BOOSTING INDUSTRIAL ENERGY EFFICIENCY

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Glossary

- ACEEE - American Council for an Energy Efficient Economy
- ANSI - American National Standards Institute
- CEE - Consortium for Energy Efficiency
- CRM – Cost Recovery Mechanism
- DOE – US Department of Energy
- EPA – US Environmental Protection Agency
- GHG - Greenhouse Gas
- ISO - International Organization for Standardization
- LEED - Leadership in Energy and Environmental Design
- NRDC - Natural Resources Defense Council
- SEM - CEE’s Strategic Energy Management Program
- SEP - Superior Energy Performance
- SVP – Senior Vice President
Abstract

European industrial manufacturers are ahead of the US based on the number of implemented energy efficiency schemes, primarily through the use of the ISO 50001 standard. The potential for US cost savings and Greenhouse Gas (GHG) reduction is large—$750 billion and a GHG reduction equivalent of taking all motorized transport off the road for a year. In the absence of a regulatory imperative, only a few forward thinking companies have engaged with high-energy efficiency performance standards. In addition, many companies have not taken full or partial advantage of utility incentive programs targeted specifically at the manufacturing or generally at the commercial sector in the US.

The Team conducted interviews with a number of policymakers, NGO experts, and energy management executives. Each interview explored the issues of efficiency, metrics, standards, certification, and the business case that demonstrates the return on investment of time and capital (human and financial) on energy efficiency improvements. We developed a series of key findings based on individual interviews with the types of professionals listed above in addition to a small number of executives and plant manager decision-makers. Finally, policy/program recommendations are provided to the Natural Resources Defense Council (NRDC) that identifies levers to accelerate energy efficiency improvement in the US manufacturing sector.
Executive Summary

OBJECTIVE: The SIPA Capstone Team was tasked by the Natural Resources Defense Council (NRDC) to identify ways to increase energy efficiency activities in the U.S. manufacturing sector in order to improve operating efficiency of the industrial sector, reduce energy costs by greater than 10%, and reduce GHG emissions.

BACKGROUND: European industrial manufacturers are ahead of the US on the number of implemented energy efficiency schemes (i.e., ISO 50001 certification standard). The projected potential for US cost savings and greenhouse gas (GHG) reductions are quite large ($750B and a GHG reduction equivalent to taking all motorized transport off the road for a year). Without a regulatory imperative, only a few forward thinking companies have engaged with strategic energy management. Furthermore, many companies do not take advantage of incentive programs that can offset their investment cost while returning financial and environmental gains.

FINDINGS: Based on the Team’s extensive desk research and interviews, we concluded that industrial firms are currently engaged with Leadership in Energy & Environmental Design (LEED), other improvement-based energy efficiency programs, and Energy Star, but few are pushing the needle toward ISO 50001 and Superior Energy Performance (which includes ISO 50001 and third party verification). Energy efficiency efforts within the industrial sector are a continuum ranging from changing light bulbs to the US Department of Energy’s (DOE) Superior Energy Performance (SEP), with current uptake centered somewhere short of the middle of this continuum.
In addition, there is also a continuum of industrial engagement with energy usage and efficiency issues that influence where the firm fits into the energy efficiency continuum. The range of this continuum covers the span from companies looking to reduce costs, but which are not specifically targeting energy, to companies that have achieved a 25% reduction in energy and are looking to reduce energy use by another 25%.

Finally, the Team looked at the energy efficiency ecosystem as it exists today. We found that, while energy efficiency advocates talk about efficiency in terms of environmental impact and payback, the C-Suite decision-makers are most concerned with risk management and operational excellence, and think in terms of ROI. Thus, the current evangelizing efforts of advocates are not well aligned with C-Suite interests and may be hindering the uptake of strategic energy management.

Figure ES1: Energy Efficiency Continuum
KEY FINDINGS: The Capstone Team came up with several conclusions, which represent existing barriers to strategic energy management uptake within the industrial sector:

- Energy efficiency is not discussed using C-Suite language.
- Energy costs are seen as fixed costs, not investments nor manageable expense.
- Energy efficiency is treated differently around the world. Those firms that adopt ISO 50001 typically do so because of European incentives and mandates. These same firms are hesitant to become SEP certified because there is no additional benefit.
- The complexity of the current energy efficiency/management performance environment confuses and clutters the landscape and slows uptake.
- There are different requirements for certification across programs.
- Energy management systems are not standardized. Measurements at a gross level are used even though more granular data may be available.

RECOMMENDATIONS: First and foremost is the need for experts to start using the language and planning cycles of the businesses they wish to impact. For a CEO, risk management, operational excellence, and brand reputation are business imperatives while energy efficiency is not. At the CFO level, the focus is on income statement metrics and risks to operational performance, of which energy efficiency is only a relatively small part even though energy costs
may be a large annual expense. As such, a key recommendation is to create a more relevant way of talking with the C-Suite about the ways that the energy efficiency imperative impacts their business performance. This includes moving beyond arguments centered on payback and the environmental benefits of energy efficiency toward a discussion of the risks of rising future energy prices, energy supply disruption, and carbon regulations.

Additional recommendations include to, as much as NRDC is able, influence the harmonizing the energy efficiency standards landscape – there are too many and no one understands them all. Comparatively, the LEED certification for buildings offers a more easily and widely recognized set of standards. We believe that NRDC can leverage Energy Star as the strongest and most well-known brand for energy efficiency solutions in the industrial sector. Since an advocacy group is limited in its ability to impose regulatory requirements, we think that picking one existing program that aligns with business interests offers a way to get both NGOs and manufacturers more focused on taking action.

We also think that NRDC can create a National Energy Efficiency Awareness Day (along with recognition/awards). NRDC should partner with the Consortium for Energy Efficiency (CEE) to create a utility toolkit and develop more robust options in the next generation of utility-based energy efficiency incentive programs. We foresee the creation of an energy utility toolkit that can be distributed to utility regulators as part of an effort to advocate for better alignment of the many state/utility variations. Finally, we believe that NRDC can reframe the energy efficiency conversation through a proactive communications and media strategy to other members of the energy efficiency universe. By highlighting case histories in language that energy efficiency decision-makers (including government and advocacy) can easily grasp, NRDC can lead a better way forward.

Most, if not all of these recommendations would benefit from further insights generated from quantitative and qualitative research with appropriate segments.
Introduction

The US industrial sector consumes more energy than the commercial and residential sectors combined\(^1\), and is responsible for nearly a third of all energy consumption. As a result, the US industrial sector presents the biggest opportunity for investments in energy efficiency. The projected potential for US cost savings and greenhouse gas (GHG) reductions are quite large ($750B and a GHG reduction equivalent to taking all motorized transport off the road for a year)\(^2\). Approximately 40\(\%\)\(^3\) of these investment projects could yield a payback period of 2.5 years.

Although energy efficiency measures seem to be a clear-cut way of addressing and solving many energy related issues, it is difficult and confusing for many industrial companies to navigate the vast array of methodologies and certifications that are available. Common practices seen in the commercial and residential sector include making the necessary changes to improve efficiencies in cooling, heating, and lighting, as well as utilizing more efficient appliances and electronics. While the same practices should be applied to the industrial sector, there is much more that can be done at the operations and industrial process level to further lower costs and emissions. However, the necessary energy efficiency implementations are technically complex and require a focused management framework in order to facilitate the process of pursuing energy efficiency opportunities more effectively.

Interviews conducted with a variety of energy efficiency practitioners, plant managers, policymakers, and C-Suite level executives reveal that in addition to the difficulties of finding and implementing a suitable strategic energy management plan, many industrial companies are also concerned with capital constraints and uncertain payback periods. Moreover, at the C-Suite level, energy efficiency is not a priority. The C-Suite level is beholden to investors and shareholders who tend to be more concerned with quarterly performance. From this perspective, there is little to no incentive for the C-Suite to invest in comprehensive energy efficiency projects that have payback periods of as little as two years.

While there are several barriers preventing appropriate implementation of strategic energy management, these can be overcome through effective communication by providing information that is readily accessible to all companies regardless of their size, energy consumption, and spend. Companies that have a higher percentage of energy cost associated with the value of

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3 Ibid.
production will reap more economic benefit by adopting more stringent strategic energy management as opposed to companies that have a low percentage of energy cost associated with the value of production. There is no one size fits all solution, and the need to provide a multitude of tailored solutions is critical to increasing the uptake of strategic energy management and other energy efficiency standards.

The SIPA Capstone Team used an initial discovery phase to understand the history of industrial energy efficiency and management in the US. This includes current practices, barriers, and opportunities, which generated a set of initial hypotheses regarding US manufacturing firm engagement to date. Based on desk research, the Team identified key unanswered questions and refined its initial hypotheses to target individual interviews with professionals that represent the energy efficiency value chain.

The Team interviewed a number of policymakers, NGO experts, and energy management and utility executives. Throughout each discussion we explored the issues of efficiency, metrics, standards, certification, and other elements that demonstrate the return on investment of time and capital (human and financial) from energy efficiency improvements. We further developed a series of hypotheses based on individual interviews with the professionals noted above in addition to a small number of executives and plant manager decision-makers. C-Suite decision makers, a critical segment, have typically not been included as a focal point in energy efficiency research based on our secondary research.

This paper presents the most effective ways of increasing energy efficiency in the industrial sector. The conclusions are based on desk research and interviews with leading energy practitioners, NGO workers, and policy makers. Results from this study will provide Natural Resources Defense Council (NRDC) with recommendations on how to boost strategic energy management in the industrial sector, including a new and improved platform for engaging with companies at the C-Suite level.

**Methodology**

The SIPA Capstone Team used an initial discovery phase to understand the history of industrial energy efficiency and management in the US. This includes current practices, barriers and opportunities, which generated a set of initial hypotheses regarding US manufacturing firm engagement to date. Based on desk research, the Team identified key unanswered questions and refined its initial hypotheses to target individual interviews with professionals that represent the energy efficiency value chain.

The Team interviewed more than twenty (20) policymakers, NGO experts, and energy
management and utility executives. Throughout each discussion we explored the issues of efficiency, metrics, standards, certification, and other elements that demonstrate the return on the investment of time and capital (human and financial) from energy efficiency improvements. We further developed a series of hypotheses based on individual interviews with the professionals noted above in addition to a small number of executives and plant manager decision-makers. C-Suite decision makers, a critical segment, have typically not been included as a focal point in energy efficiency research based on our secondary research.
Desk Research Findings

Strategic Energy Management
Strategic energy management\(^4\) is a process-oriented approach to energy efficiency that includes all of the following programs:

**SEM**
The Consortium for Energy Efficiency (CEE) has a specific definition for Strategic Energy Management (SEM) whose programs are fundamentally about investing in end-user capacity and organizational change in order to achieve holistic improvements in the ways that energy is used. SEM is defined by CEE as having all three of the following in place to effectively and continuously improve energy performance: customer commitment, energy management planning and implementation and a system for monitoring/tracking/reporting performance. Currently, there are a wide variety of SEM programs that cater to the industrial sector and differ in terms of requirements and level of difficulty in implementation. Below are three different SEM certification programs that are implemented in the industrial sector.

**Energy Star Buildings & Plants**
Energy Star Buildings & Plants is the oldest and most well-known certification process out of the strategic energy management programs. First introduced in 1992 by the US Environmental Protection Agency (EPA), Energy Star has been used to improve the energy efficiency of thousands of buildings and plants\(^5\). Although Energy Star for consumer products is instantly recognizable by more than 85\(^%\)\(^6\) of Americans, Energy Star Buildings & Plants certification in the industrial sector is not nearly as well known. Nevertheless, it has been responsible for “saving more than $9 billion and preventing nearly 120 million metric tons of greenhouse gas (GHG) emissions from entering our atmosphere”\(^7\).

Energy Star Buildings & Plants requires participants to keep track of data, establish baselines, analyze patterns, conduct technical assessments and reassess overall performance and established goals\(^8\). Additionally, Energy Star Buildings & Plants provides energy management tools as well

\(^4\) For the purposes of this paper, strategic energy management is defined as a process based approach to energy management. The acronym SEM refers to CEE’s definition of strategic energy management.


\(^6\) Ibid.


as energy management supervision and assistance. Duke University found significant savings among plants in three industrial sectors: cement, motor vehicle and corn refining

- Cement Industry:
  - 13% improvement in energy intensity
  - 60.5 trillion BTU of total annual energy savings
  - Abatement of 1.5 million metric tons of carbon
- Motor Vehicle
  - 12% decrease in fossil fuel usage
  - Abatement of 700,000 metric tons of carbon
- Corn Refining
  - 4.3% reduction in annual energy use.
  - Abatement of 470 million kg of CO₂ emissions

We also looked at what federal level programs were communicating about decision-making. Energy Star has a section on its website that is focused on facility owners and managers of buildings and plants for industrial energy management. They offered advice on how to keep executives on board with energy management by focusing on the following:

**Gain executive attention**
- Every energy program needs the backing of management to succeed.
  - Speak dollars, not BTUs
  - Make the case with financial metrics
  - First cost vs. lifecycle cost
  - Provide real world proof
  - Compare to competitors
  - Relate energy to security and risk

**Build a strong foundation**
- Take time at the beginning to make sure the proper building blocks are in place
  - Get CEO buy-in (CEO sign off on energy management; which establishes legitimacy; “many manufacturers join Energy Star to help secure CEO support.”)
  - Seek a line item in the budget
  - Implement an energy management program

**Sustain momentum**

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Keep a high profile
- Share the success
- Present awards & recognition
- Seek national recognition
- Foster senior management ownership

Leverage Energy Star

While the Energy Star Buildings & Plants certification does offer the ability to implement energy savings at low cost, it is not as robust as other strategic energy management programs such as ISO 50001 and SEP. For sophisticated industries that already have a moderate level of strategic energy management already in place, the Energy Star certification may be insufficient in providing any additional benefits to business.

**ISO 50001:2011**

ISO 50001 is intended to help organizations use their energy consuming assets in a more sustainable way by providing a framework to assess energy use and uncover ways to improve energy performance. By enforcing data collection and reporting defined measurements, this framework evaluates, encourages, and prioritizes energy efficiency. Since June 2011, when the International Organization for Standardization’s (ISO) energy management standard, ISO 50001: 2011 went public, more than 800 companies in close to 50 countries have been certified.

ISO 50001 has the most rapid penetration of any ISO standard since the quality management standard ISO 9001. By mid-January 2014, more than 5,050 sites have been certified globally. According to the German Federal Environment Agency, there were 54 certified sites in the United States as of January 2014. Close to one third of them were certified by DEKRA Certification, Inc., an accredited certification body for international management systems.

A U.S. Department of Energy (DOE) analysis calculates that U.S. factories can economically save more than 20% of total energy used in factories across the country. As a result, the DOE and the U.S. Council for Energy Efficient Manufacturing (US CEEM) have been supporting the implementation of ISO 50001. They were major players during a pilot program, through which

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11 Ibid.
they provided support and training to companies to help them implement systems that would conform to ISO 50001. In the U.S., the initial feedback of the 24 companies that were part of the ISO 50001 pilot program stressed the benefits of having a cross-functional energy management team, which makes energy management a shared responsibility and, as a result, makes it easier to incorporate changes.  

**Superior Energy Performance**

Superior Energy Performance (SEP) is an energy efficiency certification that is implemented at the facility level and requires extensive data tracking and monitoring. SEP, developed by the DOE, began working with several manufacturing plants in 2008. The pilot project was successful and, over a three-year period, all the plants involved were able to improve their energy performance by 6 to 7%.  

In order to be SEP certified, plants must achieve ISO 50001 certification as well as a third party audit by the American National Standards Institute (ANSI). SEP also provides three pathways to certification depending on the level of the plant’s energy management system. Plants with minimal energy management systems in place follow the energy performance pathway, which requires energy improvement of at least 5% over a three-year period. Plants that already have a well-established energy management system in place qualify for the mature energy pathway, which requires an energy improvement of 15% over a 5 to 10 year period. Both pathways are segmented into three certification types—silver, gold and platinum—depending on the attained level of energy improvement.  

Pilot results found that plants that have annual energy costs of greater than $1.5 million had payback periods of less than two years. On average, plants experienced improvements ranging from 6 to 25% over a three-year period. Currently, there are 16 SEP certified facilities and more than 40 plants that are currently pursuing certification.

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18 Ibid.


20 Ibid.

21 Ibid.

In order to expand the uptake of SEP, DOE introduced a SEP Accelerator program in 2013, which consists of the ratepayer-funded pathway as well as the enterprise-wide pathway. The ratepayer-funded pathway is an agreement between DOE and utilities to help facilitate the implementation of SEP in the industrial sector. The enterprise-wide pathway allows for partner companies in the industrial sector to certify multiple plants or business units with SEP in order to gain further cost savings and reduction in GHG emissions.

Utility Programs

In the absence of federal regulation regarding energy efficiency, states have taken over using a diverse and eclectic range of strategies for fostering energy efficiency within their borders. The largest group of state-level energy efficiency programs, representing an estimated 40% of the potential for energy savings in 2013 by the American Council for an Energy-Efficient Economy (ACEEE), is utilities and public benefit programs and policies. Currently, 41 states require utilities customers to pay a small surcharge to support energy efficiency programs. This surcharge takes the form of a Cost Recovery Mechanism (CRM), which is a pool of money from electricity surcharges that is used to fund programs across all customer sectors. In addition, 26 states have implemented Energy Efficiency Resource Standards, which are state-level goals for efficiency savings that set energy savings targets for utility companies. These mandates are passed on to customers through utility-backed energy efficiency programs.

The utility surcharge for industrial consumers is mandatory in some states and voluntary in others. Twenty-four (24) states have options that allow industrial customers to avoid paying part of or the entire energy efficiency surcharge, including both self-direct and opt-out programs, and seven states allow for opt-out programs, for which the company has no need to execute alternative energy efficiency programming. The self-direct option allows a utility customer to

24 Ibid.
25 Ibid.
26 Other savings come from transportation, building codes, combined heat and power, state government initiatives, and appliances.
30 Ibid.
31 Ibid.
avoid using the utility-based program in favor of a self-designed program while the opt-out allows a customer to avoid energy efficiency requirements altogether. Self-direct programs are diverse, including some that require robust standards and an evaluation of energy savings levels, and some that can become opt-out programs in all but name.  

For additional information on Utility Programs please see the Appendix.

Energy Efficiency Decision Making

Desk research on the topic of industrial manufacturing decision-making yielded limited insight into how energy efficiency decisions are made above the plant manager level; however, the magnitude of investment is such that the executive management, if not the C-Suite, most certainly would be involved in the decision-making process.

This is not to suggest that corporations, including those in the manufacturing sector, are not taking up energy efficiency under the banner of sustainability. As this report highlights, not enough companies are doing so in a substantive manner. The second annual sustainability and innovation survey conducted by MIT Sloan in 2011 identified “embracers” and “cautious adopters” who are part of the change management cadre, bringing sustainability front and center into the companies for which they are employed. The attributes for “embracers” might be used to screen for companies that are better candidates for Energy Star, ISO 50001 or SEP. These practices include (in order of most to least prevalent):

1. Move early – even if information is incomplete
2. Balance broad, long-term vision with projects offering concrete, near-term “wins”
3. Drive sustainability top-down and bottom up
4. Aggressively de-silo sustainability — integrating it throughout company operations
5. Measure everything (and if ways of measuring something don’t exist, start inventing them)
6. Value intangible benefits seriously
7. Try to be authentic and transparent – internally and externally

One study from the Netherlands did try to bring the Boardroom perspective on energy efficiency into focus. Five drivers that are key to boardroom decisions were identified: knowledge,

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33 Ibid
35 Ibid.
financials, commitment, public and market demand, and policy obligation. We think it worthwhile highlighting the key question for each driver as the answer impacts how one could discuss energy efficiency with a company:

a) Do we know what energy efficiency practices and technologies are available? (knowledge)
b) Do we have the money to invest and are we willing to spend it on energy efficiency? (financials)
c) Are we committed to prioritize energy efficiency above other investments? (commitment)
d) Do the public and market demand us taking energy efficiency measures? (public and market demand)
e) Does this government policy require us to take energy efficiency measures? (policy obligation)\textsuperscript{37}

When one spends time thinking about the implications, it is evident that understanding the specific framework of the decision-maker and the language they use to understand issues is critical to starting the discussion and ending with significant action taken on implementing change.

\textsuperscript{37} Ibid.
CEO and C-Suite Priorities

The Conference Board, whose mission is to provide the world’s leading organizations with the practical knowledge they need to improve their performance, conducts an annual survey of top priorities for CEOs based on the work that the organization does to support its member corporations. While detailed results are only available to members, the results are shared with the media. Below are the top priorities for US CEOs/Presidents/Chairmen38 over the last four years.

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<th>2011</th>
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<td>Business Growth</td>
<td>Government Regulation</td>
<td>Operational Excellence</td>
<td>Customer Relationships</td>
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<td>Government Regulation</td>
<td>Global Political/Economic Risk</td>
<td>Government Regulation</td>
<td>Human Capital</td>
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<td>Innovation</td>
<td>Innovation</td>
<td>Customer Relationships</td>
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<td>Talent</td>
<td>Human Capital</td>
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<td>Cost Optimization</td>
<td>Cost Optimization</td>
<td>Human Capital</td>
<td>Corporate Brand &amp; Reputation</td>
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Table 1: C-Suite Top Priorities in the US39

Clearly, energy management under any guise is not in the top five, though it could be argued that it might fit under the umbrella of operational excellence, cost optimization, innovation or brand. This might be a limiting study in that The Conference Board provides the ten choices offered to each leader. The Wall Street Journal takes a somewhat different approach with their CEO Council, which last convened in November 2013. The CEOs divided into five task forces and debated priorities in five areas, including managing the global competition for resources.

Each task force chose five top priorities in its subject area and reported them back to the full council. The chief executives then ranked all the priorities from the five different groups. Their top five made no mention of energy management40.

What is interesting about priority number four of the task force’s top five priorities, business-government cooperation, is that in a different survey of CFOs, it was found that CFOs are losing sleep over excessive government regulation and punitive actions. This same survey provided

39 Ibid.
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Boards seem to be focused on income statement performance and risks to operational performance. The study was not granular enough to make a direct connection between the cost of energy and operational performance, but it is likely that energy management and performance would reside here if the study were more detailed.

All this is to say that the imperative to engage with strategic energy management is not on the radar of the C-Suite. While many designers of programs intended to increase energy efficiency see the business case as rock-solid, the priorities of executive leadership frequently do not share the same mindset, much less take action.
What Are Consulting Companies Saying About Energy Efficiency

A surprise finding was the dearth of information around this topic. Besides the 2009 McKinsey Report, we identified only two major consultancy papers on energy efficiency over the past five years. This pales in comparison to the papers on other topics that corporations are buying consulting and advisory services from. Specifically we looked at a paper on energy efficiency from Accenture and the World Economic Forum and a paper from Bain Consulting on why energy efficiency deserves a second look.

- The Accenture study provided an emerging list of barriers to implementing energy efficiency. Last on the list was: poor understanding of behavioral economics and what market incentives can be deployed to tip energy efficiency to scale.42
- The Bain Brief concluded that, “Energy efficiency is an option today, but it’s likely to be a necessity very soon. Few manufacturers can pass up the opportunity to improve profitability by 2%, mobilize their employees or ignore new business opportunities …the pure business logic is already convincing today."43

These are not actionable unless a C-Suite executive is already thinking about sustainability issues that include energy/carbon footprint or in response to a regulatory imperative at a national or international level. Sub-national regulatory response would likely be handled at the operational level of a company.


Detailed Findings

After completing the initial discovery phase and conducting an in-depth analysis, the Team identified key questions that the currently available academic literature does not address. The Team then conducted interviews with twenty (20) individuals across the entire energy efficiency ecosystem in order to better understand C-Suite motivations, level of energy awareness, and response to currently available strategic energy management programs. The following is a description of the Team’s detailed findings.

Energy Efficiency Continuum

The current thinking within the energy efficiency industry is that there is a continuum of strategic energy management that starts with Energy Star, moves through ISO 50001 and ends with SEP. This continuum represents both the relative potential for energy savings in each of the three programs and the fact that Energy Star serves as a funnel, which should potentially lead a firm to adopt ISO 50001 and then SEP as it continues to seek additional efficiency savings.

The Capstone Team went into its in-depth interview research with the assumption that this continuum was the correct framework for viewing strategic energy management within the industrial sector. However, based on the interview results, the Team believes that the strategic energy management continuum created by the DOE is only a piece of the overall energy efficiency universe for industrial firms. The continuum of industrial energy efficiency represents a much wider range of programs, including building-based systems, robust energy tracking and changes to motors and compressors. The continuum as the Team sees it is pictured in Figure 1. Strategic energy management programs are located on the far right side of the continuum, while most programs undertaken by industrial firms and utility providers are placed in the far-left to center-left.

The continuum starts with the low-hanging fruit of energy efficiency, such as changing light bulbs, and moves to improve building energy efficiency without addressing industrial processes. Beyond buildings is robust energy tracking, which allows companies to take account of their energy usage though doesn’t necessarily imply that the company is making any additional attempts to reduce this energy usage. Robust energy tracking will then lead companies to upgrade motors and compressor systems, or any other machinery with heavy energy use. Beyond this point, the continuum moves toward strategic energy management programs and changes to process.

At the left of the continuum, there is widespread knowledge of LEED certification, but mixed response. For example, a Director of Energy Procurement stated that “we have some buildings that could get LEED certification, but we don’t think it’s worth the bother” while CALMAC has a LEED gold rating on its facility.

There is also a mixed response to strategic energy management programs to the right of the continuum, but less awareness of the offerings. Companies are doing a number of varying programs; however, aside from Energy Star, very few of the companies we interviewed were interested in ISO 50001 or SEP. Only those that had plants in Germany or Ireland, where the legislative environment allowed the company to take advantage of incentives (which are essentially tax avoidance plays), were interested in ISO 50001 and SEP.

It is important to note that industrial firms currently consider any action taken on the left side of the continuum as concrete action toward energy efficiency\(^{45}\). One way to combat both confusion as to the nature of strategic energy management and hesitancy to move further to the right on energy efficiency is to be very clear on the messaging of energy efficiency and strategic energy management. All action is located on the same continuum, but not all action is equal. Unless a company has reached the right-hand limit of what’s available there is always room for improvement.

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\(^{45}\) This fact is inferred from interviews in which several individuals at the C-Suite level mentioned that they were considering energy efficiency improvements, but had no interest in SEP or ISO 50001.
Energy Efficiency Ecosystem and Company Response to Advocacy

Based on desk research and interviews, the Team concluded that the C-Suite is most concerned with operational efficiency, risk management and strategy. Yet, energy efficiency advocacy groups consistently talk about energy efficiency in terms of both payback and the environment, neither of which resonate with the CFO or CEO’s priorities. Furthermore, the payback of energy efficiency projects does not usually align with the ROI required by the C-Suite. For example:

- A VP of Global Energy and Sustainability of a global manufacturing company said that “it’s harder now than ever before to actually get organizations to make investments with more than a two year payback.”

- A President of a manufacturing company said, “Companies only want ROI for 1 year or 18 months (maybe 3 years).” While some energy efficiency projects can meet these criteria, many of the most robust projects will require several years.

A consultant and previous SVP of Strategy for a major company, was able to eloquently explain the discrepancy between the energy efficiency universe, including advocacy groups, government agencies and product supplies, and the C-Suite of industrial firms. He stated that energy efficiency advocacy groups tend to start with the cost effectiveness of energy efficiency projects, even though the C-Suite is not responsible for saving money on energy bills. In addition, the conversation often starts with “this is something important to you” rather than “you are not adequately addressing your responsibilities.” This consultant characterized this mindset as a form of evangelizing, which is ineffective at reaching the C-Suite.

The C-Suite has a mandate to actively manage risk. These risks include the reliability of supply, the possibility of future penalties, and the efficiency of operations compared with competitors in other parts of the world. The C-Suite should be able to answer the following questions that deal with risk and energy:

- If your operational costs doubled in five years, how many of your plants would you have to shut down?

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If you had a carbon tax equivalent to British Columbia today, how many plants would you shut down? Are you equipped for carbon having a real cost?

What are the supply reliability issues at your major manufacturing sites and what is the cost of a production breakdown given that the reliability of the North American energy supply is exponentially getting worse? Are you equipped for energy reliability in its current form and getting worse?

If you could drop energy use by 30-40%, what would it do to your stock value, effective value of company or profitability?

Only after the C-Suite has considered these questions and still believes they are of little importance, should energy efficiency advocates focus attention to lower levels of the management chain. However, our research found that energy efficiency advocates tend to direct energy efficiency messaging at plant managers and lower management levels before these questions asked at the C-Suite level.

This same consultant also believes that utilities tend to encourage the current managerial view that energy is a fixed cost outside of their control, rather than a manageable expense. This encourages the short-term view of energy that facilitates the C-Suite’s ability to ignore energy. It also passes down energy considerations to plant managers, whose job description requires them to worry about energy prices in order to stay within their annual expense budget.

Figure 2: Energy Efficiency Ecosystem
Strategic Energy Management in Industry

Strategic energy management in the industrial sector has its own challenges. There are different levels of awareness, understanding, and interest in existing programs. Moreover, the opportunities that energy efficiency provides differ broadly. Companies’ definition of a good investment is not necessarily aligned with the benefits that an energy efficiency project could bring and programs need to be analyzed in an unusual way. Furthermore, because of the large variety of programs available (including utility programs) and extensive requirements for certification, there are more favored and least favored programs within companies.

Level of Awareness

In the US, all manufacturing companies have had to go through at least one certification process (i.e. Occupational Safety and Health), and are somewhat aware of the existence of environmental programs. The current level of awareness regarding strategic energy management programs within the industrial sector in the US is wide-ranging. Based on the interviews the Capstone Team performed, the awareness level is relative to the other programs the company has gone through or its level of engagement with environmental matters. Companies that have gone through previous voluntary certifications, such as Quality Management Standard ISO 9001, and those that have had contact with energy efficiency initiatives are the ones that know about most of the available programs.

Nonetheless, even when there is a common knowledge of the existence of strategic energy management programs, these programs don’t make it to the C-suite’s top priorities. As previously mentioned, the decision makers have other concerns and do not consider strategic energy management part of solution. Even when strategic energy management is brought to the attention of the C-Suite, the common notion that these programs have a low ROI implies they are unlikely to be implemented, especially in the case of small and medium industries with limited resources.

As a consequence of all the differences in perception and capabilities, there is a continuum of industrial engagement with energy issues. This engagement continuum is separate from the continuum of energy efficiency programs and based on the limited number of interviews that the Capstone Team has performed. The range of this continuum covers the span from companies looking to reduce costs, but which are not specifically targeting energy, to companies that have already achieved a 25% reduction in energy and are looking to reduce energy use by another 25% per unit produced as shown in Figure 3.
As shown in the graph, companies’ level of awareness is broadly divided into ten different categories from highest to lowest levels of engagement as follows:

1. They have been doing energy management/measurement for a while and have realized that the high level metrics did not give them what they needed to find the next 25% usage reduction that the CEO has publicly committed to.
2. They have a heavy/medium/light energy usage information management system that is or is not incorporated into their ERP (or complicated spreadsheets).
3. They do not have the manpower to engage with federal programs, the expense of a dedicated employee(s) is too high for them to absorb.
4. Local utility or government entity has worked with them aggressively to help make a new factory much more energy efficient, through rebates, incentives, tax breaks, etc. Energy efficiency is not seen much as a system, but an ever-expanding list of projects.

\[47\] This figure is not based on program participation per se, but rather on internally focused energy efficiency projects.
5. They know some energy metric of their usage beyond total annual costs (e.g., cost per square foot or unit produced).
6. They started to participate in one or more programs but stopped when a key manager left or management imperatives shifted.
7. Mostly in the case of small companies, they rent their factory space and the landlord would have to make significant investment. The company can’t shoulder any more cost than they have already invested.
8. They have changed light bulbs and done some other improvements in HVAC/motors/compressors in past years but either they are able to provide a clear payback period of less than a year or they need to get incentives from utility/government to offset the cost.
9. Energy efficiency is familiar to them and they have thought about participating in one or more programs.
10. They are always looking for opportunities to reduce costs because it helps them be more profitable and survive competition and changing customer demands. However, they believe energy is a fixed cost.

Company Motivations

The decision makers of a company, primarily the C-Suite, are focused on creating strategies that lead to profit generation in an environment where risk is controlled as much as possible. Manufacturing companies are concerned about producing quality products at the lowest cost possible. It seems contradictory that not much has been done about energy efficiency when it could represent big savings for a company. One of the main problems is that energy is not considered as a variable cost and the current low cost of gas makes the strategic energy management uptake problem even more challenging to address.

Companies are against more regulations because they believe regulations limit the potential energy saving of some industries and make it too expensive for others. A Director of Energy Procurement stated, “If someone from the EPA or DOE were to call me, I would be hesitant to even talk with them.” Companies have to be motivated by the perception that energy efficiency is a key priority. Energy efficiency must be viewed as something that helps reduces risk, more than just a requirement or a temporal cost saving technique; it has to be viewed as a long-term benefit for the company and not be reduced to a decision based on ROI. In the words of a manufacturing company VP, “thinking about ROI means you have no brain. It does not make any sense; you have to pay for energy anyway. Take the money you are going to spend anyway and buy an asset with it!”
Response to Programs

There are a number of strategic energy management programs available, which makes the energy efficiency environment too complicated for some. However, out of the most well known programs, Energy Star seems to be the most favored. For example, one VP said, “Energy Star makes a lot of sense.” The main benefits of Energy Star are its strong brand and the fact that the C-Suite knows what it is. Executives that have a mid to high level of energy efficiency awareness see Energy Star as being too easy and don’t like the fact that it doesn’t require any specific commitments. At the same time, this program has the benefit of fitting different levels of need and being well recognized, making it an excellent starting point for companies seeking to enter strategic energy management.

SEP is the least favored program, mainly because the C-suite does not know about it or thinks it is too demanding/resource intensive. Given that the program has just recently gone public, there is not enough information, and only companies that have done previous certifications/pilots or other energy efficiency programs are aware of it. Moreover, SEP is seen as a program that can only be done by companies that already have a high-level of energy efficiency engagement, given its robust requirements. But even companies that could do SEP do not seem to be interested in it and mention that they would only do consider it if the recognition given by SEP improved their competitiveness. However, this ability is limited given that SEP is not a global program. The program seems to require too much administration for savings that could be achieved in other ways. In the opinion of the Energy Director of a global manufacturing company, SEP “is going to have a really difficult time moving forward, unless there are incentives.”

Response to Utility Programs

Energy efficiency is predominantly undertaken in the US because of utility initiatives, mostly through light, motors, and compressor systems upgrades. According to the Program Managers at CEE, up to 80% of the energy efficiency has been done because of these programs making “utilities the most important energy efficiency manager.” However, incentives such as utility programs work only up to a limit. Companies that know about them and are able to take advantage of them do as long as it does not become too costly or a stringent.

Utility programs are very diverse throughout the US and not present everywhere. While all are trying to reduce energy demand, they are not approaching the programs from the C-suite point of view. Companies that are aware of energy do not believe the utility programs work because they do not focus on industrial processes. Companies then opt out as soon as they have no use for the programs or when it does not make sense to invest capital.
Key Findings

Based on detailed findings from the desk research and interviews, the Capstone Team developed the following conclusions as to the low levels of voluntary uptake of strategic energy management within the US industrial sector.

CEO/C-Suite - Not Talking Their Language.

The business planning cycle and capital allocation process do not lend themselves well to large scale energy efficiency management and improvement programs. Companies are looking for more immediate payback than many strategic energy management projects can provide since many projects do not make the capital expenditure cut (e.g., payback is too long, ROI not attractive, too many non-efficiency projects are considered higher priority, etc.). For US market based firms, ISO 50001 is not viewed as necessary, or even desirable, unless the company is selling internationally (through distributors).

When the Team looked at recent research that targeted CEO priorities for 2014, neither energy efficiency nor environmental improvements were on the list. An argument could be made that they are subsumed under risk management or innovation, possibly brand reputation—three of the top five challenges (the other two are customer relationships and human capital). According to the Wall Street Journal CEO Summit held last November, CEOs have business/government cooperation as a key concern. However, the key concern that CFOs lose sleep over is excessive government regulation and punitive actions.

Energy Cost Reduction.

Interviews with a manufacturing CFO and two energy directors (one global, one US only) made it clear that cost reduction is the key driver of any financial investment (especially retrofits) whether a capital project, one-off plant process improvement or part of initiative such as continuous improvement. (Typically cost savings are used to fund new investment in the same time period rather than new funding.) Further, seeing less government regulation and more flexibility is highly desirable from the CFO’s perspective.

Energy managers are looking at initiatives that lead to cost reduction and at plants where it makes financial sense – either where utility subsidies are available or where energy rates are so
high as to make the ROI worthwhile (i.e., Northeast and CA make sense, states in the South and Midwest do not because energy rates are so low).

**Energy Efficiency Initiatives Treated Differently Around the World, Incentives and Mandates Make a Difference.**

According to the Chief Energy Officers interviewed, action seems to happen when financial or human resources are made available to offset the investment or when a new facility is being constructed. One global company has all of its facilities in Germany and Ireland ISO 50001 certified because of government mandates/incentives. However, in the US this same company is only looking to certify a few facilities. Despite this, the ISO standard is how companies will benchmark all facilities globally, irrespective of whether the plant will ever achieve certification. They think that SEP is not desirable simply because there is no additional benefit gained from the additional cost of verification. Internal plant level reporting is sufficient.

**Complexity of Energy Performance Environment (Too Many Competing Standards).**

After the Capstone Team finally mastered all of the different programs that are available at either the national or industry vertical level, we think that the landscape is cluttered and confused. LEED is the only standard that shows up consistently in the conversations we have had. It seems a given when talking about administrative facilities, which inevitably come up in the discussion.

Energy efficiency is a polymorphous term with different levels of low-hanging fruit, distinctions between US and non-US locations, sustainability improvements (e.g., waste streams) and corporate level engagement (those companies who have committed publicly to goals). The awareness is there. The economic environment since the 2008 financial crisis has made it tougher in most cases to get funding for anything other than the most basic improvements (changing light bulbs, etc.).
Different Requirements for Certification, Conditions for Local Utility Programs.

Companies which have facilities that are Energy Star certified feel that additional improvements, while desirable, do not get them additional cost efficiency since there are usually no incentives or subsidies available. One manufacturer (US based) stated that they work closely with utility incentive programs, but once all the improvements available are executed, they would opt out of paying the surcharge if they could not obtain any further, immediate business year benefit.

Energy Management Systems Not Standardized.

A few companies have basically built their own measurement tools, one is tied into the ERP platform, others are more ad-hoc. One global company sought advice from Johnson Controls, Siemens and other large players and ended up partnering with a small start-up to create a black-box that would help them drill down on the energy usage of their chillers, the biggest energy usage component. Measures at a gross level are basically used even though desk research found that more granular data may be available and more actionable.
Recommendations

I. C-Suite Language

There is an important need for experts in the energy efficiency ecosystem to change their language and elevator pitch from cost savings and non-believable short payback timeframes to speaking the language of the businesses they target in order to have impact. The experts within the ecosystem all recognize the importance of having executive management/C-Suite buy-in on energy efficiency, yet often do not have a full appreciation or have only a partial appreciation of how capital is allocated, how the planning cycle (both short and long-term) works, and the strategic framework that the C-Suite uses to drive business growth and profitability.

As highlighted earlier in our findings, at the CEO level, risk management, operational excellence, and brand reputation are business imperatives while energy efficiency is not. Also, as our research has highlighted, issues that get the attention of the C-Suite can and do change from year-to-year. Ultimately, any new issue needs to fit within a company’s mission, vision and values. Further, at the CFO level, their focus is on income statement metrics and risks to operational performance, of which energy efficiency is only a relatively minor part.

Energy efficiency players (i.e., advocacy, consultants, suppliers and regulatory) must start anew to engage the C-Suite by using the right language and relevant channels of communication to communicate the way that energy efficiency aligns with a company’s business strategy.

We recommend the following frameworks, posed as questions/conversations, for engaging the C-Suite in a dialogue that asks about the risks to their continuing operations and business goals. The individual engaging in the conversation should be well armed with the insights from this report and hard facts about energy efficiency that can specifically address the questions below for the individual company.

Business Risk Due to Rising Energy Cost

What would your company look like if within five years your operating costs for energy doubled? Which divisions would find this a challenge that would cause you to question whether to remain in that business? Which divisions would find this a growth opportunity? Overall, what type of impact will this have on company profitability? How would a doubling of energy costs affect the stock price and executive compensation? What plans have you considered or developed to mitigate and adapt to a predictably more volatile energy price landscape?
Impact of Energy Intensity Reduction on Corporate Profitability

From a profitability and ROI viewpoint, what would happen if your company could reduce its energy intensity, i.e., spend, by 30-40% or even 50% within three to five years?

Impact of a Carbon Tax on Company Operations

In other Western economies, notably Europe, carbon taxes are driving changes in how energy is produced and the cost of wasting that resource in the manufacturing process. Some large US industrial multinationals are beginning to forecast, using a shadow budget, the inclusion of a US carbon tax on energy usage. If this were to come to pass in the US, which of your divisions would experience financial stress? Which would find an opportunity to grow? At what price per ton of emitted carbon dioxide emission would this be considered as having material impact on your firm’s financial performance?

Business Risk from Energy Supply Disruption

What if you had ten to twelve days per year of production interruption at each US facility, at different times, because of disruption to your energy supply? What kind of scenario planning has your firm incorporated into managing future energy supply risks? What would be the financial value of having a more reliable energy supply at your plants? How does that change if your company could run production and your competition could not due to energy supply disruptions? If it were the other way around?

“Line-of-Sight” from Energy Management to the Executive Suite

Where does responsibility for the energy supply chain reside within your organization? How effectively is that executive/team managing energy cost and supply availability risk now? How are they planning for the future?

This is not presumed to be an all-inclusive list given the limits the project scope and number of interviews. However, it provides a road map for rethinking how to talk about industrial energy efficiency in a way that has greater odds of driving behavior change from the senior most levels of an organization.
II. Simplifying the Standards Landscape

One of the biggest barriers to adopting energy efficiency is the complexity of the standards and certification landscape. This complexity is further amplified by the vast differences between manufacturing plants in regards to their equipment and machinery as well as the existence/maturity of energy efficiency management metrics and programs.

Essentially, there is no one-size-fits-all energy efficiency standard for the industrial sector due to its sector and process diversity. In the course of our research, no one industrial manufacturing company executive had familiarity with all of the standards – Energy Star Certified Buildings and Plants, ISO 50001, SEP, SEM, or Energy Management Information Systems (no two perceptions were similar). However, LEED certification for buildings was familiar to each executive and there was more than a passing familiarity with whether LEED was within reach or not for new or retrofit facilities.

The energy efficiency landscape in the US is muddled and we have concluded that this is the case because of a lack of costs (regulatory) or incentives (payment for activities) at the federal or state level. It is critical that the NRDC begin to advocate for the harmonization of the energy efficiency standards landscape in order to facilitate uptake by the industrial sector in the absence of a regulatory ‘stick.’

Since an advocacy group is limited in its ability to impose a regulatory requirement, we think that picking one existing program that aligns with business interests, albeit at the plant level, offers a way to get both NGOs and manufacturers more focused on taking action (or in the case of companies that have more robust programs, move to the next level of efficiency).

We believe that NRDC can leverage Energy Star as the strongest brand for energy efficiency solutions in the industrial sector. Energy Star is not suitable for all companies but it serves as the best starting point for a large majority of manufacturing plants and buildings. For companies with very little or no energy management backgrounds, Energy Star will provide a relatively simple way of adopting basic energy efficiency measures that will provide a benchmark that enables the implementation of more complex solutions.

In learning about the history of this program, it is the only one that we found that was promulgated primarily by executives and managers of companies and buildings. Therefore, the language and checklist nature of the standard lends itself more readily to middle through senior levels of a company when deciding whether to dedicate financial and human capital to an energy efficiency initiative.
Engaging with utilities is critical because they serve as the primary source for energy for the vast majority of US manufacturing plants and facilities. Utilities have an optimal opportunity to implement standards to help facilitate uptake of energy efficiency policies. However, the landscape for utility programs also varies widely from region to region due to state legislation, political climate, and the price and sources of energy. Due to higher energy prices and the pro-environment legislation, utilities in the Northeast and California have been highly successful in collecting data as well as implementing and investing in energy efficiency policies. Creating a utility toolkit with best practices and case studies of successful utility programs will help harmonize the many state/utility variations and help reduce the learning curves.

We think that the CEE is an ideal partner for the NRDC to work with to create both focus in the standards arena and to change the utility focus and advocate for the harmonization of programs for the manufacturing sector. One note of caution is that CEE’s recently published paper defines SEM using language gained from the regulatory sector and this term can have multiple definitions among different stakeholders. The Team is aware that CEE’s definition of SEM was created to reduce confusion regarding the nature of strategic energy management, but the SEM concept as defined by CEE has yet to reach a number of industrial executives based on the interviews conducted. A partnership between CEE and NRDC could also work to promote the SEM definition of strategic energy management.

We further recommend that NRDC and CEE develop even more robust options for utilities to offer manufacturers in next generation of energy efficiency incentive programs. Based on our research, ratepayer-funded incentive programs can easily function as gateway programs to achieve some level of energy efficiency improvements. More realistically, it provides a more intrinsic benefit for the long-term:

It allows for the collection of benchmark data, which can be used as a baseline in the future for more robust and initiative based programs vs. specific projects (e.g., changing the light bulbs).

However, this could create a disincentive for manufacturers to opt-out of paying a surcharge once they have cycled through the first generation incentive programs (e.g., light bulbs, motors, HVAC, compressed air). We are specifically talking about companies that are willing to pay into the surcharge as long as they are receiving benefits. As soon as they have completed all the programs, they will no longer pay the surcharges.

In a perfect world, the US would put a carbon tax on emissions in order to creating a step-change in energy efficiency uptake by the US industrial sector. We believe that the short-term outlook
for this type of an action is poor. If utilities can provide relevant programs, this could provide a way to increase engagement and uptake. It certainly would be an easier sell if all public utility commissions provided a set of programs that were consistent so that companies with multi-state operations can make the same decision for multiple locations as opposed to a series of one-by-one plant decisions.

IV. Public Relations Through Media: Speaking the Language of Business

NRDC needs to change the current energy efficiency conversation by utilizing the language that business decision makers can easily understand and grasp. While we developed an in-depth recommendation on engaging the C-Suite, this will likely find the best results if conducted on a 1:1 conversation basis. There are many others within organizations that are capable of driving energy efficiency behavior change and this recommendation is intended to highlight use of traditional and social media to use the findings from this report to shape and initiate a different conversation than the one that has taken place for a number of decades.

NRDC (and, if partnered, CEE) can seek to partner with CEOs and create opinion pieces in both mainstream media (e.g., The Washington Post) and trade publications to take advocacy for this sector to a different destination. NRDC must emphasize the benefits that such policies will provide not only to stakeholders, but also to the overall longevity of the company. Highlighting the altruistic benefits of implementing energy efficiency measures and the relatively quick payback on invested capital has not really moved the needle in the US for this sector. Social media and gaming are important awareness and opinion shaping tools that capture the hearts and minds of the next generation who are starting careers in the industrial companies NRDC seeks to influence.

In highlighting how energy efficiency programs will mitigate a specific type of risk to company performance and growth, a superior communications strategy will emphasize that there will be winners and losers at the plant, state and company level; plants that do not get the resources might shutter and relocate to another state (or country); states that offer more effective utility programs could have an easier time attracting and retaining manufacturing; companies that play to win on energy efficiency will likely outperform their competition. Should carbon pricing becomes an imperative that the federal government imposes, those companies that started earlier will have a competitive advantage.

These are the types of messaging points that will land at the business manager level and perhaps even at the local regulatory level and will be more effective in achieving the behavior change so clearly needed in the industrial sector over current messaging.
It is beyond the scope of this project to recommend specific media strategies and outlets. The Team presumes that NRDC can either hire the expertise or outsource to the professionals best equipped for the task.

One note of caution from the corporate side – preaching or telling someone they should do a particular action is a much harder sell, people are wired to naturally resist being told what to do – than helping an individual or company own the imperative for action. Successful advocacy and communication achieves that level of action and the resulting outcomes.

V. National Energy Efficiency Awareness Day

In order to increase awareness for the benefits of energy efficiency, NRDC should advocate for the creation of a National Energy Efficiency Awareness Day. The rapid increase in the use of social media have enabled hundreds if not thousands of organizations to create a special day of focus mobilizing their membership to respond to a call to action. With 1.4 million members, the NRDC could create a social media campaign to use members to increase awareness of the issue (and if they are stockholders, bring pressure to seek change) and how companies can make a difference in the communities and markets within which they operate. This would require a multi-pronged, old and new, media strategy that is targeted to different generations. As highlighted above, this will require professionals who are skilled in media.

In the past decade, much light has been shined on renewable energy, such as solar and wind, as the strongest weapon to combat climate change. However, such initiatives may take decades to achieve scale. On the other hand, energy efficiency can be implemented today and has the capability of not only reducing energy costs and increasing energy security, but also lowering GHG emissions with few of the traditional tradeoffs. A National Energy Efficiency Awareness Day, together with an awards and recognition program for companies and utilities, will be an additional driving force for the uptake of energy efficiency in US manufacturing plants.

As with our prior recommendation, this is a communications play, however one that engages a wider spectrum of stakeholders in pushing for behavior change in the absence of federal regulation or a carbon tax.

VI. Additional Research

The importance of the executive audience is paid some amount of lip service in the many different efficiency standards (most talk about the importance of executive buy-in/sponsorship).
However, few, if any, seem to have framed the message from the recipient’s viewpoint. Given the admittedly qualitative nature of the field research, we think that additional market research is critical to develop the appropriate conversational framework and key message points to use with each the targeted segments. For example, if a partnership with the CEE were formed they would likely want to use SEM as the way of organizing energy efficiency engagement. In our interviews with companies, this phrase generated either long pauses in the conversation or different ideas on what it could mean. Research would clarify both the nomenclature and key benefit points that would be strongest in driving behavior change on energy efficiency.

Ultimately, getting the right message to the right audience will be mission-critical to changing the energy efficiency landscape in the US industrial sector.

C-Suite research will likely be a qualitative play given the difficulty in accessing this target audience. Quantitative research with senior management, plant management, utilities and the energy efficiency eco-system will provide a much more insightful messaging and media platform to be effective. These results can be used to inform C-Suite research that would be of necessity qualitative in nature.


Appendix

Utility Programs Continued

Self-Direct Programs

Self-Direct programs may be divided into two categories: structured and less structured. These definitions are vague, but the differentiation between the two types typically appears to be the degree of monitoring and verification of energy savings levels and the degree to which the company must pay into the utility public benefit fund\textsuperscript{48}.

<table>
<thead>
<tr>
<th>Table 1: Opt-Out/Self-Direct Program Continuum</th>
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<tr>
<td><strong>Type of program</strong></td>
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<td>Payment of CRM</td>
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<td>M&amp;V of savings</td>
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<tr>
<td>How funds used</td>
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<td>Follow-up</td>
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<td>Examples</td>
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The elements that define a good Self Direct Program include the following:

- Programs are run as an acquisition program. Currently, many utility-based programs measures dollars spent on energy efficiency investments, not the total amount of energy saved through programming.
- Flexibility.
- Programs give CFOs a reason to care about the investment by moving the CRM fee out of the O&M budget and into the capital budget.
- Programs provide smart reimbursement plans.

• Programs are willing to use a stick if necessary, such as forcing customers to return funds if those funds remain unused.
• Programs collect meaningful data on the amount of money spent, the cost of each investment, the type of investments, the savings per each investment, and the total amount of energy saved.

The reasons large industrial companies typically give for wanting to opt-out or reduce their CRM surcharge are as follows:

• Current utility-based programs do not adequately address the complex and changing nature of industrial companies.
• Industry does not receive as much from the energy efficiency programs as other sectors, but pays more because of their larger utility bills. The industry sector is, therefore, subsidizing commercial and residential energy efficiency programs.
• The energy efficiency program cycle does not align well with corporate capital planning and budgeting cycles.
• Utility companies do not communicate well with industrial companies.

Greenhouse Gas Emission Targets

In addition to utility-based energy efficiency programming and state-mandated energy savings targets, state level GHG reporting requirements can indirectly influence the willingness or hesitancy on the part of industrial companies to adopt energy efficiency standards. As with state-level energy efficiency policies, state-level GHG emissions reporting requirements vary dramatically from state to state. Eighteen (18) states currently have mandatory emissions reporting requirements, including California and Wisconsin. Robust energy efficiency programs require benchmarking efforts and these efforts necessitate reliable data on either a firm’s energy spend or level of GHG emissions. The presence of mandatory GHG reporting ensures that firms in the state have already been collecting the data necessary for benchmarking purposes.

51 Kyle Aarons, Key Considerations for Industrial Benchmarking in Theory and Practice. Issue brief. N.p.: Center for Climate and Energy Solutions, 2013: 8
52 Kyle Aarons, Key Considerations for Industrial Benchmarking in Theory and Practice. Issue brief. N.p.: Center for Climate and Energy Solutions, 2013: 7
The potential importance of mandatory GHG reporting to the success of utility-based programs is highlighted in the ACEEE report on Barriers to Energy Efficiency that gives four reasons for barriers to success within the industrial sector for utility-based programs. These barriers include the problem of establishing a counterfactual for energy use levels, which can be difficult as utility companies have to distinguish between energy savings from programs from energy savings from intelligent systems more broadly. It is easier to make this distinction when the company has more data on the company’s past energy use\textsuperscript{53}.

Region Overview

Based on our desk research, the Team was initially looking to suggest that NRDC focus on strategic energy management uptake in the Midwest and California. California is the region with the most robust climate and GHG-related regulation, including GHG reporting, energy efficiency resource standards, a cap and trade program, and a climate action plan\textsuperscript{54}. This legislative environment is likely to offer an ideal situation within which to push for increased voluntary uptake of strategic energy management.

Alternatively, the Midwest region, as mentioned above, is currently a battleground with several states facing challenges to utility-based energy efficiency programs in court. Yet, the overall picture is one of rapidly expanding growth for energy efficiency in the Midwest due to the passage in 2007 by the Midwestern Governors Association of a 2% energy saving goal by 2015\textsuperscript{55}. This goal created a huge windfall for utility-based energy efficiency programs as the region is looking to invest $1.8 billion in energy efficiency by 2015\textsuperscript{56}. Results are already showing: four Midwest states are now ranked in the top ten in the 2010 ACEEE Energy Scorecard and three have held the “most improved” category in the past five years\textsuperscript{57}. These contradicting pressures for and against energy efficiency, along with the Midwest’s continued status as a manufacturing hub\textsuperscript{58}, make it an ideal region in which to focus efforts for Strategic Energy Management in the Industrial Sector.

\textsuperscript{54} This is taken from a study of US Climate Policy maps available at http://www.c2es.org/us-states-regions/policy-maps
\textsuperscript{56} Ibid
\textsuperscript{57} Ibid
After further investigation, the Team switched our focus toward C-Suite level messaging issues and discontinued its regional focus.
Segmenting by region and percentage of energy use, allows the NRDC to focus on specific plants that are more prone to implementing strategic energy management. In order to segment the different energy consumption by region, the Team looked at energy consumption per dollar of value added.

The figure below shows the significance of energy costs in the overall production of the plant or facility. Those that have a high percentage of energy consumption per dollar of value added are more likely to implement strategic energy management. In the figure below, it is evident that the south has the highest energy consumption per dollar of value added across many different industries.

The main reason for this is because energy rates in the south are relatively low compared to the Northeast, Midwest and the West. Since the energy rates are so low in the south, implementation of strategic energy management does not generate the same payback compared to regions with higher energy rates. In fact, payback periods are much longer, discouraging most industrial facilities from implementing any energy efficiency measures beyond the basics of changing light bulbs and inefficient machinery.

The discovery of shale gas and oil in Eagle Ford, Texas and the Bakken fields of North Dakota have reduced energy prices in the United States and will have a significant impact on the rate of strategic energy management implementation in the South and the Midwest, unless the government enacts legislation to boost energy efficiency in the industrial sector across all regions of the United States.
The Team also created a scatterplot in order to target specific industries that had the largest financial incentives to adopt strategic energy management. Ideally, the best candidates would be the ones located in the far top-right quadrant. These industries spend a lot on energy and have a high-energy consumption percentage in terms of the added dollar value.

While our findings did provide evidence in industries that NRDC should target over others, such as the chemical and paper industry, further research needs to be done to build a more accurate scatterplot. Ideally, information such as the exact number of plants and/or facilities in each industry and their average energy consumption would have provided a much more in-depth and fuller picture of the information found in the scatter plot below.

We recommend that the NRDC pursue this research and conduct further research in segmenting out targets by region and level of energy consumption.

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Appendix Figure 1