,668	\$6,508	\$160	\$6,964	\$6,508	\$456
15	\$10,337	\$9,837	\$500	\$9,837	\$9,688	\$149	\$10,337	\$9,688	\$649
20	\$13,487	\$13,116	\$371	\$13,116	\$12,834	\$282	\$13,487	\$12,834	\$653
25	\$16,708	\$16,147	\$561	\$16,147	\$15,940	\$207	\$16,708	\$15,940	\$768
30	\$19,982	\$19,377	\$606	\$19,377	\$19,128	\$248	\$19,982	\$19,128	\$854
40	\$26,466	\$25,669	\$797	\$25,669	\$25,369	\$300	\$26,466	\$25,369	\$1,097
50	\$32,683	\$32,086	\$597	\$32,086	\$31,577	\$509	\$32,683	\$31,577	\$1,106
60	\$39,007	\$38,256	\$750	\$38,256	\$37,693	\$564	\$39,007	\$37,693	\$1,314
75	\$48,811	\$47,566	\$1,245	\$47,566	\$46,918	\$648	\$48,811	\$46,918	\$1,893
100	\$64,659	\$63,153	\$1,505	\$63,153	\$62,558	\$596	\$64,659	\$62,558	\$2,101
125	\$80,911	\$78,942	\$1,969	\$78,942	\$78,197	\$745	\$80,911	\$78,197	\$2,714
150	\$96,258	\$94,232	\$2,026	\$94,232	\$93,445	\$787	\$96,258	\$93,445	\$2,813
200	\$127,658	\$125,642	\$2,016	\$125,642	\$124,075	\$1,567	\$127,658	\$124,075	\$3,583



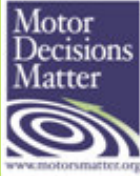
Estimated Annual Energy Savings with NEMA Premium[®] Motors¹
 TEFC · 1800 RPM · Full-load Operation · Nominal Efficiency³
 Estimated Annual Energy Cost = (Hp x annual operating hours x cost of electricity x 0.746) / (efficiency)

Enter Appropriate Values for:

Annual Operating Hours: **8000 hrs per year**
 Cost of Electricity: **10 ¢ per kWh**

Learn more about saving through sound motor management. For additional tools and resources, visit www.motorsmatter.org

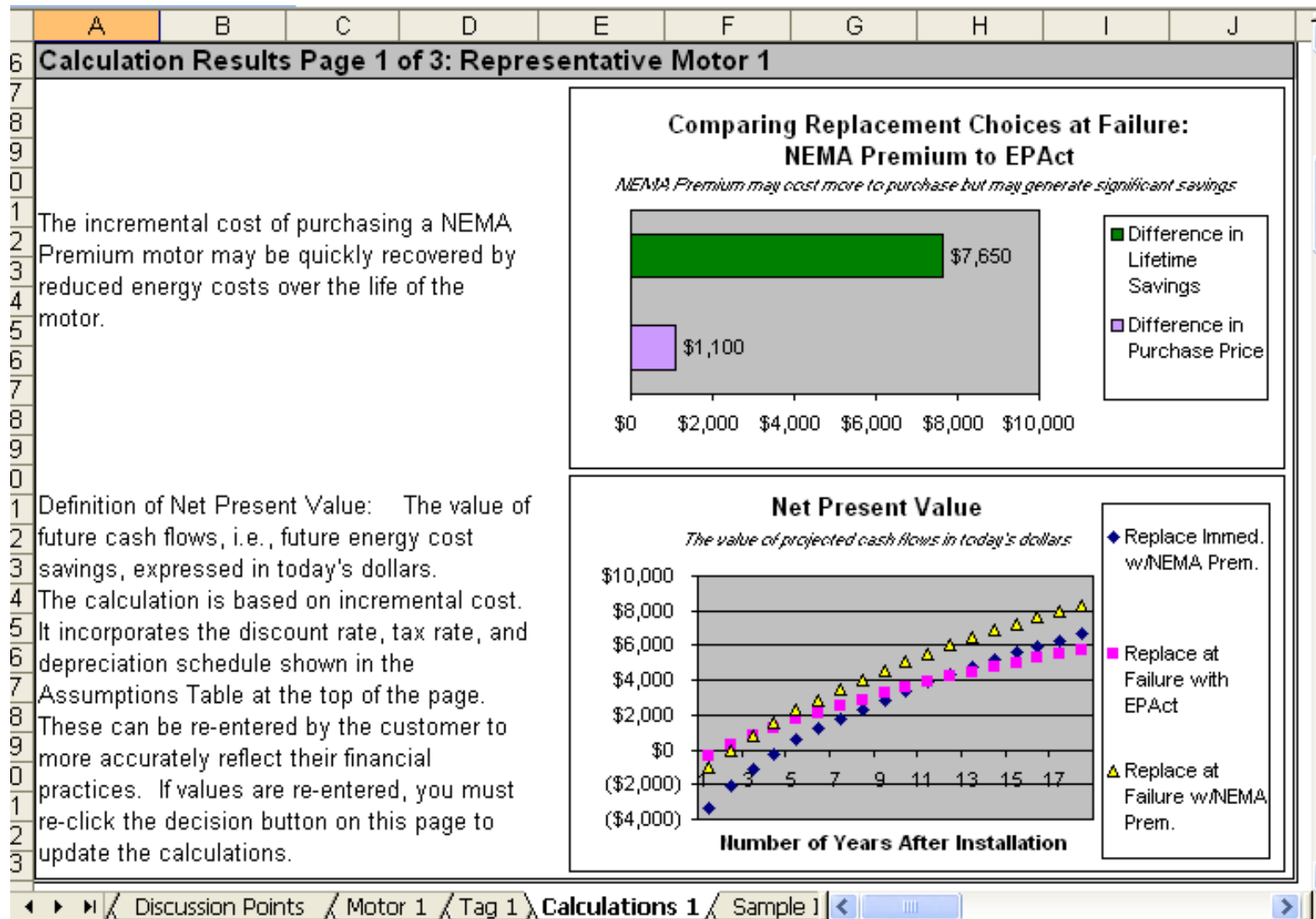
1-2-3 Approach Spreadsheet: Sample Input

A		B	C	D	E	F	G
		<h2 style="color: blue;">The 1-2-3 Approach to Motor Management:</h2> <h3 style="color: blue;">Motor 1 Page</h3>					Version 6.5
Company Information							
Company Name	ACME		Contact	Dirk			
Location	Boston		Date Evaluated	8/11/10			
Input: Representative Motor 1							
Motor Nameplate Data			<i>* Denotes required fields</i>	Motor Application Information			
Motor ID *	ABC			Year Motor Installed	1997		
Manufacturer				Motor Location			
Model				Application			
Size (hp) *	75			Total Yearly Operating Hours *	6,000		
RPM	1800			Repairs/Rewinds			
Enclosure Type	TEFC			Quantity of Similar Motors *	3		
Full-Load Efficiency (%) *	91.7%			New Motor & Best Practice Rewind Costs			
Frame Size and Type				Motor Installation Cost *	\$500.00		
Voltage Rating				Available Incentive			
Financial Information			NEMA Premium Motor Cost *	\$4,300.00			
Motor Life (yrs) *	18		NEMA Premium Efficiency *	95.4%			
Cost of Electricity (Note 1) *	\$0.1000		EPAct Motor Cost *	\$3,200.00			
Desired Payback Period (yrs)	2		EPAct Motor Efficiency *	94.1%			
Horsepower Breakpoint (hp)			Best Practice Rewind Cost *	\$2,200.00			
Quick Start / Discussion Points / Motor 1 / Tag 1 / Calculations 1							

1-2-3 Approach Spreadsheet: Results

	A	B	C	D	E	F	G
5							
6	Results: Representative Motor 1						
7	These results are for one motor. Cumulative results for the full quantity of similar motors are displayed only on the Summary page.	<u>Act Now</u>		<u>Act Upon Motor Failure</u>			
8		Current Costs (Base Case)	Replace Immediately with NEMA Premium	Rewind Using Best Practice (Base Case)	Replace with EPAct	Replace with NEMA Premium	Comparing Replacement Choices: NEMA Prem. to EPAct
9							
0	Annual Energy Cost	\$36,609	\$35,189	\$36,609	\$35,675	\$35,189	(\$486)
1	Capital Investment	N/A	\$4,800	\$2,700	\$3,700	\$4,800	\$1,100
2	Incremental Investment Cost	N/A	\$4,800	N/A	\$1,000	\$2,100	\$1,100
3	Life-Cycle Cost (Note 2)	N/A	\$638,196	\$661,653	\$645,847	\$638,196	(\$7,650)
4	Annual Energy Savings	N/A	\$1,420	N/A	\$934	\$1,420	\$486
5	Net Present Value	N/A	\$6,652	N/A	\$5,718	\$8,334	\$2,616
6	Simple Payback Period	N/A	3.38	N/A	1.07	1.48	0.41
7							
8	Decision: Representative Motor 1						
9	Review the results with your customer. Decide on the appropriate course of action. Then, click the corresponding button and the 1-2-3 software will generate label(s) that you can use to tag this representative group of motors. It will also enter the decision in the 1-2-3 Motor Inventory and Summary.	<u>Act Now</u>		<u>Act Upon Motor Failure</u>			
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1-2-3 Approach Spreadsheet: Calculation



Next Steps

- Download the MDM tools
- Start building a motor management plan
- Share with staff and management
- Let us know how things go: Take the MDM User's Survey
 - Link to survey from the MDM homepage
- Best of luck with your motor management outreach and programs!

