

Roland Berger

Focus

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Energy efficiency services in Europe
Tapping into a powerful market



Management summary

Ongoing pressure from both the political and business worlds has led to the emergence of a market for energy efficiency services – services aimed at helping companies improve how they use primary energy, through introducing new technology and other actions. This fast-growing market is set to almost double in size in Europe to around EUR 50 billion in 2025, in the process becoming a key market in the European industrial landscape.

But companies wishing to tap into this powerful market face a fundamental problem: the lack of transparency in the market. Different analysts include different businesses in their definition of the overall market, and hence calculate widely varying market volumes. We solve this problem by dividing the market into the five "lead markets" for software, consulting, engineering, operations and contracting. This systematic approach allows us to calculate an accurate market size.

Having established a robust basis for discussion, we then turn to the options for companies. Growth of the market in Europe is driven by five main factors: regulation, innovation, the energy transition, an increasing focus on sustainability, and digitalization. But challenges also abound for hopeful market entrants, including market fragmentation, strong competition and techni-

cal complexity. We examine the opportunities and challenges in detail, looking at how different factors impact the lead markets and what the prospects are for new and established players.

Ultimately, we believe that players can succeed by following a few relatively straightforward principles. They must build a compelling business case for their customers, using levers such as digitalization and cost of delivery. They must pursue smart growth through mergers and acquisitions, taking great care not to kill off the entrepreneurial spirit of their newly acquired firms. And they must ensure that they themselves have the right internal setup, with the required flexibility to accommodate strong growth businesses.

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1. Defining the market

Our systematic approach creates transparency

Energy efficiency and climate protection are high on today's global political agenda. In 2015 nearly 200 countries agreed to cut or curb their carbon emissions under the Paris Agreement. But besides its political importance, energy efficiency is also a key enabler for business. Indeed, while countries are trying to reduce their carbon footprint, companies are busy trying to reduce their energy costs.

This combined pressure from politics and business has led to the emergence of a market for "energy efficiency services" (EES). We can define EES as services provided on the basis of a contract that enable customers to increase their energy efficiency using technology and actions designed to conserve or increase the efficient use of primary energy.

In Europe, the market for EES is growing fast. According to our calculations – detailed further below – the market in the European Union (EU28) was worth EUR 26.7 billion in 2017 and is expected to grow eight percent a year, reaching a market volume of EUR 49.5 billion by 2025. That means that it is growing faster than GDP. Indeed, EES is very likely to become one of the key markets in the European industrial landscape.

One of the problems with the market for EES, however, is its lack of transparency. No universal consensus exists about what the market includes and hence on what basis to calculate its size. Our approach introduces five lead markets that make up the total market: energy efficiency management software; energy efficiency audit/consulting; engineering, procurement and construction (EPC) of energy efficiency technology; efficient operations; and energy efficiency contracting. For short, we refer to these lead markets as "software", "consulting", "engineering", "operations" and "contracting".

For each of these five lead markets we define market segments that are made up of various technology lines. Using international studies of use cases, marketing sizing, technology rating and statistical data from Europe-

an countries we can then calculate the volume of each of the lead markets in each country, from there the volume of each lead market in Europe as a whole, and finally the total market for EES. We believe that the results of these systematic, bottom-up calculations form a solid basis for international discussion and analysis. Figure A provides an overview of market volumes and forecast growth rates for each of the lead markets. Full details of lead markets and their constituent parts appear in the box feature on pages 6-8. → [A](#)

GROWTH DRIVERS

Having established the dimensions of the market, we now turn to the factors driving market growth. We identify five key drivers: regulation, innovation, the energy transition, the increasing focus on sustainability, and digitalization.

The first driver is regulation. National and international agreements oblige companies to reduce their carbon emissions. At the same time, increasing energy prices and import fees are creating new incentives for companies to improve their energy efficiency.

The second market driver is innovation. This involves the development of new energy-saving technology, the "reinvention" of production processes – for instance, electric steel production, gas phase condensation, electrolysis – and the substitution of materials, such as bioplastics replacing conventional plastics.

The third key driver is the energy transition. By this, we mean the shift away from carbon-based fuels toward locally generated renewable energy and the new focus on energy efficiency. Factors such as flexible load-sharing and energy consumption, the new market structure of power generation players and fluctuation of energy prices drive up the share of renewable energy in national energy-production landscapes.

The fourth driver is the increasing focus on sustainability at both a political and business level. Firms are

A: EES is set to become a key European market

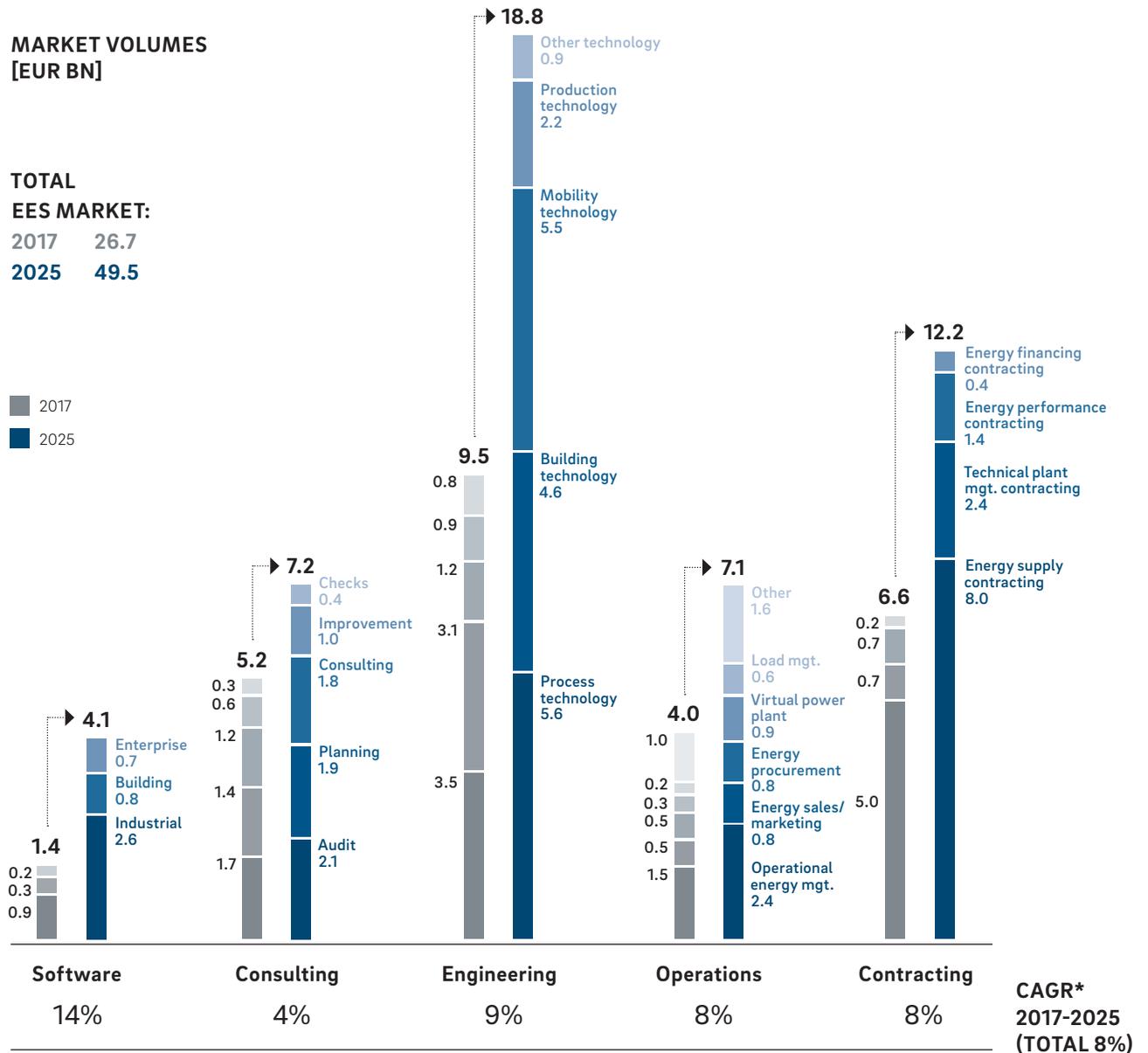
Volume of lead markets [EUR bn, EU28]

MARKET VOLUMES [EUR BN]

TOTAL EES MARKET:

2017 26.7
2025 49.5

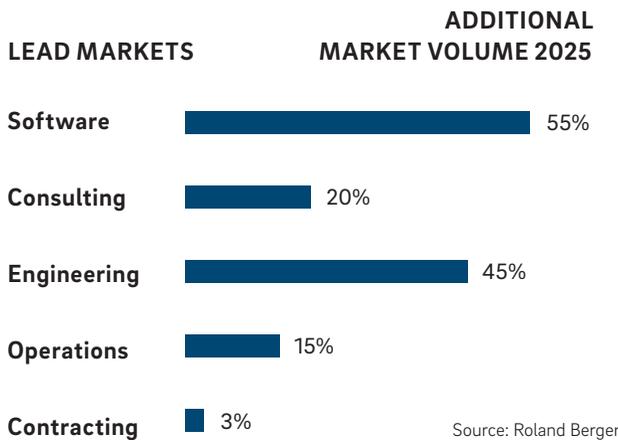
2017
2025



* Compound annual growth rate Source: Roland Berger

B: A major enabler of market growth

Additional market volume by 2025 due to digitalization



strengthening their internal procedures for climate protection and setting themselves new sustainability goals in line with political expectations.

The fifth and final market driver is digitalization. Although we have left this factor for last, it is in fact one of the main drivers of energy efficiency. The development of new technology such as the Internet of Things (IoT), blockchain and artificial intelligence (AI) allows EES providers to improve their solutions and offer customers tailored optimization services. In this way, digitalization is a major enabler of further market growth.

Digitalization is expected to expand the market by an additional EUR 13.6 billion by 2025. Its biggest impact will be in the lead market for energy efficiency management software, where we expect to see 55 percent additional market volume by 2025, and the lead market for EPC of energy efficient technology, where we expect to see 45 percent additional market volume. → **B**

Five lead markets

SOFTWARE

2017: EUR 1.4 bn, 2025: EUR 4.1 bn, CAGR: 14%

Energy efficiency management software maximizes the energy efficiency of systems or single devices by means of data collection, reporting, monitoring and optimization. The market has the following segments:

- **Enterprise energy management systems (EEMS):**
Solutions generally used in the commercial sector (2017: EUR 0.2 bn, 2025: EUR 0.7 bn, CAGR: 15%)
- **Building energy management systems (BEMS):**
Tailored solutions for the real estate sector and building facility managers (2017: EUR 0.3 bn, 2025: EUR 0.8 bn, CAGR: 13%)
- **Industrial energy management systems (IEMS):**
Solutions destined for industrial customers (2017: EUR 0.9 bn, 2025: EUR 2.6 bn, CAGR: 14%)

Three types of players are active in this fragmented lead market. All of them have a high degree of expertise in data science, software-hardware integration, smart sensors and artificial intelligence (AI), but each takes a different approach to the market. The first type, large players from the energy or electrical engineering segment, tie the software solutions they offer to sales of their own equipment. The second type, global software providers, offer energy management systems that are integrated with their core solutions, such as enterprise resource planning (ERP) systems. And the third type, specialized or niche players – of which there are a large number – offer customized solutions often for specific market segments. Growth in this lead market is driven by the falling prices of the smart sensors used to monitor energy flows, combined with advances in AI, which enable further efficiency gains from data analysis and automation.

CONSULTING

2017: EUR 5.2 bn, 2025: EUR 7.2 bn, CAGR: 4%

Energy efficiency audit/consulting refers to services that aim to evaluate the energy flows of consumers and subsequently develop energy efficiency optimization actions tailored to customers' specific situations. The market has the following segments:

- **Energy efficiency checks:** Services to ensure a specific level of efficiency and measure potential energy losses (2017: EUR 0.3 bn, 2025: EUR 0.4 bn, CAGR: 2%)
- **Energy efficiency improvements:** Actions to reduce the effective price of consumer energy services (2017: EUR 0.6 bn, 2025: EUR 1.0 bn, CAGR: 6%)
- **Green energy consulting:** Services helping companies meet their own corporate social responsibility (CSR) standards (2017: EUR 1.2 bn, 2025: EUR 1.8 bn, CAGR: 5%)
- **Energy efficiency planning:** The precise planning and dimensioning of energy efficiency solutions (2017: EUR 1.4 bn, 2025: EUR 1.9 bn, CAGR: 4%)
- **Energy efficiency audits:** Inspections or analyses of energy flows in a building, process or system with the aim of reducing the amount of energy input without negatively affecting the output (2017: EUR 1.7 bn, 2025: EUR 2.1 bn, CAGR: 3%)

The lead market for consulting is dominated by small businesses, some of them sole traders. These companies usually serve a single customer along the whole production or value chain. The few larger companies on the market offer a broad portfolio of services and leverage energy consulting services to expand their services in other lead markets, such as engineering and operations. These larger companies have a broad network of certified staff and close customer relationships. Regulation is a key market driver. New international agreements will define the needs in this market and the shape of new product offerings. At a country level, energy pricing also drives the market for consulting, including the development of trading and tax optimization actions.

ENGINEERING

2017: EUR 9.5 bn, 2025: EUR 18.8 bn, CAGR: 9%

Engineering, procurement and construction (EPC) is a particular form of contracting arrangement that obliges the contractor to hand over the completed construction or installation within a given time and budget. The market for EPC of energy efficiency technology comprises the following segments:

- **Production technology:** Energy efficiency engineering strictly related to the production process (2017: EUR 0.9 bn, 2025: EUR 2.2 bn, CAGR: 12%)
- **Mobility technologies:** Charging infrastructure for electric vehicles, mobility robots and other transportation devices (2017: EUR 1.2 bn, 2025: EUR 5.5 bn, CAGR: 21%)
- **Building technology:** Engineering services directly influencing buildings and building envelopes (2017: EUR 3.1 bn, 2025: EUR 4.6 bn, CAGR: 5%)
- **Process technology:** Engineering services for the generation of power, heat and cooling that are directly required for support processes in production (2017: EUR 3.5 bn, 2025: EUR 5.6 bn, CAGR: 6%)
- **Other technology:** Technology used to produce support products such as compressed air or deionized water (2017: EUR 0.8 bn, 2025: EUR 0.9 bn, CAGR: 2%)

The market is dominated by a number of highly specialized engineering companies that offer knowhow in high-tech areas such as energy efficiency optimized products, ultra-high efficiency building technology and innovative production processes. In many cases these companies also hold stakes in small startups or spinoffs. Companies operating on the market have advanced capabilities for a wide range of technologies, alongside expertise in managing the implementation of complex projects. Innovation and technology are key market drivers. This includes developing new energy-saving technologies and reinventing production processes – for example, reducing the number of production steps by using new vacuum mounting technologies, thereby avoiding the need for additional cleaning as is the case with traditional glue mounting.

OPERATIONS

2017: EUR 4.0 bn, 2025: EUR 7.1 bn, CAGR: 8%

Efficient operations refers to services that decrease a company's energy consumption by using technology and operational strategies such as load management, virtual power plants and operational energy management. We include the following segments in the market:

- **Load management:** Load management allows consumers to regulate their power consumption in response to market changes (2017: EUR 0.2 bn, 2025: EUR 0.6 bn, CAGR: 15%)
- **Virtual power plants:** A VPP is a system of software and control units that aggregates the supply of electricity from a range of distributed sources (2017: EUR 0.3 bn, 2025: EUR 0.9 bn, CAGR: 15%)
- **Energy procurement services:** Services handling consumers' sourcing needs and managing their energy contracts (2017: EUR 0.5 bn, 2025: EUR 0.8 bn, CAGR: 6%)
- **Energy sales/marketing services:** Services enabling customers to successfully market excess energy produced by their own installations (2017: EUR 0.5 bn, 2025: EUR 0.8 bn, CAGR: 6%)
- **Operational energy management services:** Services enabling customers to fully outsource the management of their internal energy processes (2017: EUR 1.5 bn, 2025: EUR 2.4 bn, CAGR: 6%)
- **Other services** aimed at optimizing the energy efficiency of operations (2017: EUR 1.0 bn, 2025: EUR 1.6 bn, CAGR: 6%)

The lead market for operations covers a wide range of services historically performed internally by customers but now, with complexity and innovation growing, increasingly outsourced to external providers. Several segments, such as load management and VPPs, have only emerged recently as more sophisticated grid-management systems have been rolled out. Most players in this lead market are regular energy service companies (ESCOs). However, a number of large utilities are entering the market, combining services in the area of operations with their traditional energy supply services.

CONTRACTING

2017: EUR 6.6 bn, 2025: EUR 12.2 bn, CAGR: 8%

Energy contracting refers to the provision of energy supplies or energy efficiency services on a contractual basis. It includes the outsourcing of risk, interfaces and guarantees. This market has the following segments:

- **Energy financing contracting:** Services providing a comprehensive set of energy efficiency, renewable energy and distributed generation actions, including initial energy audits and the installation of customizable solutions (2017: EUR 0.2 bn, 2025: EUR 0.4 bn, CAGR: 9%)
- **Energy performance contracting:** Services aimed at achieving energy savings so as to reduce overall energy costs (2017: EUR 0.7 bn, 2025: EUR 1.4 bn, CAGR: 9%)
- **Technical plant management contracting:** Services in which a contractor operates a plant directly (2017: EUR 0.7 bn, 2025: EUR 2.4 bn, CAGR: 17%)
- **Energy supply contracting:** Services in which a contractor efficiently provides products such as heat, cooling, compressed air or electricity (2017: EUR 5.0 bn, 2025: EUR 8.0 bn, CAGR: 6%)

Most players in this lead market are regular energy service companies (ESCOs), however their dominance on the European market is not as strong as in the United States or China, for example. Energy contracting companies have access to capital, they have cost-effective procurement and operations, and they enjoy a strong brand image. The increasing focus on sustainability is a key market driver.

2. Challenges abound

The market is complex, dynamic and technically sophisticated

The market for EES presents a number of challenges. The market is complex, fragmented, competitive, dynamic and technically sophisticated. We discuss the key challenges below.

TOUGH MARKET ENTRY AND CONDITIONS FOR ORGANIC GROWTH

Many players are currently struggling to take the lead in the market for EES. In particular, we find a large number of small and medium-sized players with highly specialized expertise and strong, long-term relationships with their customers.

We can divide EES providers into two groups, depending on the part of the market they operate in. On the one hand, we have players offering fairly commoditized products in traditional areas, such as audit and consulting services. Here, the margins are low, but so are the risks. Companies can easily enter this part of the market and then expand their business. Potentially, they can even tap into economies of scale.

On the other hand, we have players active in areas affected by the digital transformation. This part of the market is enjoying growth of more than ten percent a year, but the risks for companies are also very high. The services offered are becoming more complex, service providers are having to assume more responsibility and contract periods are lengthening. This part of the market is particularly driven by expertise, which depends strongly on the specific customer segment. As a result, we find a wide range of players, from big utilities to small digital startups.

We can also differentiate players in terms of their degree of focus on EES. Some firms are largely or entirely focused on EES and may be "native" to the market. An example would be a software startup that was created solely to provide energy efficiency software. Other players have a mixed focus, offering both EES and other services. An example would be a power gen-

eration technology company whose many business units include one that offers EES. Finally, there are players with a non-EES focus. These are companies that have previously had very little contact with the EES market at all, such as equipment providers now offering their own energy efficiency improvement software. This wide diversity of players results in a highly fragmented and complex market.

The five lead markets are structured differently in terms of the dominance of different types of players – players with an EES focus, a mixed focus or a non-EES focus. Thus, 60 percent of the lead market for energy efficiency management software is accounted for by players with a non-EES focus, while 70 percent of the

In the EES market, we find many small and medium-sized players with highly specialized expertise. Some firms are entirely focused on EES, others are not. This diversity results in a highly fragmented and complex market.

lead market for energy efficiency audit/consulting is in the hands of players with a mixed focus. At the other extreme, the lead market for energy contracting is dominated by players with an EES focus, who make up 70 percent of the market. → C

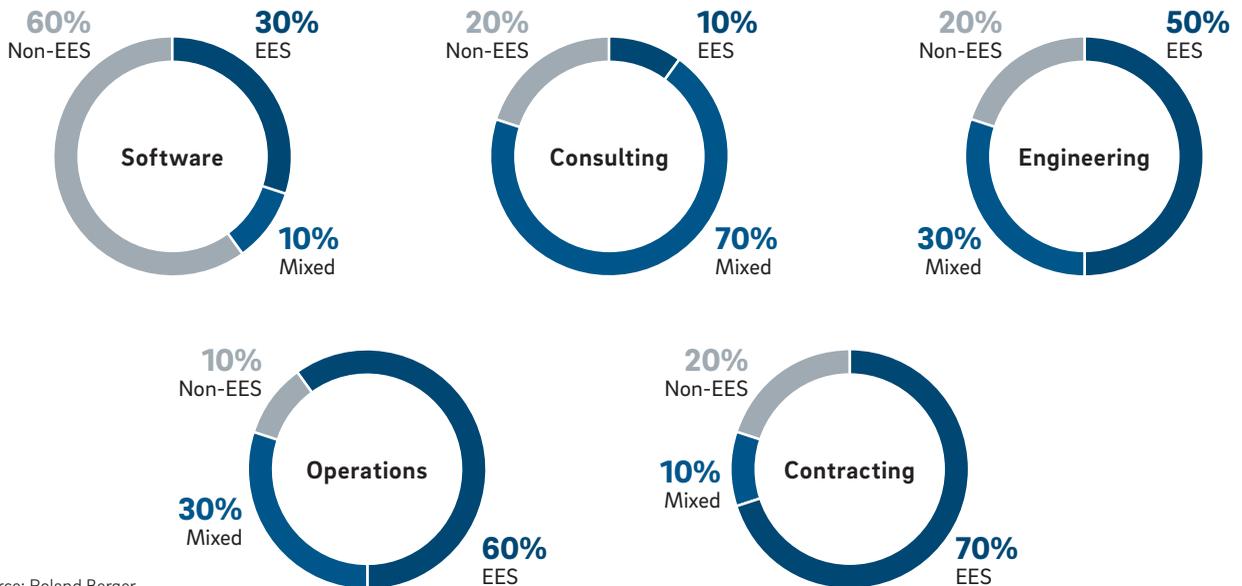
This fragmentation is particularly challenging for players with a mixed focus. These companies offer their clients a wide range of services but struggle to become experts in any specific field. For players with an EES focus, on the other hand, the fragmentation of the market is a golden opportunity. They can leverage their unique knowhow and expertise to become leaders of their particular segment. In general, to take advantage of the fragmentation of the market, players of all types are

called upon to develop their specific capabilities and reduce the breadth of their services.

Since the capabilities required of players differ widely for each of the lead markets, we are unlikely to see one or two large companies dominating the entire European market for EES. For example, in the lead market for energy efficiency management software, companies need broad knowhow in integrating existing software and hardware, possibly complemented by expertise in integrating smart sensors. In the lead market for energy efficient audit/consulting, by contrast, companies need certified experts in their workforce and the ability to establish long-term, close customer relationships. As a result, we find mainly very small companies active in

C: A highly fragmented picture

Breakdown of lead markets by focus of market participants



Source: Roland Berger

this lead market, generally focused on a single client or a small group of clients. Large utilities and energy service companies have tried over the last five years to use this lead market as an entry point for other services, such as contracting, but they have been unsuccessful.

RISKS OF MAKING BAD INVESTMENTS

The market for EES has seen intense activity in the area of mergers and acquisitions (M&A) in recent times. More than 100 transactions have taken place over the past five years, particularly in the lead market for efficient operations, which accounted for around half of all deals. The key acquirers are energy services specialists (38 percent) and utilities (16 percent). However,

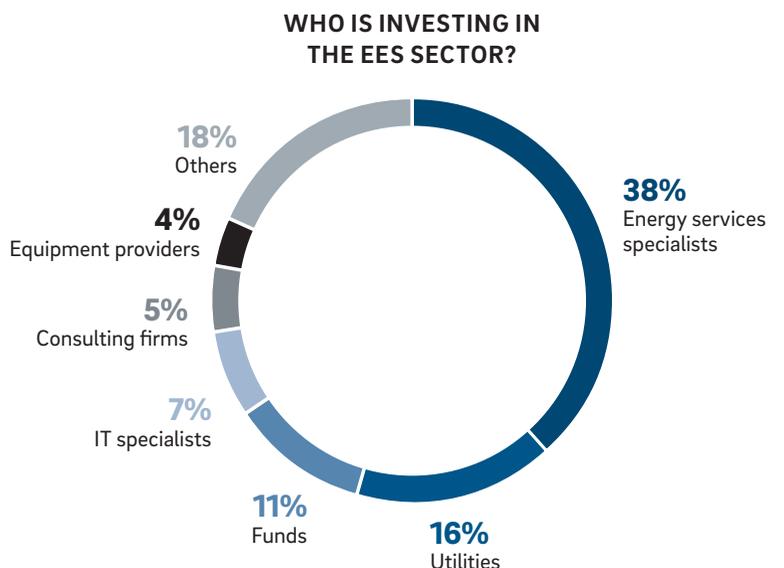
such investments are risky and large M&As have not been as successful as expected. Larger entities have faced difficulties trying to integrate smaller, more innovative companies. In particular, they have learned that imposing their own organizational structure is rarely successful. → **D**

For many companies, an investment in EES companies is very attractive. However, the individual lead markets show very different profit margins. While software providers can have very high net profit margins of 15 to 20 percent, energy efficient audit/consulting firms, on the other hand, offer poor economies of scale and low profit margins – just three to five percent. In the lead market for EPC of energy efficient technology,

D: M&A intensity

Number of transactions over the past five years and types of investors

TRANSACTIONS	LEAD MARKETS
< 10	Contracting
10-20	Software Consulting Engineering
40-50	Operations



Source: Roland Berger

economies of scale related to geographic density are possible, although net profit margins are only moderate at five to ten percent. In efficient operations, net profit margins are five to seven percent. Finally, energy contracting companies have improved financing capabilities combined with high net profit margins of 10 to 15 percent. Although these profit margins look tempting for companies usually operating in a regulated market of electricity generation, transmission and distribution, many companies engaging in M&A activity have been unable to achieve such high profit margins as around 15 percent or maintain them long term. Usually, the profiles of the companies acquired were not a perfect fit with the acquirer's current business model, and the acquirer lacked a clear vision or development strategy. In some cases, the acquirers appeared to be experimenting with new business models on the EES market,

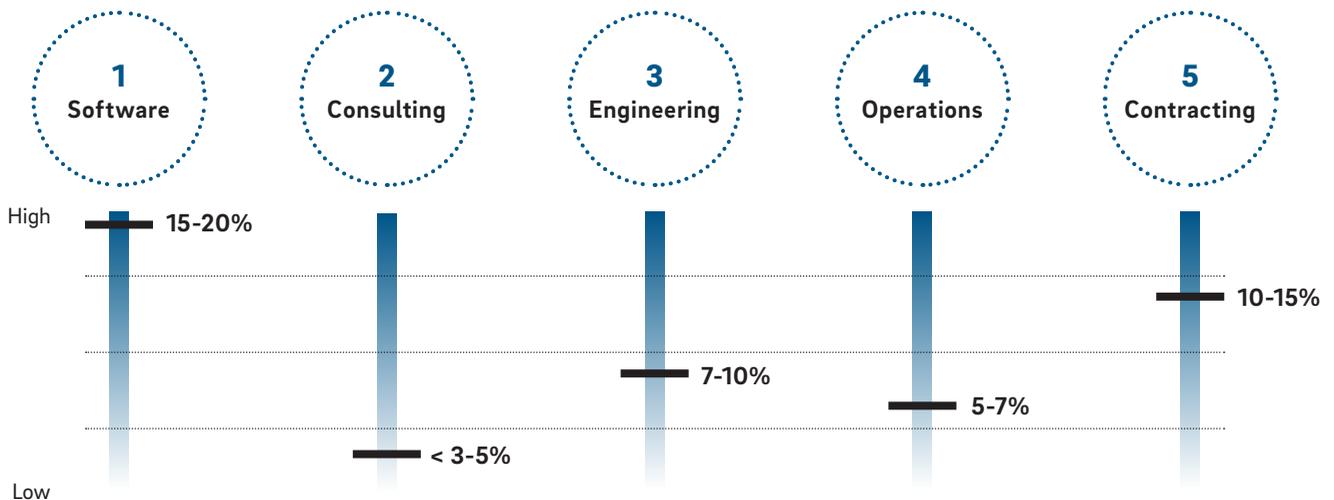
which inevitably put the success of their established business model at risk.

DIGITALIZATION CAN BE CHALLENGING FOR LARGE, TRADITIONAL ORGANIZATIONS

We saw in the previous section that digitalization is a key market driver for EES. However, while it represents a golden opportunity for new players, it remains a highly challenging issue for more traditional players. Established companies need to invest more in upgrading their IT systems. They will also need to invest in improving the skills of their employees, helping them adapt to the new digital environment. Companies can only compete effectively with market entrants if they fully understand the shift from technical engineering skills to computer engineering skills, and the implications of this for how they leverage their human capital.

E: Market of differing margins

Profitability of lead markets (% net profit margin)



Source: Roland Berger

3. Time for strategy

We identify three overriding success factors

Despite the ongoing challenges in the market – fragmentation, diverse market participants, consolidation, complexity – we believe that by following a few relatively straightforward principles, companies can tap the great potential of the market. We outline three overriding success factors below.

1

BUILD A COMPELLING BUSINESS CASE

Market players need to build a compelling business case for their customers. They should use all available levers to make their offering as financially attractive as possible. These levers will increasingly be found in the field of digitalization, but levers such as cost of delivery will remain relevant. When presenting and delivering their business case, service providers should use a segment-specific approach, drawing on their segment expertise and in-depth understanding of customer processes. Here, big data can potentially be an enabler. Contenders will also need to prove their expertise by providing strong industry references. Bold, interdisciplinary joint undertakings are called for.

2

PURSUE SMART, INORGANIC GROWTH

Given the fragmentation of the market, superior growth will often only be achievable through acquisitions. This brings with it a number of challenges. For example, the availability of suitable targets is limited as the market has been screened many times by acquirers. Companies should therefore make use of systematic “smart screening”. Another challenge is finding the right M&A approach. It is critical that acquirers do not kill off the entrepreneurial spirit of their newly acquired firms; integrating highly innovative and successful startups is an art rather than a science. Targeted profit margins can

often no longer be guaranteed due to the large, rigid organizational structure of the acquirer. The startup gains market share, but at the same time becomes increasingly uneconomical. Acquirers should therefore focus strongly on leveraging the skills or products acquired across the entire organization.

3

ENSURE THE RIGHT INTERNAL SETUP

Organizational structures often lack the flexibility to accommodate strong growth businesses: Hierarchical, stiff structures are counterproductive to entrepreneurial success. Furthermore, the growth targets that companies set are often unrealistic and create frustration among employees. The challenges for organic growth mainly relate to the origins of the company and the new capabilities that it may need to develop in order to be successful on the new market. This may require a change of mentality. For example, utility companies typically act defensively, fighting against new market entrants or new regulation. Instead, they should shift into offensive mode.

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WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

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