



Industrial Motor Systems

Boosting Energy Savings through Enhanced Awareness of Adjustable Speed Drive Opportunities

Dirk Koechner

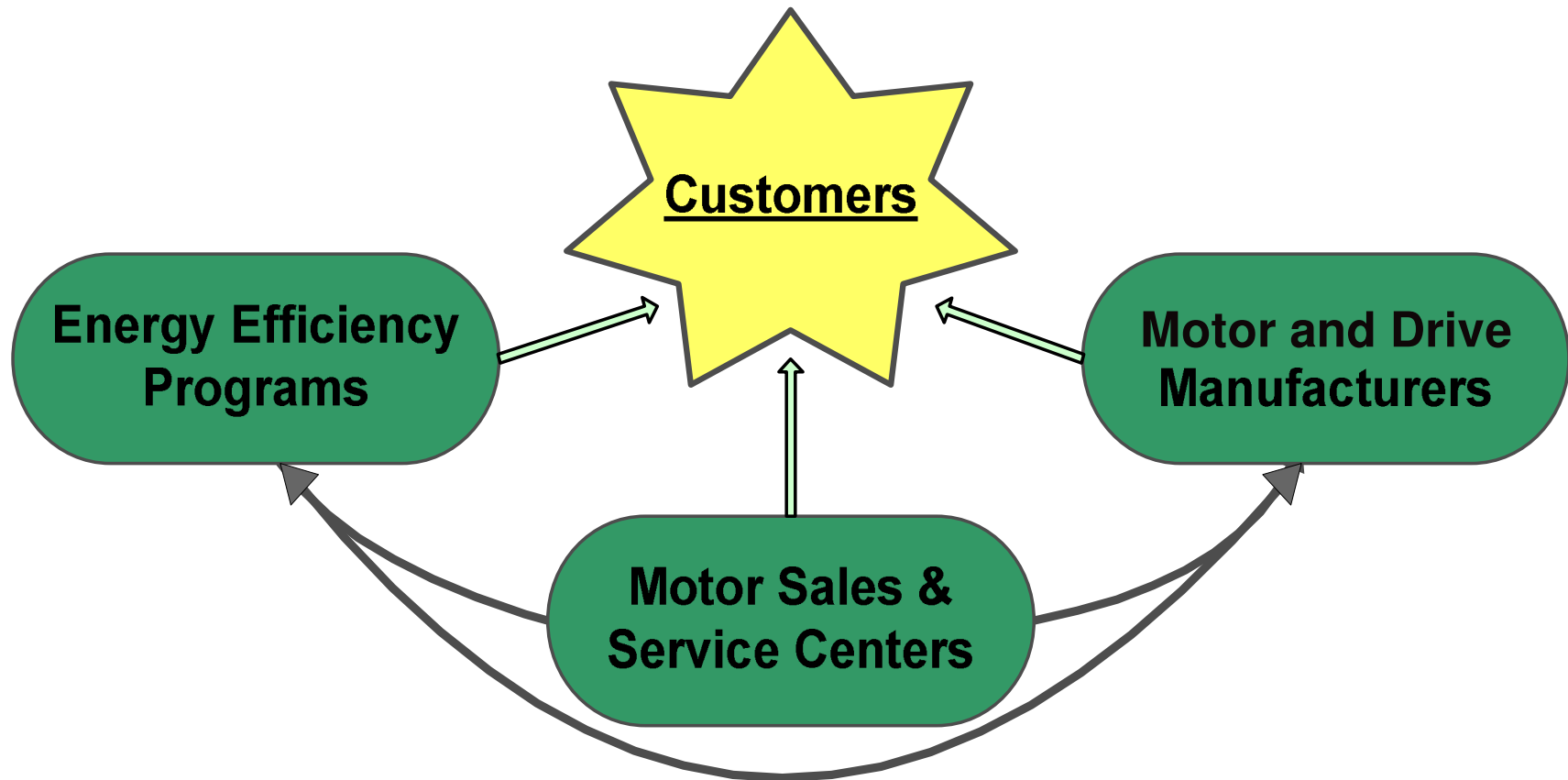
Program Manager

September 16, 2010, 3:30 – 5:00 pm CT

Session Agenda

- ▶ Introduction: MDM and the ASD opportunity
- ▶ Share your perspective: ASD messaging opportunity and audience
- ▶ MDM ASD Workgroup update
- ▶ Group discussion: the ASD energy savings message
- ▶ Review: group discussion outcomes

The Motor Decisions MatterSM Campaign: A national motor management messaging forum to enhance local effectiveness



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

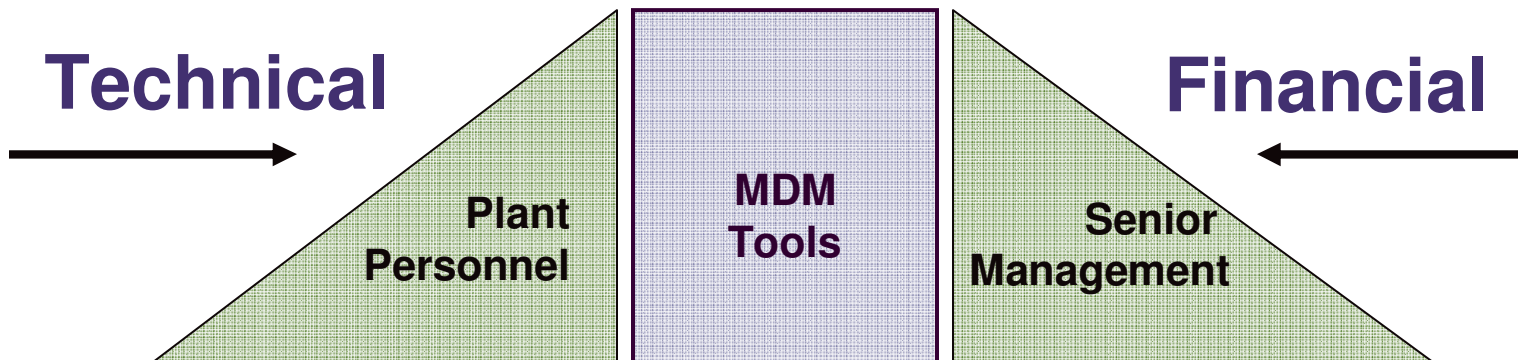
Other Organizations

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

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

The MDM Scope

To promote **proactive** motor management to facility and engineering as well as corporate and procurement decision makers



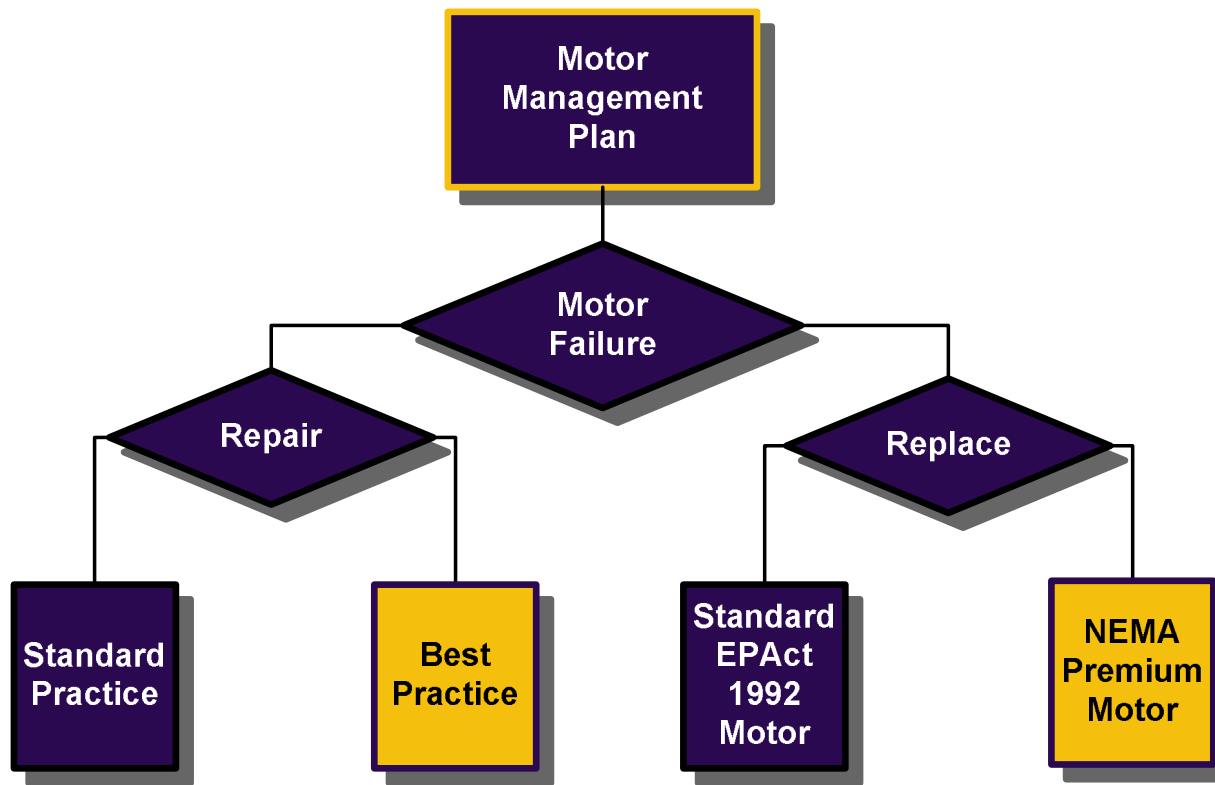
MDM's Potential ASD Messaging Opportunity

- ▶ MDM is uniquely positioned to credibly present Adjustable Speed Drives (ASD):
 - as an energy efficiency opportunity in the C & I marketplace
 - as part of overall sound motor management planning: e.g. repair/replace/drive decision making

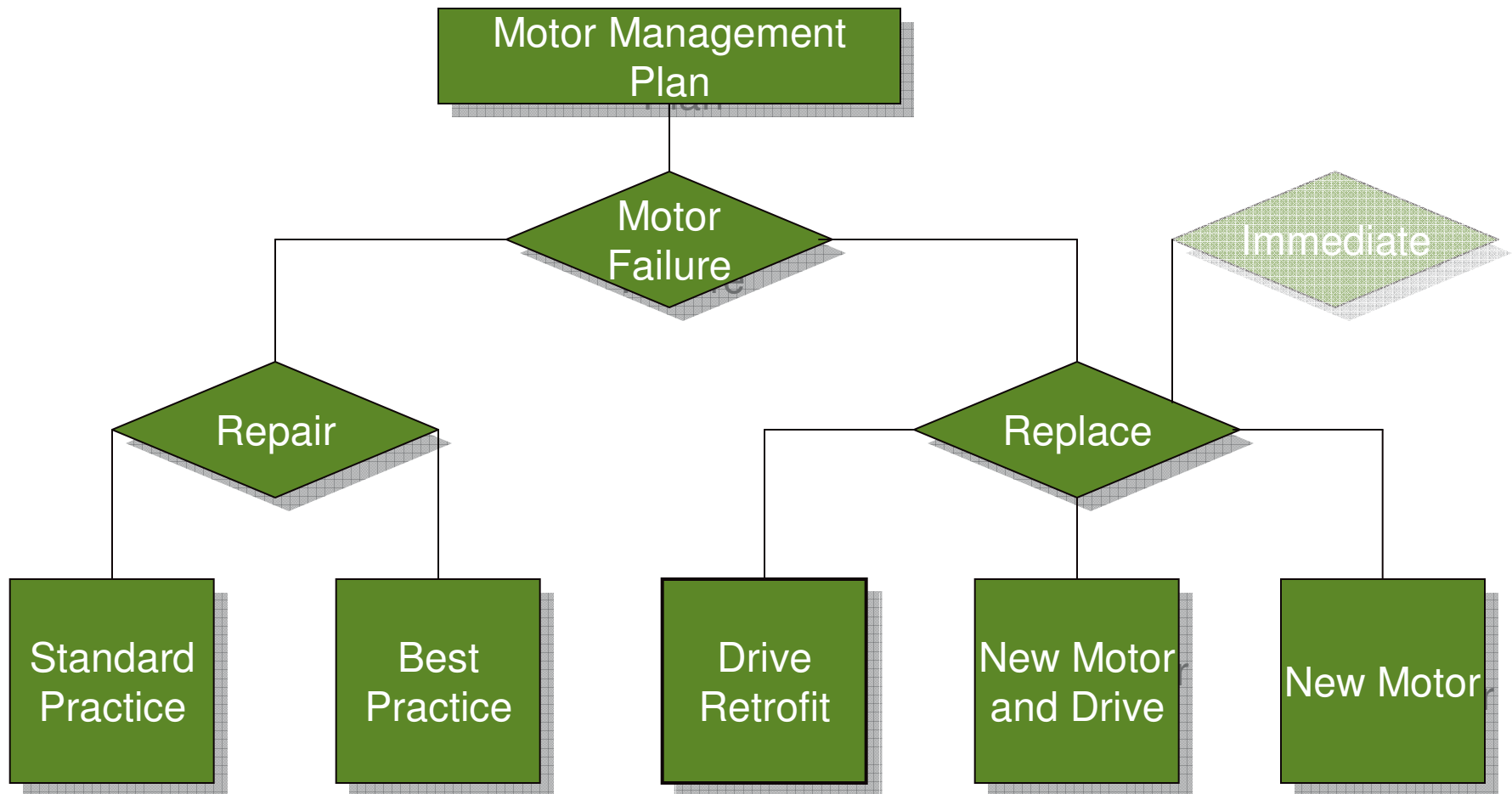
“In 2010–2012, the Campaign’s focus includes [...] developing targeted messaging, resources, and tools to communicate the *value of motor management* and the *efficiency* and performance benefits of ASDs.”

- MDM Business Plan 2010-2012

How might MDM's Repair/Replace Decision Diagram evolve?



Proposed: Motor System Planning Repair/Replace/Drive Decision Diagram



Let's hear from you

Please introduce yourself and choose a question:

1. What is the ASD growth opportunity for your industry? How big is the opportunity and what would you like to achieve?
2. What are the barriers facing greater ASD adoption? What customers are not being reached?
3. What are your C&I customers saying about ASDs? Success stories, challenges, etc.

MDM ASD Workgroup: Work to Date

- ▶ Identified marketing barriers and messaging opportunities:
 - Technical Issues / Reliability Concerns
 - Application Knowledge / Drive Selection
 - Energy Savings / Cost Barriers
- ▶ Prioritized top messaging opportunity
- ▶ Beginning content design and development
- ▶ Ongoing: refining the understanding of the overall MDM ASD opportunity

The MDM ASD Workgroup identified a number of customer marketing barriers / messaging opportunities which broadly fall into three categories:

	1. Technical Issues / Reliability Concerns	2. Application Knowledge / Drive Selection	3. Energy Savings / Cost Barriers
Goal: Highlight ASD Energy Savings Potential and ...	Summarize key technical considerations. Put into perspective / address technical reliability myths	Serve as an initial product viability and selection resource	Provide easy / application specific demonstration of life cycle cost savings
Audience	Engineering/maintenance	Engineering/maintenance and Procurement	Procurement
Message Keywords / Issues	<ul style="list-style-type: none"> ▪ Power quality issues from and to drive ▪ Overheating ▪ Vibration ▪ Configuration complexity 	<ul style="list-style-type: none"> ▪ Selecting the appropriate drive for the application (new and retrofit) ▪ Knowledge of suitable & unsuitable applications ▪ System knowledge ▪ Drive knowledge, benefits 	<ul style="list-style-type: none"> ▪ Overall ASD costs ▪ Retrofitting ASD to existing motor ▪ Large drives ▪ Regenerative AC drives
Suggested Message Vehicle	<ul style="list-style-type: none"> ▪ High level "ASD Application Considerations" brochure ▪ Inclusion in Motor Planning Kit -> Motor System Planning Kit 	<ul style="list-style-type: none"> ▪ Drive specification guidance brochure ▪ High level decision tree diagram datasheet (drive viability and selection guide) ▪ Inclusion in Motor Planning Kit -> Motor System Planning Kit 	<ul style="list-style-type: none"> ▪ Energy Savings Calculator ▪ ROI datasheet for several common scenarios ▪ Inclusion in 1*2*3 Spreadsheet

Potential New Products based on MDM ASD Workgroup Feedback

Technical Considerations Brochure	Motor and drive compatibility considerations, load profile, current rating, power quality, dos and don'ts, ...
Reliability Myths Brochure	Reliability concerns put into context (eg. voltage spikes, overheating, vibration): technology improvements and proper drive selection, installation, and operation.
ASD Helpful Resources List	A list of accurate, credible, informative industry and trade resources that describe and demonstrate ASD technology and benefits (hosted on MDM's website and included in print materials)
Overall Drive Benefits Brochure	Energy savings benefits, and additionally: process control, power factor, and real time system monitoring (ie 'check engine' light)
ASD Specification Guidance / Checklist	An aid to end users in the procurement process, provide drive specification, information, checklists, decision tree diagrams
ASD Energy Savings Brochure	A high level, easy to read, compelling summary of high value ASD energy savings opportunities
Lifecycle Cost Calculator	Demonstration of savings potential for a variety of motor/drive replacement decisions including: 1) replace immediately, or 2) replace upon motor failure, with 3) a drive retrofit, or 4) a motor and drive combination
Energy Savings Calculator	Demonstration of savings potential for a variety of drive applications (fan, pump, cooling tower, etc.)

Technical

Application

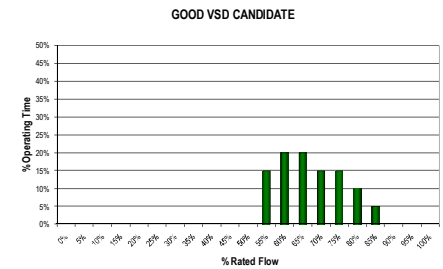
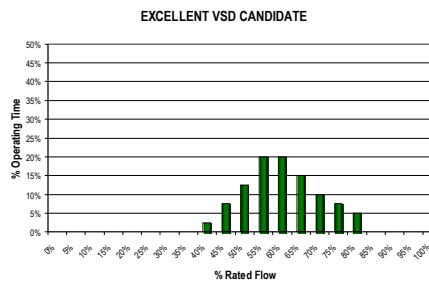
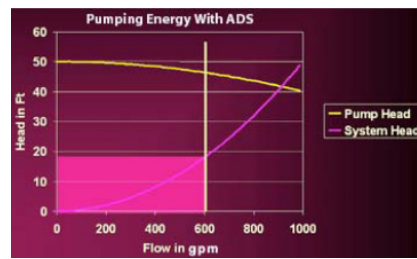
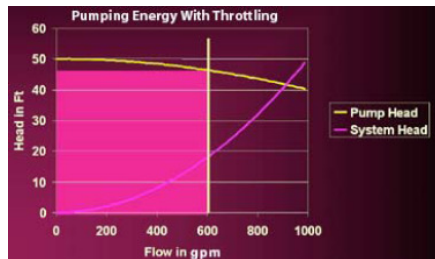
Energy Savings

Group Discussion

- ▼ Topic 1: *What are the ASD messaging opportunities for your industry? How is MDM best positioned to help achieve these opportunities?*
- ▼ Topic 2: Please read and review the sample ASD brochures with your group:
 - *What stands out? How are they effective? Are they credible and convincing?*
 - *Should they be more application specific or more general? More or less technical or visual?*
 - *Would they suit your program and sales needs? Are they useful?*
 - *How might this collateral be supported by other MDM activities: webinar or webcast, website content, etc.*
- ▼ Topic 3: *Which additional products, tools, or resources would strengthen your current ASD sales and program strategies?*

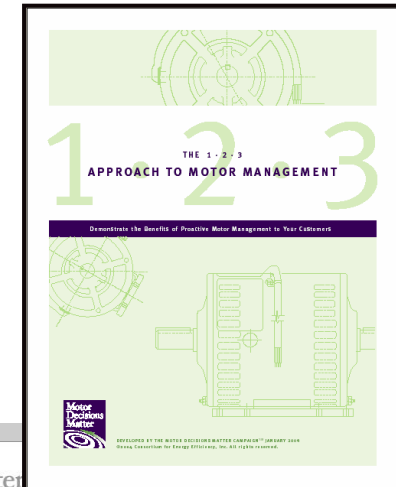
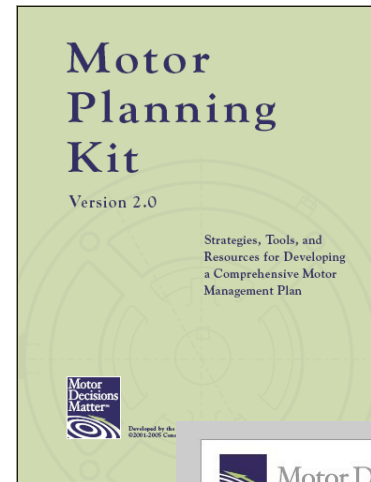
Proposed: ASD Energy Savings Brochure

- ▶ Goal: Provide an easy to read compelling demonstration of ASD energy cost savings for a variety of high value applications
- ▶ Audience: C&I end users, vendors, procurement and management decision makers



Proposed: Update existing MDM products to reflect system management, including ASDs

- ▶ Motor Planning Kit (MPK)
- ▶ 1*2*3 Calculator
- ▶ MDM Website: ASD resources



Motor Decisions Matter

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

General Helpful Resources - Energy Legislation

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

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 EPAAct 1992 to NEMA PREMIUM levels (NEMA MG Table 12-12), except for fire pump motors which remain at EPAAct 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. EPAAct 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).

Group Discussion Review

- ▼ Topic 1: *What are the ASD messaging opportunities for your industry? How is MDM best positioned to help achieve these opportunities?*
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Contact Information

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Appendix I: ASD Market and Industry Resources

- ▶ DOE 1998 Motor Market Assessment
- ▶ DOE 2009 Motor System Source Book
- ▶ Drivesmag
- ▶ EC&M (*Electrical Construction & Maintenance*)
- ▶ ESource, “*Drivepower*”, Technology Atlas Series
- ▶ NEMA Primary Industrial Control and Adjustable Speed Drive Index
- ▶ Other: ARC Advisory Grp, IMS,

Appendix II: ASD Energy Savings Brochure content

- ▼ Basic Drive Definition:
 - “[a system for controlling] the speed of an AC induction motor by varying the motor's supplied voltage and frequency of power.” – EC&M
 - “a system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor” – ask.com
 - Question: What term should signify a ‘drive’? (VFD, AFD, Inverter, ASD, VSD, Motor controller, Drive)
- ▼ Energy Savings Potential
 - Total cost: product, installation, service
 - Energy savings based on: application type, reduced power, operating hours / duty, cost of electricity -> payback period
- ▼ Application Types, use cases – which are appropriate?
 - Constant torque loads
 - Constant horsepower loads
 - Variable torque loads
 - Throttled applications