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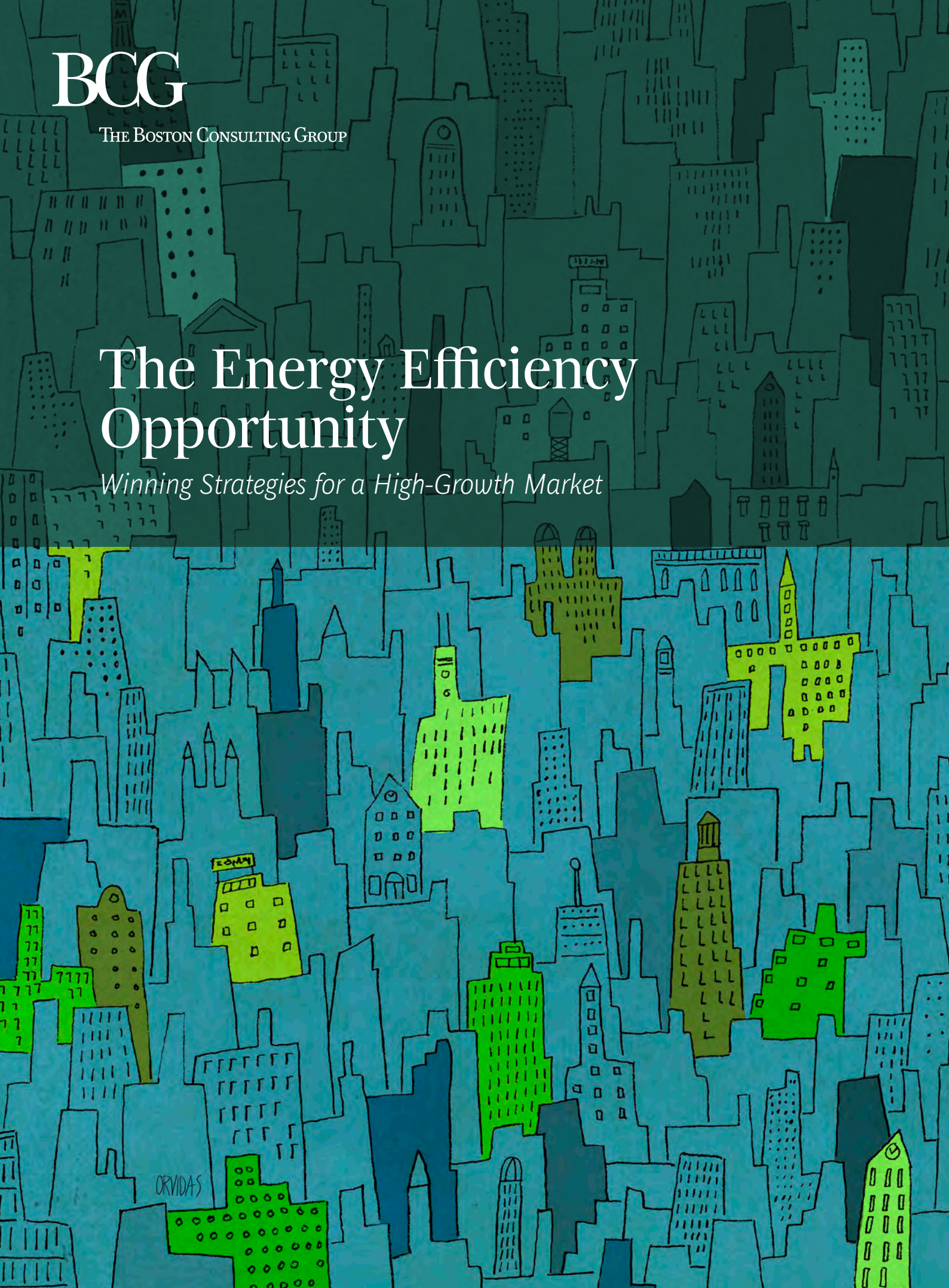
The Energy Efficiency Opportunity

Winning Strategies for a High-Growth Market



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The Energy Efficiency Opportunity

Winning Strategies for a High-Growth Market

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AT A GLANCE

The energy efficiency (EE) industry is poised for a period of double-digit growth, but prospects vary significantly by country and by market segment. For market participants, this places a premium on the right strategy, positioning, and execution.

Attractive Opportunities Will Emerge in the Commercial Sector

Some of the most lucrative opportunities reside in the commercial sector, which is likely to see a surge in investment. But prospects for segments within the sector are highly heterogeneous, necessitating well-targeted go-to-market strategies.

The Next Several Years Will Fundamentally Reshape the Industry

Increasing competition, intensified by entrants from other industries, will pressure players to professionalize and adapt their business models. Scale will become critical, leading to consolidation and attractive positions for surviving businesses.

Players Should Position Themselves Today

The industry will become a position game, so current players should stake their claims by extending service offerings, standardizing delivery, and emphasizing growth to establish scale. Utilities and original equipment manufacturers should consider entering the market to defend their core businesses.

The potential for energy efficiency (EE) measures to deliver vast economic and environmental benefits is well understood. Yet the adoption of EE measures worldwide has been much slower than anticipated.

That is poised to change. We believe that, following a visible uptick in market activity in recent years, the EE industry is likely to see double-digit annual growth through 2020, led by particularly strong expansion in the commercial sector. The industry's robust growth will be driven by a supportive mix of favorable regulation; better access to capital for consumers of EE products and services; increasing availability of public funding through public subsidiaries and utility programs, which is helping to make EE projects more attractive financially; and technological progress. Today's record-low interest rates in many markets are also providing a near-term boost to these projects' financial attractiveness.

Not all countries and market segments will be equally attractive, however. Players will have to understand the heterogeneous needs of the different markets and market segments and tailor their offerings accordingly.

Strong growth will set in motion dynamics that reshape the industry. Drawn by the industry's increasingly favorable prospects, market entrants from different arenas—including utilities, original equipment manufacturers (OEMs), and facility management companies—will challenge incumbents. As companies professionalize in response to rising competition, and as business models converge, players seeking a competitive edge will strive to develop new capabilities. The EE industry will ultimately experience a wave of consolidation, during which any number of businesses, especially those that lack sufficient size, will capitulate.

Strong growth will set in motion dynamics that reshape the industry.

Change creates opportunity, however, and there will inevitably be major winners as well. Innovative businesses that develop new skills, reach scale quickly, and position themselves strategically stand to not just survive but thrive in this new landscape.

A Nascent Market Awakens

Pundits have long believed that the EE industry, because of its very compelling fundamentals, is poised for growth. EE efforts are widely recognized as a highly cost-effective lever in the fight against climate change—they outcompete all renewable energy sources, biofuels, nuclear power, and carbon capture and storage in terms of carbon abatement costs—and in endeavors to improve countries' energy security. To harvest this potential and foster investment, governments around the world

have been tightening EE standards and launching incentive mechanisms. Simultaneously, consumers in many countries are experiencing rising energy costs as developing economies wrestle with the effects of spiraling demand and as mature economies invest to update their energy infrastructures for the twenty-first century.

The potential to increase the efficiency of energy utilization is enormous.

The potential to increase the efficiency of energy utilization is enormous. We calculate that by 2020, in Europe alone, investment in more efficient equipment and processes (excluding insulation and windows) could reduce annual energy consumption by approximately 250 megatonnes of oil equivalent (Mtoe), which represents about 16 percent of Europe's total demand.[1,2] In the U.S., the potential annual energy savings amount to approximately 200 Mtoe, or 20 percent of demand.[3] And, critically, these savings could be achieved without compromising consumers' physical comfort or countries' industrial competitiveness. Moreover, many EE initiatives are highly economical, yielding positive returns on investment and short payback periods. Payback periods for some measures, such as light-emitting-diode (LED) retrofits, can be as short as two or three years.

Challenges have constrained growth to date. Still, the industry's expansion has been moderate, with only a few countries—including Germany, the UK, and the U.S.—exhibiting annual growth approaching 10 percent. Several factors account for this. First, customers often perceive EE projects as risky and are unsure whether they can deliver the promised reductions in consumption. Industry players must therefore make substantial efforts to explain those projects' economics to potential customers. Second, not all buyers of energy-efficiency products and services are themselves the beneficiaries—a landlord might invest in efficient lighting for his building, for example, while his tenants realize lower utility bills. Third, many companies struggle to free up capital for projects that have payback periods of more than three years, even if they see the projects' value. Fourth, since energy costs in many businesses do not rank high on management's agenda, EE is relegated to the back burner.

Serving the market can also be a struggle. Customers' heterogeneous requirements and long decision-making processes increase the effort necessary to convert leads. The business can also be capital intensive, and ongoing economic weakness in several countries has made it difficult for EE companies to secure funding for expansion. In addition, the complexity of multidiscipline EE projects, and a scarcity of technical project managers experienced in handling them, impedes rapid scale-up of business.

As a result of these factors, few EE markets so far have reached maturity in terms of actual demand, the regulatory environment, and industry professionalization. The most developed markets today are in Europe, led by Belgium, Germany, Luxembourg, the Netherlands, Norway, and the UK. In the U.S., market maturity varies significantly by state, with Massachusetts and California leading the way.

Structural drivers for the industry are improving. Despite those challenges, however, the industry's structural drivers are improving. Technological progress in efficient equipment and intelligent controls is making EE offerings increasingly potent, affordable, and easy to use. (See the Appendix.) Advanced IT solutions are affording

energy users greater transparency into, and control of, consumption. Driven by a number of government initiatives in China, the EU, Japan, the U.S., and elsewhere, regulatory pressure and the availability of public funds, both for indirect incentive programs and for direct efficiency investments in public buildings, are increasing. Further, public incentive mechanisms, including both direct regulatory intervention and the provision of investment subsidies, are becoming more refined as regulators leverage lessons learned from more than a decade's worth of experimentation. Examples of successful initiatives include the £100 million London Energy Efficiency Fund, a lending program promoting EE investments in that city, and the EE investment programs that a number of U.S. states have mandated for utilities.

Private investors have started to recognize the industry's potential and are further alleviating capital scarcity through investments in energy service companies (ESCOs), individual projects, and EE funds. Simultaneously, historically low interest rates and decreasing perceived risks are driving down capital costs. The industry is also rapidly professionalizing, and companies are developing innovative business models that unlock new demand. Nonstandard financing structures—such as performance contracting, where payment for an efficiency investment does not occur up front but rather is generated through the energy savings produced over time—are removing investment hurdles for private building owners.

Sustained double-digit growth is likely—but prospects vary by market. Given this confluence of forces, we expect the market to enter an extended period of double-digit growth, with revenues increasing 10 to 15 percent annually up to and beyond 2020. Growth will not be universal, however. The most robust expansion will be in countries with high energy prices, determined regulators, a stable regulatory environment, and already-established EE markets.

By region, Europe has particularly strong prospects, driven especially by its high energy prices, increasing EU policy pressure, and a backlog of investments in public infrastructure. We expect the European EE market to reach nearly €30 billion in 2020, with markets in many countries growing by about 10 to 15 percent per year. This figure could rise even further in the event of additional support from regulators or a stronger investment push from new market entrants. We expect the most dynamic growth to take place in the region's more mature markets, such as France, Germany, Italy, and the UK. Prospects for much of southern Europe are impeded by the current economic climate, which will likely decelerate regulator activity and reduce available capital for efficiency projects. Markets in eastern Europe are still immature and will need time to develop.

By region, Europe has particularly strong prospects.

The U.S. market also has much promise, with double-digit annual growth likely for the remainder of this decade. Key factors supporting U.S. growth include an increasingly favorable regulatory environment in many states, such as laws mandating the aforementioned EE-investment programs by utilities; strong ongoing demand from the MUSH sector (municipalities, universities, schools, and hospitals), fueled by constituents' cost consciousness and comfort with long payback periods; and expanded public funding across jurisdictions. Growth will also be spurred by the launch of new business models, such as the performance-contracting and energy-management offerings currently pushing into the market.

In the medium term, we also see highly attractive prospects in the BRIC countries (Brazil, Russia, India, and China). China, in particular, shows a lot of promise, fueled by an anticipated government push for increased energy savings. Most of these markets, though, will be difficult for nonlocal companies to penetrate.

Particularly Attractive Opportunities Will Emerge in the Commercial Sector

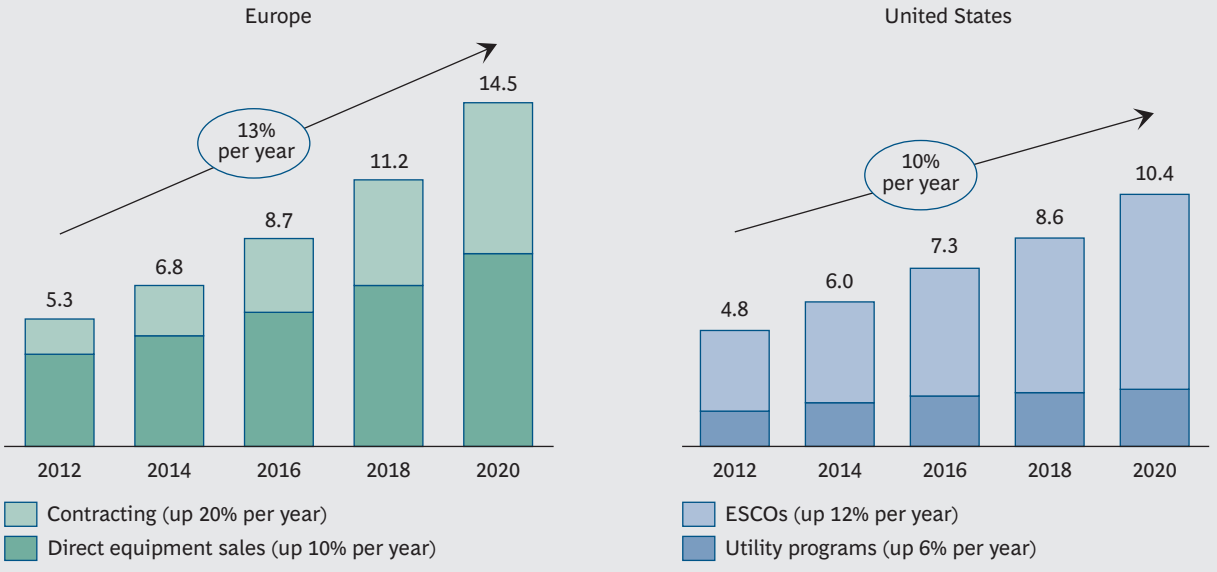
While we expect attractive growth across sectors, the biggest opportunities for EE companies will reside in the commercial space. (See Exhibit 1.) This sector offers a wealth of prospective customers that have the potential to achieve sizable gains in EE: some could reduce their energy consumption by as much as 40 percent. Additionally, unlike many industrial companies, which have invested heavily over the past two decades to enhance their EE profile, most commercial companies have yet to focus on the challenge.

Projects in the commercial sector are also typically large enough to justify EE companies' oftentimes high cost of sales. (EE projects in the residential sector, in contrast, are typically relatively small because they are focused on single-family homes.) Commercial-sector projects also attract relatively little competition from specialized local artisans due to the projects' size and broader technological requirements.

Prospects and needs vary by segment. The commercial space includes a wide range of businesses, from food retailers to commercial airports. Each has its own energy consumption profile and distinct project needs. (See Exhibit 2.) Players will general-

EXHIBIT 1 | Energy Efficiency Has Particularly Strong Growth Prospects in the Commercial Sector

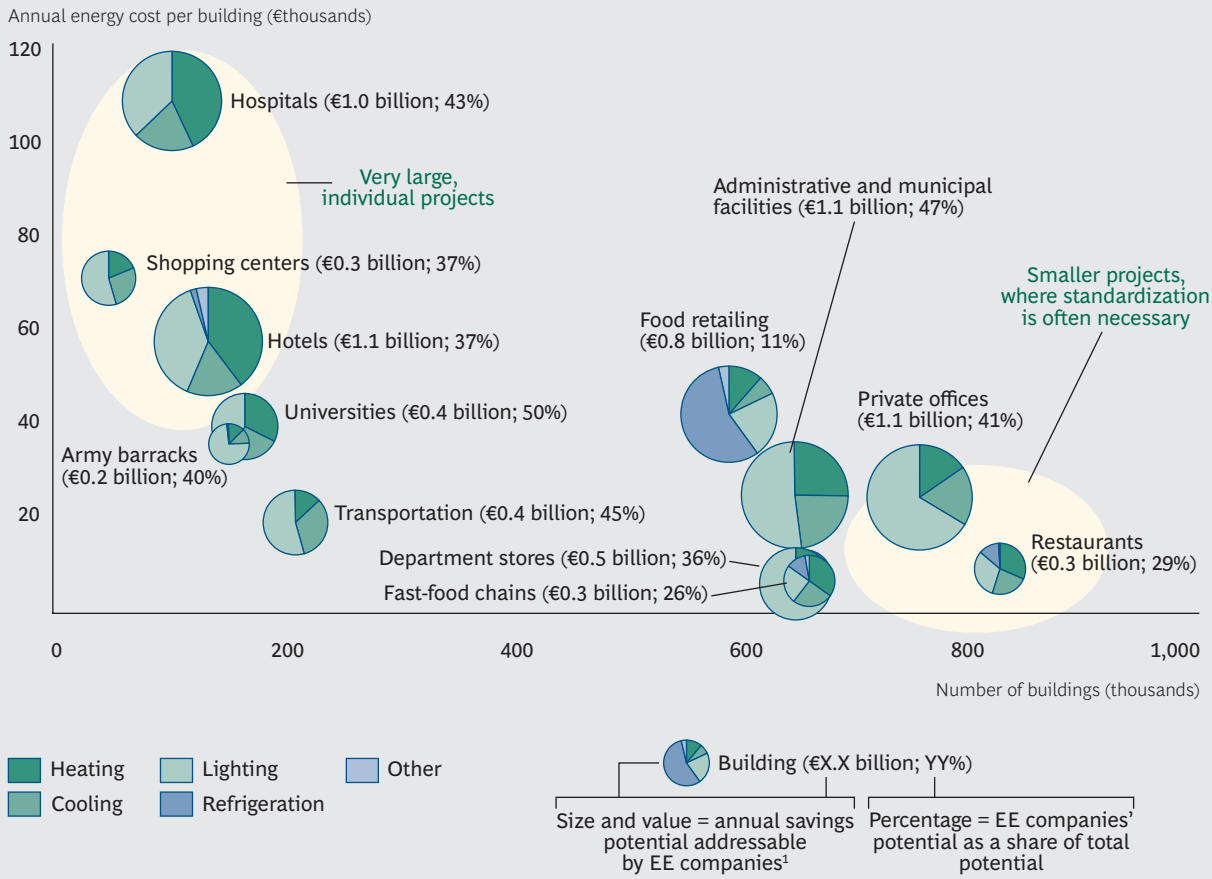
Projected market volume in Europe and the U.S. through 2020 (€billions)



Source: BCG analysis.
Note: ESCOs = energy service companies.

Exhibit 2 | Commercial Segments Have Differing Project Needs, Necessitating Different Capabilities Among Competitors

Addressable savings potential for EE companies by segment for Europe's commercial sector



Sources: BCG analysis; Buildings Performance Institute Europe (BPIE); *Europe's Buildings Under the Microscope* (BPIE report, October 2011); Eurostat.
Note: EE = energy efficiency.
[1]Based on an analysis of economic savings potential in building stock and the likelihood of realization by EE companies.

ly do best, we believe, to target large businesses that have high potential for EE improvement, comprehensive service needs, and the willingness to invest to lower their energy bills. Particularly attractive opportunities will be found in health care, hospitality, the public sector, education, and retailing, though the degrees of attractiveness will vary by country. Private offices could also become a strong growth driver, but only if regulatory pressure on building owners grows.

Two general trends in place throughout most of the commercial sector will benefit EE companies. First, nonstandard financing and contracting structures are growing quickly as the industry evolves. Second, customers are increasingly demanding end-to-end projects, which include the provision of different technologies and related services, such as an energy audit, performed by a single provider. (See the sidebar, "An Example of an End-to-End Energy-Efficiency Project.")

AN EXAMPLE OF AN END-TO-END ENERGY-EFFICIENCY PROJECT

The energy efficiency (EE) initiative described below illustrates the scope of work that EE projects can entail—and the potential return on investment (ROI) for an EE company.

The client was a large (just under 100,000 square feet) U.S. department store. The EE company implemented a wide range of measures at the store, including the following:

- Upgrading the lighting with light-emitting diodes (LEDs) in the store's interior, on its signage, and in the parking lot
- Installing a new rooftop heating, ventilation, and air conditioning (HVAC) unit with variable-frequency drive and new supply fan motors
- Installing an energy recovery ventilator; lower-dimensioned, higher-efficiency chillers; and occupancy sensors in offices and restrooms to reduce lighting demands
- Optimizing the store's HVAC controls and standard thermostat settings

Collectively, these measures reduced the store's energy consumption—including both power and heat—from approximately 2.0 megawatt-hours per year to about 1.1.

Investment for the project totaled about $600,000, which was fully paid for by the EE company. The project generated annual savings of roughly $80,000, equivalent to about 45 percent of the store's yearly energy and related costs prior to the project. The savings will pay for the project over a contract period of ten years, providing the EE company with an annual ROI of approximately 15 percent and the department store with immediate annual energy savings at no cost up front.

There is a need for a focused strategy. Although there are vast opportunities across the commercial sector, its various segments can differ substantially in terms of the products they require and the types of services they seek. Hotels, hospitals, and universities, for example, are usually interested in large, heterogeneous projects that may require retrofits for lighting, heating, ventilation, and cooling equipment. Many of these businesses and institutions lack the financial capacity to shoulder large investments, however, and therefore will need contracting solutions.

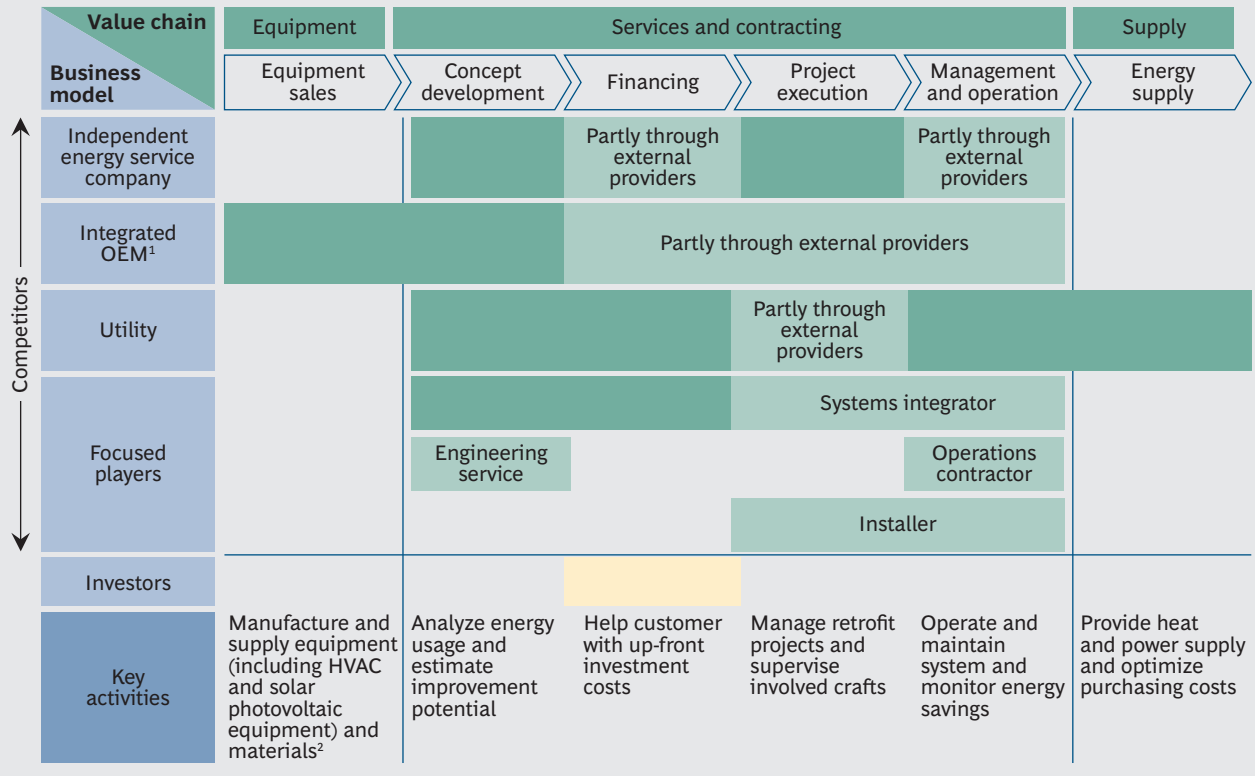
Food retailers, in contrast, often have both financial muscle and internal procurement know-how, allowing them to make necessary equipment upgrades on their own. For these businesses, ESCOs' value proposition could include the provision of heating contracting or combined heat and power plants and other self-generation technologies, such as rooftop solar panels combined with energy storage (in countries where this is financially attractive).[4]

For companies trying to enter the commercial sector, this specificity by segment has several ramifications. First, companies should not try to target the entire sector at once. Rather, they should develop a clear segment focus and corresponding product and service strategies. They should decide, for example, whether they want to focus on large, end-to-end projects or smaller ones, and determine which technologies to emphasize. Second, companies should develop a deep understanding of their customers' common needs and processes and differentiate their go-to-market strategies accordingly. This is, in fact, much more critical than a differentiated product and service delivery. Third, companies must develop the required skills across all relevant applications as well as the ability to integrate technologies into a single, coherent offer and provide comprehensive systems-management solutions. Fourth, companies must be able to offer contracting solutions at attractive financing terms. This will require stable partnerships with investors—or a very strong balance sheet and skillful risk management.

A Fragmented Industry…

In most countries, four types of players compete for EE projects: ESCOs, integrated OEMs, utilities, and more focused market participants, such as small engineering companies, installers, and systems integrators. (See Exhibit 3.) Each type has dis-

EXHIBIT 3 | Four Types of Competitors Vie for Energy Efficiency Projects



Source: BCG analysis.
[1]OEM = original equipment manufacturer.
[2]HVAC = heating, ventilation, and air conditioning.

tinct objectives and strengths. ESCOs have long focused on equipment contracting and benefit from their considerable experience, end-to-end technological competencies, and perceived independence from other providers. For integrated OEMs, the EE market offers an opportunity to establish direct contact with end customers and increase the penetration of their equipment portfolio. Utilities often enter the market in an effort to protect their core energy businesses or because they are under pressure from regulators to increase their customers' energy efficiency. More focused players compete for individual projects or act as subcontractors to larger market participants.

Increasing numbers of new competitors will enter the fray.

To date, EE markets have remained highly fragmented in most countries. In major markets, no company has yet been able to grow its business quickly enough to establish a dominant position, either in the market as a whole or in individual segments.

Within the next three years, increasing numbers of new competitors from different backgrounds will enter the fray, attracted by the industry's high growth rates and driven by flagging growth in their core markets. Each company will approach the EE market from its own angle and seek to leverage its existing strengths. Metering companies, especially in Europe, could try to leverage their superior access to actual consumption data to establish a business centered on energy monitoring and management, for example. Similarly, facility managers could leverage their typically strong familiarity with their customers' operations to identify potential opportunities for cross-selling EE products and services.

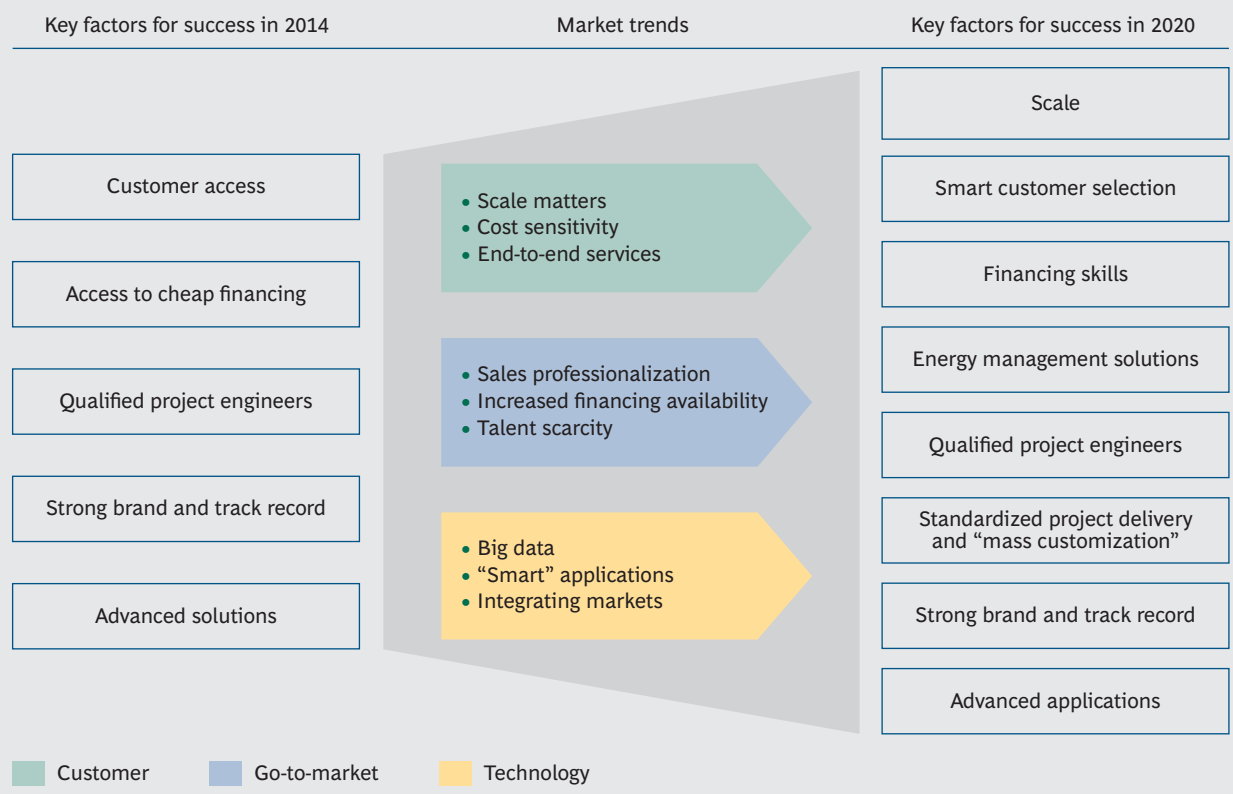
…With Consolidation on the Horizon

Traditionally, success in the EE industry has required only a few core capabilities: ready access to customers through a proactive sales organization, the ability to provide cheap financing, and qualified engineers able to plan and execute projects. As EE markets mature and more new competitors emerge, the requirements for success will change.

New Requirements for Success. As the number of quality providers increases and business models converge, cost competitiveness will become a more critical differentiator. (See Exhibit 4.) Convenience and ease of use, enabled by advances in technology and the growing prevalence of "smart" applications, will also become more important. As the number of external providers of financing for EE projects increases, however, access to cheap financing will not make as great a difference as it does today. Talent scarcity will remain a hurdle, although the challenge will gradually ease as the number of qualified project engineers grows in concert with the industry's overall professionalization.

Because of these changes, industry players will need to find new sources of advantage. To optimize costs, they will have to generate and leverage scale. They will also need to embrace "mass customization" approaches, standardizing service delivery across projects, segments, and locations. Further, they will need to evolve from their current focus on equipment contracting to competing end to end. This will entail skillfully integrating different technologies into a single, cohesive offer and providing comprehensive energy-management solutions.

Exhibit 4 | As Energy Efficiency Markets Mature, the Requirements for Success Will Change



Source: BCG analysis.

Business models enabled by big data will offer companies additional opportunities to achieve competitive advantage.[5] Through value discovery algorithms, for example, companies could use actual consumption patterns to optimize customer selection and identify opportunities based on benchmarking against peers. Advanced applications could enable "smart operation" models that are based on remote monitoring, management, and maintenance of customer equipment.

In the medium term, this evolution in what it takes to win will drive most players to broaden and integrate their offerings. Traditional ESCOs will increasingly compete with utilities and facility managers to become customers' single go-to provider. To do so successfully, they will extend their offerings to include full energy and facility management services. They will also increasingly act as demand aggregators to optimize their customers' energy-procurement costs.

More utilities, in turn, will compete end to end with ESCOs' traditional businesses. They will invest heavily in their technological and project execution capabilities or will try to find a partner that helps them serve customers in this space more comprehensively. OEMs will be forced to broaden their portfolios and extend their scope toward energy management and supply as well. Otherwise, they will risk losing market share.

Industry Consolidation. Propelled by these dynamics, the EE industry will consolidate in the long run, with a range of effects. The expanded availability of full-service offerings will diminish some of the traditional advantages of business model differentiation. Scale effects will give larger players an inherent cost advantage in competing end to end. EE will become a volume industry.

The industry will become a position game.

As a consequence, the industry will likely experience a wave of increasing M&A activity and forced market exits. This will result in the emergence of a few large, supraregional full-service companies that integrate EE, self-generation, management services, and potentially the aggregation of decentrally generated power.

Other, smaller companies will need to carve out viable niches for themselves. Regional champions that combine a convincing service package with strong local customer access and dense market penetration will stake their claims. Highly focused specialists with clearly tailored offerings will be able to penetrate individual segments.

Winning Tomorrow's Position Game

The EE industry will thus become a position game. Large, well-placed competitors will enjoy attractive, sustainable margins over the longer term. They will also have a degree of protection from outside entrants because of the scarcity of technical capabilities and experience, the length of time it takes to scale up the business around a network of installers and technology suppliers, and the up-front investment required to develop a project pipeline. Today's players should therefore aim to develop a competitive edge *before* consolidation sets in. This entails defining a sustainable position today and starting to build scale.

In addition to a handful of larger, dominant players, the industry will also be able to support a number of specialist roles, as noted. These include regional system providers, which combine a broad offering of applications with a clear geographical focus; technology specialists, which provide a single application across several market segments; and international system specialists, which focus on a narrow offering but offer it across countries. The existence of these roles also opens up market potential for orchestrators of "specialist ecosystems."

Companies considering a play in this business need to deal with different challenges and strategic choices. All face the imperative of acting soon.

ESCOs. ESCOs start with clear strengths, including the most expertise in developing, fulfilling, and operating EE projects across technologies. To remain successful, they will need to adapt their business models nonetheless. To prepare for stronger cost-based competition, ESCOs should standardize project delivery and more clearly focus their growth efforts. To compete with new market entrants, they should broaden their service portfolios and invest in developing competitive system infrastructures for energy management. Potential services that they could introduce include decentralized generation, energy supply contracts, and facility and building management.

ESCOs should also consider partnerships. A partnership with a local or regional utility, for example, could be advantageous for both parties: the ESCO would gain access to a new customer base and could focus on its core business, while the utility would gain the ability to offer its customers EE services without having to develop the necessary capabilities itself.

OEMs. OEMs have technological, product-development, and design expertise that is hard for other players in this market to match. Most OEMs today are still largely focused on pure product sales, either to end customers directly or through one of their various channel partners. But this business is under pressure from two directions. First, stronger systems integration across technologies is shifting the channel structure toward providers of end-to-end solutions—pushing OEMs farther away from the end customer. Second, as such providers build scale, they are gaining growing leverage in procurement, tilting the competitive odds increasingly in their favor.

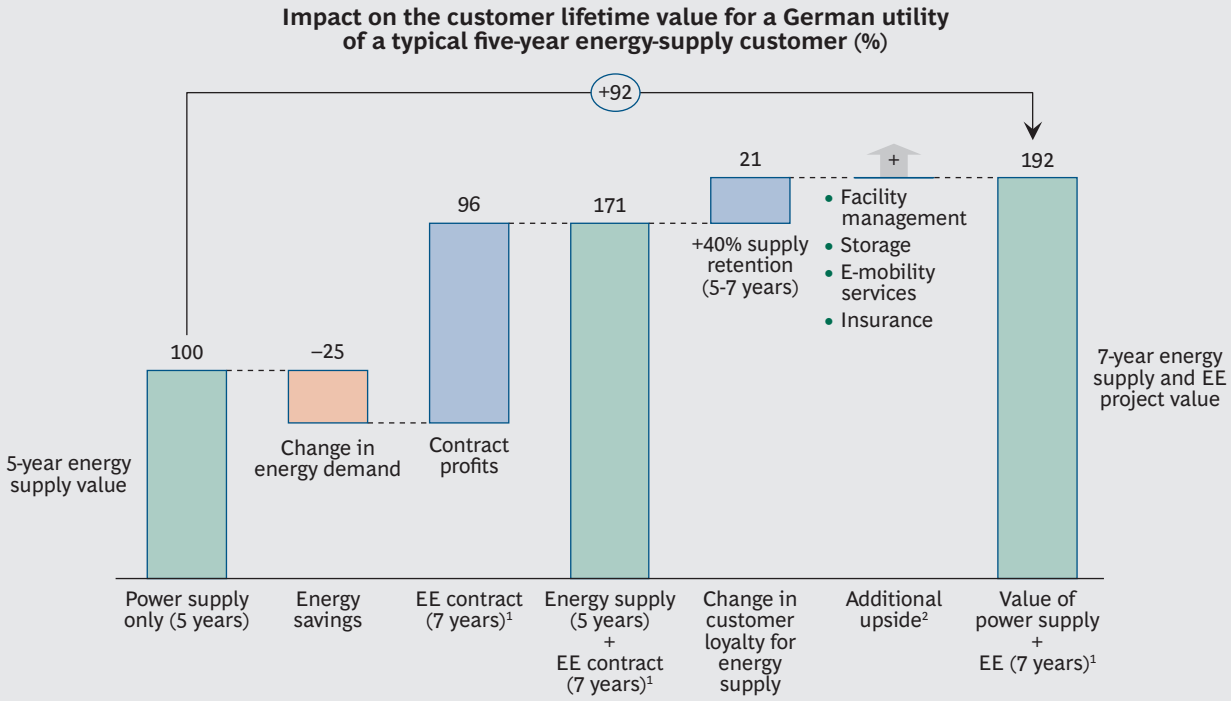
To avoid the increasing commoditization of their equipment, OEMs must protect their access to end customers by developing proprietary channels in the EE market. If OEMs decide to establish an active market presence unilaterally, they will need to move beyond a pure contracting model and develop end-to-end customer service. Alternatively, OEMs could choose to work on developing compelling sales propositions aimed at EE contractors in an effort to become the industry's supplier of choice. Or OEMs could form close partnerships with utilities to try to squeeze out intermediary contractors.

Utilities. For utilities, the advantages of developing a presence in the EE space are potentially sizable. First, by offering EE services themselves, utilities could reduce the likelihood of other providers luring away their customer base. Second, utilities are in a strong position to benefit from coalescing energy services offerings, which will eventually include EE combined with self-generation of power and energy management. Finally (and, for many utilities, counterintuitively), the business case for EE can be very attractive, at least in countries with competitive retail markets and where utilities do not have a regulatory mandate to invest in EE.[6] In markets with higher customer churn rates and high energy prices, in fact, utilities can potentially double customer lifetime value by providing EE services, even though doing so will reduce revenue from energy sales. (See Exhibit 5.) This is driven by the value difference between "saved" and "sold" energy, the higher profit margins of EE projects, and the potential for utilities to increase customer retention. By bundling EE services with energy supply, utilities can provide customers with more competitive offerings and lower energy bills without sacrificing margins. The extent of the potential financial benefit to utilities will differ by customer, requiring them to implement smart segmentation regimes.

For utilities, the business case for energy efficiency can be very attractive.

To successfully compete in the EE market, utilities first need to define how deeply into the value chain they want to integrate and then identify suitable partners to cover the rest. They must develop a transparent product offering and differentiated go-to-market approach, including a clear strategy for how to convert retail customers into EE customers and which to pursue. Utilities must also adapt their operational models, which should include a clear definition of roles within the business

Exhibit 5 | By Adding Energy Efficiency Services to Their Offerings, Utilities Can Substantially Boost Customer Lifetime Value



Source: BCG analysis based on input from BCG utility cost benchmarking.
Note: We make the following assumptions: The customer is a commercial customer in Germany whose electricity consumption prior to the implementation of EE measures is 100 megawatt-hours per year. The customer represents sales revenue to the utility of 7.96 euro cents per kilowatt-hour (kWh); the value of the EE-related savings to the customer is 22.55 euro cents per kWh. The EE project yields energy savings of 25 percent; the utility captures 70 percent of the savings value during the contract. The contracting period for EE services is seven years. The earnings before interest, taxes, depreciation, and amortization (EBITDA) of energy supply is 10 percent; the EBITDA for EE contracting is 15 percent. For financing, we assume no up-front payment, that all contract revenues are equally distributed over the contract's duration, that energy prices stay constant in real terms, and that the discount rate is 10 percent.
[1]EE = energy efficiency.
[2]"Additional upside" refers to the potential for additional revenues through the sale of related products and services, such as facility management.

portfolio, sensible placement of the new business within the overall organization, and the optimization of key steering processes.

Entrants from Other Segments. Facility managers, metering companies, and telecommunications companies all have very specific access to, and information about, customers. They can use this as a springboard to develop a lucrative presence in the EE industry. Doing so, however, will require a strong understanding of the overall market, the positioning of competitors, and longer-term success factors. To build up capabilities and scale, these players should consider partnerships that leverage their superior access and proximity to customers' operations. Access to customers' energy consumption patterns, for example, would prove a strong lure to an ESCO willing to extend its business into energy management and other data-enabled business models. IT companies are also well positioned to enter the market through partnerships, which could help them leverage their superior system capabilities for developing advanced applications in more data-driven energy-management business models.

Energy efficiency markets offer highly attractive opportunities to companies that know how to unlock them. Understanding regional regulation, identifying attractive segments, tailoring appropriate go-to-market strategies, and setting up streamlined delivery processes are preconditions for success. Navigating the challenges requires deep market insight and clear strategic positioning. But companies that manage to get it right stand to be rewarded with a sustainable top-tier position in a fast-growing multibillion-dollar industry.

Notes

1. Investment in insulation and energy-efficient windows is excluded because such items are typically supplied and installed by a set of players outside the scope of this report.

2. *Study on the Energy Savings Potentials in EU Member States, Candidate Countries, and EEA Countries: Final Report*, Energy Economics Group, March 2009.

3. *Energy Efficient Buildings: Global Outlook*, Pike Research, November 2011.

4. See *Toward a Distributed-Power World: Renewables and Smart Grids Will Reshape the Energy Sector* (BCG White Paper, June 2010) and "Solar PV Plus Battery Storage: Poised for Takeoff" (BCG article, July 2013).

5. See, for example, "The Age of Digital Ecosystems: Thriving in a World of Big Data" (BCG article, July 2013) and "Big Data's Five Routes to Value: Opportunity Unlocked" (BCG article, September 2013).

6. In markets where utilities are required to invest in EE, as is the case in several states in the U.S., utilities are often subject to "pass through only" mechanisms that limit their ability to monetize their EE programs and thus their incentive to invest in excess of required quotas.

Appendix

The Energy Efficiency (EE) Market. We define this market as spending and investment by private households, by industry, and by the commercial sector to lower energy consumption. This definition includes both contracting and direct equipment sales; direct consumer spending is included in the last step of the value chain. To avoid double counting, we excluded transactions such as equipment sales by original equipment manufacturers (OEMs) to energy service companies.

Market Sectors. This report distinguishes among three economic sectors: residential, commercial, and industrial. We define the residential sector as all private residences, including both rented and owned homes. We define the commercial sector, which is the main focus of the report, as all building space used for offices, commercial activities, administration, education, health care, and other types of services, including both private and public buildings. We define the industrial sector as facilities for all kinds of industrial production, such as metals, chemicals, paper, food, and engineered goods, as well as heat and power generation. We do not include transportation.

Retrofit Versus New Construction. The report focuses on the retrofit market because it accounts for the greatest share of EE industry activity.

Technologies and Applications. We consider efficiency investments across five key applications: heating, cooling and ventilation, lighting, refrigeration, and energy and building management systems. We do not consider insulation materials and energy-efficient windows, as these are typically supplied and installed by a different set of players that are outside our selected scope.

Market Participants. We currently see four main types of market participants: energy service companies, OEMs, utilities, and more focused players. The report and its implications are relevant for other current and potential stakeholders as well, however, including investors, facility management companies, building technology players, metering companies, and IT and telco players.

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