

## Task 5.3

# D5.3 Report on the replication potential in Germany

Grant Agreement n° 890598





Task 5.3	Work Package No.	WP5	Task/s No.	Task 5.3.2
Work Package Title	Upscaling and replication			
Linked Task/s Title	European replication potential			
Status	Final			
Dissemination level	PU-Public			
Due date deliverable	29/02/2024	Submission date	27/02/2024	
Deliverable version	D5.3 Report on the replication potential in Germany			

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## Glossary

ABBREVIATION	DESCRIPTION
AMO	Assistance à Maîtrise d’Ouvrage
CO	Confidential
EC	European Commission
EU	European Union
HW	Hardware
KPI	Key Performance Indicator
M	Month
NeMo	Network of Modernisation Partners in Hanover, Germany
OSS	One-stop-shop
PC	Project Coordinator
PU	Public
WP	Work Package



## Summary

The Horizon 2020 project I-HEROS (Integrated Home Energy RenOvation Service) is developing an entirely integrated home renovation service for homeowners in Toulouse Métropole called “Toulouse Métropole Rénov”. This study elaborates the replication potential of the one-stop-shop (OSS) model of “Toulouse Métropole Rénov” for the integrated energy advisory services in Germany.

Using a modular system to set up a one-stop-shop that was introduced by the Horizon2020 project “INNOVATE”, three case studies were analysed to facilitate a practical understanding of how a one-stop-shop functions and which offers it poses for an integrated home renovation. The modular structure of OSS made it possible to identify the differences between France and Germany in order to assess the novelty of the approach taken in Toulouse.

By means of a workshop, an online survey and in-depth interviews with German energy and climate protection agencies, the state of development of German OSS and the barriers to further development were determined.

As far as the basic modules of OSS are concerned, in the area of communication & marketing, energy and subsidy advice free of charge, the German OSS are well positioned. Especially at the beginning of the customer journey in a renovation process, they provide guidance to homeowners. The further the customer journey moves towards implementation, the OSS offers usually end and it is no longer possible to track which measures from the initial consultation are implemented. This makes it impossible to monitor the success of the consultation and the energy savings initiated by the OSS. In order to make the German OSS a more comprehensive modernisation partner for homeowners and to develop them towards an all-inclusive model, the approaches from France and especially Toulouse can be helpful.

“Toulouse Métropole Rénov” demonstrates how to showcase the OSS-service prominently in the city, directly address properties in particular need of renovation, use digital tools as advisory and monitoring instruments and build a network of quality suppliers.

### **You should read this report, if you...**

- are interested in the concept of one-stop-shops in general (chapter 3.1)
- want to find practical examples of services that can be offered within a one-stop-shop (chapter 3.2)
- wish to get an overview on the development of one-stop shops in Germany (chapter 5)
- want to set up or enhance a one-stop-shop in Germany (chapter 6)

## 1. Introduction

Tackling energy renovation issues in Europe is essential to reducing energy consumption and CO<sub>2</sub> emissions. Indeed, one of the most energy-consuming sectors in Europe, responsible for 40 % of the overall energy consumption and 36 % of CO<sub>2</sub> emissions, is the building stock. It is estimated that 75 % of the housing stock of 2050 is already built, and yet more than 35 % of the housing stock is older than 50 years. These numbers show the urgency to accelerate the energy renovation of the existing building stock.

However, for private and commercial building owners, energy-efficient renovation is associated with considerable financial, organisational and time efforts. To cope with this gigantic task of renovating the existing building stock, comprehensive information and advisory services are needed to guide homeowners and housing associations through the jungle of providers, legal requirements and funding options.

Against this background, one-stop shops for integrated home energy renovation are being created to accompany building owners on the journey to an energy-optimised building. These so called “one-stop-shops” are being developed throughout Europe also under the label of **Integrated Home Renovation Services**. This study elaborates the replication potential of the Toulouse one-stop-shop model “**Toulouse Métropole Rénov**” for the landscape of the German building modernisation market within the framework of the I-HEROS project.

### The I-HEROS project and Toulouse Métropole Rénov

The Horizon 2020 project I-HEROS (Integrated Home Energy RenOvation Service) is developing an entirely integrated home renovation service for homeowners in Toulouse Métropole. By increasing the coordination between existing programmes and targeting specific households, this one-stop-shop aims at renovating an additional 2000 housings per year by the end of the project. The project adds innovative elements such as a technical diagnostic tool developed specifically for the Toulouse Métropole housing stock.

>> More information: <https://i-heros.eu/>



Figure 1: Logo of EU project I-HEROS and one-stop-shop Toulouse Métropole Rénov

### “Hamburger Energielotsen” as Hamburgs one-stop-shop

Hamburg is striving to become a "Climate City" by 2050 and has set itself a model for a modern city of the future in which climate protection and climate adaptation are elementary components of social interaction. In order to meet Hamburg's climate protection targets in the building sector, Hamburg's Authority for Environment, Climate, Energy and Agriculture has issued a call for tenders for the implementation and consolidation of low-threshold, building-related energy advice in Hamburg in 2019. As a result of this tender procedure, the “Hamburger Energielotsen” were established in the summer of 2019. The Hamburger Energielotsen represent Hamburg's independent energy advice service, which is available to all building owners, homeowners, tenants and also tradespeople at various points in the city.



Figure 2: Umbrella brand for Hamburgs one-stop-shop



In the I-HEROS project, ZBAU was involved as a coordinating partner of the “Hamburger Energielotsen” in order to contribute its experience from Hamburg to Toulouse during the service definition phase of “Toulouse Métropole Renov ». And vice versa, conclusions were drawn from the test phase in Toulouse for the further development of the Hamburger “Energielotsen”.

## 2. Aim and methodology

### 2.1. Aim of the study

This study examines the possibilities of the replication of the comprehensive integrated home renovation service “Toulouse Métropole Renov” that was developed within the Horizon2020 project I-HEROS with the specific preconditions in Hamburg and other German cities and regions.

The identified obstacles in the development of OSS in Germany will be examined to see if approaches from the Toulouse model can help overcome them and thus offer a more comprehensive range of support for property owners' modernisation projects.

The lessons learned from Toulouse and a study of the German one-stop-shop landscape will be used to formulate recommendations for the setup or expansion of one-stop-shops in German regions and cities.

### 2.2. Methodology

#### 2.2.1. Definition one-stop-shops

The definition of one-stop shops that is used in this study was adopted from the INNOVATE Horizon 2020 project<sup>1</sup> and adapted to the German and French context. The modular system to set up a one-stop-shop was transferred from the INNOVATE guide to present three case studies and one good practice example that facilitate a practical understanding of how a one-stop shop functions and which offers they pose for an integrated home renovation (see chapter 3).

#### 2.2.2. Status quo of one-stop-shops in Germany

To analyse the status quo of the implementation of one-stop shops on energy-related building modernisation in Germany, a three-step analysis was carried out. In the **first step**, a workshop on the topic of one-stop shops was held on 1<sup>st</sup> June 2022 with energy and climate protection agencies in Germany that are organised in the Federal Association of Energy and Climate Protection Agencies in Germany (eaD).

In the **second step**, an online survey was conducted from June to July 2022 among members of the eaD to answer the two central questions:

- Which approaches of one-stop-shops exist in Germany?
- How could a potential development of the German one-stop-shops look like?

The results of the analysis can be found in chapter 5 *Status quo of the deployment of one-stop-shops in Germany*.

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<sup>1</sup> INNOVATE Horizon 2020 project (2020): „How to set up a one-stop-shop for integrated home energy renovation?“ [www.energy-cities.eu/wp-content/uploads/2020/07/INNOVATE\\_guide\\_final.pdf](http://www.energy-cities.eu/wp-content/uploads/2020/07/INNOVATE_guide_final.pdf)





In the **third step**, interviews with three energy agencies that were already involved in the first two steps to feed back the results of the survey and to identify lessons for practice and the development of one-stop shops. The energy agency of the city of Bonn, eza! energy and environment center Allgäu and the climate protection agency of the Hannover region were selected for an interview because they are currently at different stages in the development of a one-stop-shop.

### 2.2.3. Recommendations for implementation in Germany

Based on the theoretical foundations of one-stop-shops and the case studies as well as the findings on the implementation status in Germany, recommendations are given for German cities and municipalities as well as energy and climate protection agencies that aim to establish a new one-stop shop or develop existing ones (see 6 Recommendations for the setup and expansion of one-stop-shops).

## 3. One-stop-shops for integrated home energy renovation

### 3.1. What is a one-stop-shop?

A one-stop-shop for integrated home energy renovation is a virtual and/or physical place where homeowners and other building owners can find all information and services they need to implement an energy renovation project. To increase the renovation rate in one defined area, the one-stop-shop ideally covers the following services and proposes them, 'under one roof' to avoid extra effort for homeowners to navigate the modernisation market. The offers are aligned along the customer journey that needs to be undertaken in a modernisation project:

#### Overview customer journey

<b>Customer steps of the homeowner</b>		<b>Offers of the one-stop-shop</b>	
<i>Learning about the benefits of a renovation</i>		<i>Finding out which measures are suitable for your own building</i>	
<b>1</b> <b>Communication &amp; Marketing</b>	<b>2</b> <b>Independent energy consultation</b>	<b>3</b> <b>Financing &amp; funding consultation</b>	<b>4</b> <b>Network building &amp; qualification</b>
<i>Juggling the different trades during the renovation</i>		<i>Securing the financing of the renovation project</i>	
<i>Finding tailor-made solutions for your own renovation</i>		<i>Finding out what energy savings results were achieved</i>	
<b>5</b> <b>Coordination of the renovation work</b>	<b>6</b> <b>Product development for consumers</b>	<b>7</b> <b>Long-term and affordable financing</b>	<b>8</b> <b>Monitoring of the renovation results</b>

According to the INNOVATE guide on 'How to set up a one-stop-shop for integrated home energy renovation', the offers of the one-stop-shop should include the following services:

<b>1</b> <b>Communication &amp; Marketing</b>
Awareness-raising of the benefits resulting from energy retrofits
Promotion of existing services offered by other stakeholders
Promotion of the one-stop-shop services in a physical shop, demonstration site or virtual platform
Communication through a network of one-stop-shop partners – local actors who are present at the 'life-changing moments' of homeowners
Proactive demand generation through marketing and communication measures for specific target groups based on a previous market segmentation
<b>2</b> <b>Independent energy consultation</b>
Recommend relevant energy saving measures, technologies and materials
Preliminary building analysis / energy audit
Development of an 'Energy renovation roadmap' aiming at deep renovation (NZEB standard)
Provision of the list of existing suppliers
Assessment of cost estimates of the executing companies



<b>3</b>	<b>Financing and funding consultation</b>
	General advice on existing financing options for which the homeowner is eligible
<b>4</b>	<b>Network building &amp; qualification</b>
	Training of local suppliers
	Development of a certification scheme for 'quality' suppliers
<b>5</b>	<b>Coordination of the renovation work</b>
	Assistance to the homeowner with the coordination of suppliers and renovation works OR coordination of suppliers and renovation works on behalf of homeowner
<b>6</b>	<b>Product development for consumers</b>
	Customised home renovation products including house extension or adaptation to a specific life situation (e.g. flat adaptation for older / disabled person, new kitchen, maintenance needs, etc.)
	Standardised off-shelf ready-made products for a specific type of the housing stock (e.g. same type of houses in terms of age and construction techniques within the same neighbourhood)
<b>7</b>	<b>Long-term and affordable financing</b>
	Provision of products negotiated with partner technology suppliers and service providers (e.g. lower prices or 0% interest loans)
	Set up of local incentive schemes if the one-stop-shop is supported by local and regional authorities: e.g. a guarantee fund to cover eventual payment defaults by homeowners, a local revolving fund or 'advance payment fund' for homeowners who cannot overcome high upfront investment costs, subsidies, tax incentives, etc.
	Provision of one-stop-shop's own financial product (loans) to homeowners who have difficulties to obtain a bank loan and to make energy renovation accessible to all homeowners. These loans can be paid back via monthly instalments, service fees or tax payments that, ideally, take into account achieved energy savings
<b>8</b>	<b>Monitoring of the renovation results</b>
	Take over responsibility for the quality of works and achievement of estimated energy savings
	Post-work monitoring

Based on which services are offered by the one-stop-shop, they can be categorized as a business model from Level 1 to Level 4. The higher the level of the one-stop-shop, the more comprehensive the offers and the more work is taken off the homeowner's hands during the renovation. For example, the “facilitation model” of level 1 only provides important information for orientation in the start-up phase, while the “ESCO-type model” level 4 takes over all the coordination work and offers an energy-saving guarantee.

Business model	Roles & responsibilities	Practical example of what the one-stop-shop offers to homeowners
<p><b>1</b></p> <p><b>Facilitation model</b></p>	<ul style="list-style-type: none"> <li>• Raise awareness on energy renovation benefits</li> <li>• Provide general information on optimal renovation works</li> <li>• First advice at the 'orientation stage'</li> </ul>	It advises on how to renovate buildings and can provide homeowners with the list of suppliers.
<p><b>2</b></p> <p><b>Coordination model</b></p>	<ul style="list-style-type: none"> <li>• Coordinate existing market actors (suppliers)</li> <li>• Make sure all one-stop-shop services are offered to homeowners</li> <li>• No responsibility for the result of renovation works (only overlooking the whole process)</li> <li>• No responsibility for the overall customer journey (just the first part)</li> </ul>	It advises homeowners on how to renovate buildings and will push suppliers to comply with their promises. Suppliers remain responsible for the final result.
<p><b>3</b></p> <p><b>All-inclusive model</b></p>	<ul style="list-style-type: none"> <li>• Offer a full renovation package to homeowners</li> <li>• Bear responsibility for the result of renovation works</li> <li>• Bear responsibility for the overall customer journey</li> </ul>	The one-stop-shop is a contractor that sells the whole service package and is the main contact point for homeowners in case something goes wrong with suppliers.
<p><b>4</b></p> <p><b>ESCO*-type model</b></p> <p>*Energy Service companies</p>	<ul style="list-style-type: none"> <li>• Offer a full renovation package with guaranteed energy savings to homeowners</li> <li>• Bear responsibility for the result of renovation works</li> <li>• Bear responsibility for the overall customer journey</li> </ul>	The one-stop-shop sells homeowners the renovation package and guarantees the energy savings for the contract duration. The one-stop-shop is paid through energy savings achieved.

Figure 3 : Business models of OSS. Source: INNOVATE (2020): How to set up a One-Stop-Shop for integrated home energy renovation?

In the following chapter, three case studies of existing one-stop-shops are presented to show how the above mentioned services are applied in practice. Since the aim of this study is to investigate which approaches from France (especially Toulouse) can be applied in Germany, two German and one French one-stop-shop are examined in more detail:

- “Facilitation model”: Hamburger Energielotsen (Germany, City of Hamburg) [PAGE 13](#)
- “Coordination model”: Toulouse Métropole Renov (France, Toulouse Metropolitan area) [PAGE 18](#)
- “All-inclusive model”: ProRetro Hanover (Germany, Hanover region) [PAGE 25](#)

## 3.2. Case studies of one-stop-shops

### 3.2.1. Case study “Facilitation model”: Hamburger Energielotsen

Name of the OSS	Hamburger Energielotsen
Area covered by the OSS	Free and Hanseatic City of Hamburg
Inhabitants in the OSS area	1.835.000 inhabitants
Financing of the offers of the OSS	The <i>Hamburger Energielotsen</i> work on behalf of the Hamburg Authority for Environment, Climate, Energy and Agriculture and are partly funded by Hamburg's climate protection funds. The energy advice provided by the Consumer advice centre ('Verbraucherzentrale') is also funded by the Federal Ministry of Economics and Energy.
EU Funding of the project	none
Model of OSS after INNOVATE classification	Facilitation model

#### Steps in the customer journey that are accompanied by the one-stop-shop

<b>1</b> Communication & Marketing	<b>2</b> Independent energy consultation	<b>3</b> Financing & funding consultation	<b>4</b> Network building & qualification
<b>5</b> Coordination of the renovation work	<b>6</b> Product development for consumers	<b>7</b> Long-term and affordable financing	<b>8</b> Monitoring of the renovation results

Included in the OSS

Not included in the OSS

#### Communication & Marketing

Element of customer journey	Implementation in the one-stop-shop in Hamburg
Awareness-raising of the benefits resulting from energy retrofits	<p>&gt;&gt; <b>One contact for building energy efficiency in Hamburg</b></p> <p>To prevent different advisory services for energy efficiency in Hamburg from competing with each other and to facilitate orientation for homeowners, the umbrella brand <i>Hamburger Energielotsen</i> was created in 2019. Since then, the Hamburg Consumer Centre, the Hamburg Chamber of Crafts and the independent, semi-public North German network centre for building owners, planners and local authorities, ZEBAU GmbH (Centre for Energy, Construction, Architecture and the Environment), acting as cooperation partners of the <i>Hamburger Energielotsen</i>, have been linked together for joint energy consulting.</p> <p>&gt;&gt; <b>Information events and trade fairs</b></p> <p>Free informative events for property owners in which they receive information about technologies, products, construction processes, legal issues or financial support programmes concerning energy</p>

	<p>efficient living and building.</p> <p>&gt;&gt; <b>Social Media</b> On Instagram, Facebook and Twitter, the <i>Hamburger Energielotsen</i> disseminate low-threshold information on the benefits of energy-efficient renovation and the services offered by the OSS.</p> <p>&gt;&gt; <b>Telephone hotline</b> A central telephone number takes calls from property owners, answers initial questions and points to suitable offers from the energy guides for the next steps.</p>
<p>Promotion of existing services offered by other stakeholders</p>	<p>&gt;&gt; <b>The friendly forwarding</b> For further enquiries, the <i>Hamburger Energielotsen</i> cooperate with other institutions: Hamburg Chamber of Commerce, and Caritasverband Hamburg e. V. among others and guide callers of the telephone hotline to the right contact persons.</p>
<p>Promotion of the one-stop-shop services in a physical shop, demonstration site, virtual platform</p>	<p>&gt;&gt; <b>Building components exhibition</b> To make sustainable building tangible, a permanent exhibition covers around 2.000 square feet and shows models of solar panels and battery storage, heating and ventilation systems, insulation samples, windows and information boards with further explanations. The energy consultation can be combined with a visit of the exhibition in counselling islands. The exhibition is also aimed at craftsmen and energy consultants who want to learn about certain products.</p> <div> </div> <p>Figure 4: Exhibition of the Hamburger Energielotsen</p> <p>&gt;&gt; <b>Website</b> The website of the <i>Hamburger Energielotsen</i> is a growing part of the website of the City of Hamburg. A separate section presents the free services offered by the OSS. In addition, best practice examples of sustainable buildings are presented in factsheets, the free specialist and information events are announced and monthly changing thematic focuses provide information on sustainable aspects of building (e.g. new heating systems, renewable raw materials).</p>

<p>Communication through a network of one-stop-shop partners</p>	<p><b>&gt;&gt; Partner network</b></p> <p>The three cooperation partners have their own networks of experts and building owners, which are used to publicise the services offered by the OSS. The Hamburg Consumer Centre has a network with a focus on private building owners, ZEBAU GmbH of construction experts such as architects, engineers and energy consultants, and the Chamber of Crafts supplements this networking structure with construction companies and craftsmen. These partners are not officially part of a network of the one-stop-shop but they form an important stakeholder and multiplier platform. Through the <i>Hamburger Energielotsen</i>, these networks of building experts have free further training opportunities, so that they all have the possibility to stay up to date with technical developments and to pass on their knowledge to the homeowners.</p>
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<h2 style="background-color: #e67e22; color: white; padding: 5px;">Independent energy consultation</h2>	
<b>Element of customer journey</b>	<b>Implementation in the one-stop-shop in Hamburg</b>
<p>Recommend relevant energy saving measures, technologies and materials</p>	<p><b>&gt;&gt; Free initial consultations</b></p> <p>The <i>Hamburger Energielotsen</i> are mostly involved in the beginning of the customer journey and help in the first important steps towards energy-efficient living: to find out what the owners want, what is needed and how they can get an analysis of their building. And also, to know which measures are possible and how much it will cost.</p> <p>The initial energy consultation takes places in one of five advice centres spread over the city or online. In the first stage of the consultation, the person seeking advice is informed about the options for energy-related renovation: identification of the need for modernisation, classification of measures and rough estimates of expenditure, subsidy programmes, technology advice, other contact persons. It is possible for the customer to return to the initial energy consultation twice, if there are more questions or problems arise.</p> <p>The consultation is not only available for renovation but also for energy-efficient and climate-friendly new buildings, for example wooden constructions or buildings with green roofs or green facades. The topics climate change adaptation and use of renewable energies are also integrated into the consultation. To recommend sustainable building materials, consultations can take place in the exhibition, where examples of different building</p>

	<p>materials are on display.</p> <p>&gt;&gt; <b>On-site consultation</b></p> <p>In some cases, the consultant of the OSS will offer a consultation located at the building. These on-site consultations of about 90 minutes are documented with a report, where the most important facts about the condition of the building are recorded.</p> <p>&gt;&gt; <b>Building checks climate adaptation</b></p> <p>Another offer is a building check for climate change adaptation, that take place on-site. They last two hours and are free of charge for private or commercial property owners.</p>
Provision of the list of existing suppliers	<p>&gt;&gt; <b>List of experts in climate adaptation</b></p> <p>Experts who regularly participate in the workshops on climate adaptation have the opportunity to be registered on a list of experts that the <i>Hamburger Energielotsen</i> use for their customer advice when people seeking advice want to contact a company that offers climate impact adaptation as a specialty. More on this qualification scheme in &gt;&gt; <b>Inter-trade expert group on climate adaptation.</b></p>

## Financing and funding consultation

Element of customer journey	Implementation in the one-stop-shop in Hamburg
General advice on existing financing options for which the homeowner is eligible	<p>&gt;&gt; <b>Free initial consultations</b></p> <p>Information on subsidies for measures to improve the energy efficiency of buildings is provided as part of the free energy advice service. More in-depth financial advice is not part of the OSS offer. More on the consultation in the section &gt;&gt; <b>Independent energy consultation</b></p>

## Network building & qualification

Element of customer journey	Implementation in the one-stop-shop in Hamburg
Training of local suppliers	<p>&gt;&gt; <b>Specialist events</b></p> <p>Valuable impulses and lively discussions on innovations in technology and the funding landscape, sustainable and energy-efficient construction and climate protection are provided by the specialist events conducted by the <i>Hamburger Energielotsen</i>. Different speakers report from their practical experience in the field of sustainable building and modernisation and engage in a discussion with the participants. The events are free of charge for participants and there are training credits that energy consultants can use to gain credit for their registration in the Germany-wide list of energy-efficiency-experts.</p>






	<p>The cooperation partner Hamburg Chamber of Crafts trains craft enterprises in sustainable building and offers an informal exchange for energy consultants every Friday.</p>
<p>Development of a certification scheme for 'quality' suppliers</p>	<p>&gt;&gt; <b>Inter-trade expert group on climate adaptation</b></p> <p>The expert group provides a platform for specialist companies to exchange information and makes it easier for potential customers to find a suitable specialist company. Participants in the expert group are specialist companies from various trades that deal with the topic of climate impact adaptation, e.g. with regard to heavy rainfall events, storms, hail, wet winters and overheating phenomena. Participation is free of charge.</p> <p>The experts from the skilled trades meet in three workshops per year to take a closer look at the topic of climate adaptation, to exchange ideas on specific topics across trades and to receive further training. The experts who regularly participate in the workshops have the opportunity to be registered on a list of experts that the <i>Hamburger Energielotsen</i> use for their customer advice when people seeking advice want to contact a company that offers climate adaptation as a focus area.</p>

### 3.2.2. Case study “Coordination model”: Toulouse Métropole Rénov

Name of the OSS	Toulouse Métropole Rénov
Area covered by the OSS	Toulouse Métropole is constituted of 37 cities located in the south-west of France, in the department of Haute-Garonne and covers 466 km <sup>2</sup>
Inhabitants in the OSS area	762.956 inhabitants
Financing of the offers of the OSS	70 % of the offers are financed by the Region and Energy Savings Certificates through Rénov'Occitanie and France Rénov' programs, 30 % are financed by Toulouse Métropole.
EU Funding of the project	Horizon2020, project: I-HÈROS
Model of OSS after INNOVATE classification	Coordination model

#### Steps in the customer journey that are accompanied by the one-stop-shop

<b>1</b> Communication & Marketing	<b>2</b> Independent energy consultation	<b>3</b> Financing & funding consultation	<b>4</b> Network building & qualification
<b>5</b> Coordination of the renovation work	<b>6</b> Product development for consumers	<b>7</b> Long-term and affordable financing	<b>8</b> Monitoring of the renovation results

 Included in the OSS

 Not included in the OSS

#### Communication & Marketing

Element of customer journey	Implementation in the one-stop-shop in Toulouse
Awareness-raising of the benefits resulting from energy retrofits	<b>&gt;&gt; Establishing a brand</b> Previous activities to increase the rate of renovation were brought together and marketed by the city and stakeholders under the name Toulouse Métropole Rénov. The launch of this brand was accompanied by a public communication campaign on the territory (displays in the city, press, digital, radio, etc.).
Promotion of existing services offered by other stakeholders (local authority, suppliers, etc.)	The advisors from the OSS recommend other experts to the homeowners depending on the issues involved in the renovation project. There are different predefined “paths” that the homeowners will be send to based on their renovation project.
Promotion of the one-stop-shop services in a physical shop, demonstration site, virtual platform	<b>&gt;&gt; Virtual Platform</b> The website of Toulouse Métropole functions as an information hub for the customers of the OSS. The website provides modernisation guides for single-family homeowners and condominium associations that have been developed for the OSS. In addition, there are summary sheets with the most important information on various topics (e.g. thermal comfort). On the website, customers can find initial information on different renovation works by using a simple filter: Type of owner: single

owner or condominium association, Type of project e.g. insulation or heating) and Topic e.g. windows or roof.



Figure 5: Filter function on the website of the OSS [www.renov.toulouse-metropole.fr/je-me-documente](http://www.renov.toulouse-metropole.fr/je-me-documente)

### >> A flagship for modernisation in Toulouse

The physical location of the one-stop-shop is the “Maison de l’Énergie” situated near the central train station in Toulouse. Here, customers can find free information on energy-efficient building and living and get a consultation. In January 2024, 16 employees work for the one-stop-shop: 2 project manager, 1 coordinator, 12 advisors and 1 reception assistant. Opening hours are from Tuesday to Thursday afternoon from 2 to 6 pm.

In addition, the OSS advisors visit 23 locations in the metropolitan region to provide advice close to home. The dates on which counselling is provided at the locations can be viewed on the website.

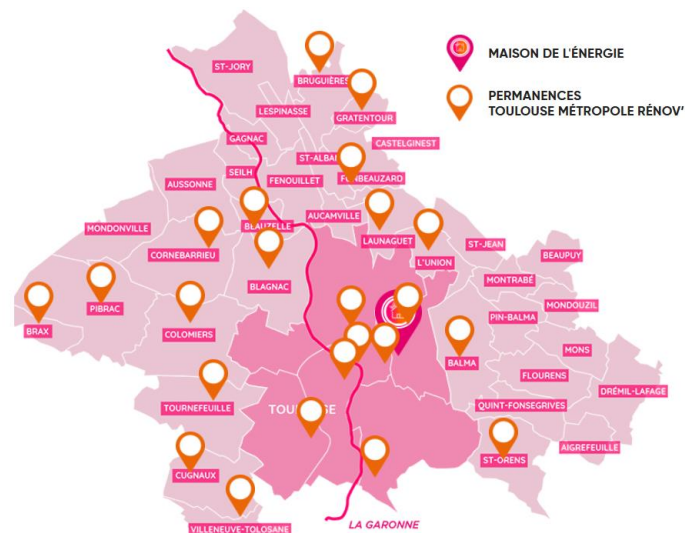


Figure 6: Locations of the OSS on the website of the OSS [www.renov.toulouse-metropole.fr](http://www.renov.toulouse-metropole.fr)

Proactive demand generation through marketing and communication measures for specific target groups

### >> Mapping energy renovation potential

Open data, data issued from the CoachCopro platform from 300 registered condominiums and more specific local data was used to analyse the energy renovation potential in Toulouse

	<p>Métropole. Coupled with a proactive communication approach to the target property owners, this work focuses on the most energy-intensive housing in the territory and pays particular attention to the most easily accessible renovations.</p> <p><b>Target group: condominiums</b></p> <p>For condominiums, buildings that are owner-occupied, have more than 12 units and were built before 1993 were targeted in the market study. In addition, apartments with an energy efficiency labeled F or G are targeted in anticipation of future government measures that will prohibit rental housing in France (labeled G as early as 2025 and F from 2028). During 2023 30.000 letters were sent to condominium owners to offer them guidance of the OSS and to announce upcoming events and webinars of the OSS specially targeted at condominiums. 7 local events were held, 500 people attended the meetings. Following these actions, 28 condominiums have contacted the service to think about a renovation project. In the first half of 2023, these new contacts represent more than 40% of newly registered condominiums.</p> <p><b>Target group: individual houses</b></p> <p>For individual houses, identical construction typologies were targeted (e.g. residential neighborhoods with similar years of construction) to allow the mutualisation and replication of support, diagnostics and technical offers. In some pre-selected neighborhoods, letters and information sessions (e.g., thermographic scans) are used to alert owners to the possibility and benefits of joint modernisations and assistance in organising them is offered by the OSS. As an example of the success of this approach you can look at the numbers of the commune of Balma: 405 homeowners were contacted via letters, 30 of them attended a local information event, 50 visited informational booths in the neighbourhood, 28 of them booked an energy consultation. At the level of the municipality of Balma, this represents 3 times more than over the same period in 2022.</p>
<p>Communication through a network of one-stop-shop partners</p>	<p><b>&gt;&gt; Communication network</b></p> <p>ADIL31, the I-HEROS partner specialized in legal advice to homeowners and tenants, uses their existing network to communicate with regional and national target groups, this includes tenants, homeowners and neighborhood associations. Professional target groups are also approached by ADIL31. These include banking establishments, actors of real estate transactions, and actors of property rental. The goal is to remind these actors about the regulatory framework concerning decency</p>



	<p>expectations, efficiency energy diagnosis and obligatory mentions in renting advert and to make them aware of the offers of the OSS. In addition, these actors act as intermediaries with the homeowners and reach them at the right time (e.g. when buying a house, taking out a loan, etc.) to recommend using the offers of the OSS.</p> <p>&gt;&gt; <b>Partners of the OSS</b></p> <p>In addition, the services of the OSS are made known through the partners who sign the 'charter of commitment'. More on the charter in the section &gt;&gt; <b>Network building &amp; qualification.</b></p>
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Independent energy consultation	
Element of customer journey	Implementation in the one-stop-shop in Toulouse
Recommend relevant energy saving measures, technologies and materials	<p>&gt;&gt; <b>Energy consultation</b></p> <p>The diagnosis can be very dependent on the project of the person accompanied. It can go from simple advice by the consultants to the diagnosis of the architect. So, the first role of the OSS is to understand the needs of the clients to send them on the right path. Depending on the type of renovation path, either the advice does not require technical experts apart from the OSS advisors or they engage a path with architects or an AMO (Assistance à Maîtrise d'Ouvrage = Project Management Assistance, especially for condominiums).</p>
Provision of a list of suppliers that are certified by the one-stop-shop as 'quality suppliers'	<p>&gt;&gt; <b>Directory of professionals</b></p> <p>To show homeowners a choice of trustworthy and high-quality construction companies, a charter of commitments was elaborated that companies sign to get listed on a directory of professionals that is accessible from the website of the OSS. Here, the homeowners can see which renovation works the companies have already carried out in Toulouse and there is a feedback possibility whereby the quality of the companies should be ensured. The advisor of the OSS guides the homeowner towards the directory of professionals and can assist the homeowner in reviewing the companies' cost estimates.</p> <p>Companies wishing to join the directory must sign the "charter of commitment" of the OSS.</p> <p>Directory of professionals for Toulouse Métropole Renov: <a href="https://renov.pro.annuaire-coachcopro.com/">https://renov.pro.annuaire-coachcopro.com/</a></p>
Preliminary building analysis / energy audit	<p>The diagnosis report includes two energy renovation roadmaps: a first work scenario targeting 40 % energy saving and a second</p>

Development of an 'Energy renovation roadmap' aiming at deep renovation (NZEB standard)	work scenario targeting 72 kWh/m <sup>2</sup> (like low-energy consumption building French label). If the homeowners wish, a third less ambitious work scenario can also be developed. The report is not free of charge, but the costs are reduced due to subsidies.
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<b>Financing and funding consultation</b>	
<b>Element of customer journey</b>	<b>Implementation in the one-stop-shop in Toulouse</b>
General advice on existing financing options for which the homeowner is eligible	<p>&gt;&gt; <b>Certificats d'Economie d'Energie</b></p> <p>On a national scale, there are two types of financial assistance. The first is government financial assistance paid by the Agence Nationale de l'Habitat (ANAH) and the second is the Certificats d'Economie d'Energie (CEE). Certificats d'Economie d'Energie (CEE). The Energy Savings Certificate mechanism or Certificats d'Economies d'Energie (CEE) was created in 2005 and requires energy suppliers whose sales are above a certain threshold to participate in energy saving, either through direct savings on their own installations or by helping their customers to save energy. The energy providers encourage the customers to save energy through various investments in energy efficiency, (e.g. insulation projects or heat pumps). These projects are eligible to receive certificates credited by governmental agencies on a registry.</p> <p>On a local scale, there are also financial aids offered by Toulouse Métropole (work assistance, financial loans etc.). The financial aids can be combined and depend on the household income.</p>

<b>Network building &amp; qualification</b>	
<b>Element of customer journey</b>	<b>Implementation in the one-stop-shop in Toulouse</b>
Development of a certification scheme for 'quality' suppliers: create a local label / charter / selection procedure to select only suppliers that provide works at the expected quality level	<p>&gt;&gt; <b>„Charter of commitments“ for quality suppliers</b></p> <p>Craft enterprises are generally the first contact of private individuals undertaking a renovation project. Therefore, the mobilisation of professionals not only impulses new territorial dynamics, but it also develops global renovations of a high quality and benefits local companies. The development of a network of companies that share the same values and maintain a relationship of trust with the employees of Toulouse Métropole Renov' brings many benefits, including knowledge sharing, efficiency gains, and optimisation of interventions.</p> <p>The OSS offers the companies a representation in a directory on the website that is recommended to all homeowners and supports the companies and offers a tool for the creation of "exemplary achievements" sheets for the general public on the</p>



	<p>internet platform. In return, the companies systematically inform the customers of the existence of a neutral and free advice provided by the OSS and update their company information on the directory. Annual meetings bring together all the actors in the charter to take stock of the measures carried out and to enable professionals to contribute to the strategic review of the charter.</p> <p>To determine the specificities of the cooperation between the OSS and the local enterprises, the charter of commitments was elaborated in partnership with the Chamber of Trades and Crafts of Haute-Garonne (CMA31), the French Building Federation of Haute-Garonne (FFB31), the Confederation of Crafts and Small Building Companies of Haute-Garonne (CAPEB31), Envirobat Occitanie, the Architects of Renovation of Occitanie (AROC) and the Occitanie Region.</p>
<p>Training of local suppliers</p>	<p>&gt;&gt; <b>Training of local firms</b></p> <p>The companies that sign the charter of commitment benefit from training offered by the OSS:</p> <ol style="list-style-type: none"> <li>1. Organisation of thematic workshops e.g.: financial aid, operation of the Toulouse Métropole OSS, bio-based and local materials, etc.</li> <li>2. Distribution of information of technical training from other stakeholders</li> <li>3. Collaboration with professional organisations to organise training specific to the needs of the member professionals</li> </ol>

Monitoring of the renovation performance	
Element of customer journey	Implementation in the one-stop-shop in Toulouse
<p>Post-work monitoring</p>	<p>&gt;&gt; <b>Monitoring &amp; Best Practice System for condominiums via CoachCopro</b></p> <p>The aim of the platform CoachCopro Toulouse (<a href="http://www.toulousemetropole.coachcopro.com">www.toulousemetropole.coachcopro.com</a>) is to encourage energy efficiency actions of condominiums by providing them with information on existing actions and the means available to carry out these actions.</p> <p>The platform has also been designed as a specific business tool for consultants in charge of condominium projects to effectively manage their business. Thus, there are functionalities to manage a condominium portfolio, to archive information, organise notifications, save documents, extract data. All this data is made available to other condominium owners via the website as a kind of best-practice-library.</p>



#### >> Monitoring System of the one-stop-shop

The project I-HEROS pays particular attention on the qualification and the consolidation of a tool to monitor the progress of energy renovation on the territory. In this respect, GRDF is working with APC to set up a monitoring system for key performance indicators. The monitoring system is based on an interactive map that visualizes the following KPIs per commune:

- consultation cases
- average costs of the implemented measures and the average number of measures carried out by condominiums
- finalised renovation projects
- ongoing renovation projects
- average reduction in energy consumption across all projects.





### 3.2.3. Case study “All-inclusive model”: ProRetro Hannover

Name of the OSS	ProRetro One-Stop-Shop for Hanover Region
Area covered by the OSS	Hanover Region
Inhabitants in the OSS area	1.200.000
Financing of the offers of the OSS	Horizon 2020, project: ProRetro
EU Funding of the project	Horizon 2020, project: ProRetro
Model of OSS after INNOVATE classification	All-inclusive model

#### Steps in the customer journey that are accompanied by the one-stop-shop

<b>1</b> Communication & Marketing	<b>2</b> Independent energy consultation	<b>3</b> Financing & funding consultation	<b>4</b> Network building & qualification
<b>5</b> Coordination of the renovation work	<b>6</b> Product development for consumers	<b>7</b> Long-term and affordable financing	<b>8</b> Monitoring of the renovation results

 Included in the OSS

 Not included in the OSS

#### Communication & Marketing

Element of customer journey	Implementation in the one-stop-shop in Hanover Region
Awareness-raising of the benefits resulting from energy retrofits	<p>&gt;&gt; <b>Previous activities of OSS partners</b></p> <p>The Climate Protection Agency Hanover Region and proKlima – the enercity fund in cooperation with the Network of Modernisation Partners (NeMo, a network of partners for renovation) form the cooperation partners of the OSS. Both proKlima and the Climate Protection Agency already have numerous offers that serve to raise awareness among homeowners.</p> <p>&gt;&gt; <b>A central contact point</b></p> <p>The one-stop-shop established in the Hanover Region bundles diverse services related to energy renovations and therefore strives to increase the renovation rate. A central contact point for everyone in Hanover Region planning to renovate was founded to strengthen the existing NeMo with one-stop-shop-services.</p>
Promotion of the one-stop-shop services on a virtual platform	<p>&gt;&gt; <b>Websites and newsletters</b></p> <p>The one-stop-shop uses the existing websites of the involved partners as platforms that already has a lot of traffic by the fitting target group. The main hub of the one-stop-shop is located on the website of the Network of Modernisation Partners (NeMo) that is one of the key actors of the OSS.</p> <p>Blog articles refer to current funding programmes, advisory services, the use of renewable energies and much more.</p>

<p>Communication through a network of one-stop-shop partners</p>	<p><b>&gt;&gt; OSS network</b></p> <p>Three established institutions in the Hanover region communicate via their channels for the one-stop-shop and distribute it through their networks. The Climate Protection Agency Hanover Region, proKlima and NeMo have a large regional impact.</p> <p>NeMo has been active in the Hanover Region since 2009. It unites energy advisers and architects, whose services are needed in the planning phase, banks and other financial institutions, contractors and advisers helping with quality control and quality assurance.</p>
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<h2 style="background-color: #e67e22; color: white; padding: 5px;">Independent energy consultation</h2>	
<b>Element of customer journey</b>	<b>Implementation in the one-stop-shop in Hanover Region</b>
<p>Recommend relevant energy saving measures, technologies and materials</p>	<p><b>&gt;&gt; Initial advice on energy saving measures</b></p> <p>The initial advice of the Climate Protection Agency Hanover Region provides first guidance free of charge. In the initial consultations, energy consultants provide information online and in small groups about energy-efficient building renovation, sustainable heating technology and the use of solar energy. In the group consultations, homeowners benefit not only from answers to their own questions, but also from the questions of the other participants. These offers are complemented by partners in NeMo that offer various energy advice services for a fee, for example on-site energy advice.</p>
<p>Preliminary building analysis / energy audit</p>	<p>No preliminary building analysis is offered. Depending on their level of knowledge, homeowners are first referred to the group counseling service of the Climate Protection Agency Hanover Region. Depending on the implementation wishes of the homeowners, energy consultants are referred for specific calculations and energy consultation. If the homeowner already has an energy advice report, the OSS will put them in touch with craftsmen from the network.</p>
<p>Development of an 'Energy renovation roadmap' aiming at deep renovation (NZEB standard)</p>	<p>NeMo offers the development of a renovation roadmap (in Germany 'Individueller Sanierungsfahrplan') for which the homeowners have to pay a fee. The fee is reduced with the help of subsidies.</p>
<p>Preliminary contract proposal</p>	<p><b>&gt;&gt; Enquiry form</b></p> <p>The OSS's service consists in referring customers interested in an energy renovation to suitable contractors and partners from the network. Since spring 2022, an enquiry form on the website of the Network of Modernisation Partners is available that bundles the enquiries and forwards them to the partners in the network.</p>

	A person who is coordinating inquiries from customers constitutes the interface between companies and customers. This person knows the specialities of the companies in the network and is able to convey the customer to a suitable company and thereby theoretically shorten the time until the customer gets a quotation and the measures are implemented.
Provision of the list of existing suppliers	>> <b>List of qualified contractors and/or advice regarding contractors who are qualified to implement the planned actions</b> The Network of Modernisation Partners (NeMo) provides a list of qualified contractors who implement energy efficiency renovation according to a climate protection code.

Financing and funding consultation	
Element of customer journey	Implementation in the one-stop-shop in Hanover Region
Assistance to homeowners in developing a tailor-made financing plan and in preparing all documents necessary for accessing financial instruments s/he is eligible for	<p>As another benefit of the OSS, the review and signature-ready preparation of matching grants is part of the OSS's services, if the homeowner hires an energy consultant from NeMo to do so. It can be a distinct advantage for homeowners to place the review and preparation in qualified hands. In this way, they can be sure that all possible funding sources have been exhausted.</p> <p>As a novelty, the OSS will offer financing through a NeMo partner. From 2023, financial advisors will also be represented in the network. Their service is to be integrated into the OSS.</p>

Network building & qualification	
Element of customer journey	Implementation in the one-stop-shop in Hanover Region
Training of local suppliers	<p>&gt;&gt; <b>Exchange and training offers in the Network of Modernisation Partners (NeMo)</b></p> <p>There are various further training offers in the network. Network partners are informed about regional training offers via newsletters. In addition, regular partner days are used to clarify and discuss relevant topics and developments.</p>
Development of a certification scheme for 'quality' suppliers	<p>&gt;&gt; <b>Network of Modernisation Partners (NeMo)</b></p> <p>In the case of Hanover, a kind of certification scheme for quality suppliers already existed in the form of the Network of Modernisation Partners (NeMo) prior to the new one-stop-stop-services. NeMo is an institution that is already known and well established in the region with many partners from the trades, energy advice and architectural offices. The network has implemented quality assurance measures. In addition, further education is highly valued within the network. All partners have agreed to a climate protection code. In addition, references and</p>

	<p>further training of the partners are checked at regular intervals by the network office, the board and the advisory board. These factors contribute significantly to building trust between homeowners and stakeholders.</p> <p>The OSS was implemented as an online offering of the Modernisation Partners network, so that it can interact as an intermediary service between the respective parties. The NeMo, on the other hand, can generate orders through the OSS. The partners from the network conclude their contracts directly with the homeowners.</p>
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### Coordination of the renovation work

Element of customer journey	Implementation in the one-stop-shop in Hanover Region
Assistance to the homeowner with the coordination of suppliers and renovation works	<p>&gt;&gt; <b>The one-stop-shop as an intermediary</b></p> <p>Interested homeowners come to the OSS with their request. To do this, they send a contact request with initial information about their questions and wishes via the website of the Network of Modernisation Partners. Based on the contact request, a coordinator contacts the homeowner and can estimate the extent of the need for advice with the help of questionnaires and clarifies the availability of suitable contacts from the network in advance by telephone. The one-stop-shop is thus responsible for the coordination of the refurbishment task in the beginning of the project, while the partners in the network carry out the work and each is responsible for its own parts.</p>

### Monitoring of the renovation performance

Element of customer journey	Implementation in the one-stop-shop in Hanover Region
Post-work monitoring	<p>&gt;&gt; <b>Displaying best practice renovations</b></p> <p>In the future it is planned to display best practice examples of successes on the NeMo homepage. Individual renovation projects will be contacted for this purpose so that there will be random feedback from the homeowners on the satisfaction of the work and the savings results.</p>

### 3.2.4. Good practice: Klimabauzentrum Bremen

The klimabauzentrum Bremen is an excellent example for a one-stop-shop that started as a facilitation model called “Bremer modernisieren” and expanded and optimised its service with the new klimabauzentrum that was established in February 2023. “Bremer Modernisieren” is the central point of contact for all homeowners in the city of Bremen and the surrounding area who are planning a modernisation or need help with implementation. Ten established consulting institutions with years of experience in the areas of construction and modernisation have joined forces here. The new klimabauzentrum gives the one-stop-shop a highly visible “home” and acts as a beacon to focus on the issue of modernisation in society. Visitors can learn in over 350 m<sup>2</sup> how to modernise their homes – with energy consultations on the spot, events and an exhibition with models of heating systems or energy efficient materials. In addition, a new digital booking tool was introduced that brings together all institutions from “Bremer modernisieren” in a central appointment calendar. This means that during the initial consultation, a digital file can be created directly for the consultation case and further appointments can be made, e.g. for a subsidy consultation. In this way, the customer receives more binding support during the customer journey than if only recommendations for further steps are made. Another advantage of the booking tool is that consent can be given to contact the customer at a later date, thus enabling the modernisation project to be tracked.

Facilitation model	Coordination model

## 4. Urban morphology types in Germany and their challenges for building retrofitting

In addition to a more efficient building technology and the shift to renewable energies, the energy renovation of existing buildings is a key factor in reducing CO<sub>2</sub> emissions in the building sector. In Germany, the effects and implementation options of energy renovations mainly depend on the individual building stock, requirements set by the protection of buildings and monuments, the ownership structure with the associated financial options and, especially in the private building stock, personal life planning.

### 4.1. State of the existing building stock

More than half of Germany's residential buildings were built before 1979 (see Figure 7).

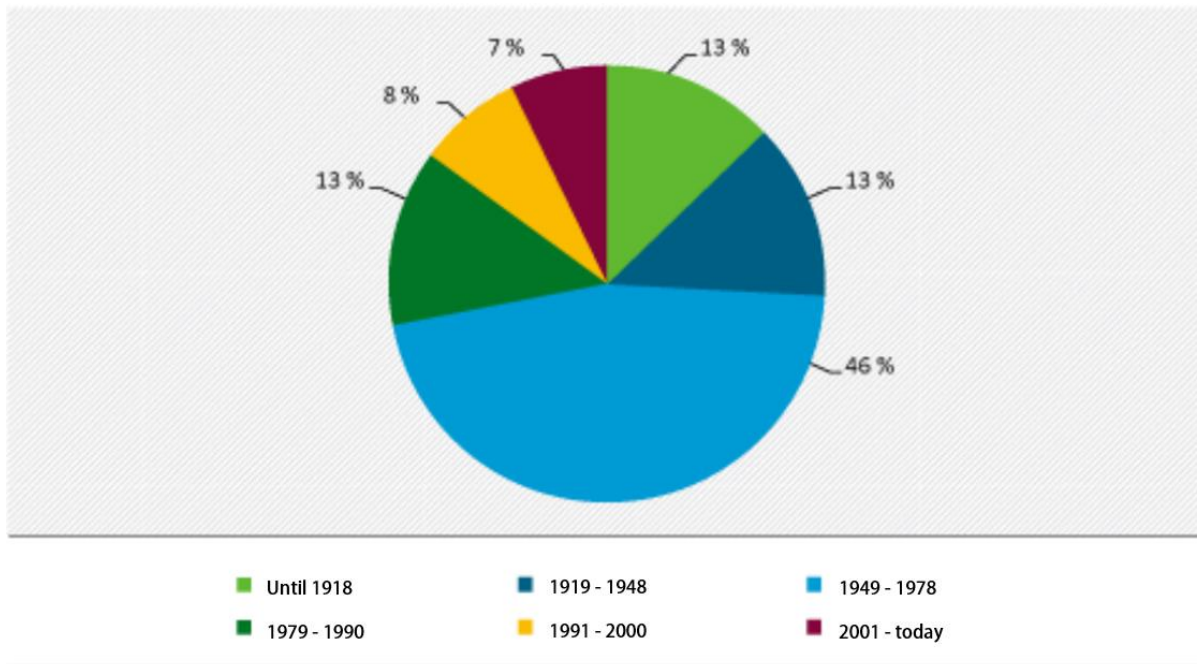


Figure 7: Building age groups (Umweltbundesamt)

Before 1995, there were no legal requirements for thermal insulation in Germany, so until today only 45 % of residential buildings built before 1979 have exterior wall insulation. Therefore, buildings constructed between 1949 and 1978 are assigned a savings potential in energy consumption of 65 % compared to 2014. For buildings from 1978 to 1995, a savings potential in energy consumption of over 55 % is assumed, and buildings constructed between 1919 to 1948 have a savings potential in energy consumption of 50 % compared to 2014<sup>2</sup>.

In 2009, the average age of consisting heating systems was 17 years. 40 % have been installed before 2001, approximately 25 % are older than 25 years. With 75 %, most existing buildings are heated with gas or oil. However, in 2017 for the first time more than 50 % of the heat sources used for new buildings were renewable energies (heat pumps and biomass)<sup>3</sup>. In summary this means, while new buildings are increasingly provided with systems based on renewable energies, the building stock is still predominantly fitted with relatively old oil or gas heating systems. Consequently, there is a great potential of exchanging the outdated systems by the end of their service life with new systems relying on renewable energies while simultaneously improving the thermal insulation of the building for a reasonable dimensioning of the heating system. Figure 8 shows the positive effect of these retrofitting measures on the energy consumption for single-family and duplex buildings built before 1978.

<sup>2</sup> IWU (2018): Datenerhebung Wohngebäudebestand 2016.

[https://www.iwu.de/fileadmin/publikationen/gebäudebestand/2018\\_IWU\\_CischinskyEtDiefenbach\\_Datenerhebung-Wohngeb%C3%A4udebestand-2016.pdf](https://www.iwu.de/fileadmin/publikationen/gebäudebestand/2018_IWU_CischinskyEtDiefenbach_Datenerhebung-Wohngeb%C3%A4udebestand-2016.pdf)

<sup>3</sup> Dena (2021): Dena – Gebäudereport 2022. [https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2021/dena-Gebäudereport\\_2022.pdf](https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2021/dena-Gebäudereport_2022.pdf)

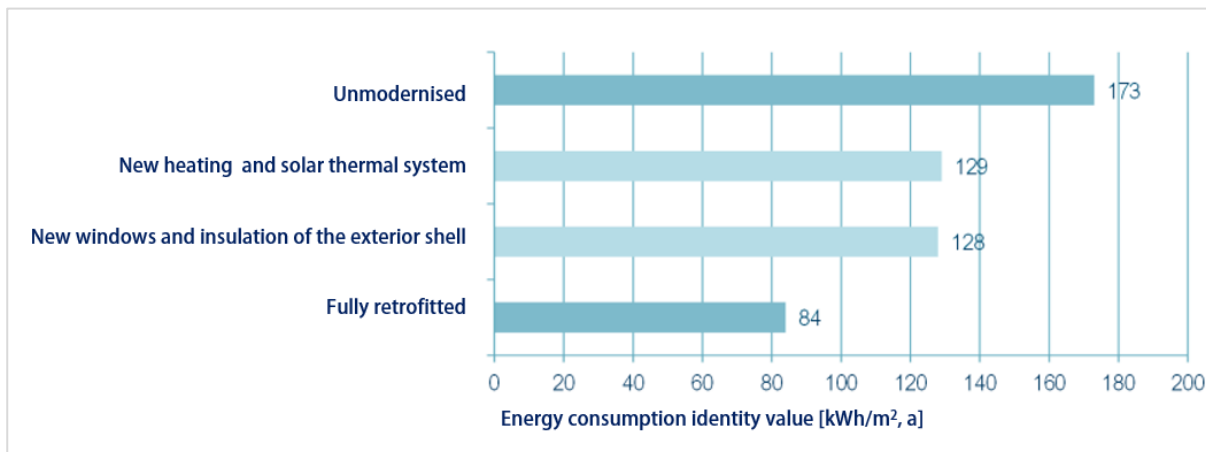


Figure 8: Energy saving potential through modernisation (Umweltbundesamt)

## 4.2. Building and ownership structures

At the end of 2020 there were around 19 Mio. residential buildings in Germany. The number is composed of 12.9 Mio. single-family houses, 3.2 Mio duplexes, and 3.3 Mio apartment buildings. With 86,6 % the majority of residential buildings are owned by private persons. The remaining share is split between apartment-owner associations and housing companies (both municipally and cooperatively owned).<sup>4</sup> Taking the building type into account, it becomes apparent that most single-family buildings are owned by private persons, so the threshold for modernisation is significantly low. For apartment buildings however there is a much greater share of buildings and apartments owned by apartment-owner associations and housing companies. Especially for condominiums, the great number of actors involved can be seen as a hindrance for modernisation.

Ownership structure		
	Buildings	Apartments
	all residential buildings	
apartment-owner associations	7,5%	20,1 %
private person	86,6%	61,0%
housing companies	5,4%	17,7%
other	0,5%	1,1%
	single-family houses / duplexes	
apartment-owner associations	2,2%	2,6%
private person	96,0%	95,5%
housing companies	1,7%	1,7%
other	0,1%	0,2%
	apartment building	
apartment-owner associations	33,6%	35,6%
private person	40,5%	30,6%
housing companies	23,5%	31,8%
other	2,3%	1,9%

Figure 9: Building ownership structure (IWU)

<sup>4</sup> IWU (2018): Datenerhebung Wohngebäudebestand 2016.

[https://www.iwu.de/fileadmin/publikationen/gebaeudebestand/2018\\_IWU\\_CischinskyEtDiefenbach\\_Datenerhebung-Wohngeb%C3%A4udebestand-2016.pdf](https://www.iwu.de/fileadmin/publikationen/gebaeudebestand/2018_IWU_CischinskyEtDiefenbach_Datenerhebung-Wohngeb%C3%A4udebestand-2016.pdf)



Within the European Union, Germany is the country with the highest share of tenants. In 2018, 53,5 % of (occupied) dwellings were rented out. In urban districts the ownership rate is even lower. The seven metropolises Berlin, Hamburg, Munich, Cologne, Frankfurt am Main, Stuttgart and Düsseldorf are extremely dominated by tenants, with an ownership rate of only 22 % (46,5 % nationwide)<sup>5</sup>.

As a consequence of the prevailing owner-user structure, most people living in apartment buildings have very little impact on improving the state and energy efficiency of these buildings. Simultaneously the tenants are obliged to pay the energy costs directly influenced by the state of modernisation. Additionally, the owner-user structure can create a barrier for building retrofitting, as the tenants have to be considered in the process of modernisation.

### 4.3. Legal situation (building regulations)

The development of the heating energy consumption in Germany is significantly influenced by legal regulations, specifying energy requirements for heated or air-conditioned buildings. The requirements for the energy standards of buildings have been continuously increased with each amendment of the prevailing regulation, as seen in Figure 10. The thermal insulation regulation (Wärmeschutzverordnung) first came into force in 1977 as a result of the Energy Saving Act (EnEG) passed by the German parliament in 1976. In 2002, the thermal insulation regulation was replaced by the energy saving regulation (Energieeinsparverordnung), applicable until 2020. In November 2020, the energy saving regulation was then novated to the building energy act. The building energy act combines the former energy saving regulation with the energy saving law (Energieeinsparungsgesetz) and the renewable energy heat act (Erneuerbare Energien Wärmegesetz).

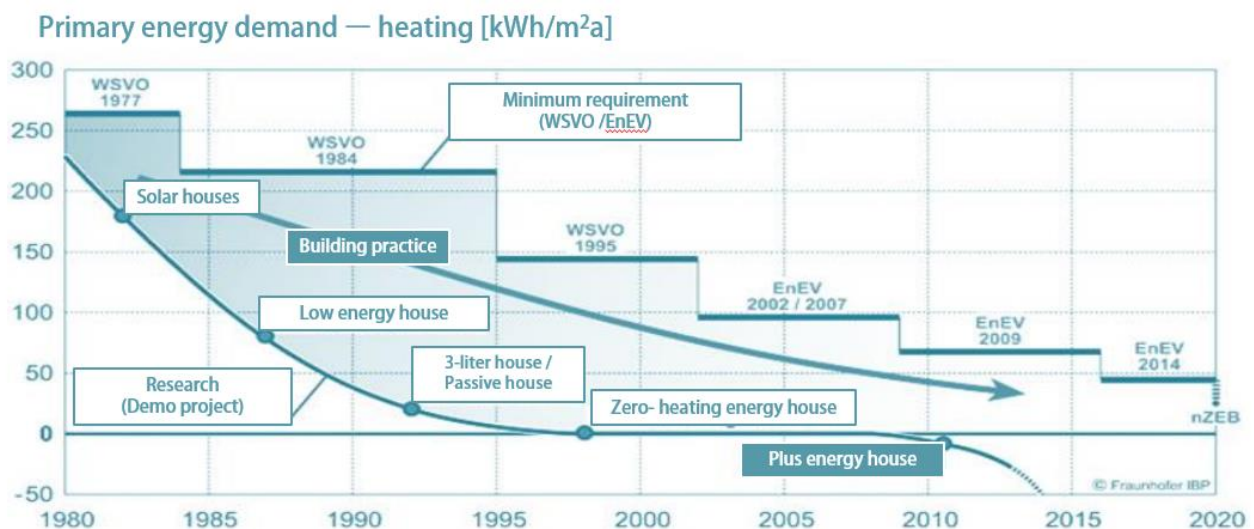


Figure 10: Development of energy efficient construction (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz)

<sup>5</sup> Statistisches Bundesamt (2022): Datenreport 2021. Wohnen. [https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021-kap-7.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021-kap-7.pdf?__blob=publicationFile)



The Building Energy Act (Gebäudeenergiegesetz, GEG) contains specifications for heating and air conditioning technology as well as thermal insulation standards and heat protection of buildings. Additionally, it includes requirements for the preparation and use of energy certificates and the use of renewable energies in buildings. The act is applicable for new buildings as well as for the renovation of existing buildings.<sup>6</sup>

Owners and buyers of existing buildings must comply with certain retrofitting and replacement obligations. Certain obligations apply to all apartment buildings, regardless of whether they are planned to be renovated. One- and two-family houses are exempt from this obligation if the owner has lived in the building before February 2002. After buying a one- or two-family house, the obligations must be fulfilled within 2 years.

- Oil and gas boilers that are more than 30 years old and have a normal size (4 - 400 kW heat output) must be replaced. However, the replacement obligation does not apply to condensing and low-temperature boilers.
- New heating and hot water pipes in unheated rooms must be insulated.
- Top floor ceilings to unheated roof spaces have to be insulated if they do not have a so-called "minimum thermal insulation" (usually 4 centimetres of thermal insulation). Alternatively, the roof above can be insulated accordingly.

Additionally, the following more general requirements are to be followed (selection):

- An energy certificate is needed if the building is rented out or to be sold
- Specialist companies must confirm the thermal insulation during renovation
- Oil and coal heaters are undesirable
- Air conditioning and ventilation systems must be checked regularly by qualified personnel
- The authorized district chimney sweeper must regularly carry out a fireplace inspection on site
- Municipalities may prescribe district heating<sup>7</sup>

#### 4.4. Financial sources and funding programmes

Funding programs are a central aspect within the strategy for the energy transition of the German government. As part of the resolutions of the Climate Cabinet 2019 and the Federal Climate Protection Act (Klimaschutzgesetz), the conditions to finance modernisation projects became more attractive, and subsidies increased. The consequence was a strong dynamic, reflected by the number of applications for the funding programmes in recent years.

The most recent development in terms of funding programs is the second reform of the federal funding for efficient buildings (Bundesförderung für energieeffiziente Gebäude, BEG). With the changes, access to the federal funding has been further facilitated, funding bonuses have been increased and the incentives for modernisation and the funding efficiency of the programme have further increased. The changes are in

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<sup>6</sup> Umweltbundesamt (2019): Wohnen und Sanieren. Empirische Gebäudedaten seit 2002.  
[https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-05-23\\_cc\\_22-2019\\_wohnenundsaniieren\\_hintergrundbericht.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-05-23_cc_22-2019_wohnenundsaniieren_hintergrundbericht.pdf)

<sup>7</sup> Verbraucherzentrale (2022) GEG: Was steht im Gebäudeenergiegesetz?  
<https://www.verbraucherzentrale.de/wissen/energie/energetische-sanierung/geg-was-steht-im-gebaeudeenergiegesetz-13886>

operation since the 1<sup>st</sup> January 2023. The BEG includes three partial programs: residential buildings, non-residential buildings and single measures and is facilitated through the KfW banking group and the Federal Office for Economic Affairs and Export Control (BAFA). The following table shows the aims and funding volume of each program:

Residential buildings (BEG WG)	Non-residential buildings (BEG NWG)	Single measures
<ul style="list-style-type: none"> <li>▪ 50.000 overall measures per year (comprehensive refurbishment to or construction of energy efficient buildings)</li> <li>▪ Gross investment volume of 32 bil. Euro per year</li> <li>▪ Saved greenhouse gas emissions: 520.000 t CO<sub>2</sub> per year</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1.500 overall measures per year (comprehensive refurbishment to or construction of energy efficient buildings)</li> <li>▪ Gross investment volume of 5.5 bil. Euro per year</li> <li>▪ Saved greenhouse gas emissions: 175.000 t CO<sub>2</sub> per year</li> </ul>	<ul style="list-style-type: none"> <li>▪ 150.000 single measure (WG &amp; NWG)</li> <li>▪ Gross investment volume of 6 bil. Euro per year</li> <li>▪ Saved greenhouse gas emissions: 360.000 t CO<sub>2</sub> per year</li> </ul>

Figure 11: BEG funding volume (dena)

Besides funding retrofitting and new constructions, the Federal Office for Economic Affairs and Export Control (BAFA) subsidises energy consultations for residential buildings. The funding program's main goal is to make it easier for homeowners and tenants to get started with the retrofitting. The consultants give on-site advice, pointing out weaknesses of the building including the heating and system technology and providing recommendations for retrofitting and modernisation measures<sup>8</sup>.

## 4.5. Commercial situation and Qualifications

The Federal Ministry for Economics and Climate Protection (BMWK), the Federal Office for Economic Affairs and Export Control (BAFA) and the KfW banking group (KfW) have introduced a nationwide list of qualified experts for subsidized energy consultation and for highly efficient renovations and new buildings. This list is an instrument to ensure the quality of energy advice and energy-efficient construction and renovation. Additionally, the list creates more security and credibility for property owners. Currently, the list contains 13.000 energy efficiency experts (incl. 8.500 architects and engineers, 3.000 craftsmen and technical professionals).

For this wide range of activities, experts must have extensive technical know-how and comprehensive knowledge of energy and building physics. Moreover, they have to follow up current developments in funding policy. The verification is carried out using a multi-level quality assurance system for the initial registration and the extension of the registration. For the first entry, the experts must provide proof of their basic and additional qualifications. The entry for each funding program is valid for three years. To

<sup>8</sup> Dena (2021): Dena – Gebäudereport 2022. [https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2021/dena-Gebaudereport\\_2022.pdf](https://www.dena.de/fileadmin/dena/Publikationen/PDFs/2021/dena-Gebaudereport_2022.pdf)



extend their listing, experts must take part in further training (24 teaching units) and provide prove of their gained practical experience<sup>9</sup>.

Following the energy consultation, craftsmen are needed to execute the retrofiting. However, in addition to the shortages of raw materials and intermediate products and supply chain problems, there are increasingly bottlenecks in skilled workers in Germany. This is delaying or even preventing retrofiting measures from happening. Overall, 85 % of the companies expect various negative effects as a result of shortages of skilled workers. In the construction industry in particular, many companies anticipate the effects of a lack of staff (94 %), but the same applies to industry (89 %). In construction, the proportion of companies that anticipate an additional workload for staff is highest (66 %)<sup>10</sup>

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<sup>9</sup> Energie Effizienz Experten (2023) <https://www.energie-effizienz-experten.de/>

<sup>10</sup> Deutsche Industrie und Handelskammer (2022): DIHK Report – Fachkräfte 2021.

<https://www.dihk.de/resource/blob/61638/9bde58258a88d4fce8cda7e2ef300b9c/dihk-report-fachkraeftesicherung-2021-data.pdf>

## 5. Status quo of the deployment of one-stop-shops in Germany

In order to find out which approaches from the one-stop-shop Toulouse Métropole Rénov could be enriching for German integrated home energy renovation services, the status quo of the German one-stop-shop services was examined in a three-step analysis. As the energy and climate protection agencies in Germany are the institutions that set up OSS in most regions, close cooperation was established with this target group. In a workshop, an online survey and individual interviews, it was determined what challenges German energy advisory structures are facing and what obstacles are seen in their further development.

### 5.1. Workshop “One-stop-shops for integrated home energy renovation as a burning glass of the current challenges in the building sector”

On 1<sup>st</sup> June 2022, a workshop was held with 15 energy and climate protection agencies of the eaD (Federal Association of Energy and Climate Protection Agencies in Germany) to raise awareness of the topic of one-stop shops and to obtain an initial overview of the approaches already being implemented in Germany. The elements of one-stop-shops were presented exemplarily on the basis of the two case studies Toulouse and Hanover and then discussed with the participants with regard to the challenges of modernisation in Germany.

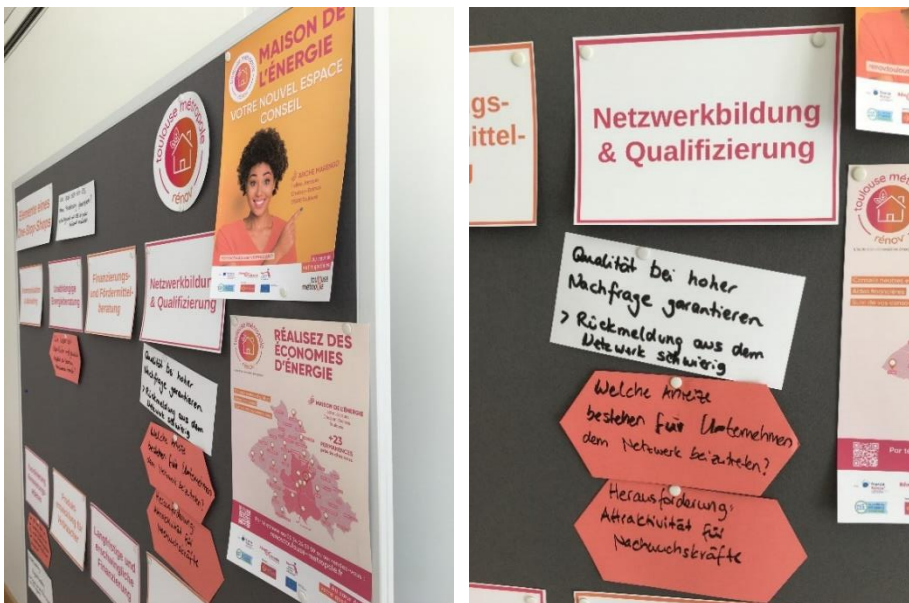
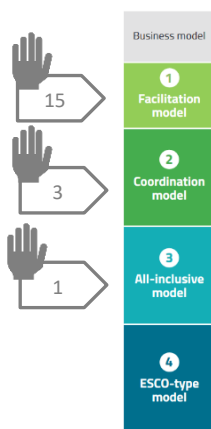


Figure 12: Impressions from workshop with the eaD members, June 2022

Overall, one-stop-shops are seen as an important solution to increase the modernisation rate, to lower the inhibition thresholds of private owners and to offer guidance through the entire modernisation process by all participants.

When the agencies were asked whether they run one-stop-shops and on which level of the 4-level INNOVATE model they would classify these, it became clear that all of them classify their OSS on the first level and only a few would categorise them on the second or even third level. Initial advice on building modernisation is offered by all agencies, as well as training in energy-efficient building for energy



consultants, architects and engineers. In some cases, efficiency/modernisation networks are also supported by the agencies, which are an important element of model 2. In general, it became clear that the step between model 1 and model 2 currently represents a barrier for all and is an important development step for one-stop-shops in Germany.

The biggest challenge is to accompany the owners through the entire renovation process and therefore cover a great part of the customer journey. One reason for this is that architectural services are involved here, which have to be remunerated according to the German fee regulations for architects and engineers (Honorarordnung für Architekten und Ingenieure, HOAI), and it is difficult to distinguish them from the free services offered by the one-stop shop or integrate

them into the offers of the OSS.

In general, it was pointed out that the one-stop-shops have to be differentiated according to the target group and that, in addition to private and commercial building owners, municipalities are also an important target group that face completely different challenges. In addition, long-term financing of the OSS must be secured without burdening private owners too much financially and without being dependent on subsidies from the state or the EU.

The key findings from the discussion on the specific elements are briefly presented below:

- Independent energy consulting
  - How can the free and fee-based advisory services of the OSS be clearly separated?
  - Conflict of interest with services free of charge that are also covered by architects/engineers regulated according to the German fee regulations
- Building networks & qualification
  - It is difficult to obtain evidence of qualification from the network on an ongoing basis, especially in times of intense workload.
  - What incentives are there for companies to join the network when the workload is already high?
  - It is a challenge to recruit and commit young professionals (attractive salary etc.)

## 5.2. Online Survey "One-Stop-Shops in Germany"

Under the title "One-Stop-Shops in Germany", an online survey was carried out among German energy and climate protection agencies from 1<sup>st</sup> June to 15<sup>th</sup> July 2022. The survey was intended to find out which approaches of one-stop-shops already exist in Germany. In addition, first indications were collected on how a potential development of the German one-stop-shops could look like. For this purpose, more than 30 questions on the elements of a one-stop-shop were developed (see in the annex).

The online survey was promoted via the ZEBAU and eaD e-mail lists, the ZEBAU newsletter and at the workshop with eaD members at the beginning of June. In total, 13 German energy and climate protection agencies and one craftsmen's cooperation (Wuppertal) participated in the online survey.



Figure 13: Participants of the online survey

### 5.2.1. Results of the survey: Current situation

A total of 7 out of 13 energy and climate protection agencies and the craftsmen's cooperation that participated in the online survey are currently involved in a one-stop-shop. The areas where the one-stop-shops are active include cities, sometimes with surrounding areas, or entire districts with mainly dense settlement structures and more than 80,000 inhabitants.

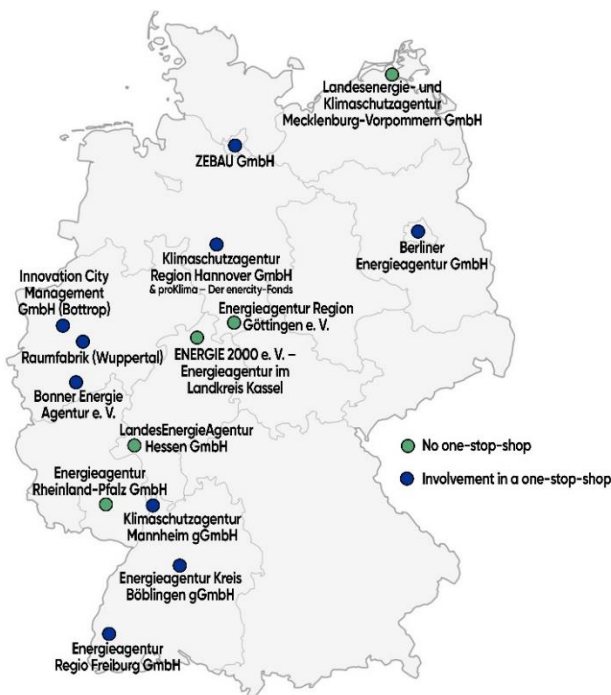


Figure 14: German energy and climate protection agencies with participation in a one-stop shop

In addition to the energy and climate protection agencies, the one-stop-shops primarily involve public authorities, chambers of crafts and building contractors. The one-stop-shops in Germany have various business models in which the involved actors take on different tasks. The tasks (e.g. coordination, advice or marketing) are divided among the participating actors according to their competences. In some one-stop-shops, an authority or administration acts as a decision-maker in addition to the energy and climate protection agencies. Furthermore, the one-stop-shops are involved in a network with consumer centres, banks, funding institutions and utility companies.

Network partners of local actors for energy retrofitting

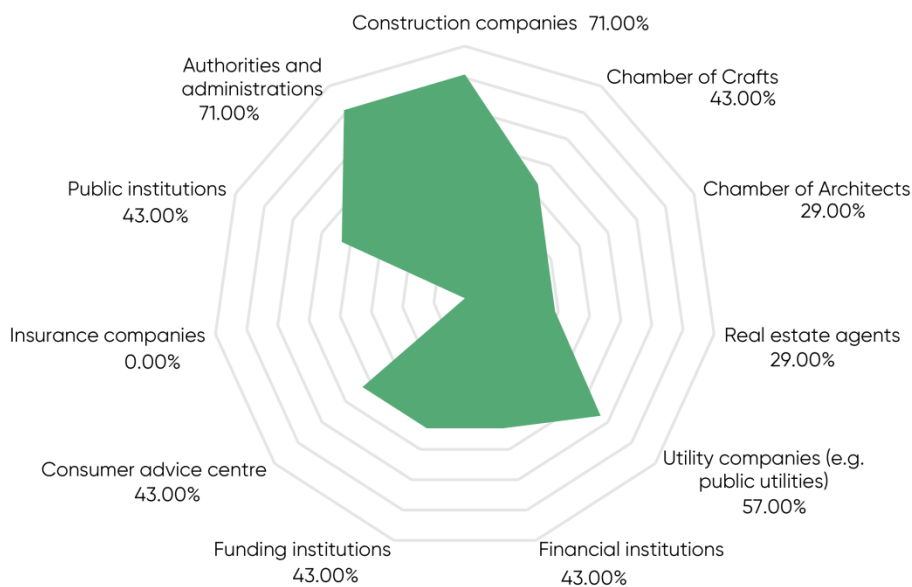


Figure 15: Network partners of German one-stop-shops

### Communication & marketing

The one-stop-shops primarily offer their advice and information services to private owners of residential buildings, single-family homeowners and homeowners' associations. Commercial and business-oriented **target groups** are addressed much less by the one-stop-shops.



Figure 16: Mainly addressed target groups of German one-stop-shops

In addition to "classic" formats like the press, information flyers and information stands, the German one-stop-shops also use online-based advertising options such as a website or social media for **communication and marketing** purposes. More than 80 % of the participating one-stop-shops do not proactively generate



demand for specific target groups, for example, through a market analysis of the existing building stock and direct approach of the owners.

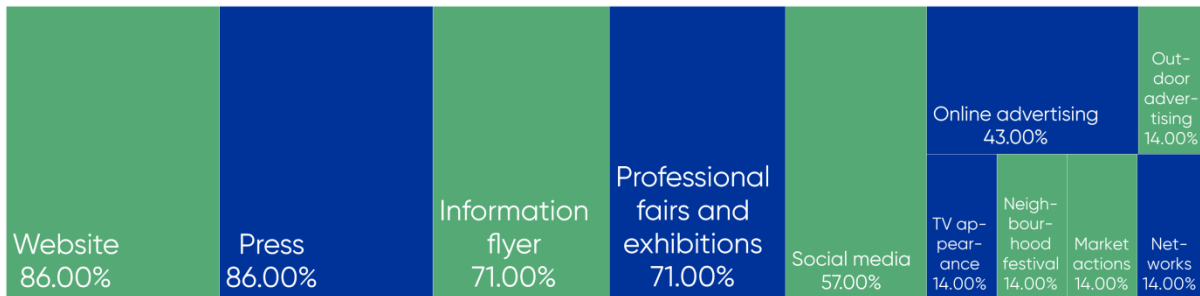


Figure 17: Advertising activities of German one-stop-shops

### Independent energy advice

The **services** most often offered by the one-stop-shops include initial advice in the "guidance phase", the provision of general information on optimal renovation work and a list of building contractors, as well as the recommendation of relevant energy-saving measures, technologies and materials. In addition, all participating one-stop-shops offer general advice on existing financing options, such as funding programmes or subsidies. The informations are provided via telephone, online consultations, events and as advice at physical advice centres. Explanation videos as a supplement to the "classic" consultation services have been used by only a few one-stop shops so far. More than half of the participating one-stop-shops offer all counselling and information services without charge.



Figure 18: Counselling and information services of German one-stop-shops

Services on behalf of homeowners, such as the coordination of contractors and renovation work or the preparation of a tailor-made financing plan including the necessary documentation, are not covered by the German one-stop-shops so far. The development of a "roadmap for energy-efficient refurbishment" and the provision of products which have been negotiated with partner technology suppliers and service providers are also currently not part of the range of services offered by the one-stop-shops in Germany.

### Financing and subsidy advice

The one-stop-shops and their free consultation and information services are largely financed by the local authorities and administrations. Explicit support for the **financing** of the free consultation services by the federal government is an isolated case. In the case of one one-stop-shop, an energy provider does the financing. The one-stop-shops under construction from the EU-project "ProRetro" in Berlin, Hannover, Bottrop, Böblingen and Wuppertal are funded by the EU Horizon 2020 programme. Percentage surcharges for services and construction measures to finance the one-stop-shop are rarely or not at all represented so far.



Consulting services	Providing One-stop shops
General advice on existing financing options (support programmes, subsidies, tax credits, energy efficiency certificates, etc.)	7
Support in the preparation of a tailor-made financing plan and in the preparation of all documents	1
Support with applications and communication with banks and funding institutions	1
Preparation of a tailor-made financing plan and all documents required for obtaining financing on behalf of the homeowner(s)	X

Figure 19: Consulting services from German one-stop-shops on existing financing option

### Networking & qualification

When asked about **networking** activities with other one-stop-shops, it became obvious that the existing counselling and information services in Germany are rarely known under the term "one-stop-shop". This is due to the fact that many offers only cover individual elements of a fully comprehensive one-stop shop and therefore are not understood as one-stop-shops. One-stop-shops that know each other are also networking with each other. Networking with one-stop-shops from other countries only takes place through participation in international projects, such as in Horizon 2020 projects.

The number of energy consultants employed in the German one-stop-shop varies. There are mainly one to five energy consultants working for the one-stop-shops. In one case there are even 25 energy consultants working for the one-stop-shop. The reasons for this are, on the one hand, the availability of professionals and, on the other hand, the size of the areas where the one-stop-shops are active. To work in a one-stop-shop in Germany, the energy advisors must fulfil certain **qualifications**. Most one-stop-shops require energy consultant training with a following certification. But the one-stop-shops also wish practical experience and general knowledge about the relevant topics (e.g. laws, subsidies, technologies).

### Monitoring

The **target values** of consultations that have to be fulfilled each year vary between the one-stop-shops. The participating one-stop-shops carry out between 500 and more than 5,000 energy counselling sessions per year. The agencies also reported that they achieve the set target values, and in some cases even exceed them. The one-stop-shops, which are currently being set up, have not defined any target values so far.

In most of the one-stop-shops, an **evaluation** and monitoring system does not exist or is being developed. The first approaches to measure the impact of the one-stop-shops are to contact those who seek advice about one to two years after the initial consultation or to evaluate the municipal funding programmes used for the modernisation. More than half of the participating one-stop-shops do not take any measures to monitor the modernisation work. Also, taking responsibility for the quality of the work and the achievement of the estimated energy savings, as well as the development of certification systems and selection procedures for construction companies to ensure quality, are not applied at this moment.

### 5.2.2. Evolution of the one-stop-shops in Germany

More than half of the participating energy and climate protection agencies that are involved in a one-stop-shop are thinking about further developing their offers. In this context, there is a special interest in the development of:

- group consultations
- explanation videos and digital information to reduce the workload of the energy advisors
- improved cooperation with local crafts companies
- expansion of monitoring
- revision of the financing model of the one-stop-shop

In the future, two energy and climate protection agencies that have not been involved in any one-stop-shop so far want to establish a one-stop-shop in their region.

The greatest **challenges** for the setup and further development of one-stop-shops are seen in the lack of sufficient numbers of qualified professionals, the financing and the commitment of the professionals to the one-stop-shop and the ongoing cooperation with network partners. Possible solutions for overcoming these challenges exist for the energy and climate protection agencies, for example, through a political focus on strengthening local crafts, support in recruiting professionals and additional education offers for energy consultants. In addition, increased cooperation with architects and engineers and the establishment of a stable network are recommended.

### 5.3. Interviews on the set up of one-stop-shops in Germany

In addition to the results of the workshop and the online survey, interviews were conducted with three climate and energy agencies on the set up of one-stop-shops in Germany. The energy agency of the city of Bonn, eza! energy and environment center Allgäu and the climate protection agency of the Hannover region were selected for an interview because they are currently at different stages in the development of a one-stop-shop. The eza! energy and environment center Allgäu has many years of experience in bundling energy consulting services, a recognized partner network and is part of the EU project EUROPA, which is establishing one-stop-shops in five European pilot regions. The climate protection agency of the Hannover region, together with proKlima and in cooperation with a modernisation partners network, is currently developing its own one-stop-shop as part of the EU project ProRetro. In Bonn the one-stop-shop is still in the design phase and is planned to start in 2024.

The interviews show that, regardless of the stage of development, German one-stop-shops face especially the challenges of attracting professionals through a network, coordinating the modernisation process without construction supervision, and setting up an efficient monitoring system to track the implemented measures after the consultation with OSS advisors. In addition, the interviews showed that the modernisation rate in Germany can only be increased if condominiums and the challenges associated with their ownership structure and complex decision-making processes receive more attention from the one-stop-shops.

#### Connecting professionals through a network

The establishment of a network of professionals or cooperation with an existing network is essential for setting up a one-stop-shop in Germany. Such a network enables the one-stop-shop to exchange

information with professionals, such as energy consultants, architecture firms or craftsmen, and recommend qualified firms to the homeowners who will implement the modernisation work.

The eza! energy and environment center Allgäu has formulated its own quality standards for each sector, according to which the companies are tested. At the same time, with their membership, the companies agree to follow the so called “energy codex” developed for the eza! partner network. The energy agency of the city of Bonn has adopted this quality control for its network. In addition, eza! offers a customer rating system on its website to monitor the quality of the network partners. Due to the high demand for construction experts, the companies are currently less interested in acquiring orders via networks. Nevertheless, the attraction of participating in the network of a one-stop-shop is the membership in a qualified cooperation and exchange network, the further training offered exclusively for the members and the closeness to the energy and climate agency and with it to the administration and municipal actors. Within the one-stop-shop, at least one staff position is needed to coordinate the network, which is financed in the Allgäu and in Bonn together with the further training through the membership fees.

In the case of the one-stop shop in the Hannover Region, which was launched by the Horizon2020 project ProRetro, a quality network called Network of Modernisation Partners (NeMo) already existed beforehand since 2009. NeMo unites energy advisers and architects, whose services are needed in the planning phase, banks and other financial institutions, contractors and advisers helping with quality control and quality assurance. The idea of the Hannover OSS was to relieve the network of the coordination effort with the homeowners in order to create more capacity for the contractors to carry out the actual modernisation work. A person who is coordinating inquiries from customers constitutes the interface between companies and customers since Februar 2022. This person knows the specialities of the companies in the network and is able to convey the customer to a suitable company and thereby theoretically shorten the time until the customer gets a quotation and the measures are implemented.

### **Process management without construction supervision**

Particular challenges in Germany in developing a one-stop-shop beyond pure consulting to the coordination of modernisation work are the legal regulations on construction supervision. In Germany, this is generally the task of architects, engineers or qualified craftsmen, who have the required authorization. In Bonn, a contract was created that transparently communicates which consultations are possible by the one-stop-shop and at what point technical support by architects and engineers becomes necessary. At the eza! energy and environment center Allgäu a small number of employees are qualified to provide consultations on funding and construction supervision against payment. In principle, the one-stop-shops in Germany pass on the building supervision to architectural and engineering companies. In the expansion of the one-stop-shop in Bonn, it is being considered to rethink the role of the energy consultants towards a neutral caretaker who accompanies and coordinates the (decision-making) process instead of taking over the complete construction supervision.

### **Efficient monitoring**

Monitoring the modernisation activities that have taken place after a consultation has been very work-intensive for the one-stop-shops in Germany. One reason for the effort is the strict data protection standards, which in Germany requires homeowners to give their agreement to being contacted again. Moreover, there is also a lack of staff capacity to contact clients to find out what measures have been

implemented. Additionally, as a result of the Corona pandemic, the proportion of video and telephone consultations has increased, so that it is not possible to request agreements to monitoring by signature at an early stage, as in the case of face-to-face consultations. Discussions with several energy agencies have led to the conclusion that no OSS has yet found a good solution for an efficient monitoring system and that there is great potential for development here in order to improve the OSS's services with the feedback from clients.

### **Raising modernisation potential by activating condominiums**

Compared with single-family homeowners and housing companies, condominiums in Germany are more difficult to activate for modernisation. The reasons for this can be found in the ownership structure of the condominium buildings. Because of the diverse opinions and different financial constraints of the individual owners, it is often hard to form a consensus leading to renovation work. In addition, condominiums need special consulting services and financing tools tailored to their structure. As part of the EUROPA project, eza! offers low-threshold impulse consultations for condominiums and adapts the filtering system on the website in their partner network to this target group.

## **6. Recommendations for the setup and expansion of one-stop-shops**

### **6.1. Summary of identified barriers**

The results from the online survey and interviews with energy agencies as well as the discussions on the development of the OSS model in Hamburg helped to define common barriers that German decision-makers are confronted with when designing the OSS business strategy and that homeowners face during their modernisation project in Germany.

#### **Challenges for the business strategy:**

- (1) Recruitment of and continuous cooperation with professionals
- (2) Long-term financing of the consulting services and consulting professionals
- (3) Accompaniment of the entire modernisation process
- (4) Efficient monitoring

#### **Barriers in the customer journey:**

- (1) Uncertainty and lack of transparency in funding opportunities and subsidies
- (2) Cost increases in the construction industry and financing difficulties for deep renovations
- (3) Difficulties of choosing from a wide range of competing offers for energy consulting
- (4) Building and planning has become complicated due to the diverse set of regulations
- (5) Several disciplines and trades have to be coordinated for one project
- (6) Search for and availability of craftsmen and architects
- (7) Lack of ongoing support during the entire modernisation process

While some challenges need to be solved on a larger scale (e.g. through clear and consistent funding opportunities and specifications from the German government), one-stop-shops at the regional or city level can help break down barriers in the renovation process. In the following sections, steps are listed that are aimed at cities that do not yet have a one-stop-shop offer and cities that have already bundled offers into one OSS.

## 6.2. Steps to set up and develop one-stop-shops

### Where to start?

In order to find out at which starting point the development of an OSS begins, an assessment of the current situation on a local base must first be made. One-stop-shops are not always directly tangible and can be found behind different forms of cooperation and umbrella brands. In most larger cities, there are already various services for homeowners that offer help with energy-efficient renovation. In Germany, these services are offered, for example, by the consumer advice centre or other institutions such as the chamber of crafts. In addition, energy and climate protection agencies also offer services in this area.

If these services still exist independently in a region, the further steps in **Case A** should be followed. If modernisation services have already been brought together under one roof and an OSS exists at the facilitation model level, the steps in **Case B** can help with further development.

### Case A: Offers for energy modernisation exist separately from each other

In this case, it is advisable to first establish a facilitation model of an OSS to combine capacities and build a trusted umbrella organisation that is known in the region as a quality provider. The facilitation model aims to raise awareness on energy renovation benefits, provides general information on optimal renovation works and gives first advice at the 'orientation stage' of a renovation project.

To establish this model, the first three steps to support the customer journey are a guidance.



The first steps focus on marketing the existing offers clearly and jointly in order to avoid duplicate offers and to provide an orientation and decision-making aid for the customer. Often, an additional financing by the municipality creates a free offer of energy consultation at the orientation level to create a low-threshold offer. At the same time, the financing and participation of the municipalities protects the independence of the consulting service from producers and companies. With the available financial resources, the OSS have to finance the free advisory and information services on the one hand, and at the same time the consulting professionals have to be attractively paid in order to bind them to the OSS. In Germany, there is generally no reason to assume that funding for energy advice will be cut, because the aim is still to increase the rate of renovations and the free initial consultation are a key to achieving this. But a study by the EU's ProRetro project shows that a large proportion of homeowners would be willing to pay a fee for the support during the entire modernisation process by a OSS. (More information on the study can be found [here](#)) Another fundamental aim is to highlight the long-term financial advantages of a modernisation and to raise awareness on funding opportunities and subsidies.

Practical approaches from Hamburg, Toulouse and Hanover to tackle the first three steps can be found in the case studies in chapter 3. For example:

- >> Building exhibition of the Hamburger Energielotsen [PAGE 14](#)
- >> Virtual platform and physical shop “Maison de l’Energie” of Toulouse Métropole Renov [PAGE 18](#)
- >> Energy consultation offers from Network of Modernisation Partners in Hanover Region [PAGE 11](#)

To guarantee independent energy consulting and to secure the offers of the OSS, the following aspect has to be considered when setting up the business strategy:

- (1) Recruitment of and continuous cooperation with professionals
- (2) Long-term financing of the consulting services and consulting professionals

By implementing the first steps, the following barriers during the customer journey can be reduced:

- (1) Uncertainty and lack of transparency in funding opportunities and subsidies
- (2) Financing difficulties for deep renovations
- (3) Difficulties of choosing from a wide range of competing offers for energy consulting
- (4) Building and planning has become complicated due to the diverse set of regulations

### Case B: Offers for energy modernisation have been combined under one roof

In order to bundle the offers in a region and to create a better overview for the customers, many cities have already combined offers under one brand and thus taken the first step towards a one-stop-shop. If this basis and hereby an OSS of the facilitation model exists, there are the following possibilities to expand the OSS and reduce barriers to renovate for homeowners.

The steps 4, 5 and 8 contribute to the evolution from a facilitation model to the coordination model. This model coordinates existing market actors (suppliers), makes sure all one-stop-shop services are offered to homeowners and aims to overlook the whole renovation process without taking responsibility for the result of renovation works.

Since steps 6 and 7 are designed for the all-inclusive model and actors of the private sector, they are not discussed further below.

1	Communication & Marketing	2	Independent energy consultation	3	Financing & funding consultation	4	Network building & qualification
5	Coordination of the renovation work	6	Product development for consumers	7	Long-term and affordable financing	8	Monitoring of the renovation results

In order to increase the modernisation rate, more and more municipalities are requesting that owners be accompanied throughout the whole implementation process in order to help overcome obstacles and prevent projects from coming to a standstill. However, the coordination of the actors involved in the renovation project is a classic task for architecture firms and is associated with far-reaching contractual regulations and liability risks. Furthermore, energy agencies and actors, which are often commissioned by the municipality to offer one-stop-shop services, are not allowed to compete with offers available on the market or interfere with the free competition of the building contractors by directing customers towards a certain supplier. Therefore, the possibilities for one-stop-shops to accompany the renovation process are limited. Nevertheless, they can play an important role by acting as a friendly and competent guide or care taker and neutral point of contact with no economic interest in the modernisation project, to help out at

the points where common modernisation projects stop. To fulfill this function, it is important that not only a free initial consultation is offered, but also that follow-up consultations are possible.

The monitoring of modernisation activities that have taken place after a consultation is currently very work-intensive for the one-stop-shops in Germany and is done only rarely. For efficient monitoring, ideally a digital file is created for each initial consultation and consent is given to be contacted again so that a consultant from the OSS can proactively approach owners to follow up on the implementation of the measures that were discussed and offer to help with problems encountered.

The establishment of a network of professionals in the building sector or cooperation with an existing network is essential to reduce one of the biggest barriers in the customer journey: finding craftsmen and construction companies to carry out the renovation work. Such a network enables the one-stop-shop to exchange information with the professionals, such as energy consultants, architecture firms or craftsmen, and recommend qualified firms to the homeowners who will implement the modernisation work. In addition, there is the possibility to train the members of the network in climate-friendly building. If a digital directory of the companies is available, the advisers of the OSS do not have the problem of interfering with the free competition of the building contractors because they do not direct their customers towards a certain supplier. Within the one-stop-shop, at least one staff position is needed to coordinate the network, which is financed in the Allgäu and in Bonn together with the further training through the membership fees. In Germany, there are already many such networks, that also provide the basis for setting them up (e.g. the eza! energy and environment centre Allgäu).

Practical approaches from Hamburg, Toulouse, Hanover and Bremen to tackle the steps can be found in the case studies in chapter 3. For example:

- >> Free education offers for experts in energy-efficient construction from the Hamburger Energielotsen [PAGE 16](#)
- >> Directory of professionals and Monitoring & Best Practice System for condominiums via CoachCopro from Toulouse Métropole Rénov [PAGE 21 AND 23](#)
- >> Enquiry form as preliminary contract proposal from Hanover Region [PAGE 26](#)
- >> Appointment booking and tracking tool of the klimabauzentrum Bremen [PAGE 29](#)

For a successful expansion of the OSS's offers, the following aspects must be considered in the **business strategy** and individual solutions found at an early stage:

- (1) Recruitment of and continuous cooperation with professionals
- (3) Accompaniment of the entire modernisation process
- (4) Efficient monitoring

By implementing more offers into the OSS, the following barriers during the **customer journey** can be reduced:

- (5) Several disciplines and trades have to be coordinated for one project
- (6) Search for and availability of craftsmen and architects
- (7) Lack of ongoing support during the entire modernisation process



### 6.3. Four Lessons learned from Toulouse

In the analysis of the German one-stop-shops in comparison with the French market and especially the OSS “Toulouse Métropole Rénov”, the following elements stood out in particular, which should generally help in the development of OSS and thus the increase of the renovation rate:



#### SHOW YOUR SERVICE

##### >> A flagship for modernisation in Toulouse

The physical location of the one-stop-shop Toulouse Métropole Rénov is the “Maison de l’Énergie” situated near the central train station in Toulouse. The Maison de l’Énergie gives the one-stop-shop a high visibility and increases the awareness of the new service. Here, customers can find free information on housing and energy and get a consultation. Opening hours are from Tuesday to Thursday afternoon from 2 to 6 pm. In addition, the OSS advisors visit 23 locations in the metropolitan region to provide advice close to home. The dates on which counselling is provided at the locations can be viewed on the website.



#### BE OUTGOING

##### >> Proactive approach through mapping of energy renovation potential

The energy renovation potential in Toulouse Métropole was analysed using open data, data issued from the CoachCopro platform from 300 registered condominiums and more specific local data (e.g. Diagnosis of Performance). Coupled with a proactive communication approach to target the identified condominiums and individual houses, this work focused on the most energy-intensive housing in the territory and paid particular attention to the most easily accessible renovations. The identified condominiums and individual houses were approached in cooperation with the mayors of the districts via personal letters, webinars and informational events in their respective neighbourhoods to make the offers of the OSS known and to trigger renovations.



#### USE DIGITAL TOOLS

##### >> CoachCopro as a modernisation assistance for condominium owners' associations and directory for quality suppliers

The platform CoachCopro encourages energy efficiency actions of condominiums. The platform has been designed in 2016 as a tool for consultants in charge of condominium projects to manage a condominium portfolio, archive information, save documents, extract data and document the modernisation project. By saving the data on the building in a digital file, it is possible to continue working on the modernisation project even after a change of



personnel or owner, and long modernisation processes can be managed and documented in this way. CoachCopro is integrated into many French one-stop-shops and by now 10,000 condominiums are registered here and 70% of the French territory is covered.

All the data is made available to other condominium owners via the website as a kind of best-practice-library. This transparent summary of the modernisation projects can show other owners the feasibility and ease their concerns. A building profile shows:

- the energy consumption before and after the modernisation,
- which measures were carried out,
- how much time the work took,
- how much it cost,
- which subsidies were acquired and
- which companies carried out the work.

CoachCopro for Toulouse Métropole Rénov:

<https://toulousemetropole.coachcopro.com/>



#### >> Building trust among homeowners through the development of a quality network

To show homeowners a choice of trustworthy and high-quality construction companies, a charter of commitments was elaborated that companies sign to get listed on a directory of professionals that is accessible from the website of the OSS. Here, the homeowners can see which renovation works the companies have already carried out in Toulouse and there is a feedback possibility whereby the quality of the companies should be ensured. The advisor of the OSS guides the homeowner towards the directory of professionals and can assist the homeowner in reviewing the companies' cost estimates.

Companies wishing to join the directory must sign the “charter of commitment” of the OSS. The charter was drawn up in collaboration with the largest craft associations in Toulouse, and it is through this collaboration that the individual companies are approached for inclusion in the directory. The OSS offers the companies a representation in a directory and several thematic workshops in a year to learn more about climate friendly construction. In return, the companies systematically inform the customers of the existence of a neutral and free advice provided by the OSS.

Directory of professionals for Toulouse Métropole Rénov:

<https://renov.pro.annuaire-coachcopro.com/>

**CONNECT  
QUALITY  
SUPPLIERS**

## 6.4. Conclusions

The insights on the replication potential of the Toulouse approach to a one-stop-shop were presented at various events in Germany and subsequently discussed with experts:

- Online seminar "Zukunftswissenbau": Energy consulting - the path to a climate-neutral building stock in 2045. 26 April 2023
- Joint workshop of the EU projects ProRetro and I-HEROS "Energy-efficient building refurbishment from a from a single source - the potential of one-stop shops in Germany". Berlin, 19 October 2023
- Efficiency conference on climate-neutral construction+modernisation, session on energy-efficient building modernisation with one-stop shops. Hanover, 11 November 2023

Overall, everyone was in agreement that one-stop-shops are an important solution to increase the modernisation rate, to lower the inhibition thresholds of private homeowners and to offer neutral guidance through the entire modernisation process.

The approaches from France were recognised as applicable to Germany. Even if the structure of the building stock and owners vary, the digital tools and the active approach to contact homeowners are methods that are transferable. However, there are currently restrictions that hinder the transfer, such as stricter data protection rules and restrictions on intervention in the private market by publicly subsidised one-stop-shops. Nonetheless, these examples show what works in other countries and which adjustments need to be made at national level in order to achieve rapid success in increasing the modernisation rate in a regional context.

### Outlook

The one-stop-shop concept is about to become more relevant as it is being promoted by the European Commission and has also been highlighted in 2021 in the proposed revision of the Energy Performance of Buildings Directive (EPBD). If the EPBD is adopted in its proposed form, member states will be required to set up one-stop-shops that should be responsible for a broad range of tasks (cf. Article 15a in European Parliament, 2023).

If the EU directive is passed, it will be helpful to learn from pioneering projects in order to promote the speed of dissemination of well-performing OSS. Established tools or procedures from local contexts could be standardised and disseminated at national level.

## 7. Annex

### 7.1. Questionnaire of the online survey

#### Survey: One-Stop-Shops in Germany - Version for participants with a One-Stop-Shop

##### Introduction

1. In which energy or climate protection agency are you active?
2. Are you involved in a One-Stop-Shop?
3. For which One-Stop-Shop are you answering the survey?
4. Do you know any other One-Stop-Shops in your region? If you do, which ones?

##### Organisation

5. Which actors are involved in the provision of your One-Stop-Shop?
6. How are the actors organised among themselves?
7. How is the provision of your One-Stop-Shop financed?

##### Consultation offer

8. What counselling and information services does the One-Stop-Shop offer?
9. Which target groups are mainly addressed by the One-Stop-Shop's advisory and information services?
10. Which steps in energy modernisation does your One-Stop-Shop support?
11. Which advisory and information services are cost-free and which are not?
12. How are the cost-free advisory and information services financed?

##### Networking and qualification

13. How many energy consultants do you currently employ in your One-Stop-Shop?
14. What qualifications do the energy advisors have to work in your One-Stop-Shop?
15. With which local actors for energy modernisation is the One-Stop-Shop linked?
16. Are there networking activities with other One-Stop-Shops?

##### Communication and marketing

17. How are the counselling and information services advertised to the public? (Measures, formats, etc.)
18. Are there proactive marketing and communication activities for specific target groups based on a prior market segmentation? (e.g. low income, specific neighbourhoods, young families, elderly, etc.)?

##### Financing and funding advice

19. What funding opportunities are available for energy-efficient modernisation in your region?
20. How do you give advice on the existing financing options?



### Monitoring

21. Which target value of consultations must be reached every year and will it be reached?
22. How is the outcome of the One-Stop-Shop (actual modernisation) measured?
23. How is the outcome of the modernisation work monitored by your One-Stop-Shop?

### Future development

24. Are you already considering or planning the further development of your One-Stop-Shop?
25. What are your wishes for the further development of your One-Stop-Shop?
26. What central challenges do you see in the further development of your One-Stop-Shop?
27. How could the previously mentioned challenges be overcome?

### Closing

28. In which federal state(s) do you work?
29. Which counties, metropolitan region, cities, municipalities, etc. does the area of your One-Stop-Shop include?
30. What is the spatial and urban structure of the area of your One-Stop-Shop?
31. Approximately how many inhabitants live in the area of your One-Stop-Shop?

## Survey: One-Stop-Shops in Germany - Version for participants without a One-Stop-Shop

### Introduction

1. In which energy or climate protection agency are you active?
2. Are you involved in a One-Stop-Shop?

### Future development

3. Are you already considering or planning the development of a One-Stop-Shop?
4. What do these considerations and plans for the development of a One-Stop-Shop look like?
5. What key challenges do you see in the development of a One-Stop-Shop for your region?
6. How could the previously mentioned challenges be overcome?
7. Do you know any other One-Stop-Shops in your region? If you do, which ones?

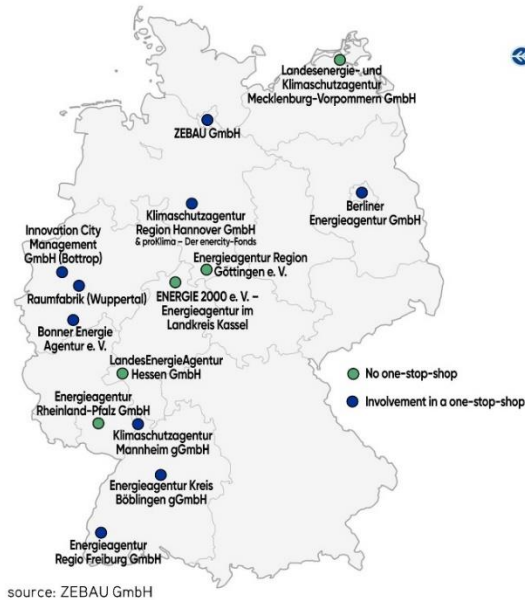
### Closing

8. In which federal state(s) do you work?
9. Which counties, metropolitan region, cities, municipalities, etc. does the area of your One-Stop-Shop include?
10. What is the spatial and urban structure of the area of your One-Stop-Shop?
11. Approximately how many inhabitants live in the area of your One-Stop-Shop?

## 7.2. Charts from the evaluation of the online survey



EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



### General findings

- 8 out of 14 participating agencies are involved in a one-stop-shop
- The areas of the one-stop-shops include cities (partly with surrounding areas) or whole districts with predominantly dense spatial and settlement structures and more than 80,000 inhabitants
- 57 % of the participating agencies are thinking about developing their existing one-stop-shop
- 2 participating agencies would like to establish a one-stop-shop in their region

3

EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



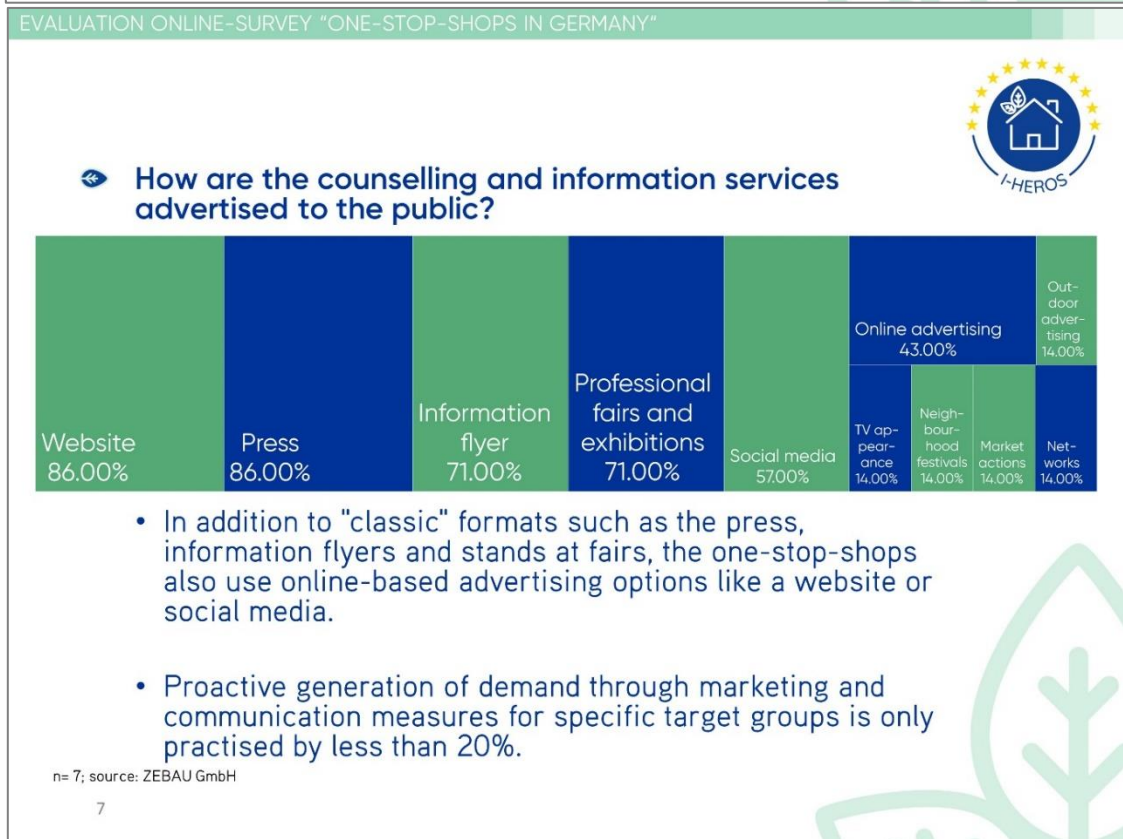
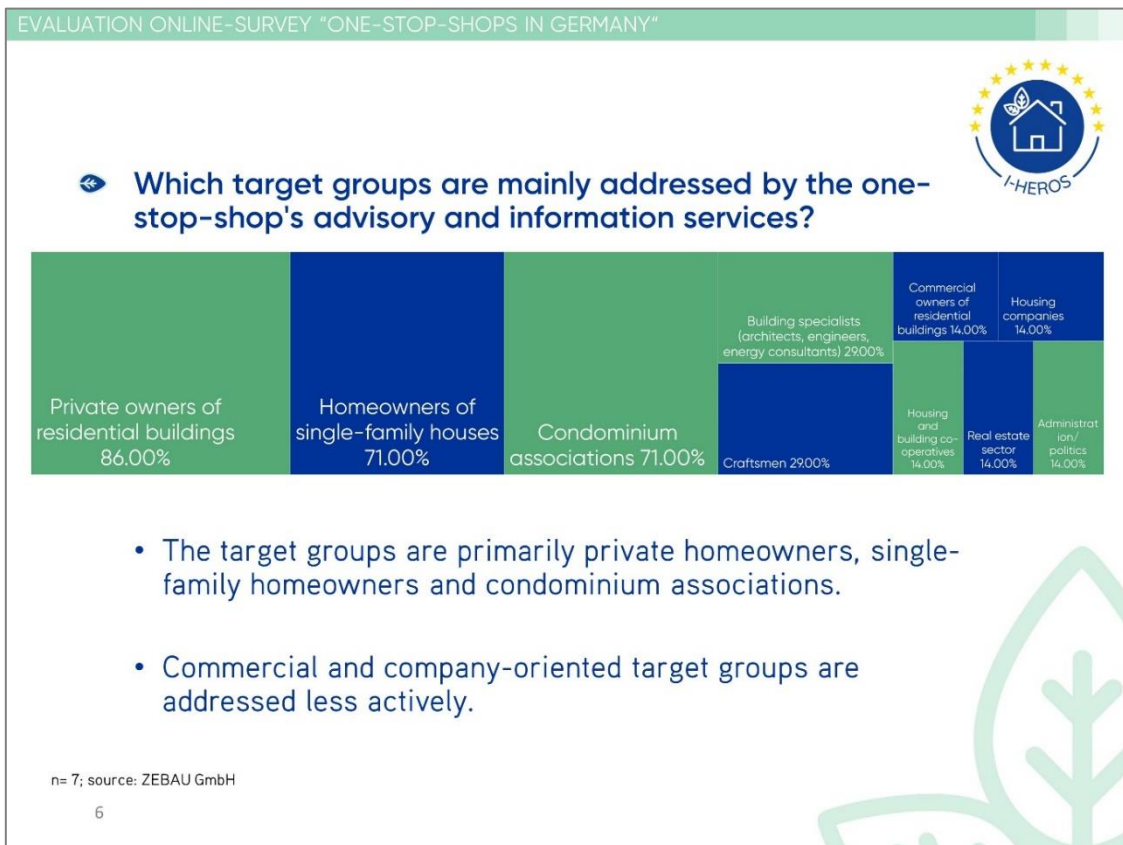
### Elements of one-stop-shops



source: based on „How to set up a one-stop-shop for integrated home energy renovation?“ INNOVATE project (Horizon 2020): [www.energy-cities.eu/wp-content/uploads/2020/07/INNOVATE\\_guide\\_final.pdf](http://www.energy-cities.eu/wp-content/uploads/2020/07/INNOVATE_guide_final.pdf)

4





EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



**What counselling and information services does the one-stop-shop offer?**



- Most of the one-stop-shops offer events for homeowners
- Telephone and online counselling as well as counselling in a local counselling centre are also frequently offered
- Explanatory videos as a supplement to the "classic" counselling services are rarely used so far

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



**Which steps in an integrated home renovation does the one-stop-shop support?**

**TOP 4 services that are offered most frequently**

- Initial advice in the orientation phase
- Provision of general information on optimal modernisation work
- Recommendation of relevant energy-saving measures, technologies and materials
- Provision of a list of construction companies

**TOP 3 services that are least offered**

- Development of a "roadmap for energy-efficient refurbishment" with the goal of comprehensive renovation
- Coordination of contractors and renovation work on behalf of homeowners
- Provision of products that have been negotiated with partner technology suppliers and service providers

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



☛ **Which advisory and information services are free of charge and which are not?**

- 57% of the one-stop-shops offer all counselling and information services free of charge.
- In 29% of the one-stop-shops, the initial consultation is free of charge and one participating one-stop-shop offers a free consultation via the hotline.

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



☛ **How are the cost-free advisory and information services financed?**

- The one-stop-shops and their free counselling and information services are largely financed by the local authorities and administrations.
- Specific support for the financing of free counselling services by the federal government is an isolated case.
- Percentage surcharges for services and construction measures are rarely or not at all represented so far.
- In the case of a one-stop-shop, an energy provider takes over the financing.
- The one-stop-shops under construction from the EU-project "ProRetro" in Berlin, Hannover, Bottrop, Böblingen and Wuppertal are funded by the EU Horizon 2020 programme.

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



What funding opportunities are available for energy-efficient modernisation in your region?



- In addition to the overarching nationwide and state funds, local funding opportunities for energy-efficient modernisation exist in more than half of the regions with a one-stop shop.
- Regional funding opportunities for energy-efficient modernisation exist only in isolated cases.

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



How do you give advice on the existing financing options?

Consulting services	Providing One-stop shops
General advice on existing financing options (support programmes, subsidies, tax credits, energy efficiency certificates, etc.)	7
Support in the preparation of a tailor-made financing plan and in the preparation of all documents	1
Support with applications and communication with banks and funding institutions	1
Preparation of a tailor-made financing plan and all documents required for obtaining financing on behalf of the homeowner(s)	X

source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



☛ Which actors are involved in the provision of the one-stop-shop?

**Public authorities and administration 38 %**

Banks 13 %

Consumer advice centre 13 %

**Construction companies 38 %**

Utilities 13 %

Research 13 %

**Chamber of Crafts 25 %**

- In addition to the energy and climate protection agencies, mainly public authorities and administrations, chambers of crafts and building contractors are involved in the one-stop-shops.
- The consumer advice centre, banks and funding institutions or utility companies are rarely involved or not involved at all.

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



☛ How are the actors organised among themselves?

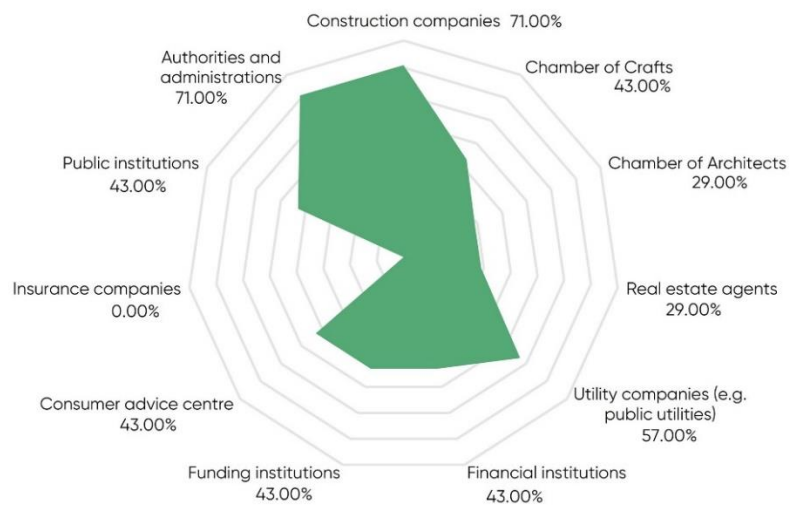
- The one-stop-shops in Germany have different business models in which the participating actors take on different tasks.
- The tasks involved (e.g. coordination, advice, application) are divided between the actors according to their competences.
- In some one-stop-shops, an authority or administration acts as a decision-maker in addition to the energy and climate protection agencies.

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



**With which local actors for energy modernisation is the one-stop-shop linked?**



n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



**Are there networking activities with other one-stop-shops?**

- Many one-stop-shops and energy and climate protection agencies in Germany are not aware of other one-stop-shops and are therefore not networking with other one-stop-shops.
- In some cases, the term "one-stop-shop" is not known, but there are offers that are similar to the one-stop-shop concept.
- One-stop-shops that know each other are also linked with each other.
- Networking with international one-stop-shops only takes place through participation in international projects.

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



➤ **How many energy consultants do you currently employ in the one-stop-shop?**

- There are mainly 1 to 5 energy advisors working for the one-stop-shops.
- One participating one-stop-shop has 25 energy advisors.

➤ **What qualifications do the energy advisors have to work in the one-stop-shop?**

- Most one-stop-shops require energy consultant training and certification.
- But the one-stop-shops also want practical experience and general knowledge of the relevant topics (e.g. laws, subsidies, possible technologies).

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



➤ **Which target value of consultations must be reached every year and will it be reached?**

- The target values vary strongly.
- The one-stop-shops that are currently being set up do not have any target values yet.
- Target values of existing one-stop-shops are achieved annually, in some cases even exceeded.
- Depending on the size of the catchment area, 500 or more counselling sessions are carried out annually.

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



👁️ **How is the outcome of the one-stop-shop (actual modernisation) measured?**

- Most of the one-stop-shops are in the process of developing an evaluation or there is no evaluation.
- In the remaining one-stop-shops, the outcome is measured by contacting those seeking advice about 1- 1.5 years after the initial counselling, the evaluation of the municipal support programme or an annual evaluation.

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



👁️ **How is the outcome of the modernisation work monitored by the one-stop-shop?**



- More than half of the participating one-stop-shops do not undertake any measures to monitor the modernisation works.
- Taking responsibility for the quality of the work and the achievement of the estimated energy savings as well as the development of certification systems and selection procedures for executing building contractors to ensure quality are not applied at all so far.

25 n= 7; source: ZEBAU GmbH

EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



### Further development of the existing one-stop-shops

- 57 % of energy and climate protection agencies are thinking about developing their existing one-stop-shop.

### TOP 3 Wishes for further development of the one-stop-shops

- Development of group counselling sessions, explanatory videos and digital information to reduce the workload of counsellors.
- Improved cooperation with local crafts enterprises.
- Expansion of the monitoring and revision of the financing of the one-stop-shops.

n= 7; source: ZEBAU GmbH

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"



### Further development of the existing one-stop-shops

#### TOP 5 Challenges for further development

- Shortage of qualified professionals
- Provision of funding after the end of the project
- Attractive payment for the consultants and loyalty to the one-stop-shop
- Recognition of added value through neutral support
- Differentiation from services on the market

#### Possible solutions to overcome the challenges

- Political focus on strengthening local crafts and local value creation
- More comprehensive monitoring
- Training initiative, e.g. through subsidised energy consulting courses
- Present the quality of the work through good public relations
- Increased cooperation with architects and engineers, e.g. via the chambers of crafts

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EVALUATION ONLINE-SURVEY "ONE-STOP-SHOPS IN GERMANY"

## Development of a new one-stop shop

- 2 participating energy and climate protection agencies would like to establish a one-stop-shop in their region



### TOP 5 Challenges for a new development

- Shortage of qualified professionals
- Funding
- Dispersed settlement structures
- Continuous cooperation with network partners
- Duration of the development

### Possible solutions to overcome the challenges

- Support in the recruitment of professionals and additional education/training opportunities
- Establishment of decentralised structures
- Establishment of a solid network

