BSR

Unlocking Energy Efficiency in China

A Guide to Partnering with Suppliers

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About this Report

This guide aims to assist sustainability professionals in global companies to establish supply chain energy efficiency programs, with a focus on China. We explain the benefits of doing so, outline a productive role that buyers can play, and show a process for moving forward based on a four-phase cycle of building foundations, catalyzing suppliers, facilitating progress, and enhancing impact.

This guide was written by Ryan Schuchard, Manager, Research & Innovation, and Daniel Gross, China Operations Manager, with contributions from Laura Ediger, Environmental Manager.

The content presented here is based on a combination of project experience and primary and secondary research. Inputs include insights from BSR's China Climate Change Training Initiative, through which we have trained more than 600 managers from manufacturing facilities in China since 2006, and insights from our role in implementing the launch of Walmart's supply chain energy efficiency program in China. We conducted interviews with senior managers from more than 20 companies, including Mikael Blomme (H&M), Jay Celorie (Hewlett-Packard and Electronic Industry Citizenship Coalition), Lonny Knabe (Nike), Brill Lacno (Levi Strauss & Co.), Ken Lanshe (Walmart), Carmel McQuaid (Marks & Spencer), Jeff Senne (Sodexo), Lin Wang (IKEA), and a representative of Target; more than 30 representatives of energy consultancies and energy service companies (ESCOs); and government officials in Chengdu (Sichuan), Dongguan (Guangdong), Guangzhou, Nanjing (Jiangsu), Shanghai, and Shenzhen.

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This guide is part of a "Thriving in a Constrained World" series. Please direct comments or questions to Ryan Schuchard at rschuchard@bsr.org.

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ABOUT BSR
A leader in corporate responsibility since 1992, BSR works with its global network of more than 250 member companies to develop sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. With six offices in Asia, Europe, and North America, BSR uses its expertise in the environment, human rights, economic development, and governance and accountability to guide global companies toward creating a just and sustainable world. Visit www.bsr.org for more information.

BSR'S WORK IN CHINA
In 2009, BSR was enlisted by Walmart to help start a pilot program to improve the energy efficiency of its suppliers, starting in China. Since then, BSR has had staff based in and around Walmart's global sourcing headquarters in Shenzhen,

where we helped design the program and led events including launch meetings and trainings with more than 200 suppliers.

BSR also manages the China Training Institute (CTI). CTI is an ongoing initiative that aims to help global buyers and their Chinese suppliers to improve corporate social responsibility (CSR) performance and overall competitiveness through a wide range of training programs, roundtables, and salons. Since 2004, CTI has delivered more than 140 days of training to more than 1,500 managers in China.

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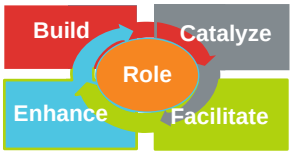


Introduction

Partnering with suppliers to manage energy efficiency can be a practical way to make them more competitive, while offering a gateway for managing climate and other sustainability issues more meaningfully in supply chains. For many companies, China is an appropriate starting point, and the time has never been better.

Companies from across industries—from Nike to Ikea to IBM—are now investing in supply chain energy efficiency.[1] Energy efficiency is important, according to Jay Celorie, HP's global program manager for supply chain energy, because "it is the most direct way for reducing greenhouse gases; it's a win-win for the environment, our suppliers, and for HP."

By working with suppliers, HP and other companies can inexpensively influence dozens, hundreds, or even thousands of organizations from the platform of a single program. For these companies, China can be the best geographical entry point for many reasons. It is a top location for energy-intensive manufacturing, it is the world's No. 1 aggregate emitter of greenhouse gases (GHG), and its government is providing more and more incentives for energy efficiency.

The time is right because a wave of new sustainability standards that include supply chain energy efficiency are on the way, such as the ISO's energy-management standard and GHG Protocol's upcoming guidance on measurement of supply chain GHG (more on this in the "Enhance Impact" section). Companies have a window of opportunity to get ahead of peers as stakeholders learn to expect more, and more tools become available to do more with.

While many U.S. and European companies have been implementing internal energy-efficiency strategies for years, they have only recently begun working with suppliers. And in places where there are some of the best opportunities for improvement—like China—the landscape is still largely unfamiliar.[2]

Defining 'Energy Efficiency' and Related Terms

Energy efficiency is defined as the amount of energy used to provide a service, or often more specifically, an *energy* service, such as illumination or heating. Increasing energy efficiency means reducing the energy needed to provide that service (e.g. using lights that require less electricity to produce the same amount of light).

Energy conservation is defined as using less energy to achieve a lesser energy service (e.g. using fewer lights). In practice, the difference between improving energy efficiency and conserving energy is not necessarily clear, partly because the value of the energy service (e.g. the importance of illumination) may depend on the user.

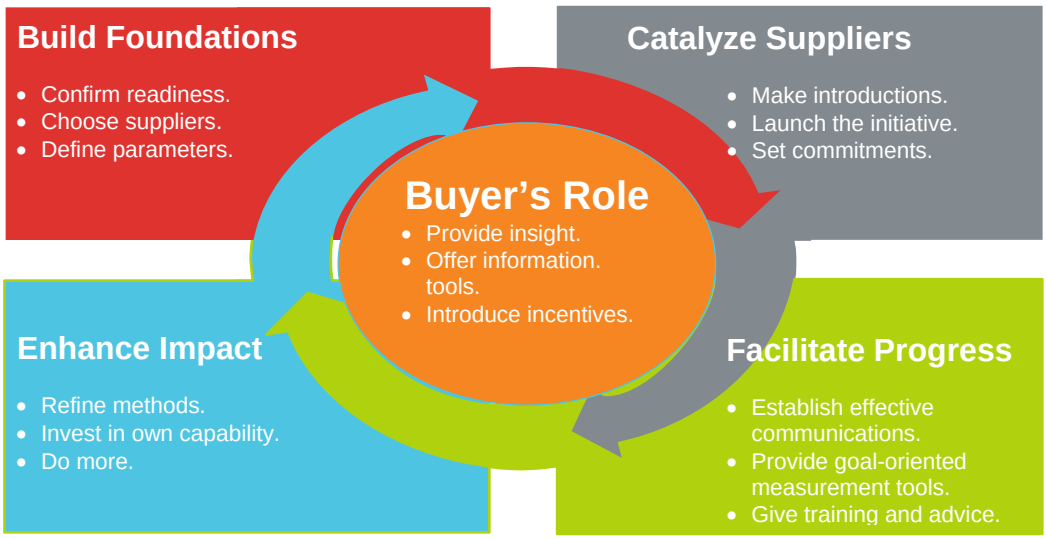
Energy intensity refers to the energy efficiency of an economy or business and is expressed in terms of energy per unit of production or revenue. For example, China's energy intensity is around 35,000 BTUs per dollar of GDP, and a company's energy intensity might be 8 million BTUs per ton of product.

Energy productivity is the output and quality of goods compared to energy inputs, and is the inverse of energy intensity. "Energy productivity" has become an increasingly common term over the past few years.

This report is designed for global companies with substantial physical supply chains, such as retailers, vendors, manufacturers, and consumer products companies (referred to as "buyers" in these pages). Borrowing from BSR's experiences working with suppliers in manufacturing, this guide describes why and how energy efficiency is a key issue for supply chain sustainability in China, outlines a unique role for buyers, and explains some of the main considerations buyers should make to get started (see Figure 1).

A case in point is Walmart, whose recent experience in reaching out to hundreds of suppliers to start energy-efficiency programs can provides some great lessons. Following Vice Chairman (now CEO) Mike Duke's announcement that Walmart would aim to have the top 200 factories it sources directly from in China achieve a 20 percent improvement in energy efficiency by 2012, the company enlisted BSR's support to launch its first supply chain energy-efficiency efforts in that country.[3] Walmart leaders have highlighted one of the most notable features of energy efficiency by describing energy efficiency as both a key to sustainability, and also as a way to help make suppliers cut costs—something that has kept energy efficiency a priority even during the recession.[4]

Figure 1: Summary of How to Get Started on Supply Chain Energy Efficiency in China



A Win-Win-Win

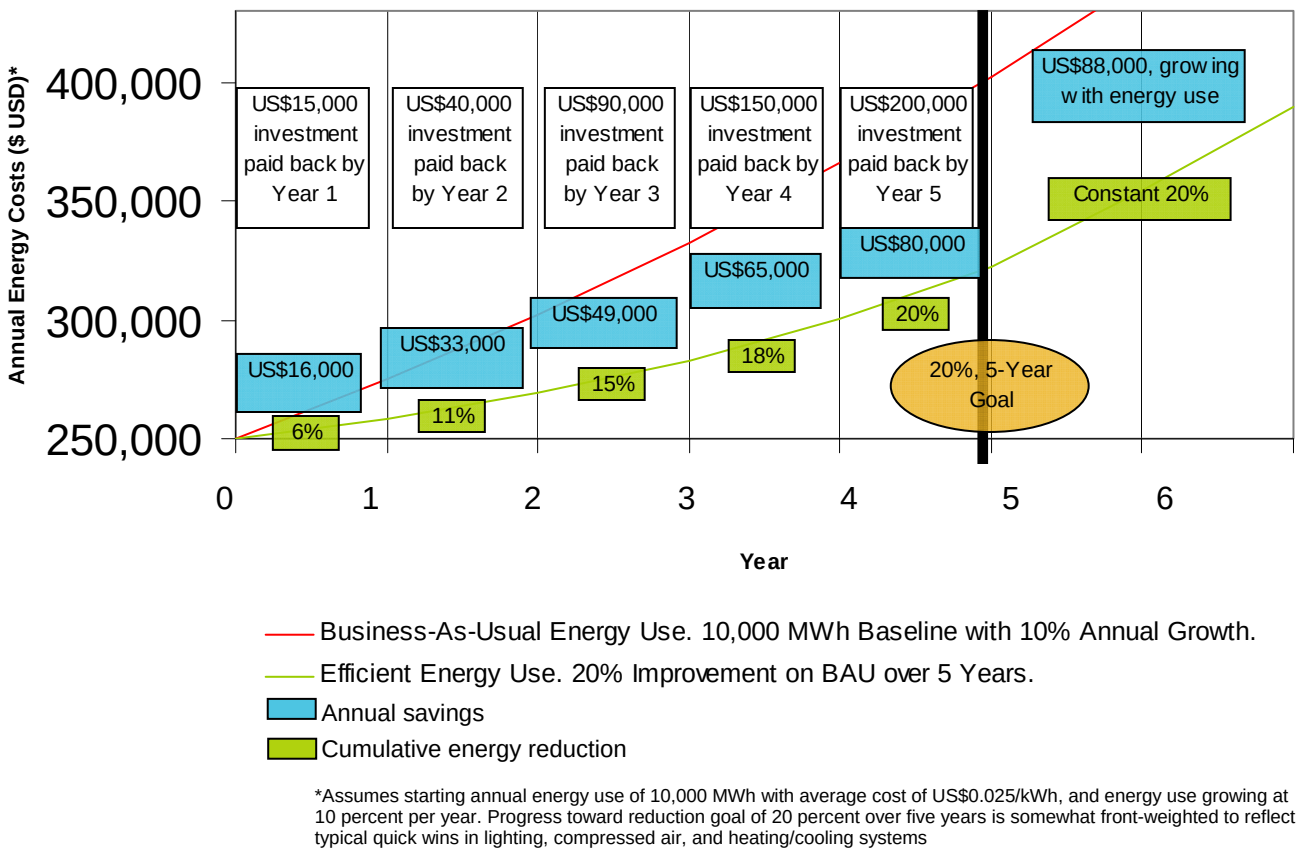
Business leaders see management of supply chain impacts and energy efficiency as top concerns for sustainability, and, in turn, companies increasingly see energy efficiency as a supply chain priority.[5] The following are some key business benefits to getting started in energy efficiency, focused on China.

COST SAVINGS

Energy efficiency goes straight to the bottom line. Improving energy efficiency by 20 percent, for example, could save a typical factory in China tens of thousands of dollars per year. It is difficult to pinpoint where suppliers will find the best opportunities without looking at multiple characteristics of a particular company, but it is safe to say that, on average, there are substantial opportunities (see Figure 2). As one consultant reflected about his research, energy intensity (as measured by kilowatt hour (kWh) per kilogram (kg) of converted resin) is about three times higher in China than it is in the United States for plastic injection

molding, up to eight times higher for some painting and coating, and most small- to medium-sized enterprises (SMEs) should easily be able to find 20 percent gains over five to 10 years. Thus, working with suppliers in China, as compared to internal operations in the United States and Europe, will often offer the best value per dollar of investment, and working with many at once offers a way to multiply impact.[6]

Figure 2: Cost Savings Potential for a Typical Supplier



*Assumes starting annual energy use of 10,000 MWh with average cost of US$0.025/kWh, and energy use growing at 10 percent per year. Progress toward reduction goal of 20 percent over five years is somewhat front-weighted to reflect typical quick wins in lighting, compressed air, and heating/cooling systems

RISK REDUCTION

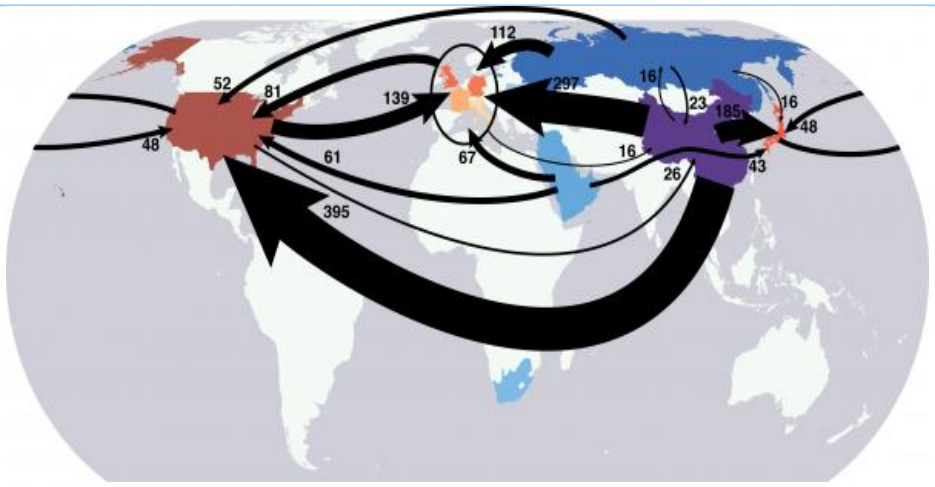
The steps to managing energy efficiency are part and parcel of navigating energy risk, which is increasingly understood as essential for strategic planning.[7] This is probably not more true anywhere than in China, where the energy future is so uncertain. Energy demand is expected to skyrocket over the next few decades, creating more strain on a grid already known for brownouts.[8] China is also the No. 1 producer of GHGs, so the likelihood of constraints created by climate regulation on energy—whether by China or importing countries—is also growing. Therefore, assisting suppliers in developing energy-efficiency programs can lead

them to better evaluate and put into place the infrastructure that will enable them to adjust to changing energy and climate market conditions.[9]

CLIMATE TRANSPARENCY

Industry creates more than a third of global GHG emissions, and improving energy efficiency is one of the most practical ways to abate GHGs, so energy efficiency in supply chains is an important component of managing climate change.[10] More stakeholders, especially investors, are realizing this link and, in turn, expect buyers to communicate about the impacts of energy in their supply chains. The U.S. Securities and Exchange Commission now mandates reporting on climate risk, and participation in the Carbon Disclosure Project's supply chain initiatives is growing, both of which require that companies engage with suppliers on energy usage to do well.[11] Questions are increasingly being directed to China because such strong impacts originate there: Nearly a quarter of the country's GHGs are used to produce exports for other countries, many of whose consumption emissions would increase 10 to 30 percent or more if they counted this category (see Figure 3).[12] But because energy-efficiency performance and best practice data for SMEs, which typify many suppliers, is scant in China, partnering with them to manage energy directly is a concrete way to learn about impacts and communicate them.

Figure 3: Supply Chain Emissions from China



Largest interregional fluxes of emissions embodied in trade (Mt CO_2 y^{-1}) from dominant net exporting countries (blue) to the dominant net importing countries (red). Arrows indicate the direction and magnitude of GHG flows.
Source: Carnegie Institution for Science

SUSTAINABILITY SYNERGIES
Energy efficiency can be an especially practical new initiative in China because many sustainability initiatives are already focused there. For example, 31 percent of the 25,000 factories that the Fair Factories Clearinghouse (an organization promoting better standards for workers) works with are in China.[13] China is the top country for shared suppliers of the Electronic Industry Citizenship Coalition, a group of more than 40 leading information and communications technology buyers. Companies are also likely to find synergies between efficiency and other resource-productivity issues, such as water savings, better process quality and throughput, and reduced downtime and maintenance costs. Once employees are tasked with saving energy, they are likely to find more "kaizen" (total quality management) type improvements.

OPENING DOORS
For those who are new to managing supply chain sustainability, energy efficiency is a great place to start. There is often a strong business case and results can be quick and satisfyingly quantitative. As Jeff Senne, Sodexo's director of sustainability and CSR performance, noted, "Energy efficiency can serve as a good bridge for discussing additional sustainability issues like carbon, water, and packaging with supply partners." An energy-efficiency program can build communications channels between buyer and supplier that can also be used for other initiatives, like water efficiency and recycling. It can also enable suppliers to capture new opportunities as technology, finance options, and relevant legislation evolve. Energy and climate are likely to be part of much larger sustainability-management challenges in the coming decades, with China at ground zero.[14] Working with suppliers in China on energy efficiency offers a path for learning about emerging sustainability issues with suppliers and establishing systems together to address them.

Understanding China's Landscape

Why doesn't energy efficiency happen automatically, since it can be cost-effective and is accessible to managers across departments within companies?

As buyers that have addressed energy efficiency in the United States and Europe know, pursuing alternatives can be expensive, especially when considering the "transaction costs" that result from understanding their situation, identifying opportunities, and evaluating options against alternatives.[15]

In China, these challenges take a unique form. There, a handful of officials in the Energy Bureau and State Energy Office plan energy supply in a way that underutilizes market-oriented price signals and keeps energy prices relatively low. The result is an energy market that encourages supply expansion rather than demand management.[16]

"Energy efficiency—and especially industrial energy efficiency … can make a significant contribution to reducing energy-related GHG emissions. It is a relatively cheap option with the potential to produce rapid, large-scale benefits. It should be viewed as the first fuel of choice in the creation of a global low-carbon energy system."

—United Nations Industrial Development Organization, 2009

Efficiency can also be seen as a distraction from the priority of economic growth. According to the U.S. Environmental Protection Agency's Walt Tunnessen, "Where energy is fairly cheap and everyone is cranking out production, there is little pressure to focus on cost-cutting. Energy efficiency is probably not factoring strongly into new capital projects since there is less market pressure (high energy costs) and less focus on carbon-dioxide reductions."

Therefore, according to one energy consultant, many senior managers simply don't see energy efficiency as being a good investment. Buyers should keep in mind, he said, that this is in the context of them "not factoring in externalities, being relatively unaffected by poor public relations, having multiple uses for capital that can easily garner excellent returns, and keeping three sets of books."

In turn, suppliers often disregard energy efficiency for multiple reinforcing reasons. They don't have energy-management programs because they don't have in-house experts. Experts aren't hired because management doesn't see their value. Management doesn't see their value because it is focused on expansion.[17]

To be sure, China's government has progressively instituted measures that encourage energy efficiency (see the first appendix listing).[18] Recently, it established a new measure targeting SMEs, "Opinions on Accelerating the Promotion of Energy Performance Contracting to Boost the Energy Service Industry," which provides new financial and tax incentives for energy-performance contracting.[19] However, most policies to date have focused on the smaller numbers of heavy emitters, or have set out directions that local authorities have yet to implement.[20]

"What Walmart has done is approach this from a business standpoint and not from a point of altruism. If we as a company focus on waste, we can make Walmart a better company, and, at the same time, become a better citizen.

—Lee Scott, Walmart chairman, on the company's energy-efficiency and sustainability initiatives, 2010

With China's unique landscape in mind, managers should temper the benefits they might expect from energy efficiency with an appreciation of some important limits. The following are some foundational expectations that buyers should consider as they begin supplier energy efficiency in China.

1 China requires an approach all its own.
2 There can be good reasons why energy efficiency isn't optimized.
3 Professional energy management providers offer some, but currently limited, resources.
4 A lack of standards means that buyers should be flexible and emphasize capacity-building.
5 Energy efficiency can be an endgame, but even better gateway.

First, China requires an approach of its own. Companies that have worked on energy efficiency outside China will have a head start. But all companies new to China will need to reconsider their assumptions there. Walmart Vice President of Global Sourcing Ken Lanshe, who has overseen the launch of the company's energy-efficiency efforts in China, has said, "We identified energy efficiency as a

significant opportunity to quickly enhance the resilience and environmental performance of our suppliers' Chinese factories." But, he added, "We quickly learned that while the successes of Walmart's Supplier Energy-Efficiency Program (SEEP) in the United States provided us with an effective model, navigating energy efficiency in China required us to leverage local partners that possessed relevant knowledge, experience, and tools."

As Lanshe suggests, China's landscape presents certain challenges, and those challenges help to clarify where buyers should focus. In fact, they help to define the very role of the buyers for energy efficiency in China, which is the topic of the next section.

"We are currently in the third year of collecting data from our suppliers. The first year, about half of the factories who responded had never calculated their footprint before, with some companies just providing basic energy data. The next year, more suppliers began putting people and resources in place to calculate their emissions. This year, following further training and education, we believe we will get substantially more factories reporting more accurate data."

—Global electronics buyer

Second, there can be good reasons why energy efficiency isn't optimized. It would be easy to say that suppliers aren't more efficient because they suffer from poor management. While this may be true in some cases, energy efficiency may objectively not be a good investment for factories given their existing resources and opportunity costs. China-based suppliers have proven to be meticulous and diligent about process improvement in general, and they demonstrate growing awareness about energy efficiency. According to one consultant, "What makes sense to me is that factories invest in growth rather than productivity because it pays better, in simple ROI terms, and faster." That doesn't mean there isn't room for improvement. Much of the problem is not the specific investments themselves, but the resources required to gather knowledge about improvement opportunities, because diagnostic tools are not as widely used in China, where environmental data is less freely transmitted and shared.[21]

Because of this, buyers should proceed by introducing new factors into the equation (as discussed in the next section) and realize that the maturation of successful program takes time. Some buyers have reported that the number of suppliers successfully participating in their program has grown steadily, but it has taken several years.

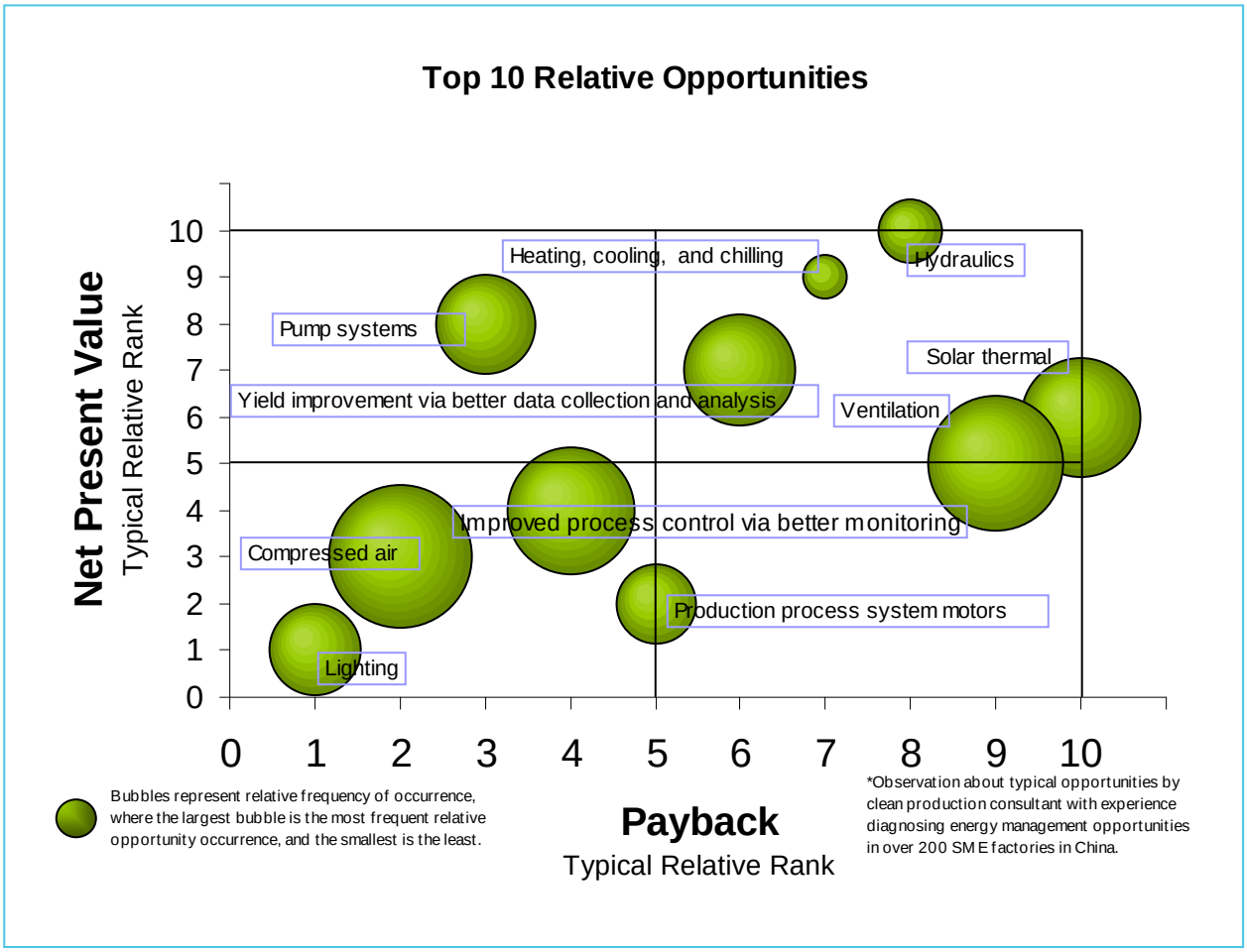
Third, professional energy-management providers offer some, but currently limited, resources. In places where energy is used efficiently, such as in Japan and Hong Kong, there is usually a bustling industry of energy-efficiency providers, termed energy service companies (ESCOs). These companies find opportunities for efficiency improvement, locate project financing, and then install equipment with agreements such as energy-management contracts (EMCs) or energy-performance contracts (EPCs). After coming of age in the 1970s, ESCOs expanded from North America and Europe to around the world, including Japan, South Korea, and Hong Kong. However, in China, ESCOs are not yet reliable, for two reasons.[22] First, they have a hard time providing finance in China because firms providing capital believe contracts are not enforceable there.[23] Second, ESCOs typically aim for larger projects, meaning they often ignore SMEs. As far as most buyers setting up supplier initiatives are concerned, ESCOs tend to take a few forms:

- **Product-oriented**: Manufacturers and marketers of equipment (e.g. lighting, motors, boilers) for sale or lease. Some have done performance contracts, but only for large projects and only when trust is high. They may provide free audits or advice, but they tend to focus on a narrow aspect of energy management or be biased toward selling certain equipment.
- **Consulting-oriented**: These companies provide energy audit and advisory services (rather than product sales or equipment retrofits) for a fee, with a focus on large contracts. Generally, they will offer customized audits and objective analyses, but free services are rare.
- **Hybrid/collaboration**: These are actually partnerships between ESCOs with different core competencies. Several consulting- and product-

oriented ESCOs have partnered or are interested in partnering with other buyers in order to offer comprehensive solutions to clients.

Buyers may be able to partner with ESCOs to deliver energy audits, diagnostic tools, advice, and personnel, and they should consider ways to build bridges from suppliers to ESCOs by hosting networking forums and facilitating bundled transactions. However, while ESCOs may be able to fill some gaps, they currently appear unable to offer comprehensive and inexpensive solutions.

Figure 4: Typical Relative Energy-Efficiency Opportunities for SMEs in China



Fourth, a lack of standards means that buyers should be flexible and emphasize capacity-building. Several decades of managing energy efficiency globally has led to metrics for understanding and making decisions about energy use inside of a given company. But working with suppliers in groups presents a new order of data analysis to grapple with, such as comparing suppliers against each other and communicating publicly about progress. Unfortunately, there is a lack of generally accepted standards for doing so. The challenge is compounded in China, where energy information is less automated and verification takes more effort.[24] Also, while there have been many studies that look at China's energy intensity overall, whole-economy depictions aren't very representative of SMEs because the general picture is so skewed to the tiny number of huge emitters (only 1,000 companies use fully one-third if China's energy). As a result, there is

little information available today about best practices for relatively small, non-intense enterprises. Of course, buyers could maximize knowledge by gathering and reporting on activities and processes comprehensively, and taking multiple years' worth of time-series data. But this would be expensive, try the patience of suppliers, and stand in the way of actually acting.

The implication is that buyers will need to use shortcuts such as asking for qualitative information about management systems, and giving suppliers the flexibility to manage energy in a way that makes most sense for them. They should also watch for emerging standards (more on this in the "Enhance Impact" section) and seek to incorporate new developments into their methodologies. Overall, they should view operating in an environment with a lack of perfect knowledge as an opportunity to thrive where others have stayed away. These should also emphasize capacity-building as a key part of the energy-management program—as opposed to compliance—for both suppliers and themselves alike (see Figure 4).

Fifth, energy efficiency can be an endgame, but an even better gateway. Energy efficiency can be a practical step toward understanding climate impacts in supply chains, and promoting better management and modernization, which can support more sustainable practices overall. But the ability to find breakthroughs in process improvement is limited when using energy-efficiency tools alone. That is partly because energy use is somewhat "end-of-pipe" compared with design and materials, for example. Also, while getting started is a huge accomplishment for many suppliers, successes may lead to plateaus, and obsolete technologies that are supposed to be eliminated might be kept on hand. Because of this, buyers need to be realistic and honest about expected environmental accomplishments. Finally, the same thing that makes efficiency attractive—the fact that it can save costs quickly—can also distract companies by helping them focus on short-term gains rather than the long-term goal of sustainability progress.

The bottom line is that buyers can reasonably expect energy efficiency efforts to yield quick wins and create new opportunities, but it is hard to know what exactly they'll be. Therefore, buyers should think of energy efficiency work as "sustainability R&D" and thereby aim to conduct many experiments that will create options and more information to move forward from.

In the following pages, we present a guide for understanding the role of the buyer, followed by a four-part process of building foundations, catalyzing action, facilitating progress, and enhancing impact.

Role of the Buyer

According to the United Nations Industrial Development Organization, one of the most powerful ways to realize energy efficiency is to change industrial corporate culture.[25] Moreover, because buyers can influence dozens, hundreds, or even thousands of suppliers from a shared platform, they have a very special role to play. With that in mind, buyers should think of their role as enabling suppliers to pursue efficiency on their own by offering shared—and thereby cost effective—resources to address the various obstacles mentioned in the introduction.

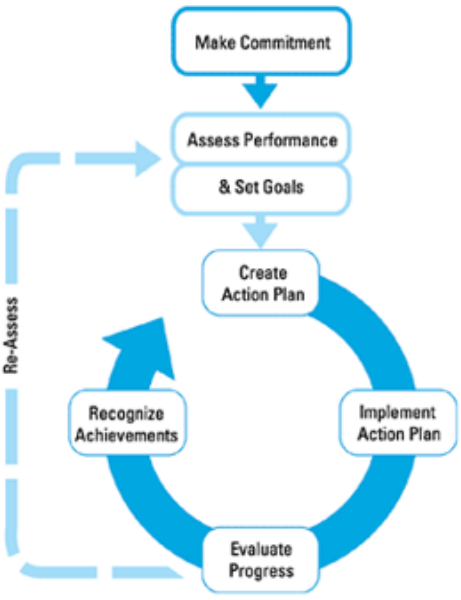
In doing so, buyers will face two sets of choices: whether to invest in efforts themselves versus asking suppliers to make those investments, and whether to request participation versus requiring it as part of the business relationship. One of the most promising ways forward is to focus on building and institutionalizing suppliers' energy-management systems, while linking purchase orders to minimum standards, and providing a program for shared R&D. In doing so, buyers will be able to use three main levers:

1 Provide insight by orienting suppliers to energy management and helping them to troubleshoot.

2 Offer information tools that enable suppliers to make better decisions on their own.

3 Introduce incentives that make energy efficiency more attractive.

Overview of an Energy-Management Program



Source: EPA Energy Star. See http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index for more.

Provide Insight

The first area of leverage is to orient suppliers to best practices in energy management (see sidebar) and troubleshoot difficulties. Here, the buyer's role is to get suppliers started and bridge temporary resource gaps. As one consultant told us, "Most of the opportunities are plain old block-and-tackle process management and plant maintenance. We have growing evidence that, once supplied with some proxy data to get them rolling, and some facilitation on creating action plans and KPIs, factories can do energy efficiency with no outside assistance."

While this centers on management of energy, buyers can also help by sharing general accounting, finance, and operations decision-making tools that they use every day (see "Productivity Methods" sidebar on next page). For example, a footwear buyer that had been considering co-investing in distributed solar equipment ultimately achieved one of its biggest gains—a 9 percent improvement in energy efficiency—by taking factories step by step through their energy bills and showing them how to reduce waste and increase equipment efficiency. "We talked to our marketing team about renewable energy," said the buyer. "When we looked into it, once you start doing an engineering analysis of a solar panel and take into account the relative inefficiency of photovoltaics today, even if we spent US$1 billion covering every factory we source from with solar panels, we would only see a 3 percent reduction in our carbon footprint."

At the early stages of engagement, the buyer can provide research the suppliers' potential hot spots and low-hanging fruits. Next, the buyer can provide peer case studies to inspire suppliers and invite trainers to speak with them. Then, buyers can offer an expert sounding board, either with personnel who are in-house or with consultants from an ESCO.

Productivity Methods

Productivity is the output from a production process per unit of input. It is important for suppliers because it can have the same or even greater effect on profitability as sales. The following are some key productivity principles.

Lean production is a practice that seeks to reduce work by eliminating waste, which is considered the expenditure of sources for anything other than the creation of value for the end customer. Lean production was popularized by the Toyota Production System (TPS).

A related concept is **quality**, which can be thought of as the degree to which a set of inherent characteristics fulfills a need or expectation. Tools for managing quality include Six Sigma, Total Quality Management, and ISO 9000. Quality improvement is addressed in TPS in the principle of "kaizen," or continuous improvement

Cost accounting sets out ways to determine the cost behavior of departments, operations, and even processes. Cost accounting uses activity-based costing, which offers a way to pinpoint costs of production activities.

Offer Information Tools

The second area of leverage is to provide suppliers with better tools for making decisions themselves. This differs from the "providing insight" stage, which emphasizes sharing knowledge that has already been established. Information tools create more rigorous analytics to develop knowledge that is not yet available. But it does feed back into the "providing insight" stage by creating more knowledge that buyers and suppliers can discuss. For example, the installation of energy sub-meters could allocate energy use to discrete activities, which could in turn help buyers and suppliers think through energy impacts and opportunities related to orders.

As we will see, such tools do not have to be expensive or complex. Many are spreadsheet-based and make use of US$50 energy meters. As one consultant said about rampant energy inefficiencies, "Managers in China can be meticulous about continuous improvement. What makes opportunity identification expensive is not a lack of information on alternatives. When properly motivated, factories are showing that they have no problem tracking down all kinds of equipment and vendors. No, it is expensive to identify opportunities because no one has data."

At the foundational stage, the buyer can create a framework for sharing information tools by showing ways to think about energy analytics and the kinds of decisions that can be made with them. Also, early on, they can share free tools and guidebooks, and outline how applications such as energy sub-meters can work. Then buyers can provide data-collection and analysis tools, which they can update as standards and technology come along.

Introduce Incentives

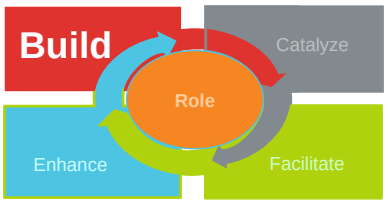
The two previous topics focus on maximizing the likelihood that suppliers will pursue energy efficiency while the price of energy efficiency remains basically constant. A third place for leverage is to give suppliers an extra push by introducing new economic incentives into their cost-benefit assessment. Many suppliers BSR has talked with clearly stated that that even with training, they are unlikely to change their "business as usual" approach unless there are positive incentives to reach the target or penalties for failure. This could include canceling orders from poor environmental performers and integrating environmental performance into supplier-rating systems.

One way buyers can do this is by creating a combination of new positive and negative consequences. On the positive side, buyers can offer awards, recognition, and resources to factories that choose to invest in energy efficiency. They can also make it clear that they are looking for partners to grow with them on sustainability and will ultimately drop suppliers that do not meet a minimum standard. Walmart does both.[26]

Perhaps most important of all, buyers can commit to linking orders to progress. According to one consultant, "Buyers need to accept that they have a role in setting expectations for suppliers that goes beyond cost, schedule, and quality. This has increasingly been done with social compliance; now it's the environment's turn." This reinforces what the owner of HY, an ESCO, told us: More explicit incentives and mandates to get energy audits and reduce their energy use are needed to increase supplier efficiency.

At the foundational stage, buyers should focus on showing the business opportunity to senior managers both on its own terms and as it relates to the importance of the supplier-buyer relationship. Then, during a one-on-one discussion, buyers can provide more incentives by detailing the returns that managers can expect. Over time, buyers can reward suppliers that have case studies to share, and keep them motivated by steadily increasing incentives.

Build Foundations



Once the buyer has a clear picture of its role, the first phase of working with suppliers is to build foundations for the engagement. Typically buyers aim to reach as many suppliers and make as much aggregate progress as is practical. However, suppliers have different energy footprints, are at different stages in evolution, and have different capacities for responding—which means a one-size-fits all approach probably will not work. Instead, buyers need to manage the trade-off between pushing many suppliers for ambitious goals, and ensuring there is sufficient flexibility and feedback mechanisms so that the buyer can learn about suppliers.

As one footwear buyer said, “Getting a 20 percent reduction in energy consumption or carbon emissions is easy for some but hard for others. Some factories can achieve really quick fixes, while others face high up-front investment costs and long payback periods because they have already taken care of quick fixes.” A good way forward is to create the outline of a program that has clear direction and firm requirements, but offers some flexibility in how suppliers achieve progress, and then invite a diverse set of suppliers to participate.

This phase involves taking the following steps:

1 Confirm readiness.
2 Choose suppliers.
3 Define parameters.

Confirm Readiness

At this point, buyers should have a good idea about what they hope to achieve based on concepts outlined in the introduction. Now they should evaluate some of the known success factors and commitments that they will need to make in order to confirm that moving ahead makes sense.

EXPERIENCE
Ideally, buyers will have some experience with energy-management systems internally. This will offer a beneficial resource for suppliers, and having it in-house makes it easy and inexpensive to share. For example, a recent study by Pew Center on Global Climate Change said that companies should aim to do the following when working with suppliers on energy efficiency: 1. build the internal program; 2. offer that experience, and specifically the reporting systems and metrics, to suppliers; 3. use third-party programs to provide technical assistance.[27]

Companies that have done work can directly share informational tools they have used, and also provide internal personnel as consultants. However, while having energy managers that have executed energy plans can help, it is not absolutely required, as buyers can also to incorporate experiences from others, such as leading suppliers. As one energy consultant told us, “One thing we learned from piloting is that plunging in is just fine.” In this case, a buyer would probably want use an experienced third party to help steer the effort.

ALIGNMENT
Because of the potential scale of impact, managing energy efficiency can be an exciting proposition—and it may be not be a stretch to secure interest and involvement of senior leaders in the company. However, successful

Program Features: The Case of Walmart

What does a working supplier energy-efficiency program look like? The following are some features of Walmart's supplier energy efficiency program in China:

- **Target**: 20 percent increase in energy efficiency
- **Timeline**: 2007 to 2012
- **Number of suppliers**: 200
- **Start**: Two launch meetings held in Shenzhen with 100-plus factories each
- **Reporting requirements**: Quarterly report on energy used (by month), choice of production units or revenue (by month), and progress against energy-management action plan
- **Information management**: Spreadsheet-based supplier "query" tool and spreadsheet-based "dashboard" analysis tool
- **Verification**: Four progressive phases that include random and targeted site visits
  Capability-building: Two training series, model factory visit, case study sharing, and onsite factory consulting
- **Specialists**: Introduced 30 ESCOs to factories at launch meetings
- **Incentives**: Combination of the message that this is essential for continued business, combined with recognition rewards

implementation requires sustained effort that may require continually following up with factories on data, and troubleshooting reporting problems.

For that reason, in the operational leadership, it is best to involve a member of the buyer's sourcing team that is responsible for business relations with the target suppliers. That person should be able to proactively and effectively organize meetings and delegate responsibilities, and ideally the sourcing team involved will have a normal reporting relationship with them. Also, performance reviews of that individual and the team should be linked to the success of the program.

RESOURCES
What are the actual pieces of this program, and what will they cost? Requirements depend on several issues, including the number of suppliers, desired speed, and desired robustness of energy information. Key components that require distinct operational capabilities and skill sets include:

- Research: Before kicking off the program, and throughout its operation, research will be required to understand suppliers' situations and opportunities for working with partners, which may include dozens of ESCOs.
- Launch: Start the program by deciding on the overall approach and plan, and engage suppliers to kick it off. This is typically done through at least one in-person forum to introduce, educate, and motivate suppliers. Ongoing development and calibration, including possible ongoing forums, will need to be managed.
- Training and support: In line with the role of buyers as enablers, effective programs will emphasize capability development. Buyers have a host of tactics available for this (see the "Facilitate Progress" section).
- Data management: Transmitting and analyzing energy-efficiency data—however comprehensive or streamlined—is necessary for enabling decision-making. Trade-offs will have to be considered before creating the architecture, and program management will need to be led.

Choose Suppliers

Once buyers have sufficient alignment and understand and accept the resource needs, they should select suppliers. To start, they should assess the entire global supply chain through a life-cycle analysis or other estimate that allows pinpointing priority areas. Assuming these results confirm that the program should include China, buyers should proceed by selecting individual suppliers there.

How many? Most buyers are stretched thin, as they are working on a large number of social and environmental initiatives with a small compliance or social responsibility team. For them, starting a program can be made manageable by using a pilot phase to engage a relatively small number (five to 20) of suppliers.

Most program costs are fixed, but there are variable costs per supplier. For instance, buyers may need to spend additional resources on remediation and factory support if verification audits reveal inconsistencies with reported data or a significant gap between the factory's status quo and the established target. Resource limitations thus necessarily limit the scale.

Once the scale is defined—which perhaps includes multiple phases, starting with a small pilot set—buyers should consider targeting suppliers based on:

Tools to Identify Global Energy Hot Spots

The following are resources for understanding energy "hot spots" in global supply chains in order to confirm whether China should be the starting place, or whether it is somewhere else:

» The Boustead Model
» Chain Management by Life Cycle Assessment (Leiden University)
» EIO-LCA (Carnegie Mellon)
» Environmental Impact Estimator (Leiden University)
» GaBi 4 (University of Stuttgart)
» LLamasoft
» SimaPro 7.1

For more resources, see www.life-cycle.org.

- **Impact**: There are likely some areas where a few improvements can have large impacts. As one footwear buyer said, "Forty percent of the energy required to manufacture a shoe goes into making the rubber outsole, which is one of the smallest pieces. If we can focus our efforts on reducing the energy to make that one piece, you can see a huge impact."
- **Spend**: Significant purchasing power with a supplier (such as 30 percent or more of a supplier's output) is often one of the largest determinants of meaningful engagement and sustained progress.
- **Reach**: Some suppliers may be traders or distributors. They could potentially make good partners for amplifying efforts by encouraging the suppliers they work with to be involved on the buyer's behalf.
- **Relationships**: Trust already built with long-term existing relationships can make communication more efficient and can be conducive to experimentation.
- **Clusters**: Costs are lower when suppliers are clustered together. Most buyers we spoke with focus on Pearl River and Yangtze River deltas, where their suppliers tend to be located (one retailer said that 60 percent of its factories are in Guangdong and Jiangsu provinces). Fewer suppliers are located inland and northern provinces, though this will probably change.
- **Subsidies**: Finally, in some cases, provincial and local governments may offer specific incentives that could make work in certain regions more viable (see the first listing in the appendix).

Define Parameters

Next, the buyer should define the main parameters of the initiative in order to clearly communicate to suppliers what is expected. This should be defined and explained to suppliers at the outset in order to motivate them and give them the confidence that this is important, while outlining how it is flexible enough to be widely inclusive and relevant.

Figure 5 summarizes some main suggested expectation that buyers should have and relate to suppliers at the outset.

Figure 5: Key Parameters

Expectation	Relevance	Details
1. Commit to joining the program with good-faith effort.	• Required for planning and a useful indicator for reporting	• Commit senior management support and join trainings and conduct reporting over life of program.
2. Establish an energy-management system.	• Critical for progress over time	• Incorporate best practice . • Staff an energy manager with a team; give resources and incentives.
3. Set and achieve a marquee KPI goal.	• Ensures good practice is achieved	• Accept or suggest alternative to a default goal (use 20 percent over five years unless there is a better idea). • Should credit early actors that have already done work.
4. Report on a range of energy-performance measures.	• Provides broader picture and allows for making adjustments	• Commit to transparency and openness to verification. • Clarify problems and context.
Create and report on action plan with specific activities described.	• Important for understanding what has been done and estimating forward • Necessary for verification	• Document actions and activities undertaken toward energy efficiency.

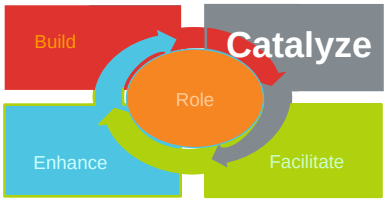
Buyers are finding that a clear road map is necessary for driving progress. An apparel buyer told us, “We are done with just presenting our suppliers the business case of energy efficiency and waiting for them to ask. This year, we are going to ask our top 10 suppliers to take specific, concrete, measureable steps to increase their efficiency and reduce emissions.”

One of the most important and challenging aspects of defining parameters is establishing a marquee KPI goal—or “the target” for short—because buyers often hesitate to be over-prescriptive, since suppliers are so different: Suppliers have varying willingness to provide information size and complexity of energy use, capability, nimbleness, and work already done. China-based suppliers, on the other hand, usually just want to be told what is expected.

Is there one number that can work? As one energy consultant explained, “Ten percent might be too hard for apparel factories, and 40 percent might be too low for plastics fabrication. But I certainly think that something much bigger than 20 percent over five to10 years would be justified for an average for almost any supply chain in China, with a few exceptions.”

Therefore, buyers can enable participation for all types of situations while setting a clear, quantitative target that suppliers will be allowed to appeal within a short discovery period in case they have identified alternative targets or key performance indicators that make more sense. Consider suggesting a default target of 20 percent improvement of energy intensity over five years, and consider inviting factories to suggest alternative targets and methods if they have a reason to do so. See “Sample Progress Metrics” in the appendix for more details.

Catalyze Suppliers



Once the foundations are established, the next phase is to give suppliers direction and motivate them to get started. However, getting such work off the ground can be challenging because of the cooperation, willingness, and initiative required.[28] Therefore, overcoming inertia and helping suppliers take the first step is critical. As one buyer representative explained of their challenges, "For many factories, it's not a priority for them, and they can feel it's not a priority for us, so there is no motivation for immediate action."

Buyers that are motivated to catalyze suppliers to act can do so by outlining specific requirements with meaningful incentives, especially by tying performance to orders. But there is a trade-off between taking advantage of this first opportunity, when setting ambitious, concrete expectations will have the most impact, and the risk of setting goals that may be crude or even inaccurate. A strategy for managing this is to make some suggested "default" expectations, and then lead a controlled discovery period that allows suppliers to appeal for a customized approach.

The key components of this phase include the following steps:

1 Make introductions.
2 Launch the initiative.
3 Set commitments.

Make Introductions

With the foundations laid, the buyer should invite selected suppliers to participate in the program, focusing on their senior leaders, who will be essential for success. Unlike in Japan, as one ESCO manager told us, in China, managers are often skeptical about investing in savings instead of top-line sales, because they have learned to focus on growth. That means that even if a supplier agrees to participate in a program, they may not have experience evaluating efficiency or understand the commitments required, and they may be unlikely to stay committed over time. Therefore, it is essential that senior management be involved and supportive at the outset.

Buyers should ask suppliers to do two things: First, suppliers should send two or three representatives to the launch meeting hosted by the buyer to provide an orientation to the program. This should include both a representative from senior management and the person most likely to be responsible for energy management, who could be a facilities manager (who often manages power, steam, and compressed air) and/or a production manager (who manages energy related to the used of machinery and equipment).

Second, buyers should ask suppliers to respond to a questionnaire that describes their situation and that will allow the buyer to prepare for the launch meeting. Essential background questions to ask about the supplier are:

» What is the size of your company, in terms of people, revenues, and facility locations?
» How much energy do you estimate your company uses annually, and what are your main fuel sources? (See the appendix for a standard audit form.)
» Can you summarize your company's main energy-using production processes?
» Do you have an energy-management plan or system in place? If so, please describe it.

» What, if any, steps, activities, or investments has your company already taken on energy efficiency?

» What kind of productivity approaches does your company currently have in place, such as lean, quality, and cost-accounting management?

» Do you have any planned investments or divestures?

» Do you have any questions that you would like to have addressed?

Buyers can use this information to confirm or modify their expectations to be communicated at the launch meeting, summarize to suppliers the kinds of things they appear to be doing as a group, and understand what special issues might need to be discussed.

Launch the Initiative

At the launch meeting, the buyer should start by framing the overall purpose of the work. This should including explaining that the initiative is about increasing manufacturing modernization and productivity, which is good for business. It's also about the buyer's own sustainability goals, which depend on suppliers who understand the buyer's concerns and can be partners in addressing them over the long term.

This is a good place to present the business case for investing in energy efficiency in the context of overall productivity. Show that energy efficiency can be a great investment—that many investments are recouped within a few years. However, keep in mind that the opportunity costs of capital and discount rates of medium- and long-term investments are often perceived as very high in China, and managers may be very focused on the short term. [29] Treat this as the beginning of a process of discussion with senior managers, and emphasize investment returns.

At the same time, buyers should show the additional incentives the program offers, and ideally how orders will be linked to performance. The buyer should be ready to address suppliers question as well as potential challenges such as what happens if suppliers refuse to participate.

Also at the launch meeting, the buyer should outline the key parameters, including default targets, and elements of the program so that suppliers will be clear about their responsibilities and next steps by the end of the forum.

Set Commitments

Following the launch meeting, a "discovery" period should commence, whereby suppliers can digest the expectations, collect information, and then confirm their participation and targets selected. This period should be as short as possible but give suppliers enough time to coordinate and possibly work with partners to finalize their decision. One to three months should suffice.

Invariably, suppliers will exhibit various levels of responsiveness. Some will have already led energy-efficiency work and have stories to tell, others will participate as requested, and still others will require more effort to keep involved. Figure 6 summarizes considerations for managing these types of suppliers as the engagement progresses.

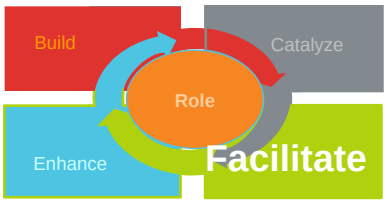
Figure 6: Managing Supplier Responses

	Characteristics	Who They Are	Why They Are Important	What to Expect			
				Discovery Phase	Commitment Phase	Midway Through Program	By Program End
Leaders	Already doing work on energy efficiency and prefer to set own targets	Energy-intense suppliers like primary manufacturers in high-end chemicals, electronics, and bio-medicine	» Showing leadership to stakeholders » Sharing with peers	» Response to initial outreach with evidence of strong work done	» Commitments made » Independent progress underway » Achieve goals	» Share with others » Achieve goals	» Beat goals » Create and receive recog-nition for efforts
Followers	Responsive to directions and able to move quickly on reporting and goal-setting	Suppliers that are active in other sustainability programs and/or have good management systems and have been responsive in the past	» Potential for near-term change	» Mixed levels of responsiv eness	» Generally commitments made » Respond and report	» Overall good reporting » Plan and efforts underway » Progress toward desired targets	» Achieve goals » Share case studies
Laggards	May have a hard time responding to initial requests	Companies that are smaller, make up a smaller share of spend, or that company has a newer relationship with	» Potential to make break-throughs » Credibility » Can be instructive about hurdles elsewhere	» Lower levels of respon-siveness	» Lower level of engagement in commitment	» Lower transparency and/or demonstrated actions and progress	» Some progress

Buyers should aim to work with all of these supplier types. One reason is that it may be hard to know in advance how suppliers will perform, and being prepared this way ensures the buyer can respond to anything. A second is that working with a group allows conducting more “experiments” that are likely to inform the group overall. A third reason is that focusing on fewer than all of the segments is likely to lead to missed opportunities.

Walmart's Lanshe has said, "We want to know how our suppliers’ factories are doing in this energy-efficiency program, but, more importantly, we want them to progress. We realize that successfully participating in this program requires not only management commitment but also time, so we have looked for ways to provide them flexibility within a framework, while thinking outside the box to develop practical information-management tools.

Facilitate Progress



With suppliers starting to take action, the buyer's next aim should be to facilitate progress by offering appropriate informational resources. The aim is to help suppliers effectively execute commitments on their own. Managing information—from raising awareness to providing analytics to helping understand choices—is one of the biggest bottlenecks to doing so. As one energy consultant has said, "Some energy-efficiency 'experts' want there to be a separate special discipline full of tools and concepts. There is none. Efficiency is efficiency; data are data. When you have more of the latter you will tend to get the more of the former."

But developing comprehensive systems to convey information can quickly become costly, and suppliers may resist systems that don't interface well with their current systems or systems they aren't familiar with. Also, with new standards emerging and expectations changing quickly, it may not make sense to make huge investments in infrastructure. Buyers have to manage the trade-off between creating sufficient information-delivery systems that lead suppliers toward progress and doing so in a way that is flexible and inexpensive. A strategy for developing suppliers, therefore, should be to create information-sharing systems that are multipurpose, entry level, and make effective use of estimating and automating.

The following are three main steps to facilitating progress:

1 Establish effective communications.
2 Provide goal-oriented measurement tools.
3 Offer training and advice.

Establish Effective Communications

One of the first things needed to start is to ensure the clear and consistent transmission of information. To do this, consider having suppliers use a standard energy audit form (see the appendix for example) to communicate about their efforts. They can also use this to ask professional providers they might work with to communicate their terms.

Buyers should also set a recurring calendar for check-ins and updates on reporting progress. Quarterly reporting should strike a good balance between the need for regular check-ins and the need to keep costs manageable. This should be linked to annual milestones.

Once it is clear what to report, create communication systems that have maximum utility. Whether using spreadsheets or enterprise software, a good information system should provide performance metrics that provide accurate and comprehensive feedback about a supplier's reported progress. But that's not all. Making the most of a tool would include the following:

» Automated assurance
» Diagnostic information for the supplier
» Performance review context

At some level, on-site factory visits should be used for verification. However, physical visits are costly, especially if third parties are involved. Therefore, a tool for supplier reporting should build in as much assurance as possible by asking factories to demonstrate systems and evidence that indicate the degree of accountability. To do this, the tool can ask suppliers to document team members'

Energy-Efficiency Technology Solutions

What exactly are different kinds of energy-efficiency solutions? The following is a grouping by one national association of the services that its group of 65 ESCOs provides:

» AC capacitors
» Building envelope
» Decentralization specialties
» Distribution transformer
» Efficient lighting
» Emissions-reduction technologies
» Energy-management systems
» Fuel cells
» Generators
» Heating/ventilation/cooling
» Manufacturing and process equipment
» Recycling
» Renewable technologies
» Waste heat recovery systems
» Water

Source: National Association of Energy Service Companies (www.naesco.org)

names and how objectives are tied to performance, detailed action plans, and specifications on new equipment.

It should also provide diagnostic information for the supplier. When suppliers input data into a reporting system, the system should ideally interpret results and provide instant feedback about improvement opportunities. A good way to do this is to ask suppliers to choose answers from predefined values—for instance, regarding certain equipment or practices—that are linked to performance scores that suggest the best opportunities for improvement. In this case, it should have a solution pathway based on pre-assessed project opportunities, or a tech-assistance team that can be deployed quickly so that action becomes real. Otherwise, people stop believing the system has real consequences or that help is really available.

Jeff Senne, who leads Sodexo's sustainability performance metrics and reporting effort in North America, has developed a comprehensive sustainability-management tool called "SMART" (Sustainability Measurement and Reporting Tool). According to Senne, creating of a clear and visible road map for users is a key part of scaling continual improvement, so linking performance measurement with implementation guidance is crucial.

Finally, the communications system should collect sufficient data for providing a group performance review with recommendations quarterly. That means taking care to ask for questions that can be standardized across suppliers.

Provide Goal-Oriented Measurement Tools

Senior management support and action plans are necessary but alone they are not sufficient for progress. Analytics are essential, and so buyers can offer suppliers tools to help them identify opportunities and make decisions on their own. One buyer revealed that, "For many of our suppliers, their technical and production managers' heads are often swimming with too much information, and they don't know where to begin. Many of these factories had been conducting their own energy projects for the last five to seven years, but with no visible impact on energy consumption or the bottom line."

In a similar vein, one consultant said, "More factories are interested in continuous improvement, but will continue to resist any program that is long on analysis that doesn't have a steady stream of actionable improvement ideas, which is what they expect."

As outlined earlier, the same reporting tool that suppliers use to collect and report energy information can be structured to provide instant feedback to suppliers. For example, a spreadsheet-based tool can be programmed to indicate whether the values suppliers select are within or outside of expected ranges. These tools can then provide a summary score that suggests specific priorities for improvement and steps the suppliers should take to realize them. An advanced tool would refer suppliers to specific solutions providers and ESCOs.

Buyers can also provide a quarterly or annual progress report to suppliers that shows a statistical analysis of suppliers reports overall. This can be used to help suppliers see where some of their peers have found the greatest opportunities.

Transparency can be expensive. Factories often do not have infrastructure that allows for the sharing of robust and comprehensive information about energy use, and developing a system can quickly become complex and expensive. As one apparel industry buyer said, "It just doesn't make sense for us to spend two years trying to create a data-capture system for our supply chain. Many of our factories themselves move locations, and the industry moves too fast. This means we are also switching a large portion of our supply base every year."

However, sophisticated monitoring and reporting software is not necessarily needed. The “80/20” rule can be used to prioritize who has to report, how often, and in what level of detail. One electronics company, for example, has 1,100 facilities. From that set, 650 are asked to report, 210 are asked to show detailed best operations and maintenance practices, and only 24 have continuous monitoring. The following are some key components and suggestions for an effective performance-measurement system:

» **Data collection**: Communication about energy-efficiency progress generally means sharing monthly electricity and energy bills on quarterly intervals. In the absence of (or in addition to) these, suppliers can use portable energy meters to take and report regular readings. Remember that energy data should be buttressed with qualitative information about management systems that includes processes, products, and recent or planned investments. For the reporting format, suppliers should almost always provide spreadsheets as an option because of the convenience and familiarity.

» **Actions**: It is important to record the actual actions that suppliers take, such as their development of action plans, equipment installed, or changes made to raw material inputs. These concrete steps are useful for understanding how they are likely to perform in the future, and provide some automatic verification. They can also often provide a means for extrapolating to estimate actual efficiency improvements.

» **Group data analysis**: Once suppliers have reported results to the buyer, the buyer needs to analyze the results. Buyers should screen results for any obvious problems, and if enough suppliers participate in the program, they should produce comparative statistics that can help to locate outliers. As with data collection, group data analysis can also be done with spreadsheets, but buyers may wish to use a database solution such as Microsoft Access or input the data into their own intranet system.

» **Verification**: Buyers should verify results, and at the same time realize that creativity will be needed to keep costs manageable. The core of verification is audits using a global protocol called “International Performance Measurement and Verification Protocol” (IP/MVP). However, these audits can be costly—in South China, they run around US$2,200 to US$4,400 per visit—and have certain constraints. Buyers can therefore develop a tiered approach that begins by asking questions that are difficult to falsify, looking for outliers in reported data, and conducting a combination of random and risk-based site visits. Such visits can be a combination of traditional IP/MVP audits and less formal walk-throughs.

Offer Training and Advice

To buttress their provision of tools, buyers can provide training and advice. There are a variety of ways this can be done, from group education to personalized consulting. Buyers can offer their own in-house personnel, hire consultants, or bring in trainers. There are also plenty of accessible guidebooks that show tried-and-test approaches for starting energy-management programs and identifying low-hanging fruits.

Training programs can be a practical first step in developing suppliers’ capability. These are not only inexpensive, they provide a large number of suppliers with critical introductory material, and an opportunity for suppliers to build relationships with ESCOs that can help develop and implement curricula. Training programs should include an overview of the value of developing an energy-management program, the requirements for implementation, and common solution technologies. As much as possible, trainings should also include best practices and local case studies.[30] Key topics include analyzing an

energy bill and understanding where energy is being used and wasted, evaluating energy management of production and facility equipment, assessing different energy-efficiency options for a particular piece of equipment, and calculating financial payback periods to justify investments.

In their efforts, buyers should help identify needs and trouble spots and find ways to correct course. In exceptional circumstances, suppliers will have already started and won't need help. These suppliers can they provide valuable examples for their peers. They can also turn suppliers into instructors by offering a best practice information exchange among peers.

In BSR's Energy-Efficiency Training Series, which more than 20 Chinese factories from five different industries attended in 2009, factory operations managers were asked to complete their own case studies to share what they had done to reduce their energy consumption. These narratives helped managers gain the confidence to build action plans and take ownership of energy management. This approach has been shown to kick-start factory programs that achieve a 5 to 10 percent reduction in energy consumption that pay for themselves in less than two years. At the same time, the approach also develops managers' ability to engage with technical providers who can help accomplish deeper reductions.

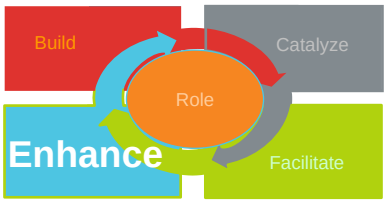
Buyers can help both suppliers and ESCOs identify opportunities with physical events, teleconferences, or by sharing statistical information. Buyers can also strike creative alliances by calling on ESCOs to provide auditing and assessment services in exchange for potential bundled sales opportunities.

Buyers can also provide people to conduct on-site energy-opportunity assessments. The best way to do this, if possible, is for buyers to offer their own energy teams to visit supplier sites in order to share background information about what has worked internally. One footwear buyer offered its factories in China, Indonesia, and Vietnam an energy expert who had worked on process efficiency at the company's facilities in the United States. Leveraging the buyer's understanding of the manufacturing processes in the United States, this approach led to a 6 percent average decrease in the absolute GHG footprint for 19 factories operated by the buyer's five largest contract manufacturers since the program launched in 2008 This reduction came in spite of a simultaneous 9 percent increase in production.

In another example, a leading furniture retailer entered into an NGO-led pilot program in 2009. The best performers were those in the glass industry. The buyer had an in-house industrial glass energy expert who worked directly with the glass suppliers to provide training and advise them on the selection of third-party ESCOs.

Providing internal personnel can help suppliers identify opportunities for cost savings and reinforce how to do assessments on their own. It can also allow the buyer to gain a more intimate understanding of management practices for suppliers and build relationships. An alternative is to hire a third-party energy consultant or ESCO, ideally as part of a long-term arrangement, while using someone who already has experience with the buyer's industry. Walmart, for example, is working with Environmental Defense Fund to provide free energy-efficiency consulting to dozens of its factories. The approach has led many factories to significantly reduce energy consumption by increasing the efficiency of injection-molding machines, motors, and air compressors. This approach can be replicated by companies working alone or in groups.

Enhance Impact



In the final phase, buyers should seek to enhance impact by taking stock and considering new way to develop, grow, and build foundations for even more effective engagements. Ideally, work done on energy efficiency will lead to new kinds of choices, such as whether to take current suppliers further or expand to new suppliers, and whether to focus more on energy efficiency versus addressing different issues such as water and waste. At the same time, some opportunities to divest may become clear. Therefore, this phase feeds back into the initial "build foundations" phase—typically at the end of the first year and then subsequent years.

The following are some important things to consider about enhancing impact:

1 Refine methods.
2 Invest in own capability.
3 Do more.

Refine Methods

A coming wave of new standards means that there has never been a better time to start, because getting systems in place now can position buyers to accelerate as efforts suggested from new guidance become mainstream. But while buyers don't need to wait for new standards to move forward, they should watch the development of norms and science in order to incorporate better methodologies as they become available

Three things can help. First, keep an eye on development of the following key standards, and integrate them into methods—and where possible, participate to influence the outcomes:

» **ISO 50001 facility energy-management guidance:** This industrial and commercial facility energy-measurement standard is due in late 2010.[31]
» **GHG Protocol "Scope 3" supply chain guidance:** This long-awaited protocol for energy-led GHG supply chain accounting is based on the global standard, the GHG Protocol corporate standard, and is due in late 2010.[32]
» **China Energy and Climate Registry:** This technology platform for registering energy and GHG data is modeled after the U.S.-based Climate Registry. They are currently recruiting co-founders.[33]
» **UN Clean Development Mechanism (CDM):** This provides energy-efficiency carbon finance methodologies. Look for more details at COP16 in Mexico in December.[34]
» **UN Global Compact (UNGC) Supply Chain Sustainability Guidance:** This standard, still under development, provides advice for companies on how to engage with suppliers on the UNGC's "Ten Principles."[35]
» **Walmart's GHG project guidance:** Though this is not an official standard, the company's internal policies for executing its recent GHG reduction goal—likely the largest ever single-company application of energy-efficiency-led supply chain improvement—is likely to influence norms.[36]

Next, buyers can integrate stakeholder engagements into the program, with a plan to involve those with experience on technical methods, as well those who will be most informed about maximizing credibility in reporting.

Finally, buyers should consider opportunities for creating consensus-based approaches, following the example of groups like the Electronic Industry

Citizenship Coalition (EICC). As one of the co-leaders of the EICC's carbon reporting systems said, "The electronics industry knew it needed to demonstrate responsibility and accountability regarding embodied energy in our supply chain, and there wasn't a system to accomplish this, so we created one."

Invest in Own Capability

It is also a good idea to consider how the company's own internal resources and alignment can be improved. One way to strengthen efforts is to make sure that other departments, especially government affairs and finance teams, know about and support the work. Managers should communicate lessons learned from working with suppliers on energy efficiency and look for ways to collaborate with those departments, as they may be able leverage the work done here and may have useful resources or insights to share.

Related to that, buyers should communicate on work done to the public in annual corporate responsibility reports, the company website, and annual responses to the Carbon Disclosure Project. Doing so can raise the profile of this type of work and attract potential partners that can make the work easier.

Managers should also keep in mind natural planning cycles over the course of the year (or multiple years) that could bolster the program. When annual planning is done, revisit (or, in less ideal circumstances, visit for the first time) incentives. As discussed earlier, the team should have an internal champion with strong influence over the sourcing team, and the team should have annual performance goals and other key performance indicators linked as much as possible to the success of the program.

This is also a time to consider making more resources available for building energy and sustainability expertise in-house through trainings and possibly hiring new staff. Related to that, reconsider opportunities for joining or starting collaborative efforts with peers that promote cost-effective common approaches to measuring and sharing information.

Do More

If a buyer plays its role effectively, it can expect initial successes to lead to more ambitious programs. Much of the challenge is in getting started, and once the program is launched and the initial investments are made, the incremental costs of adding more factories can be relatively small. As Jay Celorie, who also co-leads the EICC's supplier carbon report system initiative said, "The objective of our efforts was to create accountability and transparency down the supply chain for energy efficiency by establishing accounting and reporting expectations for our direct suppliers and asking these direct suppliers to set the same expectation with their suppliers." As buyers conduct these projects, they can share insights about baseline energy intensity and improvement potential, which could, in turn, enable governments to help with more incentives.[37]

This is also the right time to consider whether enough progress has been made to pursue new opportunities. One consultant said, "Materials management programs are the real goal, unless you want to be always fighting the last war." According to him, a buyer could transition from a focus on energy to materials with the following steps:

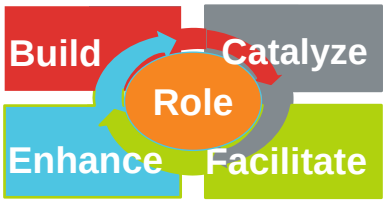
1. Find out what processes and procedures are used to manufacture the product.
2. Learn how those compare to best practices, or at least what it looks like in a life-cycle analysis.

3 Develop criteria for saying "this process/equipment is not good enough/too risky because it is too wasteful."

4 Pick some processes to eliminate, starting with some dramatic and simple ones that should generate a surprised reaction from everyone (e.g. using coal to make steam for pressing irons).

The bottom line is that the best case scenario will lead to some challenging decisions about whether to go deeper versus broader, both in terms of geography and issues. Buyers should anticipate this discussion about “what next?” early with consideration of different scenarios.

Conclusions



With budgets lean and climate change policies in flux, investing in supply chain energy efficiency—starting in China—can offer a solid path for furthering business sustainability efforts. There are many practical ways to do so, once buyers understand some of the key obstacles and how they can play a value-creating role in addressing them. These steps include:

1 Provide insight by orienting suppliers to energy management and helping them to troubleshoot.

2 Offer information tools that enable suppliers to make better decisions on their own.

3 Introduce incentives that make energy efficiency more attractive.

Energy efficiency can create leaner and more competitive suppliers, though there remains much to learn about how to adapt tools and approaches for new markets like China. With this guide, those who see the value in pursuing opportunities have a road map.

There has never been a better time to start. More buyers are starting to lead, and a wave of new standards is on the way, so getting systems in place now can position companies to accelerate as new guidance becomes mainstream. Pioneers show a good deal about fundamentals, but leadership is not established, so early movers have a chance to get ahead.

There is also a window of opportunity to get ahead of governments in solving climate change, by using the unique reach and capabilities of business to go beyond their operations to their broader networks. The upside is giving society more confidence that business can lead the way in solving climate solutions, while creating value all around in the process.

Appendix

Government Incentives

To the extent possible, buyers should use government incentives. Present opportunities are somewhat limited, but buyers should watch for new incentives to develop. They should also not rely too heavily on incentives because that will limit the program scope to what incentives will pay for—for example, buying a bank of motors based on rebates, but failing to use advanced motor systems to drive major savings and productivity gains. The following are some key developments in this area by region.

NATIONAL GOVERNMENT
China's national government and some provincial governments offer incentives for energy efficiency. Most initiatives focus on the top energy consumers, though some address smaller companies. For example, governments have opted to create income tax policies (as detailed in the National Development and Reform Commission's "SME Energy-Efficiency Guidelines") that reduce or waive the tax burden of businesses that can document energy savings, phase out old technology and equipment, and promote contracting for energy management across China. In April 2010, the State Council, China's central government, issued a measure called "Opinions on Accelerating the Promotion of Energy Performance Contracting to Boost the Energy Service Industry," which provides new financial and tax incentives for energy-performance contracting.[38]

While these policies are often based on clear principles, they lack implementation details. Even those that address very narrow issues, like the naming of technologies supported or prohibited by the government, are taken as general guidelines rather then measures.[39] Therefore, incentives, implementation, and regulation are highly variable and in some cases nonexistent at the provincial and municipal level..

THE YANGTZE RIVER DELTA (YRD)
Shanghai, the largest city in the YRD, has instated a large number of measures to improve municipal energy efficiency. Shanghai's main incentive programs include a 300 RMB (about US$44) reward to local enterprises for every ton of standard coal (2.5 tons of carbon-dioxide emissions) saved through energy-efficiency efforts. The incentive applies only to organizations that have saved a minimum of 500 tons of standard coal and carries a ceiling of 3 million RMB per enterprise. The city has also developed an energy-savings fund to support the development of contract energy-management programs, building energy efficiency, and clean-production efforts. This fund implements the national tax policy incentives detailed above.

Other YRD cities, including Nanjing, implement provincial regulations that closely mirror Shanghai's, albeit to a lower standard. Nanjing's incentives include a 200 RMB reward to local enterprises for every ton of standard coal saved, with a minimum of 1,000 tons of standard coal and a ceiling of 2 million RMB per enterprise. Nanjing does not issue many policies beyond those of the Jiangsu provincial government, but has a municipal clean-production center designed to help local enterprises implement clean-production techniques.

THE PEARL RIVER DELTA (PRD)
Led by Shenzhen, PRD provincial and municipal government policies are largely in line with those of the YRD in terms of focus and scope. Starting in 2005, Shenzhen municipality has been providing rewards of up to 100,000 RMB to enterprises that can show energy-efficiency improvements and shift power demand away from peak hours. Shenzhen also provides subsidies of up to 80,000 RMB to enterprises carrying out clean-production projects and up to

50,000 RMB to help factories fund energy audits. The Shenzhen Bureau of Trade and Industry has signed a “Strategic Cooperation Proposal on Energy Efficiency” with Siemens to provide a series of energy-efficiency services for the city.

Guangzhou and Dongguan mainly implement provincial energy-efficiency guidelines and incentive policies targeted at small- and medium-sized enterprises. This includes 200,000 RMB rewards for enterprises that pass clean production audits, a reward of 200 RMB per ton of saved standard coal (which can be applied for by both ESCOs and factories cooperating in an EMC), incorporation of energy-efficiency improvements into the expectations for local officials’ performance, and implementation of national tax breaks for energy-efficient enterprises. Guangzhou also provides special funds for factories that phase out old, inefficient technology (1.5 percent of fixed-asset investment up to 2 million RMB), and a 90 percent tax break for companies using products on government environmental or energy-saving technology lists.

Dongguan provides an award of 100,000 RMB for enterprises that pass clean-production audits and 50,000 RMB to energy-consuming enterprises, ESCOs, industrial associations, and township governments that show outstanding results in energy efficiency. Guangdong Province has announced that it has plans to promote EMC work in the province and will support it with an unspecified amount of government funding.

CHENGDU, SICHUAN

Compared with the YRD and PRD, Chengdu has fewer regulatory and incentive policies for local businesses, but there are some mechanisms that encourage energy efficiency. The municipal government provides a subsidy of 100,000 RMB for industrial energy-efficiency retrofits with investments of more than 1 million RMB and an additional 50,000 RMB for each additional 1 million RMB invested. Non-industrial enterprises can receive the same funds for projects over 300,000 RMB and for each additional 500,000 RMB invested. Chengdu also offers income tax breaks amounting to 1.5 percent of the total value of energy-efficiency projects over 1 million RMB, with a ceiling of 2 million RMB.

Sample Progress Metrics

There are various ways to measure performance. It helps to clarify some potential definitions of “energy” first, and then “improvement.”

ENERGY

Understanding the whole picture of energy requires looking at more than a single indicator, and no single calculation allows for comparison across all suppliers, so buyers should pay attention to numerous issues and use them to corroborate each other. The following is a summary of key methods:

Method	Indicator*	Benefit	Drawback
Energy Intensity	**Raw Material Inputs** Energy use divided by key raw material (by kilogram, surface area, of volume)	» Accurate » Factories already know basic info about raw material inputs » Large benefits accrue from knowing more, meaning they are more likely to do more » No special tools are required » Once there is data, KPIs can be set by comparing things like conversion rates in the best practice data and developing realistic targets »	» Detailed work » Progress can be expressed in many ways, and should be customized by the buyer » Suppliers may not be willing to spend time
	Product Outputs Product category list can be defined by buyer, making it relatively accessible	» Can be made accessible to suppliers by providing category list » Provides standard way to compare against baseline and among peers	» Compare suppliers » May not represent the best driver of energy
	Sales Revenue	» Accessible » Familiar to many buyers' stakeholders	» May not represent the best driver of energy
Simple Energy Use	Electricity plus fuel consumption over time (e.g. month or year) in kilowatt-hours or BTUs (British Thermal Units)	» Accurate point-in-time measure of all energy use » Necessary for GHG inventory » Accessible »	» Not very comparable against other factories » Not very descriptive as a baseline for change » Does not account for growth in activity »
Process Standards	Performance specifications (e.g. lighting ratings)	» Improvements can quickly accurately imply change in energy	» Not granular data
	Technology application (grouped by best, good, or obsolete practice)	» Simple proxy	» Not granular data

*Can be normalized to account for variance, for example by weather (using the "heating degree days over cooling degree days" or "HDD-CDD" system), hours of operation, or product type. Also, typically refers to the total enterprise but can refer to specified part.

IMPROVEMENT

Generally, there are two main ways to describe improvement:

» **Improvement against own baseline**: For example, a supplier reduces its raw material input energy intensity by 20 percent over the course of five years. This is generally most relevant for suppliers that are relatively non-energy-intensive.

» **Improvement toward best practice**: For example, a supplier achieves intensity within a certain range of established best practices for a main energy-using process. This is most relevant for energy-intense suppliers like chemicals producers, where processes are more standardized and research is available.

It takes time (generally multiple years) to have strong confidence in some results, because of statistical noise like seasonal climate. On the other hand, savings made in the short term can be extrapolated if the savings resulted from changes in equipment specifications, like lighting, which have efficiency ratings. Related to this, results could be affected by new plant investments, process changes, or even increased production volume, so suppliers should report on significant changes.

Generally, milestones for reaching targets should emphasize the steps needed to establish energy-management teams, which are critical for ensuring sustained success because of the accountability that these teams create.[40] Therefore, the naming of teams and creation of action plans should also be seen as interim outcomes on their own, because they are key predictors of success.

Sample Energy Audit Form

1 Executive Summary

» List the most implementable recommended energy-conservation measures and show the implementation cost and dollar savings amount. Special care should be taken to list all projects potentially over the factory's previously stated internal rate of return hurdle.

» Provide basic suggestions to senior management on how to set up an energy-management program in their facility to deal with these issues.

2 Background/Facility Description

» Outline the basic information of the facility and the energy-audit process, which may include but is not limited to:

- Location of the factory
- Scope of business and chief products
- History of energy-saving activities or retrofits
- Names/backgrounds of auditors and their auditing methodology
- Metering equipment or methodologies utilized

3 Energy Consumption Analysis

» Create a facility energy consumption balance, showing graphically the use of all major equipment in kilowatt-hours and their percentage share of total consumption (depict as pie chart).

4 Energy Cost Analysis

» Create an energy cost analysis measuring each energy source's contribution to the total monthly energy bill (depict as pie chart).

5 Process Description

» Describe the factory's primary production processes and the equipment used in production.

6 Energy Management Recommendations

» Identification of the top 10 recommendations the factory can implement to save energy, the upfront cost (estimated), payback period, and return on investment for each.

7 Process Improvements

» Identify the five largest areas of management opportunities to save energy (that do not require technology purchases). Possible examples include:

- Reducing peak-hour boiler use
- Group maintenance of light bulbs
- Repair steam and air compressor leaks
- Clean boilers to eliminate fouling and scale
- Turn off steam tracer during summer

8 Energy Financing Options

» Suggest recommendations particular to the factory of the different options the facility can leverage to pay for the investments required. Suggestions of specific vendors and providers are appreciated.

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