Industrial Energy Efficiency Opportunities and Financial Tools that Drive Implementation

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Midwest Industrial Energy Efficiency Summit

January 11, 2012

NorthStar Initiative on Sustainable Enterprise

INSTITUTE ON THE ENVIRONMENT

UNIVERSITY OF MINNESOTA
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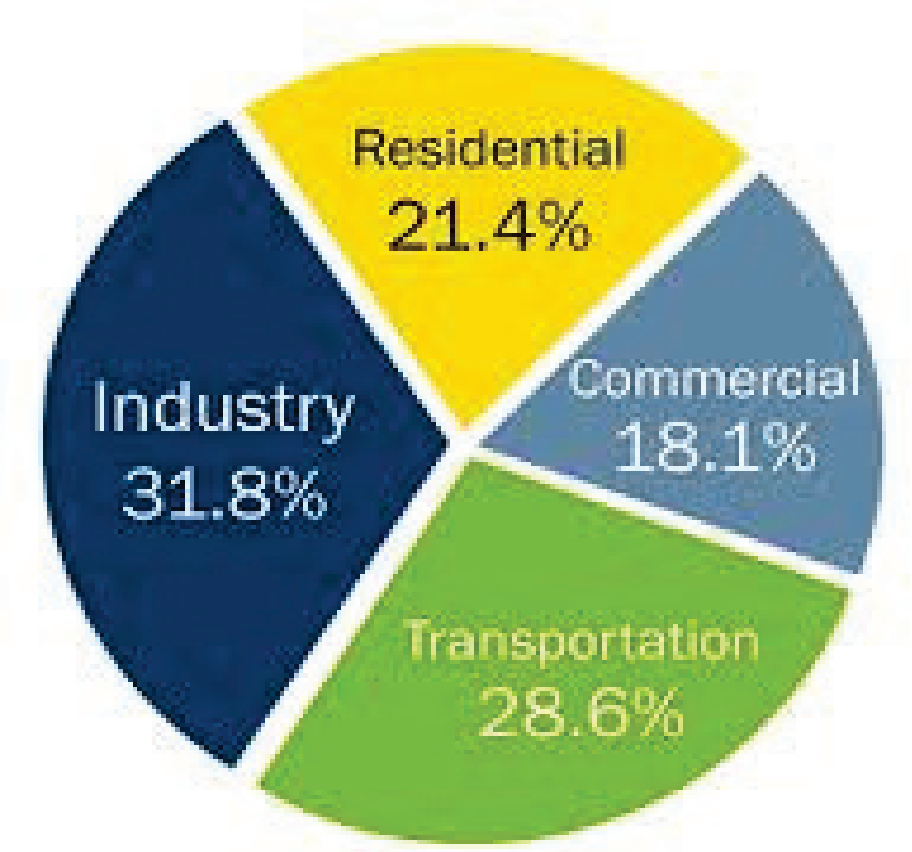
Topics to be Covered

- Summaries of existing studies on midwest industrial energy efficiency
  - Industry sector/subsector opportunities (MnTAP)
  - Alternative financing mechanisms (NorthStar)
- Recommendations for further action
- Ways MGA can advance initiatives

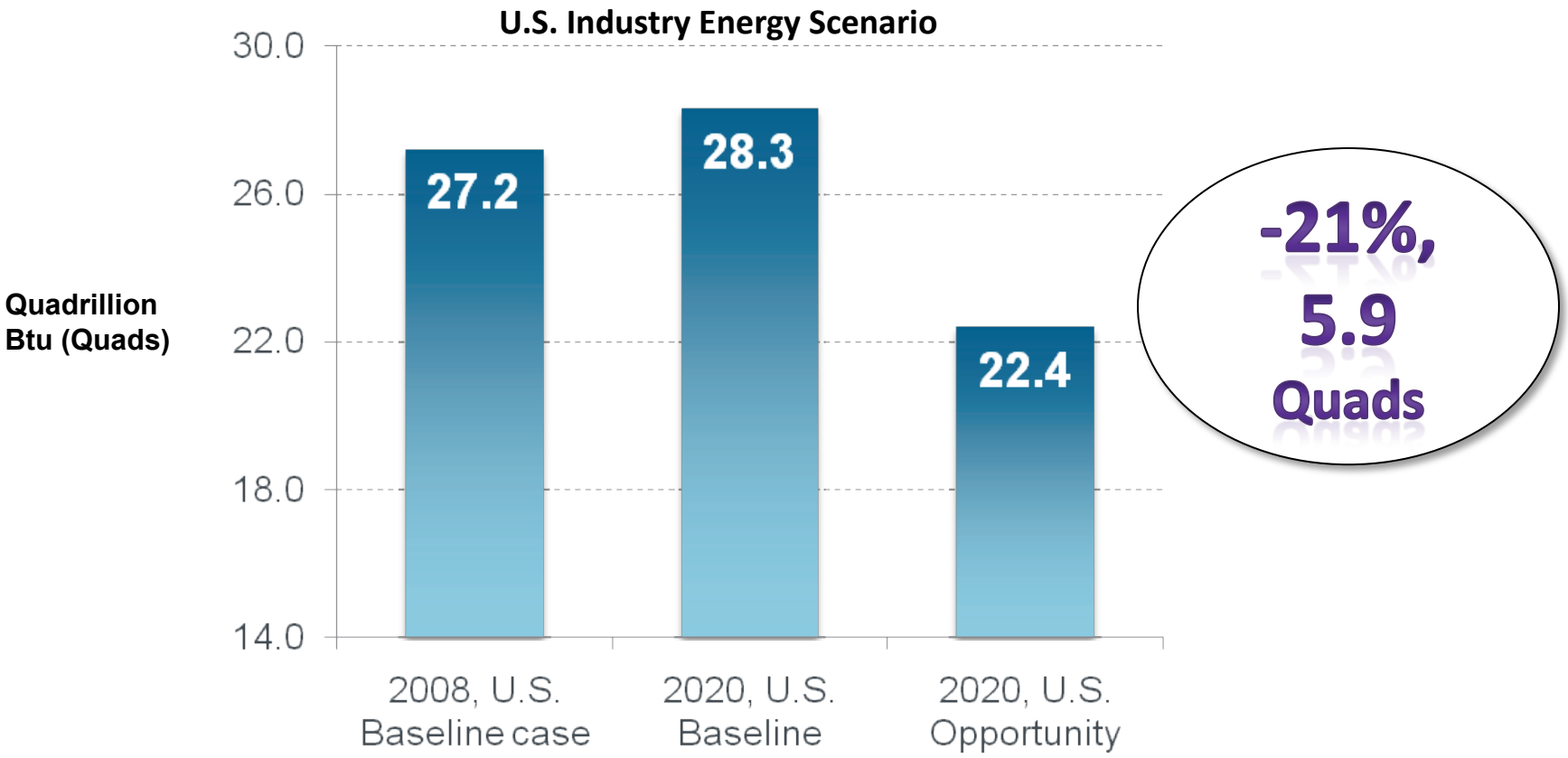
U.S. Energy Consumption

- Industrial sector uses 32% of all U.S. energy
- 62% of this energy is used in core production processes including:
  - Compressed air
  - Fans
  - Pumps
  - Motors
  - Steam systems
  - Process heat



Energy Efficiency: The Largest Source of New Energy

Industrial energy efficiency measures have the potential to reduce expected energy demand growth by ***more than 20%*** by 2020



Source: McKinsey & Co., *Unlocking Energy Efficiency in the U.S. Economy*, July 2009.

Food Processing Energy Efficiency Opportunities

Sub-sector	Potential Savings		Technology Opportunities
	Elec.	Fuel	
Poultry processing	15%	11%	Refrigeration, heat recovery, CHP, motors
Cheese and butter processing	16%	11%	Refrigeration, heat recovery, pump/fan/motor, CHP
Commercial bakeries	16%	6%	Compressed air, heat recovery, improved use of ovens, pump/fan/motor optimization

Information from study completed for 8 Minnesota utilities

Source: MnTAP, University of Minnesota

Metal Fabrication Energy Efficiency Opportunities

Sub-sector	Potential Savings		Technology Opportunities
	Elec.	Fuel	
Machine shops	9%	15%	Pump/fan/motor optimization, HVAC, process heat, welding
Coating, plating, polishing, finishing	17%	25%	Insulation, ventilation, heat recovery, compressed air
Sheet metal fabrication	15%	24%	Boiler improvements, reduce cure times, welding, motors

Information from study completed for 8 Minnesota utilities

Source: MnTAP, University of Minnesota

Metal Casting Energy Efficiency Opportunities

Sub-sector	Potential Savings		Technology Opportunities
	Elec.	Fuel	
Non-ferrous casting	10%	13%	Isothermal melting, furnace improvements, heat recovery
Iron operations	20%	17%	Improved burners, motors, VFDs, combustion equipment
Aluminum operations	19%	14%	Melting technologies, compressed air, insulation, efficient motors and belts

Information from study completed for 8 Minnesota utilities

Source: MnTAP, University of Minnesota

Case Study: Brass and Aluminum Foundry, Blaine, MN

- Used sector-based analysis to predict facility-specific energy and cost savings
- Metal casting savings (melting technologies)
  - 14% electricity
  - 6% gas
- Heat treating savings
  - 10% electricity
  - 8% gas
- Potential annual energy savings: 4.7 million kWh
- Potential annual cost savings: $233,000

Energy Efficiency Gap

Economically justifiable energy savings of 25 – 30%

Actual implemented energy efficiency investments (30% implementation rate)

Focus of the study: Identify and enhance the role of financial instruments in driving energy efficiency investments for small/medium enterprises (SMEs) in the industrial sector.

Traditional Company Barriers to Energy Efficiency

- Lack of capital budget: 38%
- Insufficient payback/ROI: 21%
- Uncertainty of savings/ROI: 16%
- Technical expertise: 6%
- Landlord/tenant split incentives: 5%
- Buy in from senior leaders: 5%
- Dedicated attention, ownership: 4%
- Inability to finance: 3%
- Other: 3%

75%

Johnson Controls, ACEEE Conference, May 2011

Existing Financial Models

- Owner-financed
  - Owners design, manage, and finance project
  - Take full responsibility for quality and ROI
- Utility fixed repayment
  - Utility provides up-front capital costs and organization
  - Capital repaid through monthly, fixed, non-performance related surcharges
- Energy savings performance contracts (ESPC)
  - Energy efficiency retrofit provider (usually ESCO) designs and finances project
  - Capital repaid through promised energy savings; “pay from savings” model
  - ESCO assumes responsibility for quality and economic success

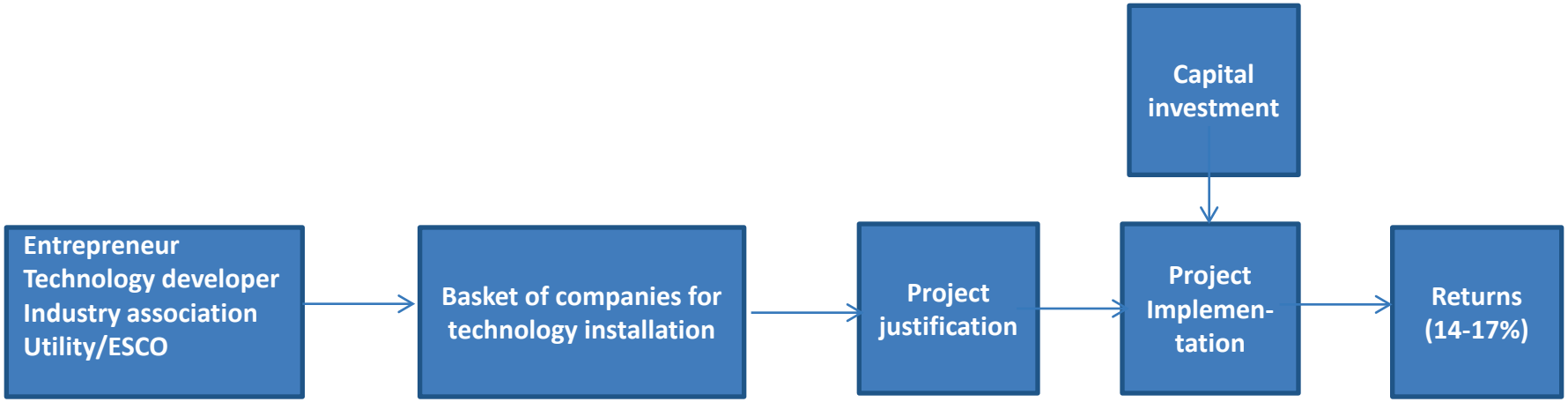
Sweatman and Managan, 2010

New Financial Models

- ESCO-led
  - Partner with insurance companies to insure promise of energy savings to company
  - Partner with vendors or suppliers to utilize established vendor relationships
- Vendor-led
  - Vendors currently offer capital lease to own, operating lease, and equipment rentals
  - Partner with existing financial programs to meet customer needs: PACE, Federal ESPC, ESCOs
- Industry/trade association-led
  - Provide ESPC services combined with asset management services

Aggregate Investment Model

- Increase scale by bundling multiple projects
- Reduce project development costs by using standardized information: data collection and contract language
- Investors gain confidence and get desired returns

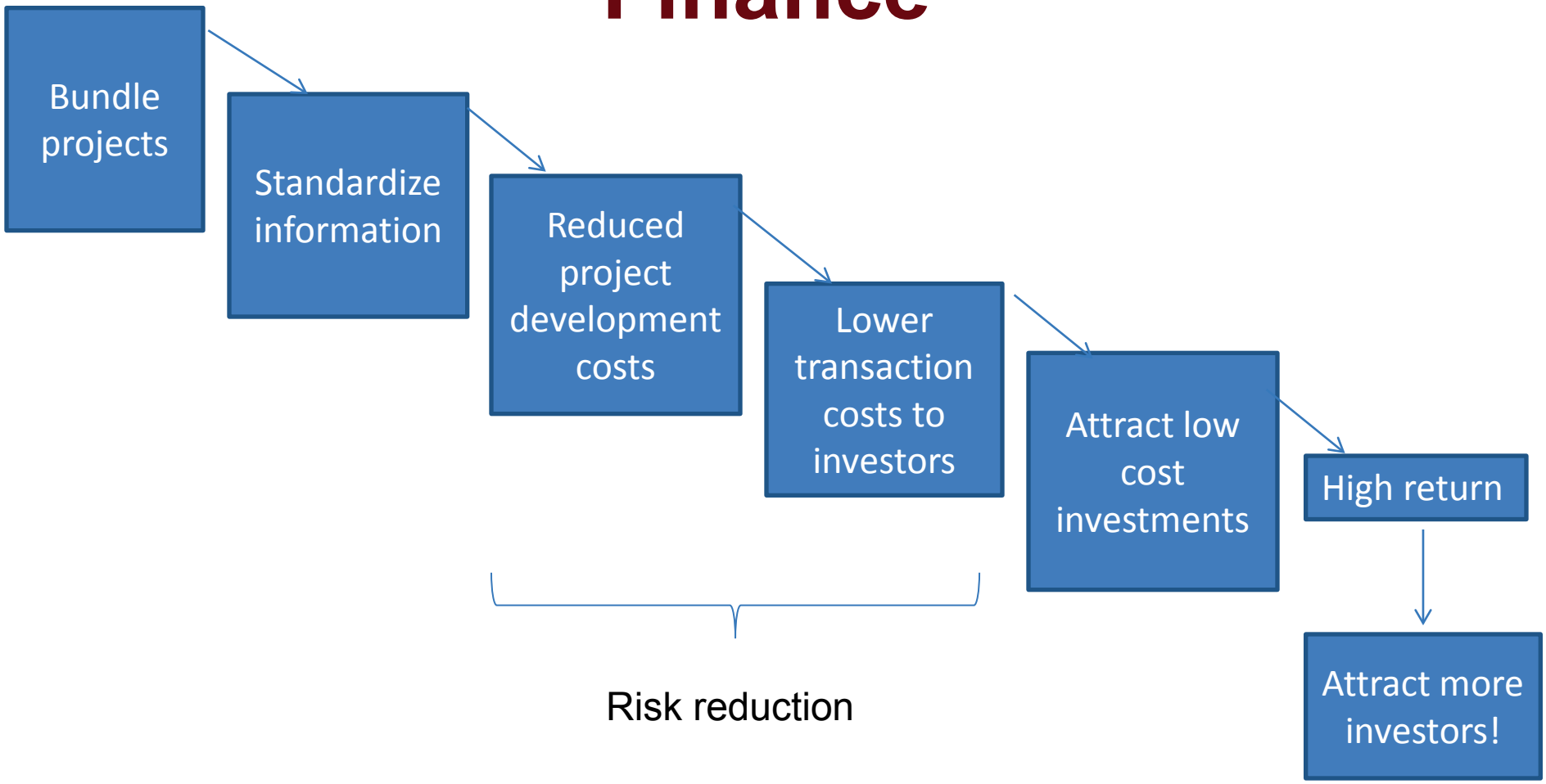


Sweatman and Managan, 2010

Aggregation Approach to Energy Efficiency Financing

- Achieves scale
  - Investors can invest large tranches of money
  - Service providers can ensure upfront costs are covered
- Reduces project development costs
  - Similar operations and energy efficiency opportunities
  - Standardized information, including data collection and contract language
- Reduces risk
  - Includes multiple companies
  - Balances project and company risk
  - Provides returns that investors want to see

Transforming Energy Efficiency Finance



Rethinking Investment Justification Criteria for Energy Efficiency Projects

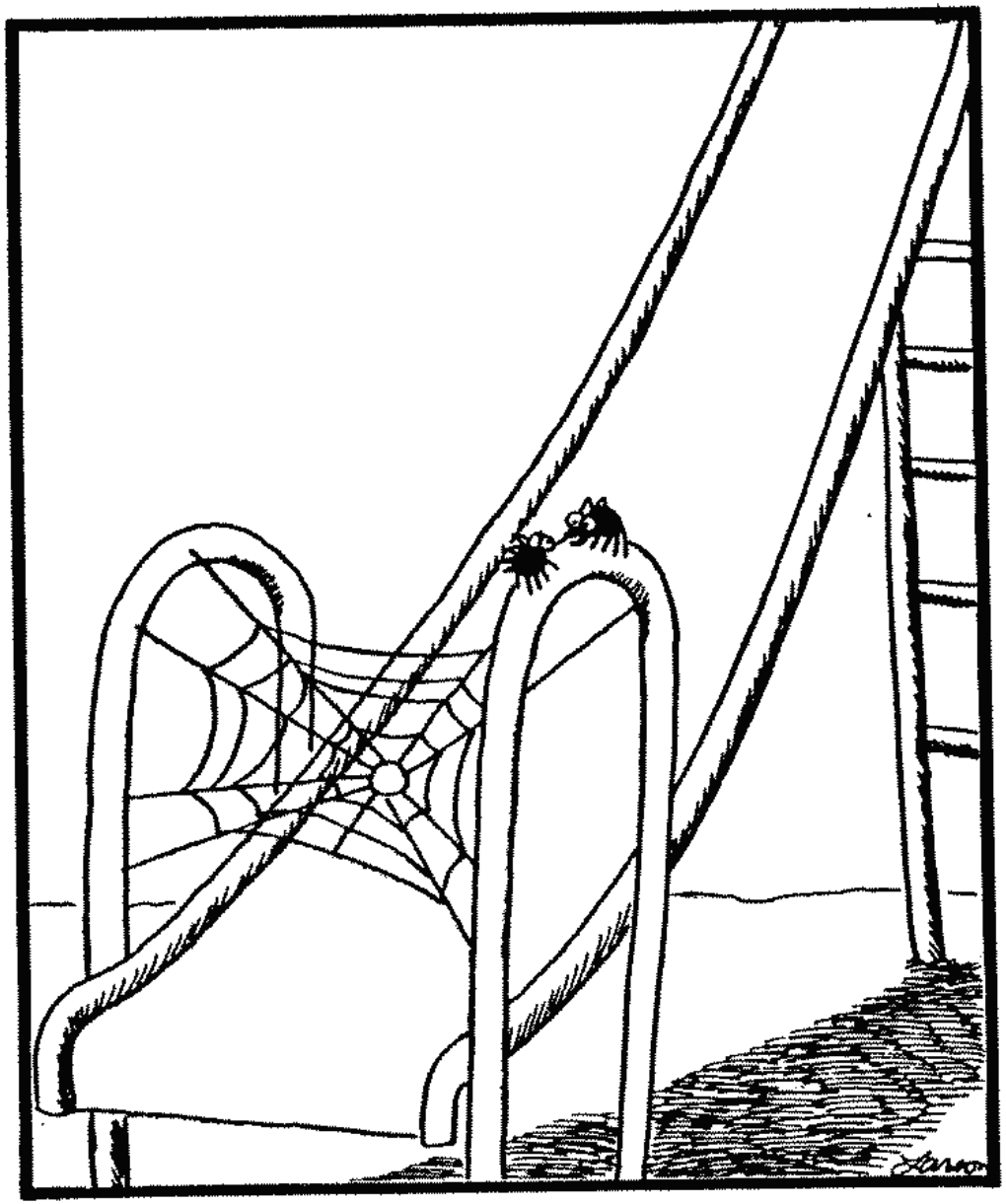
- Energy efficiency for greater productivity (Worrell et al, 2003)
  - Resource efficiency (energy, water, materials)
  - Climate change, energy sources, resource depletion and pollution
  - Overall productivity improvement
- Incorporate long term strategic thinking (Fine, 1993)
  - Consider place in market: quality, lead time reduction, advanced capability, versatility/agility
  - Drivers: corporate goals, benchmarks, certifications
- Manage energy as a tangible asset
  - Included with inventory, equipment, buildings, etc
  - Not a cost of doing business

Recommendations for Further Action

- Aggregated approach to project financing
  - Achieves scale
  - Reduces project development costs
  - Reduces project risk
- Development of energy efficiency asset class (evolved from clean-tech funds)
  - Space to invest in industrial energy efficiency projects
  - Establish institution to pool risk—mobilize and accelerate private sector investment
  - Standardize information to improve risk such as data collection, uniform contract language
- ESCO improvements for the industrial sector
  - Supply chain approach--focus on common operations and opportunities
  - Broaden technical qualifications of the ESCOs
  - Establish useful metrics

How Can MGA Add Value?

- Support policy initiatives
  - Tax incentives
  - Revitalizing manufacturing (IMPACT)
  - Equipment standards and certification
  - Legislation and goals for clean energy and energy efficiency
  - Resources for technical assistance, grants, and loans
- Engage the finance community related to the value of energy efficiency and alternative finance mechanisms
  - Education and networking
  - Data aggregation approaches
  - Energy efficiency asset class
- Support ESCO service delivery improvements for the industrial sector



"If we pull this off, we'll eat like kings."

Skip Laitner, ACEEE

Energy Efficiency

Energy efficiency will save you more money, more quickly, than almost any other measure to reduce pollution or improve efficiency.

-- Joseph Romm, 1995, from
Lean and Clean Management

References

- Fine, C. (1993) Developments in Manufacturing Technologies and Economic Evaluation Models, Chap 14
- Worrell, E., et al (2003) Production Benefits of Industrial Energy Efficiency Measures. Energy 28, pp. 1081-1098
- Sweatman, P. and Managan, K (2010) Financing Energy Efficiency Building Retrofits, Climate Strategy and Partners
- MnTAP report: http://www.mntap.umn.edu/resources/reports/DOC/MnTAP_IndustrialE2Analysis.pdf
- NorthStar report: Contact Cindy McComas for a copy