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Empirical Analysis of the Market for Energy Services, Energy Audits and other Energy-Efficiency Measures

Summary of the final report 2018 - BfEE 17/2017

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1 Background and goals

In order to meet the climate goals and to move forwards with the necessary energy transition, many puzzle pieces must come together. A major part of this are the markets for energy services and energy efficiency. Both markets are subjected to continuous changes – with new products, mergers, and divisions of different business models. The Federal Energy Efficiency Center (Bundesstelle für Energieeffizienz, BfEE) is, according to section 9, paragraph 2, number 5 of the German Energy Service Law (EDL-G), responsible for – amongst other things – monitoring the market for energy efficiency services (EES), energy audits and other energy efficiency measures, as well as developing proposals for its development.

Since 2016, markets have been studied annually. This study is the third of its kind. As has become clear in the previous years, the studied markets have found a solid base in Germany and are generating high profits. There's a plethora of services on offer, of which only a part is precisely defined. The product segments of energy consulting, energy contracting, energy management and energy efficiency information have once again been a special focal point.

Previous studies (such as BfEE 2018¹) have also shown that the public sector is an important market segment for energy services. This is why, for the first time, approximately 500 data sets were collated from the public sector in the year 2018. For this purpose, the survey was adapted to be as accessible for smaller, municipal construction departments, as for the larger property management of the federal government and federal state authorities.

For the market study of 2018, the survey design was further optimised and solidified. It was in principle based on thorough surveys of both the supply and the demand side. Nameworthy improvements include the consistent and uniform phrasing of the questionnaire, as well as an even stronger standardisation of the survey's design. The survey for the public sector included the option of multiple editors being able to access and edit the survey.

Compared to previous market studies, the market for energy services is mostly stable. When differentiating between the separate services, there are significant variances in use and prevalence.

¹ Bundesstelle für Energieeffizienz (BfEE) (Ed.), „Empirische Untersuchung des Marktes für Energiedienstleistungen, Energieaudits und andere Energieeffizienzmaßnahmen im Jahr 2018“, Endbericht 2018 - BfEE 17/2017, Eschborn, 2019.

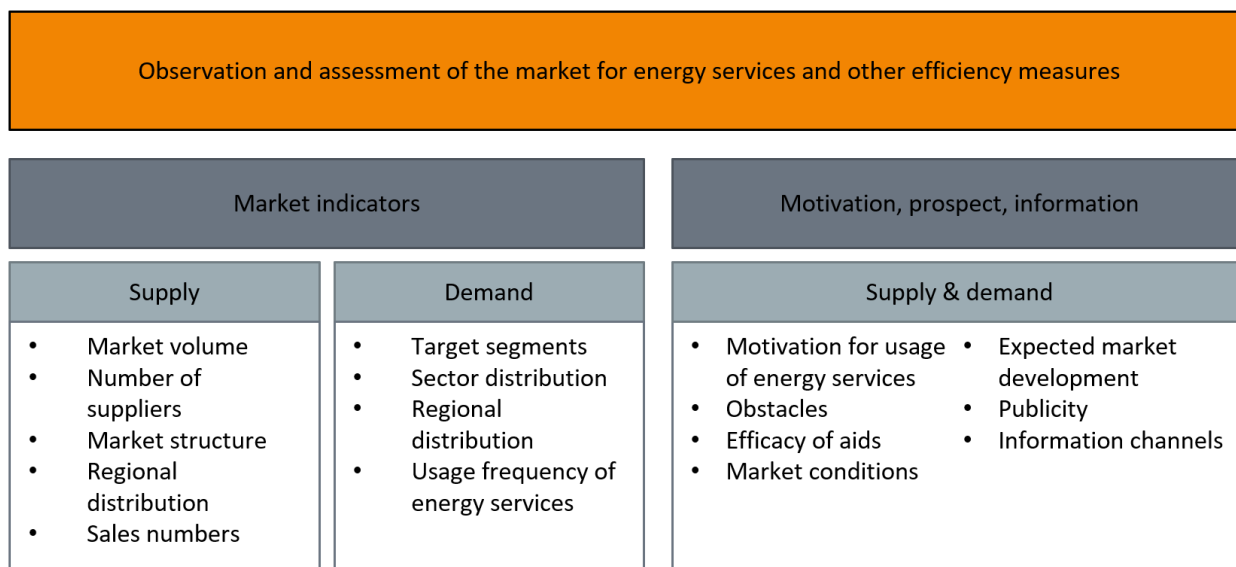
2 Survey design

The goal of this study is the monitoring and evaluation of the market for energy services. For this purpose, an indicator-based survey design was created, within which information for the following categories was obtained:

- standardised, within the temporal course comparable, key market indicators for all relevant products (market monitoring)
- motivation, barriers and information pathways of provider and demand side, as well as expectations regarding market development.

Various indicators were assigned to each of these goals and were obtained during the study. (see figure 1)

Figure 1: Objectives and indicators concerning the market observation



To obtain the described indicators and to create a comprehensive market overview, a mix of methods was used. These included:

- literature and document analysis
- obtaining qualitative information by guideline-based expert interviews
- obtaining empirical data by way of standardised surveys through phone interviews and an online questionnaire.

For the energy contracting market analysis, additional data from the databases of Orbis and Dafne was used. Prognos AG's web crawler was used for the identification of businesses which offer energy contracting.

Some interviews were held with selected representatives of associations and authorities, whose areas of responsibility include the federal, state or municipal energy supply and building stock in Germany. The purpose of these interviews was primarily to gain a deeper insight into the structure of the public sector and the distribution of responsibilities in the relevant areas. Furthermore, these interviews added an additional layer to the foundation of data collection preparation. These were developed to be tested during standardised data collection. This made it possible to tackle specific questions in-depth and extrapolate further possibilities and reliable ways of interpreting and explaining from it.

In total, five standardised data collections were conducted. On the demand-side, Kantar Emnid interviewed approximately 3,000 private households, 2,750 businesses and 470 institutions of the public sector by telephone. The survey of the public sector on federal and state level was supplemented with an identical online version of the

questionnaire, making it possible for multiple responsible officials to access it and make edits. On supply side, the survey was conducted online and by telephone. The online survey was sent out to an e-mail list of approx. 19,000 relevant addresses. 210 providers were interviewed by telephone. (see table 1)

Table 1: Performed standardized surveys in 2018

	Sample	Short designation
Supply side		suppliers
via telephone	210	
online (usable answers)	1,259	
Demand side		
private households	3,014	households (tenants / owners)
enterprises	2,751	enterprises
public sector	474	public sector

New in the 2018 survey was the inclusion of the public sector. The responsibilities for questions around energy services in the federation, the states and the municipalities are multifaceted and, depending on the level, not clearly defined. As described above, expert interviews were conducted in order to ask the respective offices in advance what survey pathways would be useful, and who the correct point of contact would be.

In the surveyed municipalities, the department responsible for the municipal properties was identified and surveyed by telephone. Furthermore, school administrations, waste disposal organisations, water suppliers and wastewater disposal organisations were also surveyed.

Every state has a different approach to organise energy and building subjects. Some states coordinate all matters concerning their own properties and buildings in one central state-wide authority or department, other states deal with these matters in a decentralised manner – on the level of districts or other sub-levels. The surveyed offices can decide for themselves whether the questionnaire was to be answered by one person in a telephone interview, or whether multiple people should have access to an online questionnaire with identical content over a longer time period. Additionally, universities/universities of applied sciences and correctional facilities, which are directly subordinate to a state, were asked.

On the federal level, a coverage of approx. 90% of all civil and military federal properties was realised by interviewing a few key people holding leading positions.

The response rate of the public sector was satisfyingly high. In total, 381 institutions were reached on a municipal level. The sample survey size on state level was 91, reaching multiple institutions in 14 out of 16 states. Looking at all surveys spanning federation, states and municipalities, a high spectrum of property numbers was covered (from one to thousands) and therefore also building space (a few dozen to several million square meters), administrated by the respective responsible people.

3 The market for energy services

3.1 Overview of market volume

The German market for the three largest segments of energy services is robust and stable with a generated annual turnover of approx. 9 billion euros. In table 3 the market volume of the energy services market and the three market segments is displayed for the last three years. Due to the methodological challenges around determining the total number of providers, there are some uncertainties which contribute to a fluctuation in market numbers. Compared to previous years, there is little dynamic in the market numbers.

Table 2: Market volume of the energy services market in analysis 2018 and previous years

	Analysis 2018	Analysis 2017	Analysis 2016
Energy consulting	ca. € 370 – 402 million	ca. € 790 – 850 million	ca. € 470 – 520 million
Energy contracting	ca. € 7.2 – 8.6 billion	ca. € 7.7 billion	ca. € 7.2 – 8.4 billion
Energy management services	ca. € 466 million	ca. € 435 million	ca. € 200 million
Total	€ 8.0 – 9.5 billion	€ 8.9 – 9.0 billion	€ 7.9 – 9.1 billion

3.2 Energy consulting

Market volume

The total market for energy consulting had a volume of about 400 million euros in the year 2017². This number is essentially calculated using three variables: for every named type of consulting, the average number of cases per provider, as well as the price of these, was collected. These were multiplied by the estimated number of energy consultants in Germany. The results vary according to the estimated number of consultants. Table 3 below gives an overview of the respective percentages of the types of consulting. As in the previous years, the dominant types in terms of turnover are energy consulting for businesses and for the public sector.

² Market analysis of every year show numbers from the previous years. The Analysis of 2018 gives numbers from the market in the year 2017.

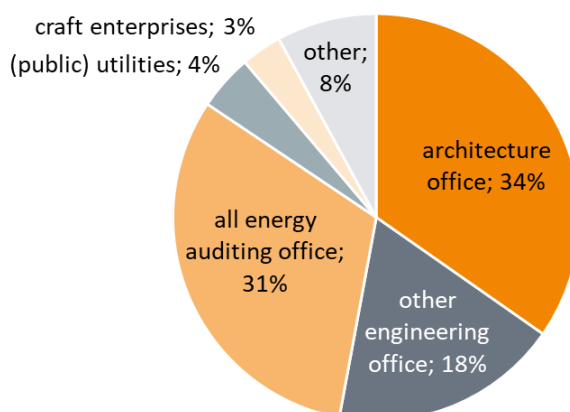
Table 3: Projected market volume for energy consultations (lower boundary)

Type of consultations	Revenue in million Euro (11,500 consultants)	Revenue in million Euro (12,500 consultants)
Energy consulting for enterprises / public sector		
Energy auditing following DIN 16247-1	ca. 110	ca. 120
Energy consulting for non-domestic buildings	ca. 94	ca. 103
Energy consulting for facilities and production processes	ca. 77	ca. 84
Energy consulting for households		
in-site consulting	ca. 64	ca. 69
energy-check	ca. 21	ca. 22
stationary consulting	ca. 4	ca. 4
Total	ca. 370 million Euro	ca. 402 million Euro

The total minimum market volume is roughly the same as that of 2015, and, due to methodology, clearly below that of 2016. The difference to the previous year can be explained by two main factors: on the one hand, the questionnaire was simplified, due to the synchronous questioning of providers, done online or by telephone. On the other hand, the options of average numbers of offered consultancies were changed. Due to these changes, the number of offers per consultant was reduced significantly, compared to 2016. Without adjusting the sales figures for full time positions, the figures are constant, when compared to 2016. For business and public sectors, the more complex energy consulting types are more likely to be offered by larger providers, so adjusting the figures in these segments has a significant impact.

The surveyed energy consultants categorise their operations into three categories: architecture offices, other engineering offices, and all energy auditing offices. Together, these form 80% of all operations (see figure 2). Energy supply businesses and crafts businesses contribute 3 to 4% of all operations. From the survey it is very clear that these two types of businesses carry a higher significance, especially for private homeowners, and so they may be underrepresented in this study.

Figure 2: Sector distribution for suppliers of energy consulting

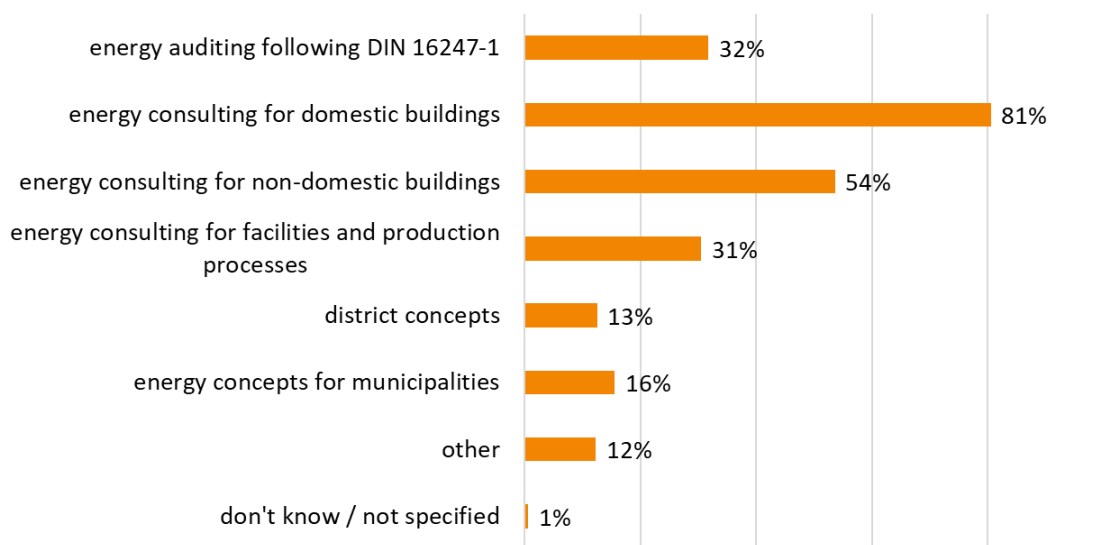


EES survey 2018, suppliers of energy auditing, n=1,278

Energy consultations for residential buildings are by far the most frequently offered type of energy consulting, as shown in figure 3. Slightly more than half of all energy consultants also offer consultations for non-residential buildings. Roughly a third of all surveyed offer energy audits and consulting for plants and production processes. These, however, do not bring in an equal turnover share. Instead, the more complex types of energy consulting are offered by comparatively few of those surveyed. Yet these have a much higher share of turnover in the whole market than consultations for residential buildings, which are relatively standardised and easily provided by nearly all experts.

It is important to note special municipal offers, such as concepts for districts or climate protection concepts. They are offered by over 10% of all energy consultants. Due to their small significance to the total market, they are not further quantified within this study.

Figure 3: Types of offered energy consultations

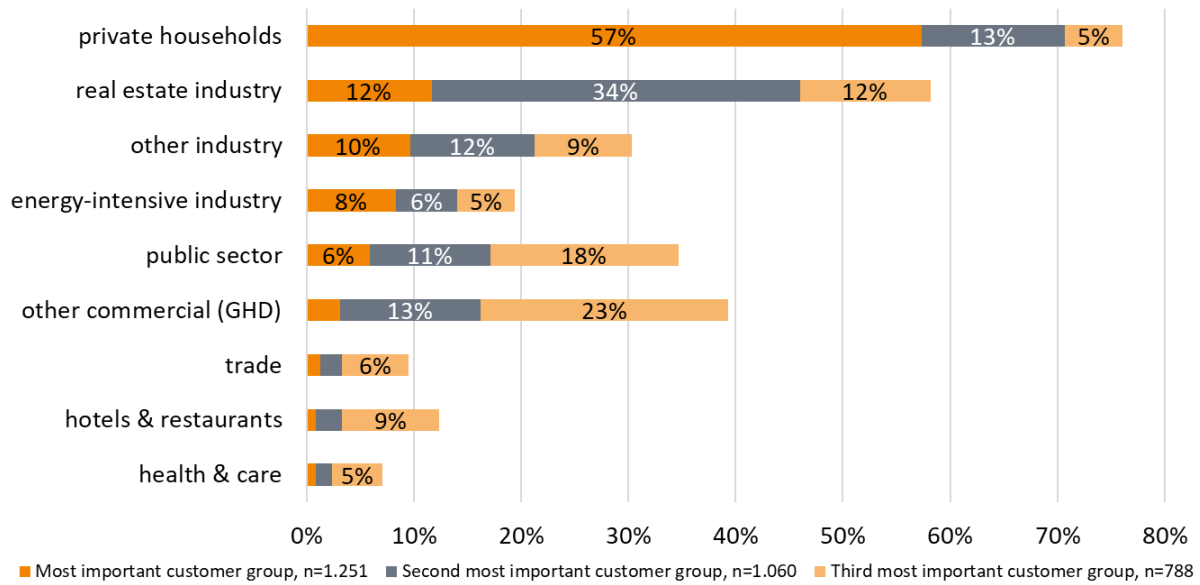


EES survey 2018, multiple choice question, suppliers of energy consulting, n=1,278

Energy consultations for residential buildings can be further divided into sub-offers. Nearly all (87%) energy consultants who offer energy consulting for residential buildings (e.g. BAFA energy consulting for residential properties) conduct these at the client's location and include a comprehensive report. Two thirds also offer an additional, shorter, energy check. Consultations by telephone and online chat (25%), or stationary consultations (19%) are only conducted by a minority of energy consultants.

From the perspective of energy consulting providers, private households are the most important customer segment in the market, followed by the real estate industry, which is named particularly often as the second most important customer segment (see figure 4). Additionally, there's a whole range of other customer segments, which are important especially for specialised businesses, and also for the overall view. Those particularly important to name here are manufacturing, commerce, trade and services, and the public sector.

Figure 4: Most important customer groups for energy auditors

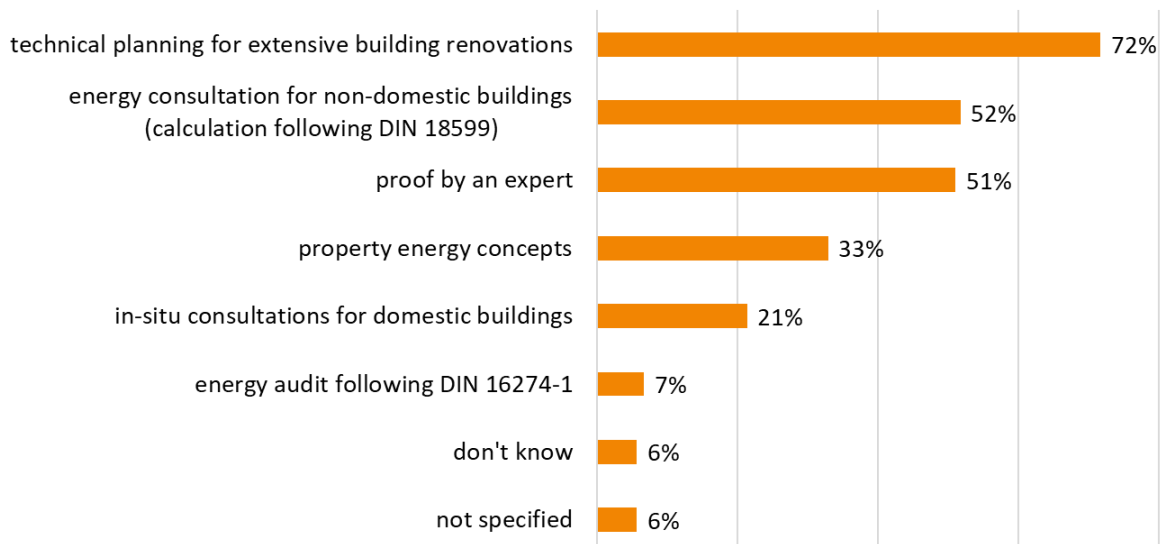


EES survey 2018, suppliers of energy auditing, n=1,278

Public Sector

Parts of the public sector use external energy consulting and planning services much more frequently than businesses or households. Just above 60% of those surveyed made use of such support in the last 5 years. External support is particularly frequently used for technical planning of comprehensive building renovations, as shown in figure 5. Energy consulting is also frequently used for non-residential buildings (52%) and residential buildings (21%), creation of property concepts (33%), as well as verification and confirmation by experts (51%).

Figure 5: Used types of energy consultations and planning services by the public sector



EES survey 2018, multiple choice question, Public sector which uses external support, n=268

Conclusion on energy consulting

Conservative estimates place the market segment volume for the surveyed energy consulting services at around 400 million euros. This includes energy checks and stationary energy consultations, extensive energy consultation for non-residential buildings, residential buildings, as well as plants and production processes with site inspection, and energy audits.

Market monitoring over the last years seems to indicate that the energy consulting market segment has become differentiated and has matured. Highly qualified and specialised small and micro businesses dominate the provider's side. Offers, consultation numbers and costs, as well as hourly rates, are stable when compared to the market analysis of 2017. Throughout Germany a sufficient range of qualified energy consulting is ensured. Consulting recipients have also not indicated a lack of offers.

The wide range of offered consulting products is requested fully by all areas of the demand side, and the satisfaction rate of the used consulting services is high.

However, especially households and businesses seem to have some untapped potential, which could enable market growth. An environment that makes measures in the area of energy efficiency and the associated energy consulting services seem more necessary and economically attractive would support this. This does not mean that the costs for consulting products must be lowered, as there is no evidence of dissatisfaction regarding the cost-benefit-ratio. Aiming to have a renovation rate that's as high as possible, the problem lies more with the perceived lack of need to take action, as owners either rate the state of their buildings as good, or because the energy costs and the associated potential savings are generally seen as too low.

Barriers for future market growth could be – next to the still low energy cost level – bottlenecks in the realisation of energy efficiency measures, due to the high utilisation of the building industry.

3.3 Energy contracting

In this analysis energy contracting is defined as all services around energy supply contracting, energy performance contracting as well as technical facility management and operational management of energy supply.

Market volume

Rough estimates of the market volume can be made, using the estimated total number of providers, as well as the average annual contracting turnover of the providers. The heterogeneity of the market, as well as the quality of available data contributes to the tentativeness of the projections which follow, and so these can only be used to get a rough estimate of market size. The market volume was determined in three ways: one, analogous to last year, by assessing association's data, two, using the databases of Orbis and Dafne, as well as Prognos AG's web-crawler, and three with projections based on the results of the EES survey.

The 247 members of the VfW (association for heat supply) generated 3.1 billion euros of contracting revenue in 2017, according to the association (VfW 2018³). Within the 2018 facility manager contracting market overview⁴, data of eight further contractors was collated, which are mostly not organised within the VfW. Based on the published data, their average revenue can be estimated at 188 billion euro per business. Furthermore, the contracting revenue of utilities not organised in VfW can be added. That's around 270 businesses, according to own estimates (mostly municipally owned utilities). The survey has shown that their turnover is in a similar league as that of the VfW members, which would amount to a total market volume of 3.2 billion euros. In total, this amounts to an estimated market volume of 7.8 billion euros (see table 4).

Energy performance contracting accounts for only a very small part of the total market volume. 8% of all contracts of the members of the VfW are energy performance contracting contracts.

Table 4: Market volume estimations for energy contracting

Type of supplier	Number	Ø Revenue per supplier	Estimated total revenue 2017
VfW-members	247	€ 12.6 million*	€ 3.1 billion
Bigger ESCo⁵	8	€ 187.5 million	€ 1.5 billion
Utilities	268	€ 12 million	€ 3.2 billion
Total	523		ca. € 7.8 billion

Source: VfW 2018, Facility Manager 2018

* The average revenue has been applied to all VfW members (including such without new contracts for this specific year)

The second method used to estimate the market volume involved creating the base population by searching for word combinations on the websites of potential firms and comparing them with data from associations. 550 contracting providers were identified this way. To determine contracting turnover and employment numbers, the business-specific key figures concerning sector, revenue and employment figures from the databases of Orbis and Dafne were offset with the data of the energy services survey. Of 107 billion euros total revenue, approx. 8.6 billion euros is contracting revenue (see table 5). In 2017, 16,000 employees were working in the contracting area, and productivity lay at 530,000 euros per employee. The contracting turnover, as well as the number of providers, is a bit higher than the estimates of the associations. This indicates that some businesses are not organised in associations, which were now included in this more comprehensive approach.

³ VfW 2018: *Der VfW in Zahlen*, VfW, 2018.

⁴ Facility Manager 2018: Sonderausgabe von „Der Facility Manager“, *Marktübersicht Energiemanagement-Systeme und Energiecontracting-Anbieter*, FORUM Zeitschriften und Spezialmedien GmbH, 2018.

⁵ ESCo: Energy Service Company, mostly specialized on contracting

Table 5: Market indicators and market volume from energy contracting

Field of business	Number	Total revenue (€ million)	Contracting-Revenue (€ million)	Total number of employees	Contracting employees
Utilities	363	48,820	4,362	61,221	3,661
Craft enterprises	39	3,938	207	3,482	300
Manufacturer/supplier	26	7,157	1,748	22,888	8,386
Engineering office	27	487	57	819	214
ESCo*	14	2,190	1,193	4,053	1,585
Real Estate Management / Facility Management	15	41,743	873	43,533	1,325
Architecture office	11	2,701	162	5,753	751
Not specified	51	-	-	-	-
Total	546	107,037	8,602	141,749	16,222

*Source: Orbis, Dafne, own calculations

The assignment „ESCo“ was done manually for companies, which knowingly earn most of their revenue with energy contracting. This is a conservative method.

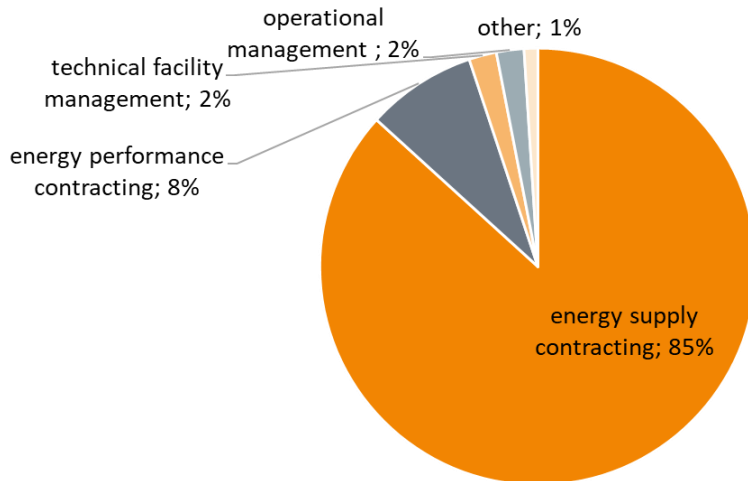
In a third method to estimate the market volume, for every sector, the survey results were extrapolated to determine the total number of providers, as well as key market figures. This amounts to a market volume of approx. 7.2 billion euro.

When compared to other energy services included in this survey, the market volume numbers in the area of contracting are, with 7.2 to 8.6 billion euros, comparatively high. This is because the contracting market is mostly dominated by energy supply contracting projects, within which a large part of the generated turnover from energy purchasing is omitted. It would be appropriate to mark the turnover from services, this is, however, very difficult due to methodological constraints.

According to the 2018 survey, 60% of providers primarily offer energy supply contracting, or rather, have closed the most contracts in this area. Energy performance contracting is primarily offered by 18% of those surveyed, leasing or organisational management contracting by a further 22%. With such a base, the following representations and evaluations based on the standardised surveying are especially meaningful for the situation of energy supply contracting. The focus point of energy supply contracting is not as pronounced as in the previous year (in 2016: 75%), with just 60%. Especially the area of operations management has grown.

Additionally, figure 6 shows the distribution amongst the members of the VfW. There, energy supply contracting predominates with 85%.

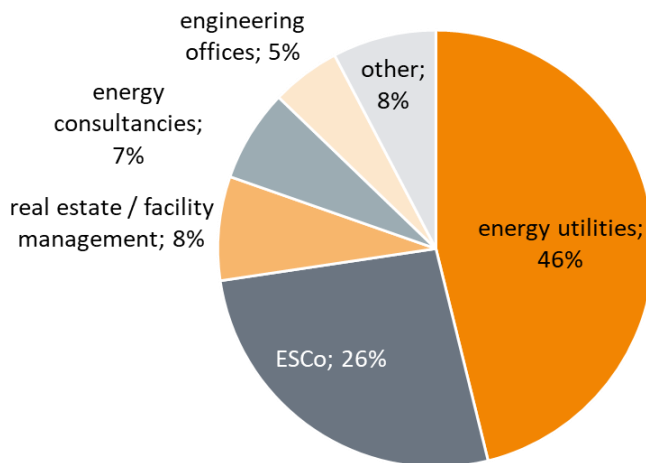
Figure 6: Offered types of contracting of VfW members



Source: VfW in Zahlen 2018

Contracting is mostly offered by utilities (municipally owned utilities and other energy suppliers, roughly 50% of all suppliers) and businesses which describe themselves as contractors (26%) (see figure 7). Compared to last year's survey, there's a small shift from utilities (60% in 2016) to contractors (16% in 2016). A further, smaller, supplier group are energy consulting and engineering firms with a total of roughly 12%. There's also the real estate industry / facility managers, which are with 8% a growing supplier group, which last year was still included in the category 'other'. Furthermore, there's a group of other providers (8%), which is comprised of businesses with very diverse key activities. Among them are energy agencies, IT or software providers and craft businesses.

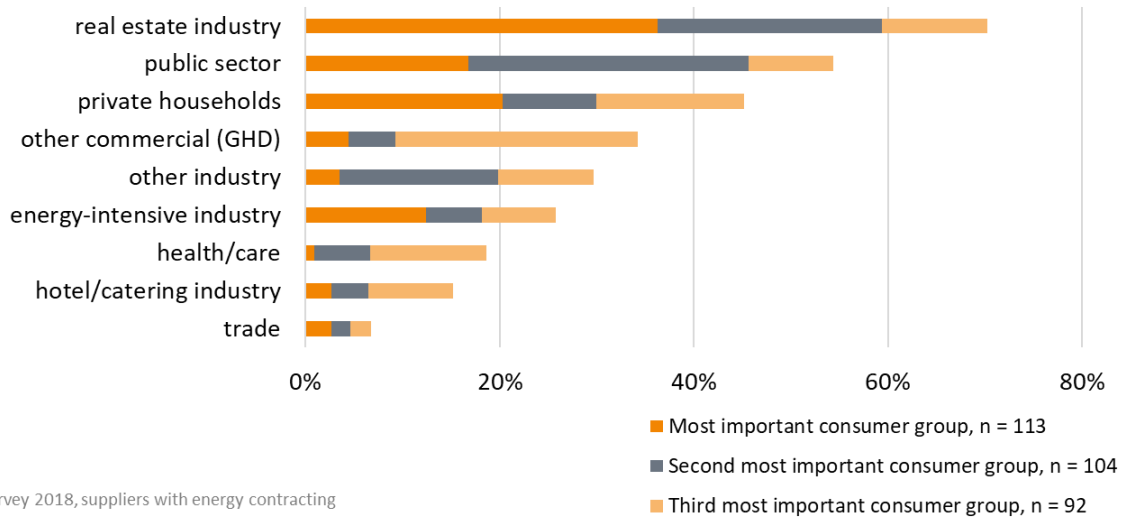
Figure 7: Sector distribution for suppliers of energy contracting



EES survey 2018, suppliers of energy contracting, n = 117

According to the conducted provider survey, like in the previous year, the most important target group of the contractors remains the real estate industry (see figure 8). Seventy percent (and with that a continuously growing part) of contracting providers consider this segment to be one of their three most important customer segments (2017: 60%, 2016: 50%). The second most important customer segment remains the public sector, which was named by 55% of those surveyed, and which is also growing (2017: 50%, 2016: 46%).

Figure 8: Most important clients for suppliers of energy contracting



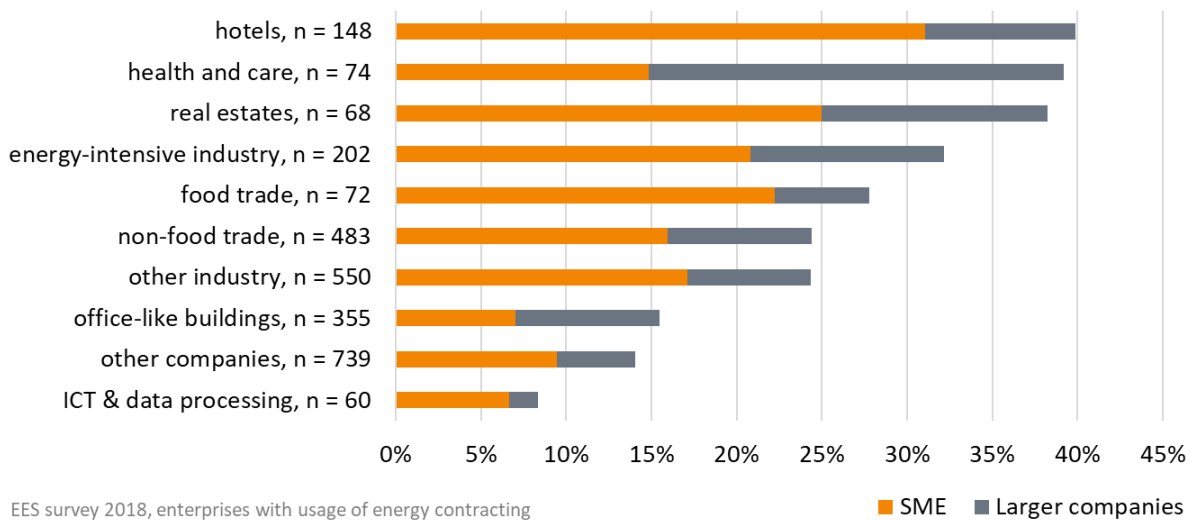
EES survey 2018, suppliers with energy contracting

The third most important customer segment are private households, which are an important customer group for 45% of contractors. For a sixth of those surveyed, they are the most important customer group. Seeing as there's a rather limited number of contracting projects in owner-occupied property, those surveyed could also be including projects in the housing market (e.g. landlord-to-tenant electricity).

Commerce and industry are additional important customer groups. Less relevant customer groups are health / care, hotels / hospitality, as well as trade sectors.

In surveying users of energy services, 31% of small and medium enterprises (SME) from the sector "hotels, hospitality and recreation" replied that they were using contracting in the last 5 years (see figure 9). Second and third largest groups are SME from the sectors "real estate sector, housing" and "food trade". The number of surveyed non-SME is on the whole much smaller, with other sectors predominating: "health, care and homes", "real estate, housing", as well as "energy intensive industry" were sectors in which large businesses made use of contracting more than average in the last five years.

Figure 9: Energy contracting demand in various sectors

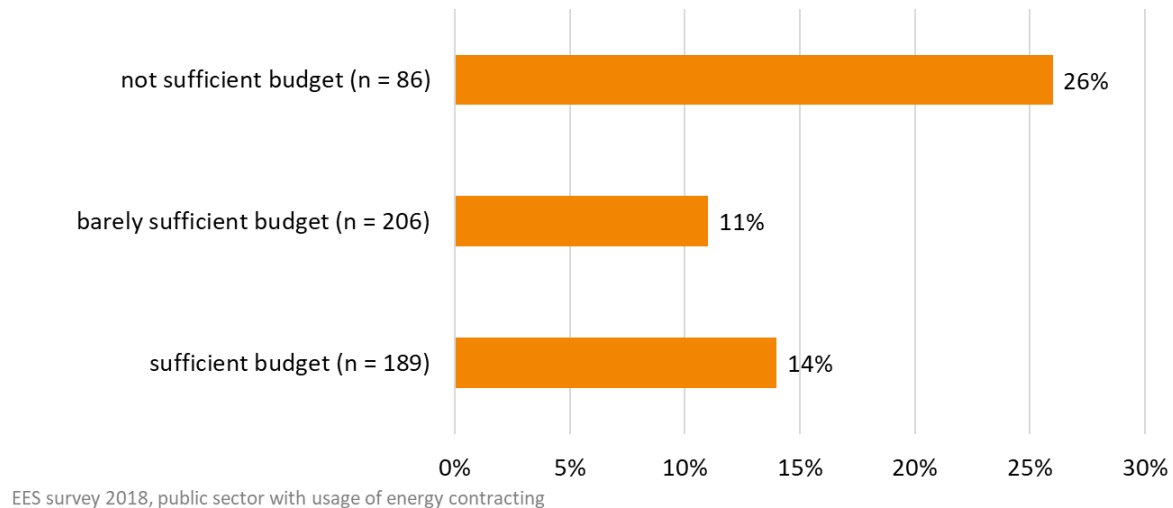


EES survey 2018, enterprises with usage of energy contracting

The percentages named in the figure relate to the absolute number of businesses which have used contracting. For example, 65 of the businesses surveyed from the energy intensive industry segment made use of contracting. This is roughly 32% of the total 202 surveyed businesses in this sector. This can be divided into 21% SME and 11% non-SME.

The following figure shows the percentage of those surveyed from the public sector, who use contracting depending on the budget design. It becomes clear that when there are insufficient budgetary resources, contracting is used more frequently (26%) than when the budgetary resources are (barely) enough.

Figure 10: Relationship between budget situation and usage of energy contracting



Conclusion on energy contracting

In the market evaluation of 2018, the market volume was determined in three different ways, all of which include some uncertainties. The new web-crawler tool, as well as the compilation of data from different databases, literature research, and results from this year’s survey, have confirmed last year’s results in terms of scale: the market volume for contracting in the year 2017 was, according to the 2018 survey, around 7.9 billion euros. A base population of 550 providers were found.

Most contracting providers generate over 10 million euros turnover (some significantly more). A majority of them are utilities and specialised contractors. The percentage of the turnover generated by contracting is fairly constant for utilities, with 10%, and also for contractors, with 50%. The majority of providers estimates that the market volume is at least growing, which is a similar result compared to the analysis of 2017.

The market for contracting is still mostly made up of energy supply contracting – not as much as in the previous year, as especially leasing or operational management contracting are growing in significance and are already being offered by 22% of contracting providers. The strongest market penetration of contracting can be found in hotels, hospitals and care homes, as well as in energy intensive industry. The real estate industry is also a growing group on the demand side. For providers, the most important customer groups are the real estate industry, the public sector and private households, which are the segments with the highest energy sales. From the provider’s perspective, the main barrier is in particular the frequently changing legal framework.

Roughly two thirds (58%) of contracting providers offer their products primarily locally, approximately every fifth provider offers them nationally. Throughout Germany, wherever you are, there are at least 20 businesses offering energy contracting. The highest concentration can be found in parts of North Rhine-Westphalia, Hesse and Rhineland-Palatinate with up to 40 providers.

Contracting happens when a person who is especially responsible for the topic of energy, or the CEO, realises it. The main motivation for the use of contracting is, for about 75% of those surveyed, to save energy. The main barriers are the quickly changing energy-economic framework and economic reasons, such as energy prices and uncertainties around investments. Most providers don't cite lacking quality or too high competition as a barrier for contracting.

The public sector also primarily uses contracting to reduce energy consumption. For this segment, further important reasons are the opening up of investment opportunities, as well as strategic decisions. Those surveyed of the public sector, who state not having sufficient budgetary resources, use contracting much more often than those who state having sufficient budgetary resources.

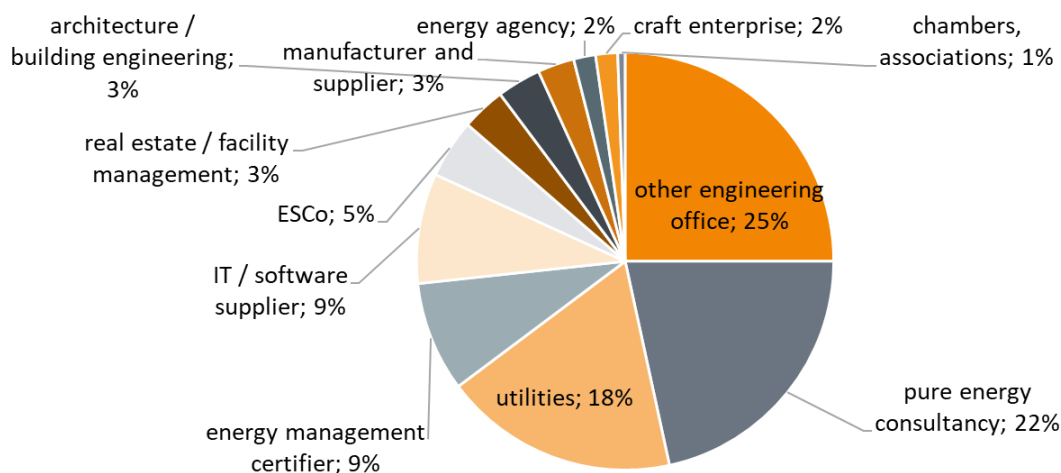
3.4 Energy management

Market volume

Base population of energy management providers

It is assumed that the German energy management (EnM) market encompasses a total of around 950 suppliers (see figure 11). Of those, over 400 businesses are energy consulting, engineering, or architecture firms. Utilities are also strongly represented, with around 170 suppliers. Smaller supplier groups are certifiers of energy and environmental management systems, IT and software providers, developers / suppliers of technical facilities, contractors and energy agencies.

Figure 11: Distribution of sectors for energy management services (share of total numbers)



EES survey 2018, supplier, projections based on 293 supplier questionnaires. Total number: approx. 880

Using the average total turnover and the turnover share as a base, the turnover from energy management services can be calculated for the individual supplier groups. Extrapolating the result onto the number of providers per provider category, the market volume of the supply side can be calculated. (see table 6)

Table 6: Supply-side estimation of market volume for energy management in 2017

	Number of suppliers	EnM revenue in € 1000 per supplier	Total revenue with EnM in the market in € million
Manufacturer/supplier	ca. 25	ca. 4,400	ca. 110
IT/software supplier	ca. 75	ca. 1,200	ca. 90

Certifier energy/environmental management	ca. 80	ca. 900	ca. 72
Pure energy consulting office	ca. 190	ca. 250	ca. 47.5
Other engineering office	ca. 220	ca. 190	ca. 41.8
(Municipal) utilities	ca. 170	ca. 200	ca. 34
Architectural / building engineering office	ca. 35	ca. 800	ca. 28
Real estate / Facility Management	ca. 35	ca. 700	ca. 24.5
ESCo	ca. 40	ca. 100	ca. 4
Chamber, associations	ca. 5	ca. 200	ca. 1
Energy agency	ca. 15	ca. 30	ca. 0.5
Craft enterprises	ca. 15	ca. 10	ca. 0.2
Total	ca. 905		ca. € 453 million

In the previous year's energy services market analysis, the sub-market for energy management was determined to be 669 million euros, using the same calculation methodology. As all data put into this calculation could only be roughly recorded, the uncertainty area is high, compared to the result. The number of providers decreased from 1,000 last year to about 905. However, a stable and consolidating market can still be assumed.

Estimated demand side market volume (core products)

In table 7 the sales volumes for the individual core products in the energy management segment is projected. To do so, the number of sold services were multiplied with the average price per service. This average price was determined by surveying providers to establish the average sales price, and surveying demand side businesses for the average costs for the same services. As stated in table 7, the figures from the 2018 survey differ, in part, significantly.

The first or re-certification of energy management systems is sold by providers for under 4,000 euros on average. The surveyed demand side businesses state paying more than thrice that amount for the same service on average. For both products an average of 8,800 euros is used. The surveyed demand and provider side both offer a notably more stable value for the verification of an alternative system according to SpaEfV (German legislation) and for the consultation and monitoring of energy and environmental management system implementation.

The average was also calculated in this case, and it only differed from the declarations by one or two percent. Regarding the price (or rather: costs) of energy controlling and energy management software, large differences can be found, again. This is mostly because of the partially very small number of samples used. Notable for energy controlling are particularly the zero-answers received from both demand and provider side.

These values were not included in the calculations, but do indicate that this product is often included in a package deal with other services or investment arrangements. To compare the results, the values from 2017 have been included also.

Table 7: Projected Number of sold and demanded EnM services

Types of EnM services	Supply side approach: sold services	demand-side approach: demanded services	Used average	Survey 2017
First certification EnM system	€ 2,350	€ 15,213	€ 8,782	€ 11,715
Re-certification EnM system	€ 3,869	€ 13,813	€ 8,841	€ 4,550
Verification of alternative systems following SpaEfV	€ 4,840	€ 5,037	€ 4,939	-
Consultation and accompaniment for the launch of an energy or environmental management system	€ 10,708	€ 10,516	€ 10,612	€ 10,578

Energy controlling	€ 5,604	€ 18,793	€ 12,199	€ 15,289
EnM-Software	-	€ 18,647	€ 18,647	€ 12,732

With these approaches the core products regarded here amount to a total of approx. 110 million euros (table 8). Certification and re-certification have a turnover of around 20 million euro. The turnover for consultation and monitoring of the implementation of energy management systems is also a bit more than 20 million euros; whereas verification of alternative systems according to SpaEfV contribute roughly 4 million euros to the market volume. The two largest product groups are energy controlling (approx. 36 million euros) and the sales of energy management software (approx. 27 million euros).

Table 8: Market volume for specific EnM products

Types of EnM services	Sold services	Average price per service	Total revenue of EnM services
First certification EnM system	500	€ 8,782	€ 4,390,750
Re-certification EnM system	2,000	€ 8,841	€ 17,682,000
Verification of alternative systems following SpaEfV	870	€ 4,939	€ 4,296,429
Consultation and accompaniment for the launch of an energy or environmental management system	1,990	€ 10,612	€ 21,117,765
Energy controlling	2,920	€ 12,199	€ 35,614,548
EnM-Software	1,472	€ 18,647	€ 27,449,971
Market volume of core products			€ 110,551,462

In the previous 2017 survey a market volume of 137 million euros was calculated for these core products. As shown previously, the uncertainty around the data used for this calculation is quite high. More importantly, the surveyed products are not identical to the ones surveyed last year. The results are therefore not directly comparable.

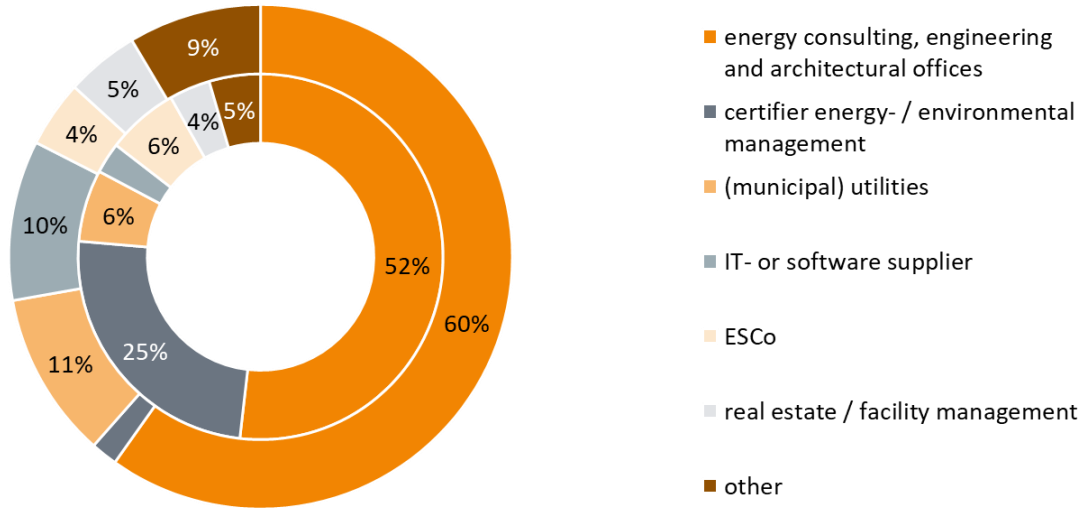
Just like last year there's a relatively large difference between the market volume estimated by provider side and the volume of core products. This base stability strengthens the assumption that especially in dynamic and innovative markets, products constantly diversify and so are hard to standardise. It can be assumed that the providers interpret product definitions much more broadly. This leads to many providers presumably including the areas of smart metering, sub-metering or smart home in energy management (by extension, or at least in parts). Digitalisation, in particular, is contributing to the growth of this area. There are apparently currently many innovative services on offer related to digital products, which cannot be strictly fitted into the here chosen categories of core products.

In these results a typical characteristic of such surveys can be found: as long as the products in the market are exactly defined and straightforwardly classified (e.g. certification according to a certain DIN ISO), the market volume is found to be rather small. In the vaguely defined terms of consultation, supervision, monitoring etc. the perceived volume increases, because the product scope generally goes much further than standardised products. In particular, the uncertainty regarding which concrete services are related to these products is increased – whether e.g. measurements and counting systems or fees for recurring services (e.g. maintenance, billing, collection, etc.) are included in turnover ratios.

According to the survey, energy consulting, engineering and architecture firms make up the majority of providers of energy management system services (outer ring of the figure, without certification) with 60%, and 52% with (re-) certification services (inner ring) (figure 12). A further quarter of (re-)certification providers is the to be expected group of certifiers, which otherwise plays a secondary role in energy management system services. In contrast,

utilities and IT/software providers play a larger role for other energy management system services with roughly 10%, whereas both groups only provide less than 10% of certification providers.

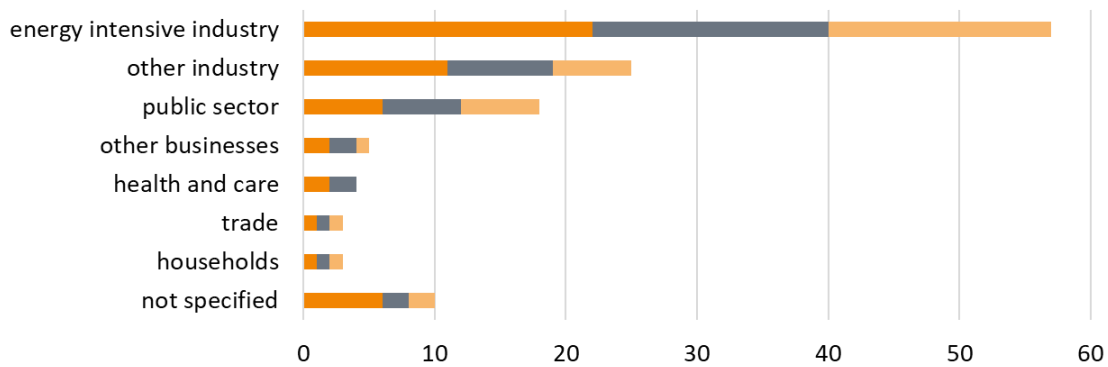
Figure 12: Suppliers of (Re-)certifications of EnM systems and other EnM services



EES survey 2018, suppliers of (Re-)certification of EnM systems (inner ring, n = 110) and other EnM services (outer ring, n = 234)

From the provider viewpoint, the demand of energy management is generated mostly by industry (figure 13). Especially noteworthy is the energy intensive industry, which was named as the most important customer group by half of those surveyed. To a significantly smaller extent, other important customer groups for providers are the public sector, other commerce, as well as the real estate industry. Trade and private households were barely named. This also applies to services related to the certification of environmental and energy management systems, as well as any other energy management system services.

Figure 13: Most important customer groups for suppliers

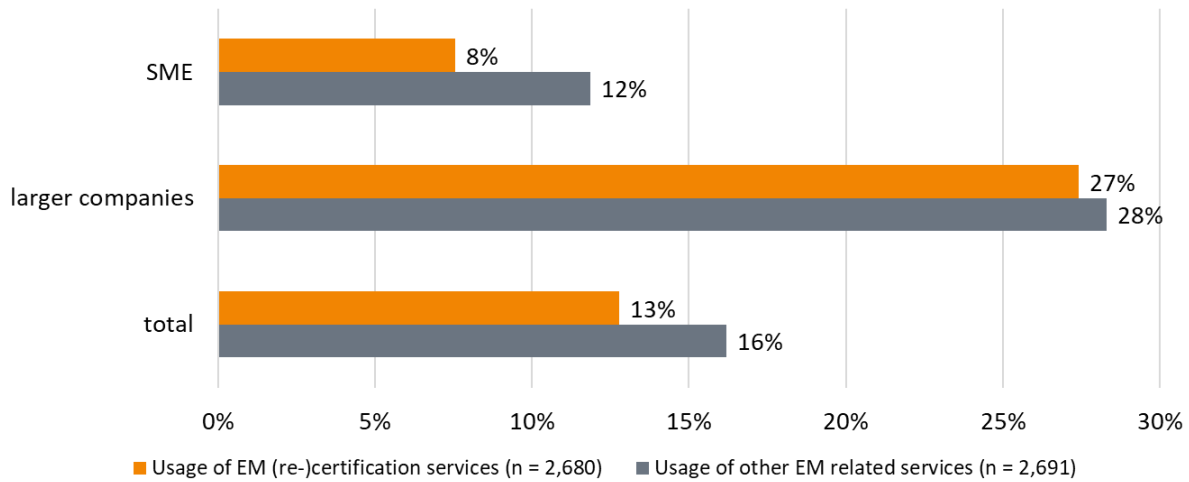


most important customers (n = 51) second most important customers (n = 40) third most important customers (n = 34)

EES survey 2018, suppliers of EnM services

The survey of businesses has shown that only eight to twelve percent of small and medium businesses make use of services in the energy management area, as shown in figure 14. This increases for larger businesses to 27% which made use of (re-)certification, and 28% which also made use of other services related to energy management.

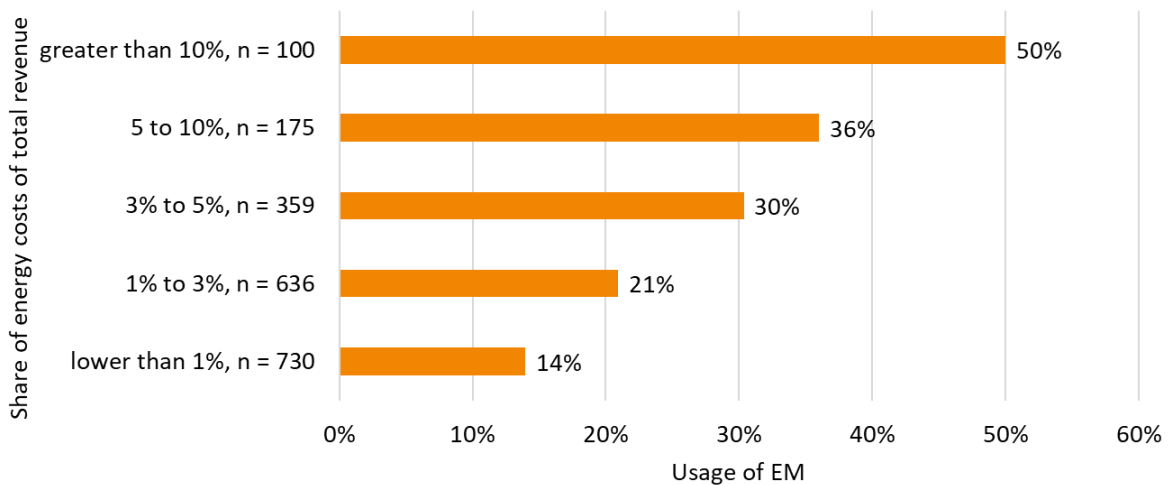
Figure 14: Enterprises with usage of EnM services



EES survey 2018, enterprises with EnM service usage

The percentage of energy costs in the total costs of a business appears to be a significant factor in deciding to use energy management services (see figure 15). According to the most recent survey, 14% of businesses for whom energy makes up less than one percent of costs, use energy management services. When energy makes up three to five percent of costs, this grows to about a third. Half of those surveyed use energy management related services when energy makes up over 10% of costs.

Figure 15: Share of energy costs of total costs of enterprises



EES survey 2018, enterprises with EnM service usage

Conclusion on energy management

The services related to energy management are still being offered by a diverse provider structure. The providing businesses slightly consolidated in the year 2017, and now encompass 905 providers. The generated turnover for the year 2017 is 453 million euros, and is stable, when compared to the market volume of 2016 (see BfEE 2018). The majority of businesses on provider side assume that the market will continue to grow.

The certification of energy management systems according to ISO 50001 is the largest part of the energy management business. Furthermore, the introduction of energy controlling and load management, as well as the

installation of sensors and measurement technology, play a large role for providers. Trainings for energy efficiency are also frequently named by businesses on the demand side.

The offer of energy management is distributed well, nationally. Throughout Germany every location has at least 100 providers offering energy management services. The highest turnover is generated in the federal states with high economic power in the south and in the west.

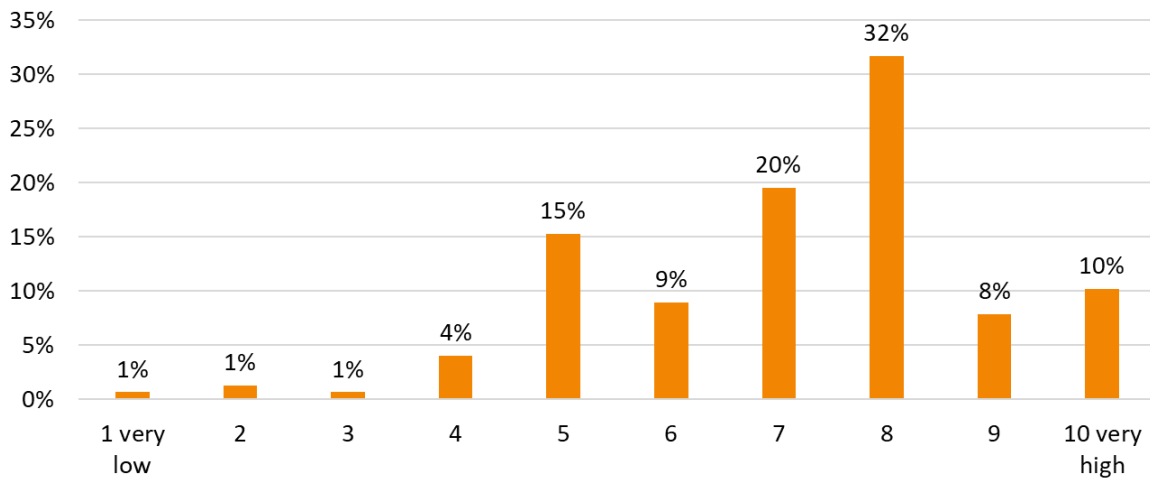
The demand is still mostly created by the energy intensive industry, as well as other industry. These two segments alone were named 75% of the time as most important customer group. According to the survey, the demand generated by SMEs is double the demand generated by large businesses. 50% of businesses where energy contributes more than 10% to overall costs, use energy management, according to the survey. Further growth of the energy management market segment with economically attractive customers is therefore possible.

3.5 Focus: public sector

Being one of the significant customer groups, the public sector was included in the 2018 survey as an additional focal point. Some relevant results have been integrated into the chapters on market segmentation. Based on the particularity of this target group, and as it's the first time it's been included in this survey, the following section lists separate evaluations.

As shown in figure 16, the topic of energy efficiency has a high relevance (6 or higher) for three quarters (78%) of the authorities and institutions surveyed. With an average of 7.1 amongst those surveyed, the public sector is higher than surveyed businesses (5.7) and only slightly below the surveyed private households (7.8) in the 2018 survey.

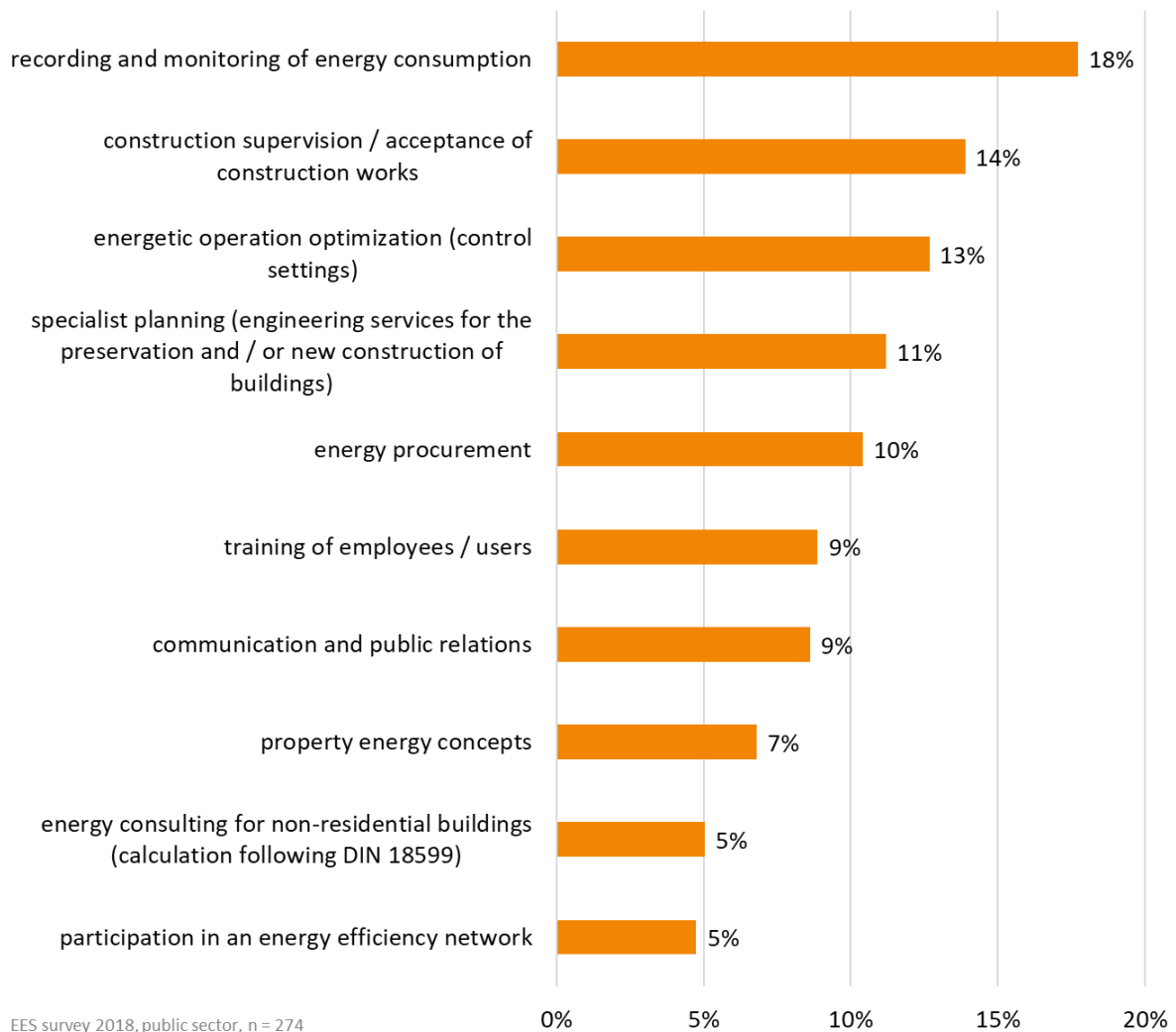
Figure 16: Relevance of energy efficiency in the public sector



EES survey 2018, public sector, n = 474

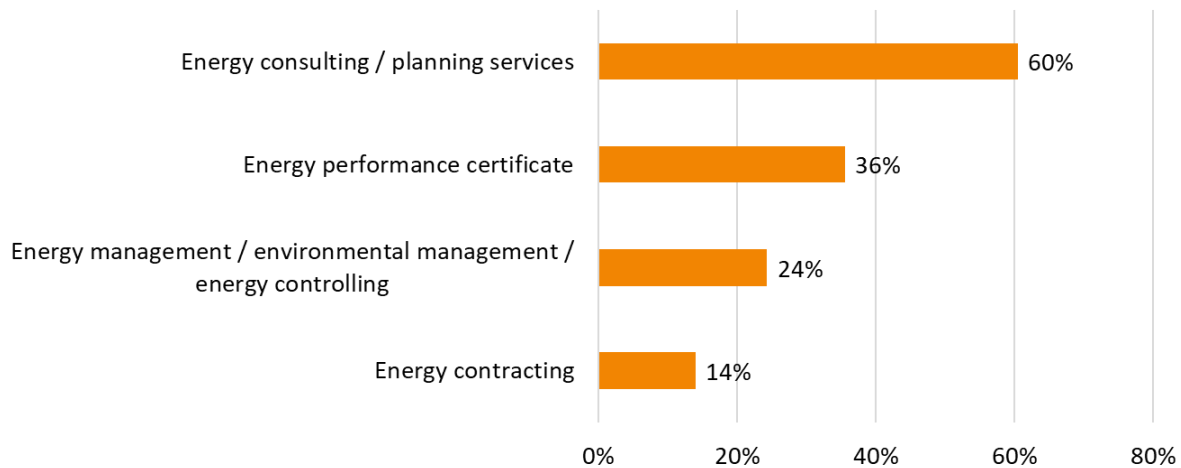
The demand for energy services in the public sector is not only directed at external service providers, but especially at civil servants and divisions assigned to this topic. Nearly a fifth of the public institutions surveyed capture and monitor their energy usage themselves (see figure 17). More than 10% of operation optimisations, energy sourcing, as well as construction supervision and expert planning are done by authorities themselves. On the other hand, energy concepts and energy consultations are rarely done internally.

Figure 17: Internal implementation of energy efficiency services



Demand for external services, which are the focus of this study, varies widely (see figure 18). Nearly two thirds (60%) of the surveyed people in the public sector indicated making use of external energy consulting or planning services. A quarter of those surveyed made use of energy management, and 14% made use of energy contracting – both also by external service providers. An unexpected result is the modest use of external service providers for the creation of energy demand certificates. Internally, services for energy performance certificates were used by only five percent, and externally only by 36% of those surveyed. Considering the energy performance certificate requirements applicable to public buildings larger than 250m² with public access, this seems too few.

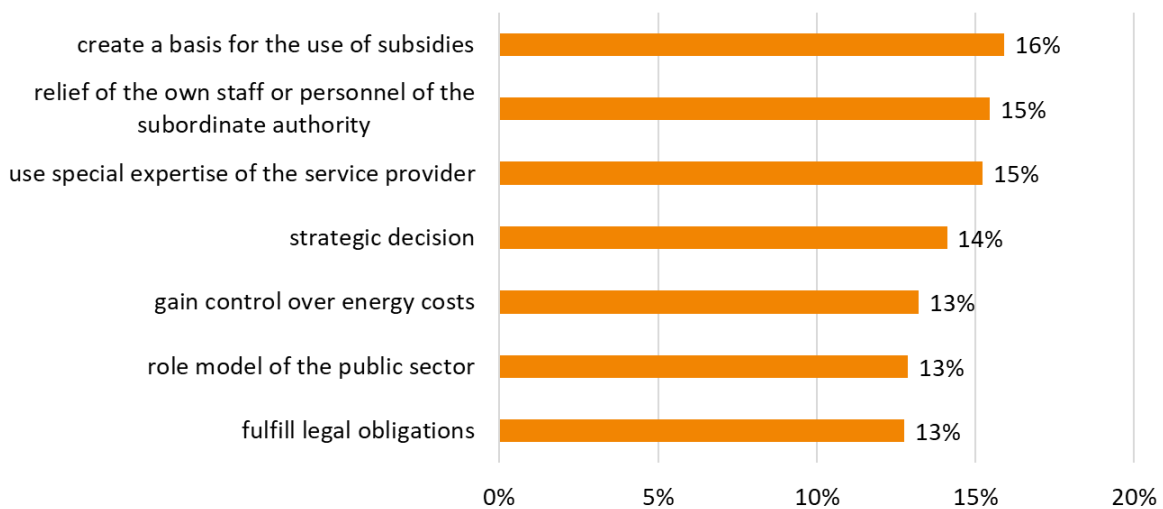
Figure 18: Usage of external energy efficiency services



EES survey 2018, public sector, n = 474

The reasons for the conscious use of external service providers in the area of energy efficiency are varied. All reasons named in figure 19 were named with roughly the same frequency.

Figure 19: Reasons for using external providers

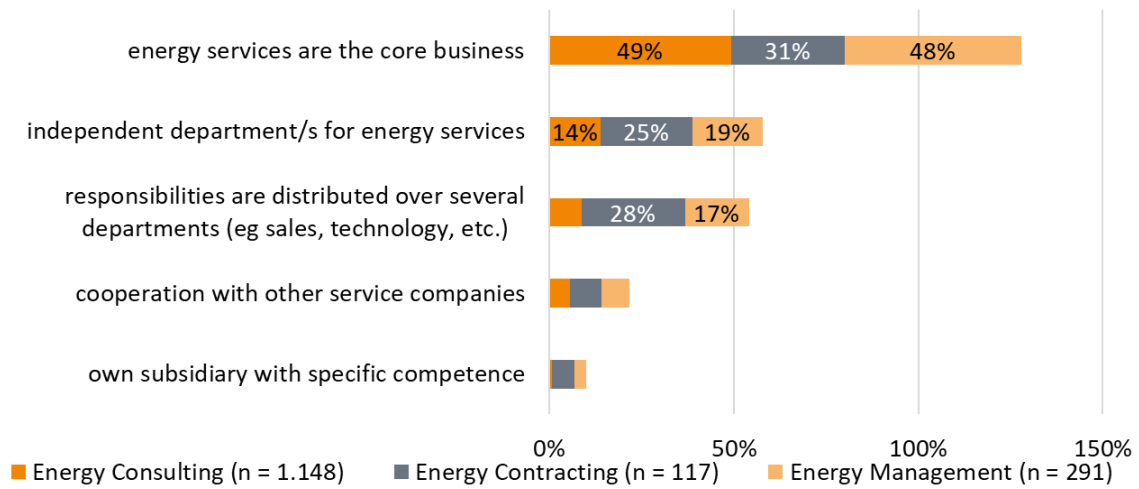


EES survey 2018, public sector, n = 205

4 Information pathways and market conditions

How is the business for energy services organised amongst providers? Most providers surveyed indicated that their core business is energy services. However, independent departments, as well several departments working together, were named just about equally often. The organisation in cooperation with other service providers or subsidiaries of the parent company were named very rarely, as shown in figure 20.

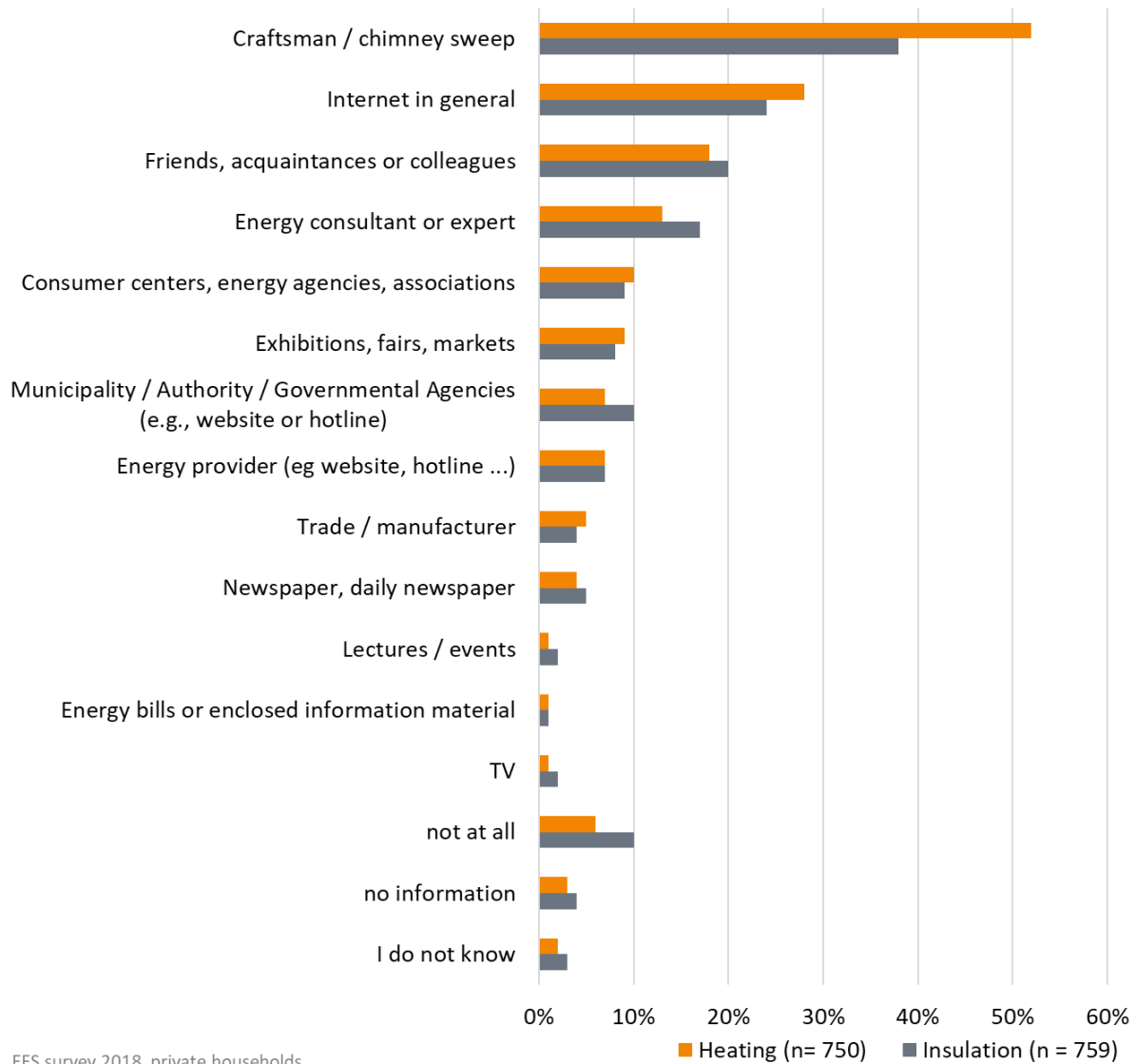
Figure 20: Internal organisation of EES business in suppliers



EES services 2018, suppliers

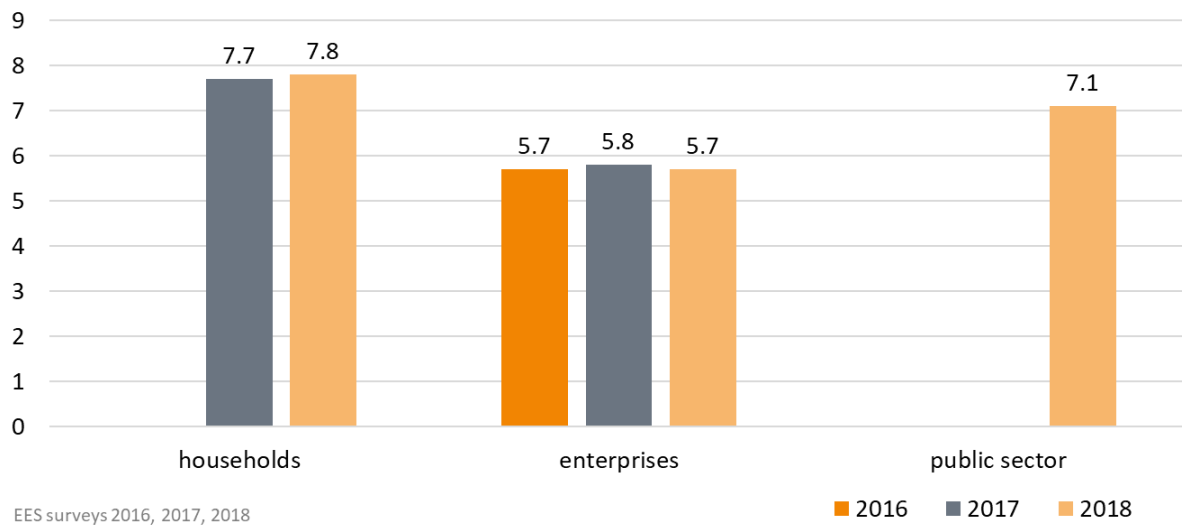
For the demand side, good information sources for energy service offers are very important for a functioning market. 50% of households with property were asked about information sources for insulation measures and heating system measures. In both cases, as shown in figure 21, craftsmen or chimney sweeps were the most important source. The second source of information for owner-occupied households is the internet. Only 13% of those surveyed had direct contact with energy consultants.

Figure 21: Information channels for private households on heating and building insulation



All of those surveyed on the demand side were asked about the relevance of the energy efficiency of their household, business or public institution. (1 = “completely unimportant” to 10 = “very important”). For households and businesses, figures from the 2017 survey are available, for businesses even from 2016. In figure 24, the current, as well as the historic, average values are shown. In principle it can be observed that households and the public sector assign a higher importance to the topic than businesses. Over the various years there seems to be a high stability.

Figure 22: Relevance of energy efficiency in different sectors in the last three years



5 Summary and conclusion

Energy services continue to play an important role for investments in energy efficiency. Since 2016, the BfEE regularly monitors and evaluates this market with scientific support of an evaluating team (Prognos AG, ifeu Institut, Kantar EMNID).

The spectrum of energy service providers and energy service products is heterogenic, though the latter isn't always clearly defined and therefore hard to capture. For this reason, the BfEE focuses on specific energy services: the market structure that results from this consists of three main areas of energy consulting, energy contracting and energy management.

The survey was mainly conducted using computer-aided telephone interviews based on guided questionnaires for both supply and demand side. Multiple approaches were followed simultaneously: the demand side of the German energy service market was covered by surveying 3,014 households (tenants and owners), 2,751 businesses of various sizes, as well as 474 authorities on federal, state and municipal level.

It can be observed that the methodology of the study has improved and has now reached a robust and useful design. Some methodological challenges are still present: generally, the amount of providers in the individual market segments can only be determined when there are closed markets or approval regulations. In open markets this is not the case. Even with a considerable sample size, it remains a challenge to calculate the total number of providers.

Market numbers

The three largest parts of the German energy services market generate an annual turnover of approx. 9 billion euros. Looking at the previous years, it can be determined that the German energy services market is robust and stable. However, when compared to previous years, there is little movement in market numbers (see table 15).

Table 9: EES market volume in the last years

	2018	2017	2016
Energy consulting	ca. € 370 – 402 million	ca. € 790 – 850 million	ca. € 470 – 520 million
Energy contracting	ca. € 7.2 – 8.6 billion	ca. € 7.7 billion	ca. € 7.2 – 8.4 billion
Energy management	ca. € 466 million	ca. € 435 million	ca. € 200 million
Total	€ 8.0 – 9.5 billion	€ 8.9 – 9.0 billion	€ 7.9 – 9.1 billion

When looking at the market numbers, it is important to consider that because of the named challenges relating to the base population of providers, a methodological uncertainty of +/- 0.5 billion euros cannot be avoided. Furthermore, methodological adaptations were made in various segments compared to the years 2016 to 2018. Therefore, calculations of precise growth rates based on the available data would be afflicted with too great an uncertainty. It can be positively noted that even though fossil fuel prices were low, energy services have not lost market volume. In general, providers in all market segments seem optimistic about future growth perspectives.

When the relevant key market figures, as shared by businesses on provider side, are evaluated, the three market segments together comprise of roughly 7,500 businesses, which are dominated by smaller offices in terms of numbers (see table 10). From the number of those in full time equivalent (FTE) it becomes clear that not all of those employed are working solely on energy services. Indeed, only a few of those employed spend on average more than half their time on services, meaning there's an FTE employment number of approx. 34,000 FTEs.

Table 10: Market indicators in direct comparison

	Revenue [€ million]	Number of companies	Employees	FTEs
Energy consulting	390	ca. 6,000	ca. 12,000	ca. 4,500
Energy contracting	7,900	ca. 500	ca. 38,000	ca. 25,000
Energy management	470	ca. 900	ca. 6,970	ca. 4,600
Total	8,760	7,400	56,970	34,100

Provider side

Market oriented energy services offer a wide market segment, in which many different energy transition players are active in different sectors. It's a mix which is dominated – especially for consulting – by small architecture and engineering firms, or specialised energy consulting firms. In the segments with more complex and demanding B2B products there are more and more energy suppliers and municipally owned utilities active. Next to these, there are further provider groups, which, for example, come from more technologically oriented sectors (measurement, control & regulation technology, technical building equipment), as well as service-oriented sectors (real estate industry, facility management). Even if a few providers in the energy services sector employ hundreds, sometimes thousands, of employees and have a turnover in the mid seven figures, no strong market concentration can be observed – indeed, the opposite: the provider market is characterised by small and medium businesses.

For every market segment the regional availability of providers subject to processing sites and delivery radius was analysed. All energy services providers in Germany are mostly evenly distributed over all regions, with higher concentrations in industrial and demographically strong regions in the south and west of Germany, like Baden-

Württemberg, Bavaria and North-Rhine-Westphalia. There's no region in Germany with a supply shortage. Especially because of the high number of businesses which offer national and international services, there's no location with less than 160 energy consulting providers, 20 energy contracting providers and 100 energy management providers. In the named strong regions, the numbers are higher by at least 49%.

Demand side

At the same time, just like in previous studies, a market weakness was observed on the demand side. It can be concluded that the quotas for using energy services are not exhausted. In all product groups the usage rates are way below 50%, indicating that there's a significant, un-tapped market potential. However, private and public sector investors remain hesitant to use energy services. This is a phenomenon which is also known from observing energy efficiency: it mostly affects products that would be useful and helpful for, e.g., the realisation of energy and climate goals, however, with the low energy prices and low contributed percentage of energy to costs there's not much pressure on the players to act. This changes noticeably when looking at the energy intensive segments, or those sectors in which there are clear incentives or even requirements to use energy services.

Those questioned in the public sector emphasise the strategic meaning of energy efficiency, and also see implementation deficits. Three quarters of those surveyed said that in their administrative area there's a need for investment in real estate. Nearly 30% of the public sector surveyed are of the opinion that the available resources are not enough, or inadequate, to cover the necessary maintenance costs or even to carry out specific investments for energy efficiency. The fact that the support of external service providers could help in these situations, and that they are still not utilised, indicates that there are still other blocks or reservations towards energy services products.

An important factor for the lacking dynamic are the comparatively slow investment cycles in buildings or in the industry. Investors are rarely systemically interested in energy efficiency, many only start to think about it when confronted with an increased investment need or spontaneous breakdown of equipment. The most frequently named blocks on the side of the providers are low energy prices and high investment costs, uncertainty on customer side regarding the use, frequent changes in legal framework, and a lack of staff expertise.

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