

# Learnings from 5 years of monitoring the German market for energy efficiency services: a market-based approach towards energy efficiency

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## Abstract

For 5 years, the Federal Energy Efficiency Center (Bundesstelle für Energieeffizienz, BfEE) has monitored the German market for energy efficiency services in collaboration with external partners. Annually, it provides the most extensive survey in this area. This ongoing study allows for a continuous and detailed evaluation of the German market. Its main goals are to provide information and increase transparency in the market and give orientation for the improvement of energy efficiency measures.

Based on the findings, the BfEE identifies current barriers and drafts policies for a greater efficiency impact. To unlock further investments in energy efficiency and broaden in-depth understanding of the market and its various participants is essential. In this context, a multi-method approach has been introduced, including face-to-face interviews and mass surveys. Moreover, a comprehensive catalogue of relevant services and actors has been established. Over the years, the study has continuously improved. Today, it covers dozens of variables within 5 parallel surveys. In total, 6,502 responses from online surveys and 77,500 interview minutes have been aggregated. This allows for a sharp adjustment to the dynamic of the market and a realistic depiction of market participants' expectations and motivations.

Based on this data, the paper addresses the barriers and conditions of the different groups on the demand side of energy services, supported by comprehensive quantitative analyses. It

covers usage of energy services and actual implementation of efficiency measures as well as the different causes behind actors' actions. Furthermore, it discusses which measures could address these challenges and support a sustainable transition by examining the areas of information, standards and incentives across the different market participants and services.

## Introduction

Energy services encompass a wide range of products from energy checks and consultancy services to energy management, audit and contracting. They address private residents as well as the commercial and public sectors. The different customer groups use energy services to understand, plan, implement and finance effective energy solutions. The German legislation describes energy services and their importance as follows:

any activity provided by third parties under contract, through which the implementation of energy efficiency measures is prepared, supported, planned or carried out (German Act on Energy Services and other Energy Efficiency Measures EDL-G, §2, Nr. 6)

This broad definition summarizes different aspects of the effective improvement of energy efficiency and point to the diversity of services offered in this area. As a gateway to the realization of energy efficiency measures the acceleration of demand and variety of energy services is essential for achieving Germany's climate goals. For this purpose, an understanding of market conditions and participant's behaviour is central. They are the prerequisites for the development of a customized policy mix of information, standards, and incentives.

## Methodical approach

Internationally the term “energy efficiency service” (EES) is used differently and there is no uniform definition. Therefore, the first task within the scope of the market study 2016 was to draw up definitions for a variety of services and actors. The selection and defining process included expert workshops, where the relevance of a service, actor or product was assessed by their scale or distribution on the market for energy services (Flegel et al 2017, p. 1882f.). As a result, a comprehensive catalogue was established and served as a benchmark in the study for the last 5 years. As Figure 1 shows, the study identified four relevant areas of the energy service market: information, energy consultancy, contracting and energy management. The annual empirical analyses concentrates on those services, which are characterised as “high profile”. This means, that they require higher qualifications from service providers and a noticeable effort from users (not only in financial terms but also in compiling documentation, energy data, etc.).

The second task for the initial setup of the market study was to create a survey concept (Figure 2). Two considerations were central to this process. Firstly, the intention of developing a set

of key market figures which will enable a market monitoring over the years. Secondly, the need to explore the drivers and barriers behind the use (or non-use) of energy services. Both considerations were taken into account. Indicators were developed for different market participants on the supply and the demand side. Figure 2 shows the indicator-based survey concept in detail, which was continuously improved since the beginning of the monitoring process.

The key market figures represent the cornerstone of the study and the empirical work. They focus on hard facts such as market size, number of services providers, sales and employees numbers as well as use-frequency for the different services. The second pillar of analysis considers information, motivation and market outlook regarding the field of energy services. Additionally, indicators such as motives or barriers towards the use of such services as well as different incentives are analysed for the different market groups.

To capture these indicators the following methods and approaches were applied:

- qualitative analysis of secondary literature,

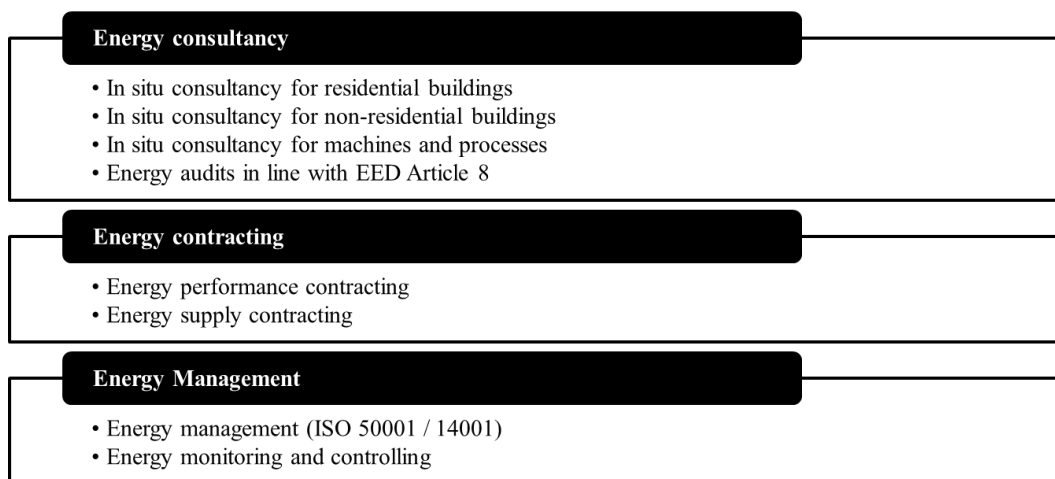


Figure 1. Overview of the studied services.

Observation and assessment of the market for energy services and other efficiency measures			
Market indicators		Motivation, prospect, information	
Supply	Demand	Supply & Demand	
<ul style="list-style-type: none"> <li>• Market volume</li> <li>• Number of suppliers</li> <li>• Market structure</li> <li>• Regional distribution</li> <li>• Sales numbers</li> </ul>	<ul style="list-style-type: none"> <li>• Target groups</li> <li>• Sector distribution</li> <li>• Regional distribution</li> <li>• Usage frequency of energy services</li> </ul>	<ul style="list-style-type: none"> <li>• Motivation for usage energy services</li> <li>• Barriers</li> <li>• Effectiveness of funding</li> <li>• Market conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Expected market development</li> <li>• Awareness</li> <li>• Information channels</li> </ul>

Figure 2. Goals and indicators of the market survey.

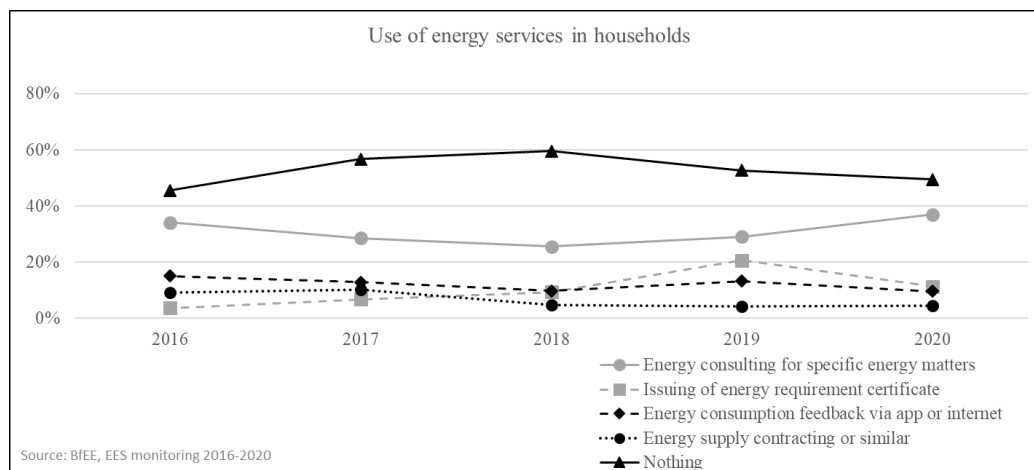


Figure 3. Use of energy services in households, monitoring reports from 2016 to 2020.

- collection of empirical data via standardized surveys by telephone interviews and online questionnaires,
- collection of qualitative information via guided expert interviews.

Customer needs and expansion potential of the energy services market have been studied since 2016 based on data sets from around 2,500 private households, 2,750 companies (2,500 SMEs with 10 to 249 employees and 250 big enterprises with over 249 employees) and 500 public institutions. On the supply side, around 260 enterprises and 500 to 1,000 consultants and auditors are interviewed annually. The following company profiles are selected for this purpose: utilities, energy contractors, suppliers of energy technology and energy management software as well as certified auditors of energy management systems and facility manager.

## Market conditions

An in-depth understanding of the market and its various participants' needs is essential to unlock further investments in energy efficiency. Based on the annual findings of the market study, the BfEE identifies current market barriers and drafts possible measures for a greater efficiency impact. In the following section, the paper addresses the market situation and sheds light on the conditions of the different groups on both the supply and demand side. Current and past challenges are discussed alongside possible future measures for each specific group.

### PRIVATE HOUSEHOLDS

#### Demand group

Two different questionnaires were created. One questionnaire addresses property owners who generally have the option of implementing energy efficiency measures either in their own homes or in the buildings, they rent out; the other addresses tenants. The survey was conducted for both target groups by telephone (CATI). An equal number of households was selected randomly across the 16 federal states of Germany. Approximately 1,500 owners and 1,000 tenants were interviewed.

#### Use of energy services

As shown in Figure 3, most private households preferred not using energy services at all over the course of the 5 years. The most used energy efficiency service is energy consulting. Around 37 % of the surveyed households in 2020 made use of energy consulting compared to 49 % who did not use any energy efficiency services. Energy certification is the second most often used service with a share of 11 %, followed by energy consumption feedback via app or internet with 10 %. The least utilized service among private households is energy contracting (4 %). Both, consumption feedback via an app or energy contracting exhibit declining trends in 2020 compared to 2016. (BfEE 2021).

In the last survey of 2020, three quarters of the surveyed owners showed no inclination to renew or receive services in the area of energy consultancy. Furthermore, only 10 to 20 % of the households can imagine using such services and have not yet used one. This is where the market potential for energy consulting in privately owned properties lies.

The relatively intensive use of consulting services and energy certificates can be explained by two central reasons. First, there are significant subsidies for consulting services. According to the providers of energy consultancy, 64 % of their services in the residential sector are subsidized by the government (BfEE 2021). Second, the energy certificates are required by law. Since 2014, an energy certificate, according to § 16a Energy Saving Ordinance (EnEV), is a mandatory part of a housing advertisement.

#### Motivations and barriers

The most common reasons for not using energy consultancy services are: 1) no need for action on the building ("I am not planning any construction measures on the building", 55 %), 2) questions on the subject would rather be clarified without an advisor (45 %), 3) already low energy costs (39 %) or 4) the added value of the advice was not clear (38 %). Market structure reasons play only a minor role in this context. Only 8 % of the respondents say that they did not know how to contact suppliers. Furthermore, 12 % say that energy advice has a bad reputation (BfEE 2021). These results allow for the assumption of an overall successfully developed supply side of the market. Therefore, the paper focuses on framework conditions of the demand side.

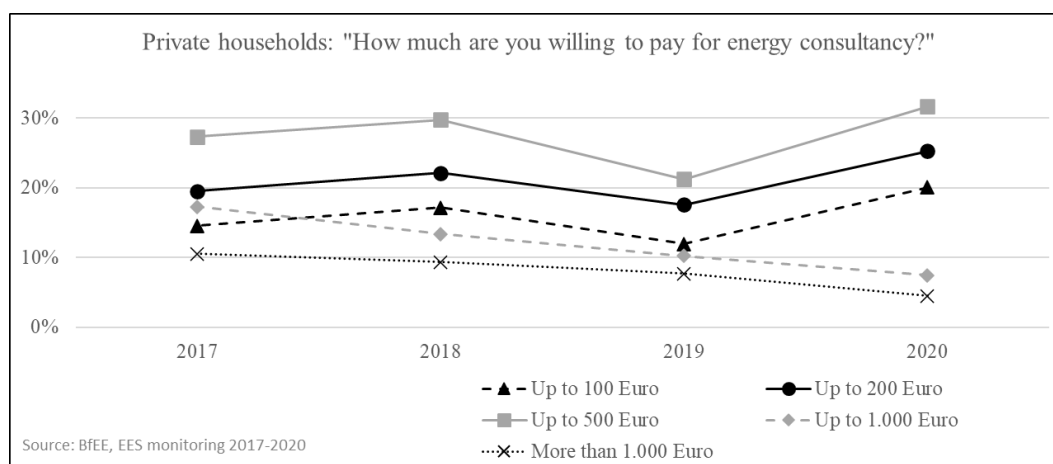


Figure 4. Willingness to pay of private households for energy consultancy.

The value added of professional support is not highly acknowledged. The willingness to pay for energy services is relatively low. The monitoring results, represented in Figure 4, show an increase in all price categories following a low in 2019. Still, there is a declining tendency in paying higher rates for the services of “up to” or “more than 1,000 euros”. This is a challenge, since it diverges from the market price. The average price for energy consultancy in residential buildings is relatively stable over the years and varies between 1,100 and 1,410 euros for a consultation (BfEE 2016, 2017, 2018 and 2019).

Homeowners were asked about the reasons for implementing modernization measures on the building. By far the most frequently cited reason is “to reduce energy costs” (84 %), the desire for a modern technical standard (65 %) and ecological reasons (63 %). However, most respondents assume that their building is in good condition. More than half of the owner households do not currently see any need for renovation.

One way of placing energy consulting services on the household’s radar is to link them to renovation reasons such as necessary construction measures, house aging, mould or age-appropriate reconstruction.

#### Measures: Information, standards, and incentives

Among households not interested in external energy advice, additional market potential could possibly be tapped through targeted advertising, promotion, or regulatory measures. Driving factor for energy efficiency investments is mostly the opportunity of saving energy costs. There is a broad spectrum of benefits resulting from improving energy efficiency at home, such as a better indoor environment, or an overall greater living comfort (Payne et al 2015). So far, such aspects are not sufficiently acknowledged. There is the need to communicate the multiple benefits of energy efficiency measures. Energy services should be promoted as their gateway.

Stronger incentives and assistance for upgrading heating networks in the residential sector are already put in place. Since January of 2020 the governmental subsidy program for the promotion of the installation of new heating systems and fuel switching has expanded. Moreover, more attractive funding rates are offered. Alternatively, private residents can deduct their income tax by 20 %, and up to 40,000 euros, of their renovation costs (Energetic Renovation Measures Ordinance, ES-

anMV). Both measures will be supported by the price signal of the introduced national carbon pricing system in the sectors heating and transport in 2021 (Fuel Emissions Trading Act). Consequently, the implemented measures in households are expected to increase (Figure 5).

The strong incentives should be accompanied by an adequate communication campaign of energy services. The campaigns should clearly outline how energy service providers can support the implementation of energy efficiency measures.

#### COMMERCIAL SECTOR

##### Demand group

A survey of approximately 2,500 SMEs<sup>1</sup> and 250 larger companies was carried out to ascertain their experience with energy services. A strict distribution according sector, size class and federal state was introduced in order to reflect the target group of the survey as accurate as possible. Initially, ten industries were selected that are highly relevant for the energy service market: Energy intensive industry, other industry sectors, food trade, non-food trade, hospitality sector, real estate, health, information and communication, office type businesses and other companies.

##### Use of energy services and implemented energy efficiency measures

As in the residential sector, the most used service by companies is energy consulting. Figure 6 shows a stable, but not very dynamic development of services usage over the years. Furthermore, a declining trend across all services in 2020 can be noted. Energy consultancy stays in the area between 20 and 30 %, followed by energy supply contracting (10 to 20 %), energy management (10 to 14 %) and energy performance contracting (6 to 13 %). In sum, there is an untapped potential for energy efficiency services in the commercial sector.

A main reason behind the leading role of consultancy services for companies is the energy audit as a part of this service branch. On the one hand, there are subsidies for the performance of energy audit in SMEs; on the other hand non-SMEs

1. According to EU definition for SMEs.

are obligated by current regulation to conduct an energy audit every four years. Alternatively, they can implement an energy management system accordingly ISO 50001.

Regarding the implementation of energy efficiency measures, the commercial sector predominantly introduced improvements in the area of indoor lighting (70 to 80 %). Besides this, it invested in staff information and motivation (60 to 70 %) (Figure 7). Energetic modernization of buildings rose from almost 17 % in 2016 to a peak of 43 % in 2019 and 2020. The share of companies undertaking measures regarding process optimization ranges from 25 % to 30 % over the years. There were a significant number of companies who did not implement any measures. However, their number declined over the past years: from 14.3 % in 2016 to 8 % in 2020.

Overall, companies currently invest more in measures with a lower saving potential such as “staff information and motivation”, which are easier to implement and do not require a high investment in contrast to building renovation or process optimization. To stimulate further investments in these two areas,

relevant governmental funding programs were restructured and subsidy rates were increased.

In 2019, a simpler and more user-friendly funding model was introduced to promote more effective investments in the use of industrial waste heat and the improvement of energy efficiency of production processes (BMW 2019a). The funding package aims at companies of all sectors and sizes, municipal utilities and especially energy service providers. Additionally, enterprises can apply for various funding programs for energy consultancy services and energetic improvements on their building envelope and processes.

#### Motivations and barriers

The value added of using a service provider in matters of energy efficiency was not widely acknowledged among companies. Half of the surveyed enterprises (48 to 55 %) planned or implemented energy efficiency measures as an in-house solution, without external help. Further key reasons for not engaging a service provider are the lack of a price incentive (28 to 42 %) as

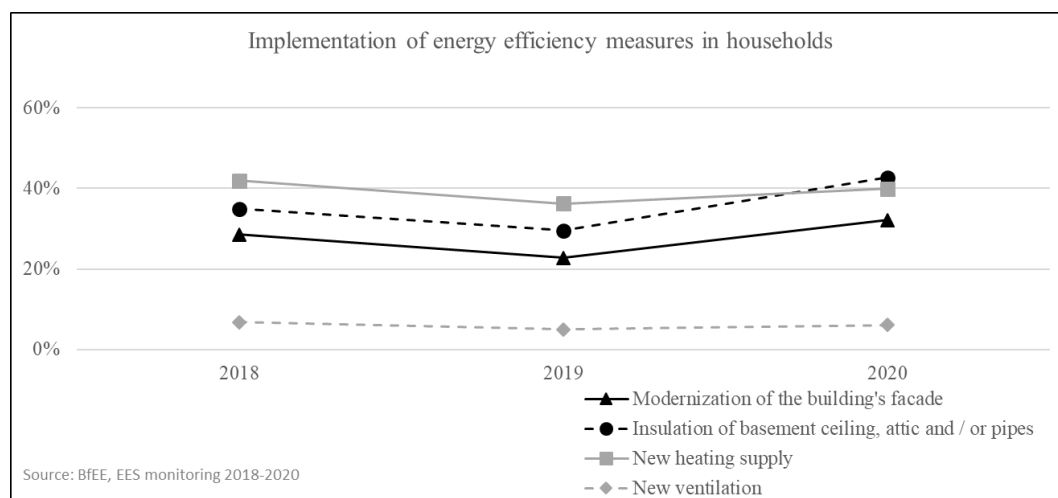


Figure 5. Implementation of energy efficiency measurements in households.

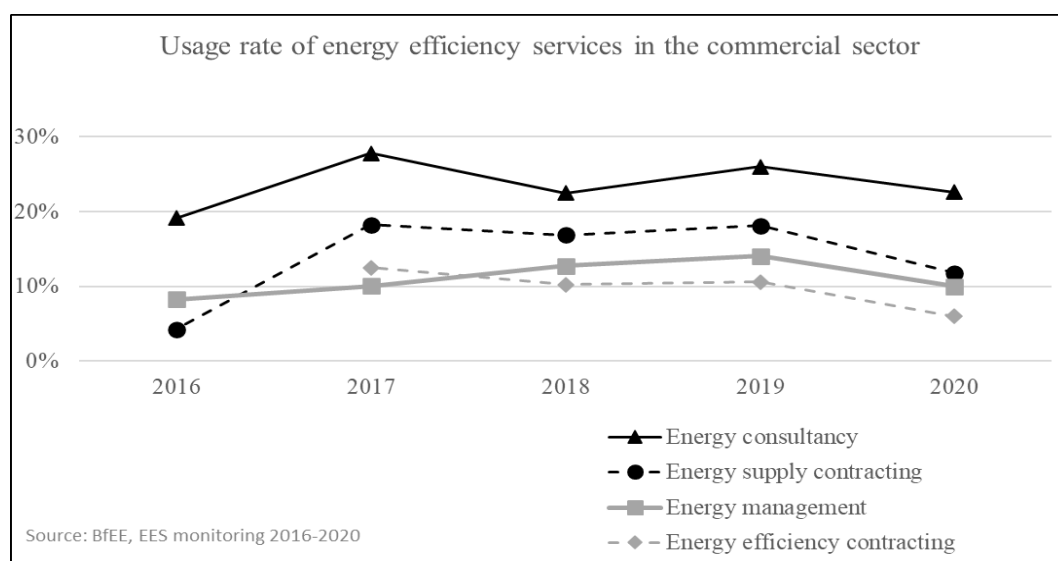


Figure 6. Usage rate of energy services in the commercial sector.

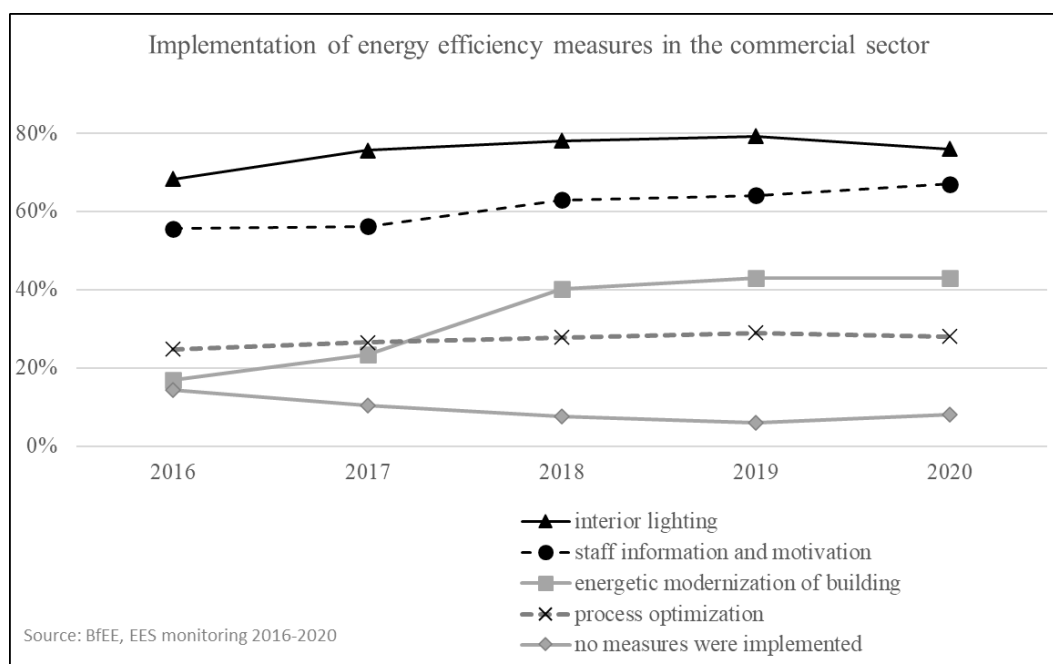


Figure 7. Implementation of energy efficiency measures in the commercial sector.

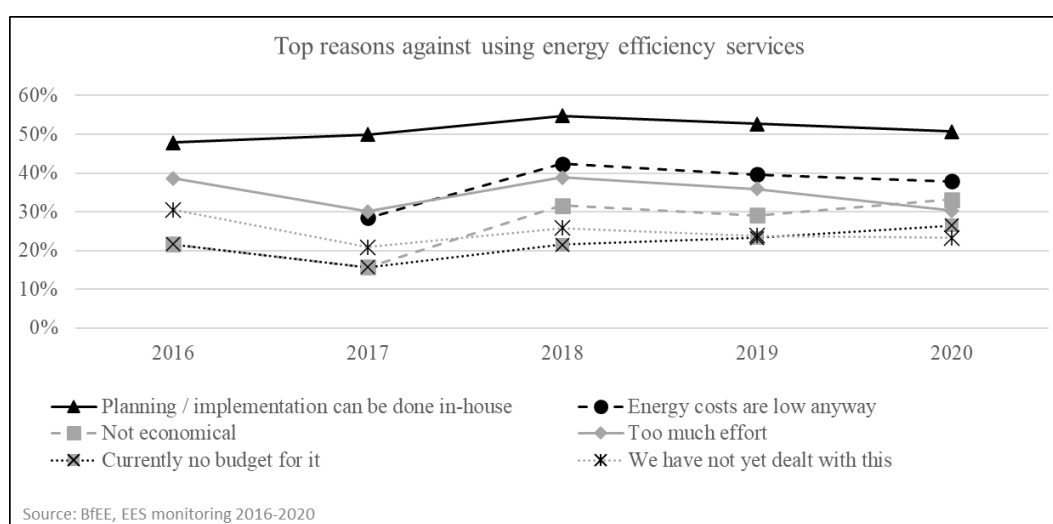


Figure 8. Top reasons for not using energy services.

well as the perception of the services as “too much work” (30 to 39 %) or economically not viable (16 to 33 %).

Over the past five years, 57 % to 76 % of the surveyed companies have indicated energy costs as a main reason for using energy services such as energy management, consultancy, audit and contracting. In the 2020 survey, another reason has gained significance: the perception of energy services as part of the companies’ strategy decisions for climate protection has become more relevant. As Figure 9 points out, significantly more companies perceived energy management (70 %) and audit (54 %) as strategic decision in comparison to previous years.

This development can be explained with the requirements of the regulatory framework regarding energy use and efficiency in the commercial sector. A closer observation of the companies’ motives for using energy management services clearly indicates an emphasis on compliance with the regulatory frame-

work (Figure 10). In contrast to SMEs, large enterprises are obligated by law to carry out an energy audit every four years since 2015. Alternatively, they can implement an energy management system. In 2020, 58 % of the surveyed large enterprises used energy management for this purpose.

#### Measures: Information, standards, and incentives

The German commercial sector has achieved some progress in reducing energy usage. High levels of ISO 50001 certifications have been reached (IEA 2020, p. 79). Nevertheless, the full potential of energy efficiency improvements has not yet been realised. First, not only production processes and energy sources should be the focus of policies, but also entire systems, including upstream chains. Second, effective incentives and price signals should be introduced and carbon-leakage scenarios should be considered (Agora Energiewende et al 2021). Especially for

energy-intensive companies, an effective policies mix of price, subsidies and taxes is needed.

In 2021, a new funding program for energy audits in SMEs was introduced. This is intended to incentivise small and medium companies to deal with issues of energy consumption and carry out energy efficiency measures. Subsequently, companies and energy service providers can apply for governmental funding to support the realisation of the planned energy efficiency measures. Positive synergies are expected in the upcoming surveys.

Finally, barriers such as the perception of the energy services as “too much work” or economically not viable can be addressed by information campaigns. As a policy instrument, information measures aim to influence the perceptions and actions of a certain group or actors. It can address investment decisions and usage routines, provide basic orientation for action, contribute to problem knowledge and expand or change perceptions (BMW 2020).

## PUBLIC SECTOR

### Demand group

A survey regarding the public sector is part of the market monitoring since 2018. A main challenge for the study and the gathering of data in this sector are the differences in the institutional structure and assigned responsibilities on and between the different governmental levels: Federal, state, and local. Expert interviews have been conducted in previous years to identify the relevant departments. More than 500 data sets were collected every year through interviews and online questionnaires.

On the local level, the following departments were interviewed:

- Public and school administrations,
- waste disposal companies,
- water suppliers,

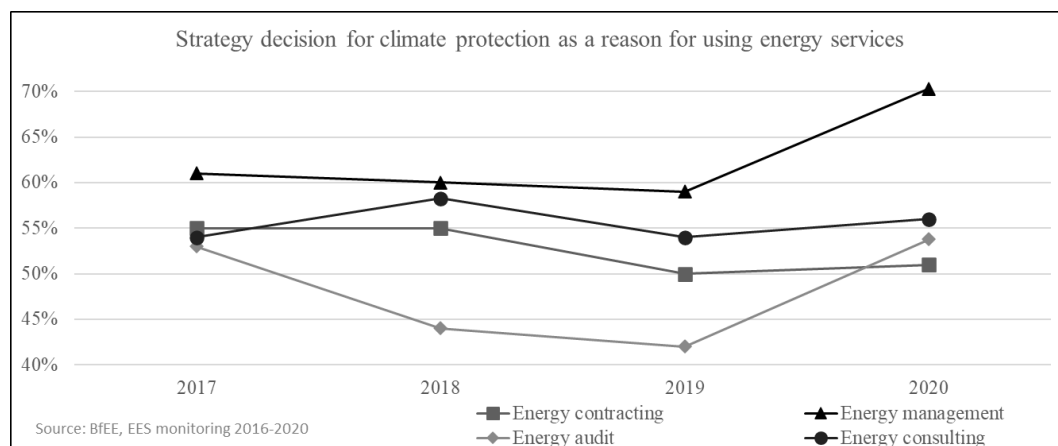


Figure 9. Strategy decision for climate protection as a reason for using energy services.

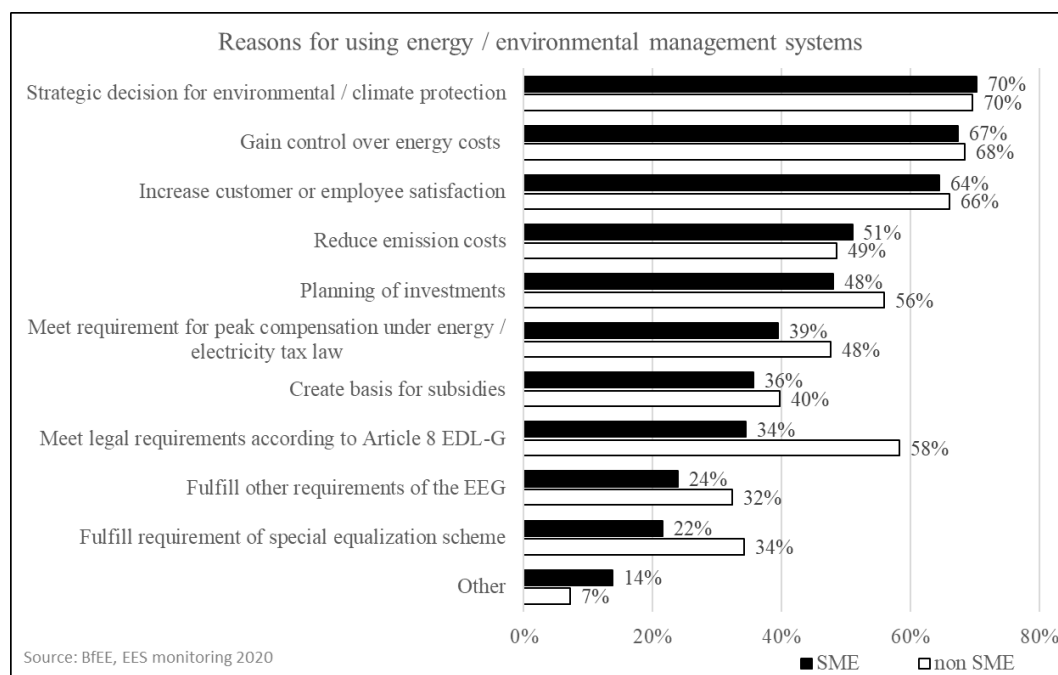


Figure 10. Reasons for using energy/environmental management systems.

- wastewater disposal companies.

On states level, the management of energy and building issues are organized differently. Some states coordinate all issues relating to their own properties and buildings centrally in a state-wide agency or department, while other states handle these issues on a decentralized basis at the level of districts or other sublevels.

Almost all federal civilian or military buildings (around 90 %) are managed by two institutions that are interviewed every year.

#### Use of energy services and implemented energy efficiency measures

Energy consultancy is the leading energy service in terms of frequency of use. Almost 60 % of the interviewed public bodies used energy consultancies in 2020. In contrast, the other services have usage rates below 40 % (Figure 11).

The implementation of energy measures in the public sector is slightly declining in 2020. Figure 12 shows two negative trends since 2019. First, fewer institutions (16 %) are implementing measures with a greater savings impact, such as energetic modernization of buildings. Second, more institutions (6 %) are not carrying out any improvements.

#### Motivations and barriers

The main barriers for energy services and the implementation of efficiency measures are insufficient budget (31 %) and the preference for an in-house solution (28 %) (BfEE 2021). The latter is often perceived as the more economical solution in contrast to external services (BfEE 2020, 6.3 *Barriers to use of energy services*).

Both of these barriers can be addressed by energy contracting services. Especially energy performance contracting is of inter-

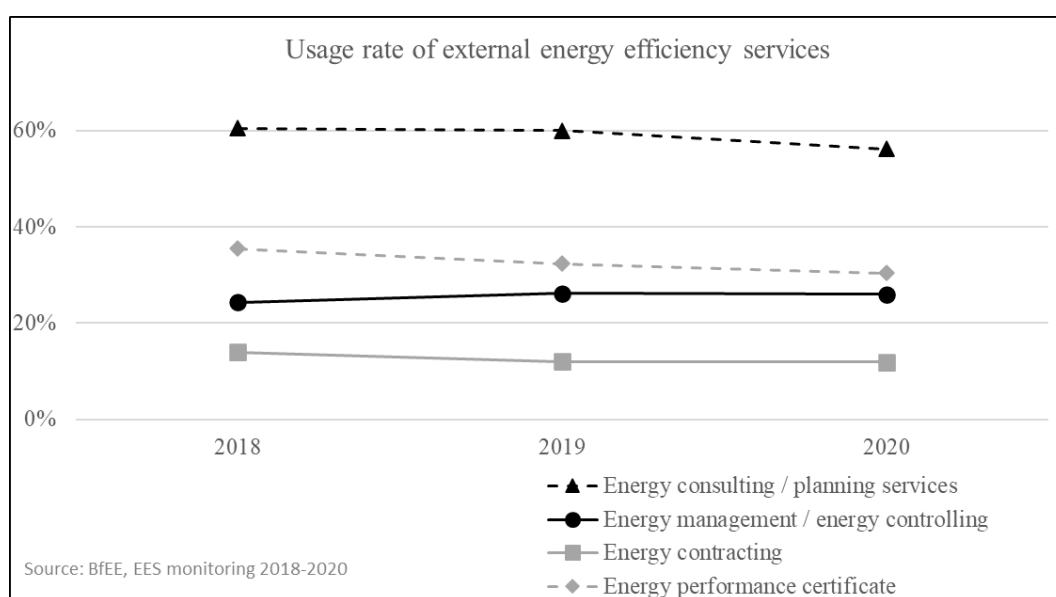


Figure 11. Usage rate of external energy services in the public sector.

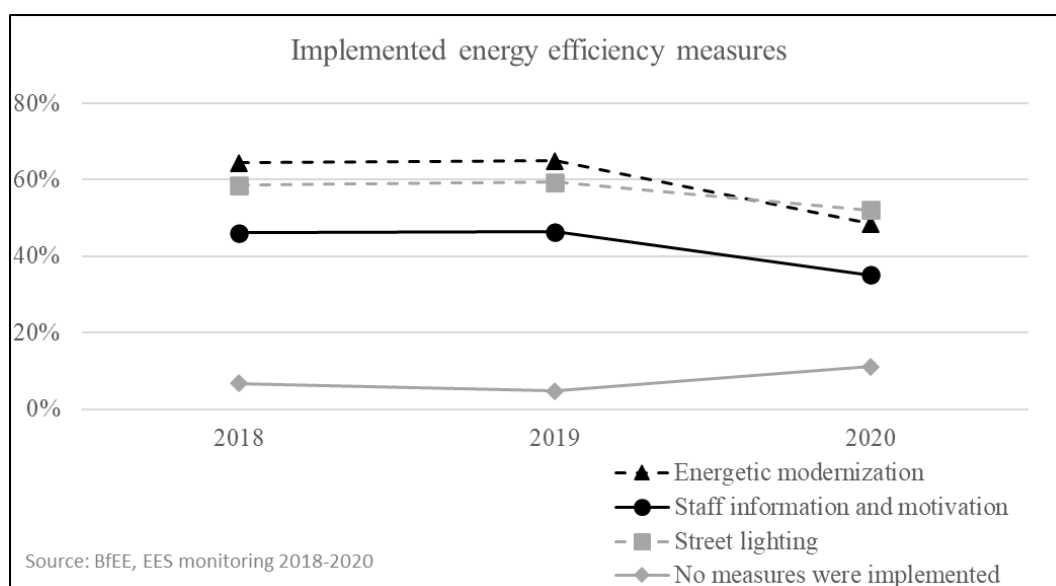


Figure 12. Implemented energy efficiency measures in the public sector.



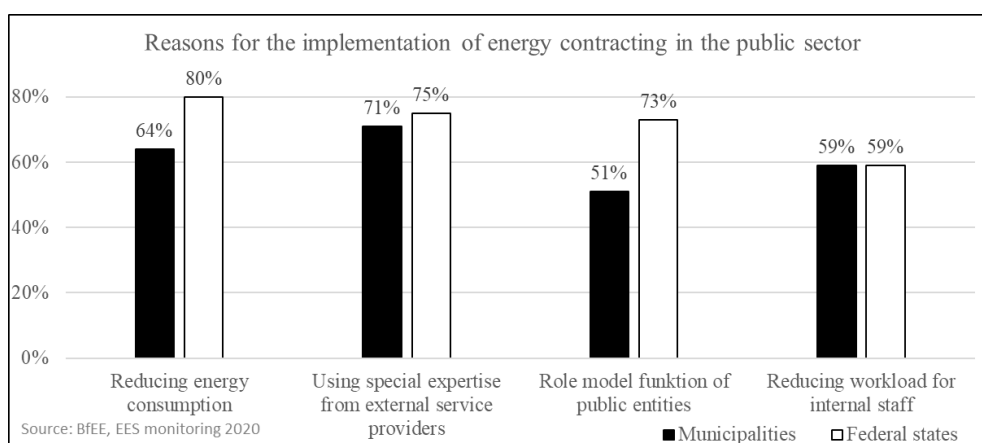


Figure 13. Reasons for the implementation of energy contracting in the public sector.

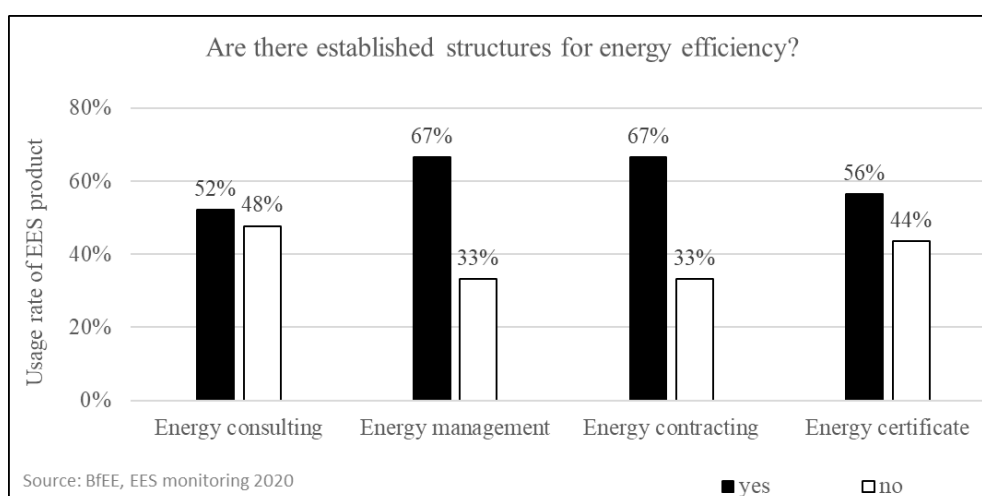


Figure 14. Are there established structures for energy efficiency? Survey results of the public sector.

est for the public sector. It allows the customer to undertake an energetic modernization, mostly of the technical equipment in a building, by an expert without the need for an upfront investment. Asked about the reasons for implementing energy contracting, supply and performance, the public sector acknowledges on both governmental levels, the expertise of the external service provider (71 and 75 %). As Figure 13 indicates, further strong motives are to reduce energy costs and to fulfil the role model function of public bodies regarding the improvement of energy efficiency.

A facilitating factor for using energy services was found in the establishment of an accountable entity within the public institutions, tasked solely with issues regarding energy efficiency. This could be a team, a department or an energy agency on a federal state level. Figure 14 shows the strong correlation between an accountable entity and the usage of energy services. This is essential for services such as energy management (67 %) and contracting (67 %), depending on the personal engagement on the purchaser side of the service.

#### Measures: information, standards, and incentives

The public sector is expected to be a role model for increasing the renovation rate and standards in public buildings (BMWi 2019b). This role includes intensively using and promoting en-

ergy services. Two factors can play a key role to meet these expectations. First, the provision of additional funding enhances a more intense use of energy services. Second, the introduction of additional internal work force solely for the concerns of energy efficiency will intensify the usage as well. Moreover, the additional work force can secure a successful planning and implementation of efficiency measures through a greater accountability on the customer side.

For this purpose, a new funding program for energy efficiency services in the public and commercial sector was launched in 2021. It finances energy consultancy, audit and performance contracting in non-residential buildings.

#### Summary and conclusions

The market for energy services in Germany is mature and stable. There are no indications for shortages on the provider side and over 70 % of the energy consultants intend to expand their revenue with energy services in 2021 (BfEE 2021). Suppliers are optimistic about the market development in the next three years. The strong incentives from policy makers introduced in 2020 and 2021 suggest a further acceleration of the energy service market. The paper focuses on the demand side, with its variety of motivations and barriers. The main goal was to

discuss possible complementary measures to fill in the gaps in the instrument mix and achieve full market potential.

Generally, across the different customer groups lacking acknowledgement of the value added by energy services is the most common identified barrier to using energy services and implementing energy efficiency measures. Information campaigns can be adopted to address this challenge. Energy services can be complex products that require clarification, budget, and skilled personnel on the side of the customer. Therefore, information measures on the benefits of these services with details on suitable funding programs is essential for facilitating their usage.

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