

Report on the European EPC Market

Deliverable D2.2

Horizon 2020

Grant Agreement No. 696040



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 696040.

Imprint

Published by: Grazer Energieagentur GmbH
Kaiserfeldgasse 13
8010 Graz
office@grazer-ea.at

Phone: +43 316 811 848 0

Internet: www.guarantee-project.eu

November 2016

Disclaimer:

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained herein.

Table of Contents

1. Executive summary	4
1.1. Political Framework	4
1.2. EPC market: chances and barriers.....	5
1.3. Survey on EPC.....	6
2. Market volume	9
2.1. EPC turnover.....	9
2.2. Number of projects	9
2.3. Size of projects.....	11
2.4. Other important energy services	12
2.5. Critical assessment	12
3. Market assessment of EPC sectors	13
3.1. Public sector.....	14
3.2. Private sector: Industry.....	15
3.3. Private sector: Tertiary sector.....	16
3.4. Private sector: Residential buildings.....	17
4. Stakeholder survey results	18
4.1. Basis of survey	18
4.2. Experiences with EPC	19
4.3. Problems and potential solutions.....	23
References	27

1. Executive summary

1.1. Political Framework

General findings:

- ▶ **Most important driver:** Impacts of the EU Energy Efficiency Directive (EED), in particular the following articles and their transposition into national law in the member states:
 - Art. 5: the 3% annual renovation target for public buildings
 - Art. 18: focus on the delivery of energy services, e.g. the useful outcome of using energy rather than purely on the supply of energy itself
 - Art. 19: removal of barriers to energy efficiency in accounting rules
 - Art. 20: availability of financing options for EE measures and maximising of benefits of multiple financing schemes.
- ▶ **Relevant support schemes:** In almost all partner countries a range of support schemes for EPC exist. These include green loans, white certificates, cohesion funds, subsidies for initial analysis etc.
- ▶ **Relevant barriers:** All partner countries have to deal with low energy prices since 2013. Consequently, the motivation to invest in EE measures is generally low. Furthermore, in some countries (e.g. Italy and Romania) the European System of National and Regional Accounts (ESA95) is interpreted as follows: Investments in EPC projects are considered as public debt and consequently projects are not approved. In the more advanced EPC markets the legal framework essentially allows for EPC (Germany, Austria, Norway, and Czech Republic), still in some cases legal uncertainties prevail and prohibit projects.

Highlights: The following highlights were identified for Austria, Slovenia and Norway.

- ▶ **Upper Austria:** EPC projects can be subsidised with up to €75.000 or up to 40% of the investment costs. The scheme is one of the reasons for the very dynamic EPC market in Upper Austria with 140 supported EPC projects between 2006 and 2015. These projects showed a cumulative investment volume of 39 Mio € with granted subsidies of 3.2 Mio €.
- ▶ **Slovenia:** Availability and allocation of EU Cohesion Fund for technical support and funding of the deep energy renovation of public buildings via integrated EPC and ESC models.
- ▶ **Norway:** has a national standard for EPC contracts (NS6430). The standard is originally based on model documents and guidelines developed in former EU projects. The standard is now utilised in almost all public tenders.

1.2. EPC market: chances and barriers

In the well-developed as well as in the emerging EPC markets the public sector is still the most important EPC client group. All private market sectors, which were addressed in the assessment (industry, tertiary sector, residential buildings) are characterized by a lack of projects and standards. The following main chances and barriers for the EPC markets have been identified in this report:

Chances of current EPC market:

▶ Climate protection targets:

Especially the public sector has to deal with reaching the CO₂ reduction targets and needs to take relevant measures and define strategies. Furthermore, the issue of climate protection and sustainability gains importance. The green image of buildings and companies as well as the interest of individuals (like tenants) in this issue is an important driver for EPC in all sectors.

▶ Legal affairs:

Resulting from the EED there are obligations that can foster further EPC projects. These are mandatory energy performance certificates for buildings as well as the mandatory energy audits (affecting especially the residential and the industrial sector). Besides, there is an increasing number of energy management systems (e.g. ISO 50001) available, which are used frequently.

▶ Chance to offer integrated and combined services and products:

EPC provides the chance to offer integrated services and products. Whereas, in the industrial sector integrated energy services can be developed, the tertiary sector can profit from integrated comfort and maintenance improvements. In addition, EPC offers the combination with relevant measures and tasks as e.g. deep renovation in the public sector or the combination of facility management with energy services in the residential or tertiary sector.

▶ Potential of markets:

Both the public and the private market show a good potential all over Europe. Though the public sector is already well developed in some countries, there are still potentials to unlock in many regions. The private sector is still developing its potential. If good solutions for the split incentives dilemma are developed and implemented, large market segments, especially as regards rented facilities in the tertiary sector and residential buildings can be unlocked. ESC is already well established in several sectors and can be used as a catalyst for EPC.

Barriers to current EPC markets:

▶ Legal frameworks and political support:

In many countries non supportive legal frameworks are a limiting factor. Especially the tertiary and the residential sector are affected as regards rented units. Particularly the public sector is highly reliant on political support and consequently in many cases on the political will to actively support EPC.

▶ Split incentives dilemma

The split incentives dilemma is a main barrier in the tertiary and residential sector as far as rented facilities are concerned. Thus there is a strong demand for developing applicable solutions.

▶ Lack of best-practice examples:

Many sectors in the private EPC market are characterized by a lack of best practice examples, which are an important factor for promoting EPC and providing effective communication. Consequently, there is a lack of experience within the sector, as well as a lack of standards.

▶ Complex procurement and time frame:

Traditional procurement approaches are still widespread. Complex and lengthy procurement is seen as hindering and is thus not applied. Consequently, there is a low level of understanding for EPC. In industry and the tertiary sector, usually short project duration is preferred, and in the public sector medium- and long term planning is rare.

▶ Resistance against outsourcing:

In the tertiary, residential and public sector resistance against outsourcing predominates, which hinders the use of EPC.

1.3. Survey on EPC

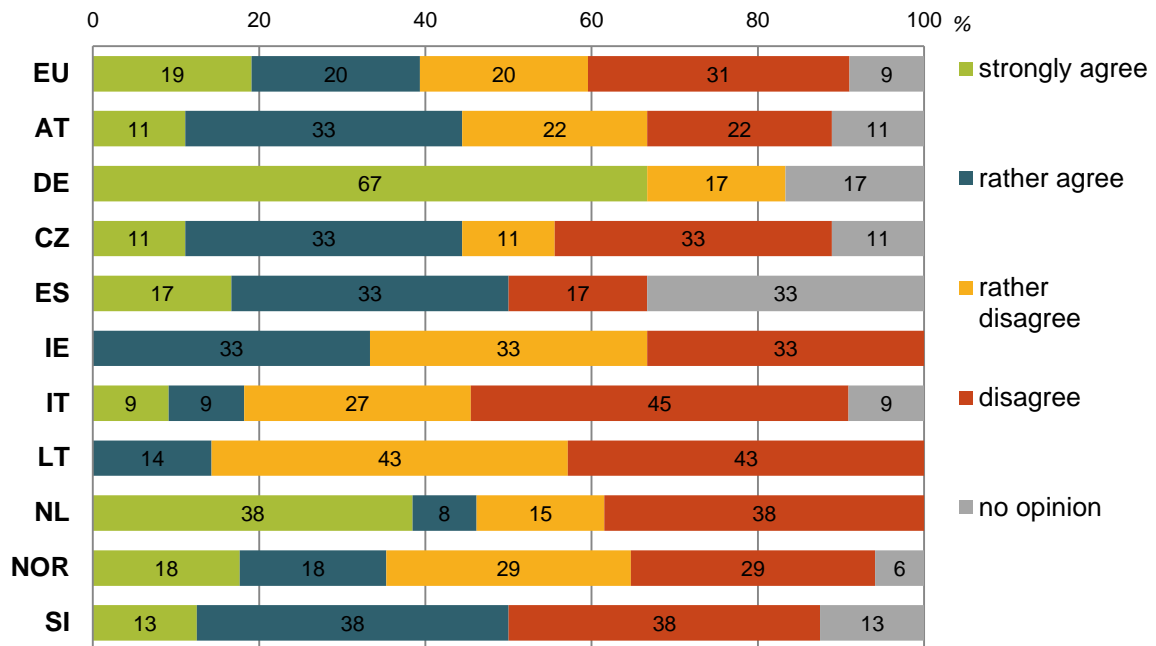
An online-survey on EPC with a focus on private client groups and evaluation of barriers and solutions has been performed. 256 international experts participated in the survey, addressing experienced and potential clients, ESCOs and other stakeholders. The most striking results of the survey are the following:

- ▶ Experience with the involvement of ESCOs is only partly available. 60% of respondents indicate that they have rather no experience with ESCOs.
- ▶ More than 50% of respondents indicate equity financing as the predominant form of financing of energy efficiency refurbishment.
- ▶ Reduction of CO₂ or increase of building value are hardly driving forces for modernization measures.

► Most important reason for EPC: Guaranteed energy cost savings.

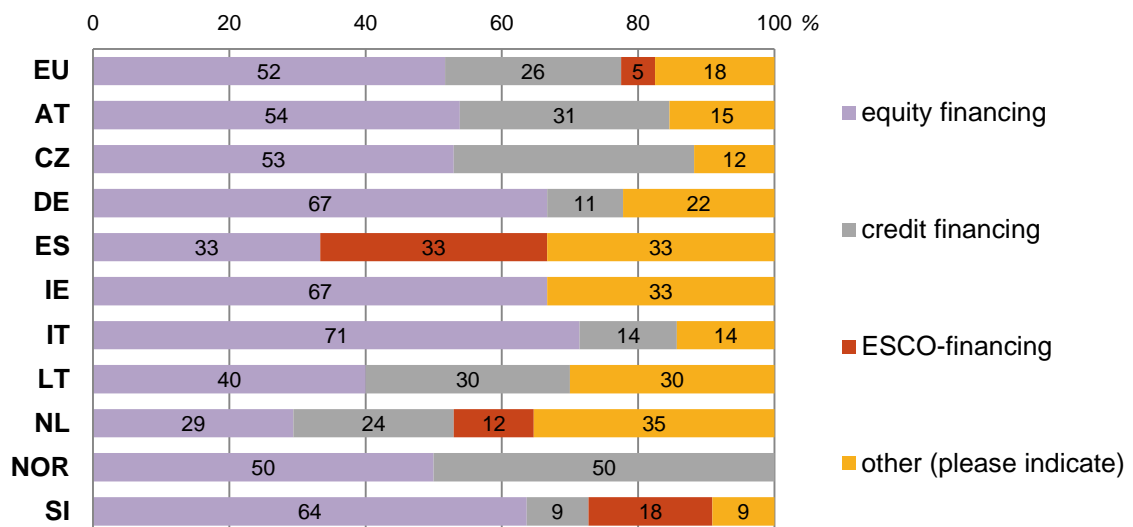
Experience with the involvement of ESCOs is only partially available

Question: Please indicate whether you agree with the following statements: **We have experience with the involvement of energy service companies (ESCOs).** Base: 89 responses



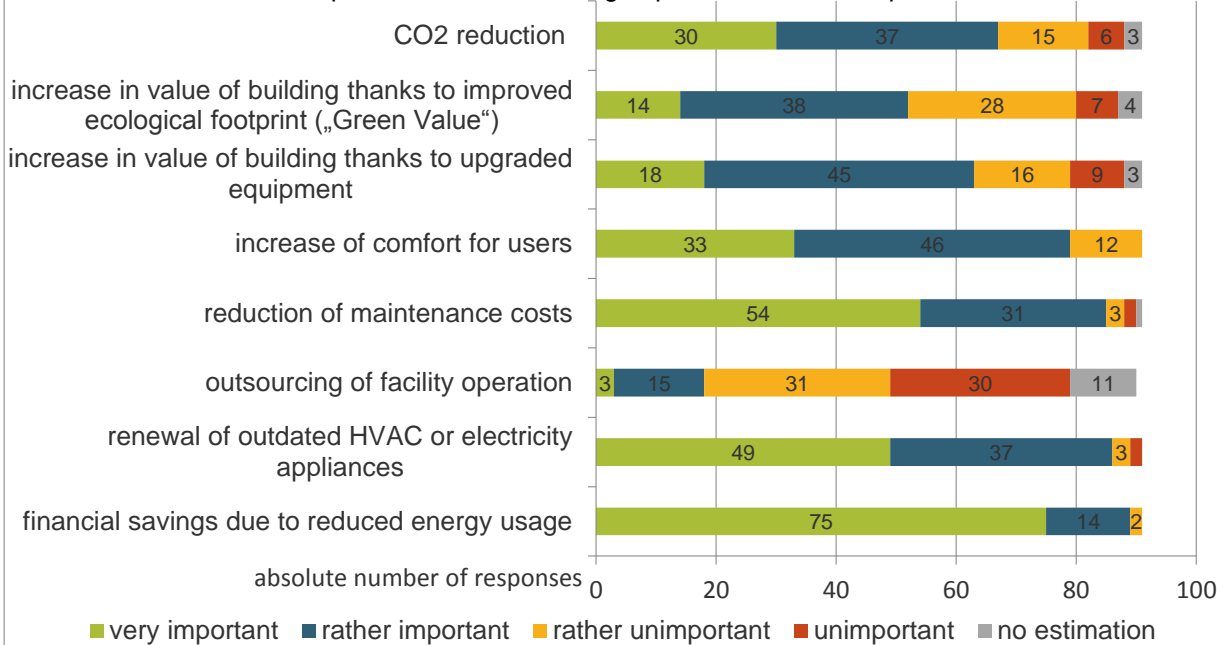
Equity financing predominant form of financing chosen

Question: Which type of financing is chosen most often for energy efficient refurbishment? (multiple choice possible). Base: 120 responses, indications: 120



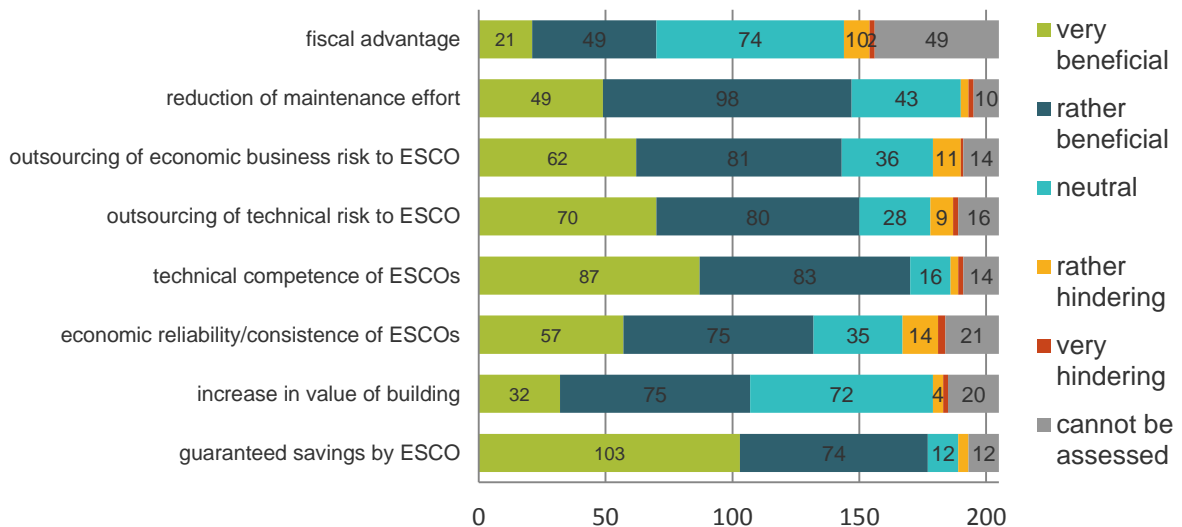
Financial savings and reduction of maintenance costs are most important reasons for modernization

Question: There are several reasons for an energy efficient refurbishment. How do you evaluate the importance of the following aspects. **Base:** 91 responses



Most important reasons for EPC: 1. Guaranteed energy cost savings, 2. Technical competence of ESCOs, 3. Outsourcing of technical risk

Question: Please evaluate the subsequent aspects regarding their influence for the implementation of EPC projects. Note: If you cannot evaluate a certain aspect, indicate “cannot be assessed”.
 Economic aspects. **Base:** 205 responses



2. Market volume

As regards precisely determining the EPC market volume, there is a big lack of data for various countries. For advanced as well as for emerging markets there is presently no sufficient information to allow for a complete overview.

2.1. EPC turnover

Revenues from EPC vary a lot among advanced and emerging markets and can only be presented by way of some exemplary countries:

- ▶ Germany: EUR 80 Mio (2014)¹
- ▶ France: EUR 70 Mio (2012)²
- ▶ Belgium: EUR 1 - 5 Mio per year³
- ▶ Spain: EUR 20 Mio (2013 – 2015)⁴

2.2. Number of projects

Regarding the number of EPC projects, which were initiated in the last ten years, there is mainly data for EPC projects with public clients available. It has to be mentioned, that data is incomplete in most cases.

a. Public clients

The number of projects initiated in the last 10 years is varying a lot among countries. The advanced markets, for which data is available, can record 42 to 96 projects per country. In the emerging markets the first projects were generally initiated later.

¹ Representing the turnover of the largest ESCOs; Source: <https://www.facility-manager.de/>

² FEDENE, SNEC, 2016

³ JRC, 2013

⁴ Representing the turnover of the largest ESCOs

Country	Total 2006-2016
Germany ⁵	96
Norway ⁶	42
Czech Republic	91
Spain	7
Lithuania ⁷	22
Netherlands ⁸	26
Romania	7
Slovenia	55

For the following countries, there is no data available concerning the number of EPC projects with public customers: Austria, Belgium, France, Ireland, Italy and Slovakia.

b. Private clients

Concrete figures of EPC projects with private clients are only available for the following countries:

- ▶ Czech Republic: 1994 – 2005: 12 projects; 2006 – 2015: 6 projects
- ▶ Netherlands: 2005 – 2015: 22 projects
- ▶ Romania: 14 projects

For the remaining countries there is presently no data available.

⁵ <http://ted.europa.eu>

⁶ www.doffin.no

⁷ VIPA, 2016

⁸ Source: RVO database

2.3. Size of projects

Key parameters	Germany ⁹	Austria ¹⁰	Norway ¹¹	Czech Republic ¹²	Spain ¹³	Italy ¹⁸
Average baseline / project [€/a]	1,800,000		77,000		895,146	
Average guaranteed savings [%]	26		33		23	
Average investment / project [€]	2,035,000	285,000	1,650,000		800,000	
Average ESCO turnover over duration [€]	4,275,000				2,400,137	
Average contract duration [a]	12		7 – 18	3 – 6	6	
Average total investment [€]			300,000 – 6,000,000	610,692		200,000 – 500,000
Average guaranteed savings [€]				107,722		

Key parameters	Lithuania ¹⁴	Netherlands ¹⁵	Romania ¹⁶	Slovenia ¹⁷	Slovakia ¹⁸
Average baseline / project [€/a]	21,800		230,000		
Average guaranteed savings [%]	56	29	35	25	16 – 30
Average investment / project [€]	330,000	1,618,333	702,000	821,000	
Average ESCO turnover over duration [€]					
Average contract duration [a]				13	5 – 15
Average total investment [€]					
Average guaranteed savings [€]					

⁹ Data referring to Berlin Energy Saving Partnerships (BEA)

¹⁰ Data referring to database of OÖ Energiesparverband

¹¹ Data referring to 2013 – 2015, www.doffin.no

¹² Data referring to database of individual EPC projects developed by APES (Association of ESCOs) members in 2015, amended by data from initial database of EPC and EC projects developed by ENVIROS in 2003 and maintained later on by SEVEN – up to 2007

¹³ Data referring to projects facilitated by ICAEN

¹⁴ Data referring to projects for public EPC customers financed by VIPA

¹⁵ Data referring to RVO database

¹⁶ Data referring to 2005 – 2015, JRC 2010

¹⁷ JRC, 2013

¹⁸ transparence.eu

2.4. Other important energy services

In five countries (Germany, Austria, Czech Republic, Belgium and Spain), energy supply contracting is seen as the predominant ESCO business model. EPC is estimated to have a share of around 5 – 20%, whereas ESC covers 75 – 85%. Other important energy services vary from country to country as follows:

- ▶ delivery contracting or heat supply contracting (Slovakia)
- ▶ systems for energy monitoring, energy labelling and energy audits in the public and private sector (Norway)
- ▶ price of heat sold to “third parties” (Czech Republic)
- ▶ co-/trigeneration, building automation and fan coils (Italy)
- ▶ delivery of heating and cooling (cogeneration) or WKO (thermal energy) (Netherlands)
- ▶ Supply and operation of energy equipment (Romania)

2.5. Critical assessment

Most of the counties (10 out of 14) indicated a generally high potential for EPC. However, some predominant barriers hamper the broad roll-out of EPC projects. These barriers encompass:

- ▶ Financial barriers (such as lack of intervention of financial sector/lack of adequate financing options/public procurement law) (France, Ireland, Italy, Lithuania, Slovenia, Norway)
- ▶ Institutional/legal barriers (such as lacking regulatory framework) (Italy, Lithuania, France)
- ▶ Lack of information (Spain, Belgium) as well as lack of EPC facilitator support schemes (Slovenia)

3. Market assessment of EPC sectors

The SWOT analysis was elaborated for the following sectors:

Country	Public	Industry	SME	Tertiary	Residential
Norway*	✓				
Netherlands	✓	✓	✓	✓	✓
Spain	✓	✓			✓
Belgium	✓	✓		✓	✓
Germany	✓	✓		✓	✓
Czech Republic	✓	✓	✓		✓
Austria	✓	✓		✓	✓
Ireland	✓	✓		✓	✓
Italy	✓	✓		✓	✓
Slovenia	✓	✓		✓	✓
Lithuania	✓				✓
Romania	✓	✓			✓
France	✓	✓		✓	✓

* Norway provided a SWOT for the private sector in general

As can be seen from the table above, there is a lack of market data in several countries, especially for the private sector. This can be attributed to the fact that the private market is not well established in many countries.

Expert feedback collected from market stakeholders combined with own experiences are shown in the following SWOT analysis regarding EPC in the various building sectors:

3.1. Public sector

STRENGTHS

- Good suitability of public buildings for EPC
- Project bundling/large projects are possible and common
- Guaranteed energy cost savings
- Financing through ESCO
- Numerous successful pilot projects
- Well-tested EPC standards available
- Experienced ESCOs and facilitators

WEAKNESSES

- Weak demand due to low energy prices, low interest rates and high public debt levels
- High transaction costs due to public procurement rules
- Difficulty in raising financial liquidity
- Lack of trust in ESCO industry, **low number of ESCOs in some markets reduces competition**
- Lack of political support (dependence on subsidies and political willingness)
- **Mid- and long-term planning is still rare and is among the first elements of a project to reduce investment costs**

OPPORTUNITIES

- Still large potential in most regions
- Modernisation backlog, extensive refurbishment needs
- **Chance of combining EPC with deep renovation**
- Openness for long commitment periods
- Exemplary role of public sector
- Public CO₂ reduction targets (nationally, regionally, locally)

THREATS

- **Restrictive EPC approval in indebted communities of some Federal States (cf. Eurostat guidance note)**
- **Fear of legal challenges of mayors and other legal representatives**
- Strongly depending on political support/ supportive stakeholders within administration
- Tendency to reduce outsourcing and to build up own technical capacities in some administrations



3.2. Private sector: Industry

STRENGTHS

- High cost-consciousness in industry
- Openness to outsourcing in industry
- High energy demand in industry
- Guaranteed energy cost savings
- Broad scale of measures

WEAKNESSES

- **Typically only a short project duration and payback is being accepted**
- Industry is careful about its processes
- Energy cost is low in relation to total cost
- "Closed" market, hardly public tenders
- Hardly best practice available
- Hardly experience in project facilitation → no standards

OPPORTUNITIES

- ESCOs/manufacturers/utilities can use their strong ties to industry
- Possibility to develop/offer integrated energy services
- Process heat utilisation offers opportunities for CHP application
- **Legal obligations (e.g. energy audits) and increasing number of energy management-systems can foster projects**
- **Adaption of procurement to industry's procurement routines can open the market**
- ESC is already well established and can be a catalyst for EPC

THREATS

- EE measures in production processes require highly specialised ESCOs (small supply market)
- Limited knowledge of ESCOs about industrial processes
- **Complex and lengthy procurement might keep off from purchase of EPC**
- EPC industry market highly dependent on development of energy prices
- Senior management prefers income generating projects over cost reduction
- **Potential leakage of information prohibits project development (i.e. energy prices, production processes)**

3.3. Private sector: Tertiary sector

STRENGTHS

- Increased building value through EPC
- Option of financing through ESCO
- Significant energy cost saving potentials, large market

WEAKNESSES

- **Typically only a short project duration and payback is being accepted**
- Split incentives dilemma in case of rented facilities
- Limited number of best practice available
- Hardly experience in project facilitation → no standards

OPPORTUNITIES

- Green image
- Interest (of tenants) in energy cost savings
- Investment companies show interest in clustered projects
- **Combination of FM with energy services**
- **Possibility to integrate comfort and maintenance improvement**
- Increasing number of energy management-systems can foster projects
- **A good solution for the split-incentive-dilemma for rented facilities** could open a large market segment

THREATS

- Resistance against outsourcing energy related services and operations to third parties
- Non-supportive legal frameworks (taxation) in case of rented units
- **Traditional procurement-approach favoured, low level of understanding for EPC**
- **Forfeiting not possible, ESCO financing too risky/costly**

3.4. Private sector: Residential buildings

STRENGTHS

- Option of financing through ESCO
- **Increased building value through EPC**
- Green image
- Guaranteed cost savings
- High cost consciousness

WEAKNESSES

- Resistance against outsourcing property management and operations to third parties
- **Split incentives dilemma**
- **Behaviour of tenants has high influence, hardly manageable**
- Challenging M&V situation
- **Mainly deep retrofit required – not possible with payback from savings alone**

OPPORTUNITIES

- Interest of tenants in energy cost savings
- Interest of tenants in climate protection and energy (cost) savings
- Significant saving potentials
- Combination of FM with energy services
- **Mandatory energy performance certificates draw attention to energy consumption and create value for good performing facilities**
- **A good solution for the split-incentive-dilemma in rented facilities** will open a large market segment

THREATS

- Non-supportive legal frameworks
- Vast majority of properties are owned by individual property owners
- Individual owners can block decisions
- **Forfeiting not possible, ESCO financing too risky/costly**
- **Complex contractual requirements (also with tenants) create a risk and subsequently raise project costs**

4. Stakeholder survey results

In addition to the literature research, an online stakeholder survey was conducted in order to address EPC-market stakeholders, ranging from building administrators and owners to facility managers, ESCOs, agencies etc. Specific questions were only addressed to the respective target group (not all participants were asked all questions). The questionnaire included a mixture of quantitative as well as qualitative questions concerning the use of energy efficiency services in Europe.

4.1. Basis of survey

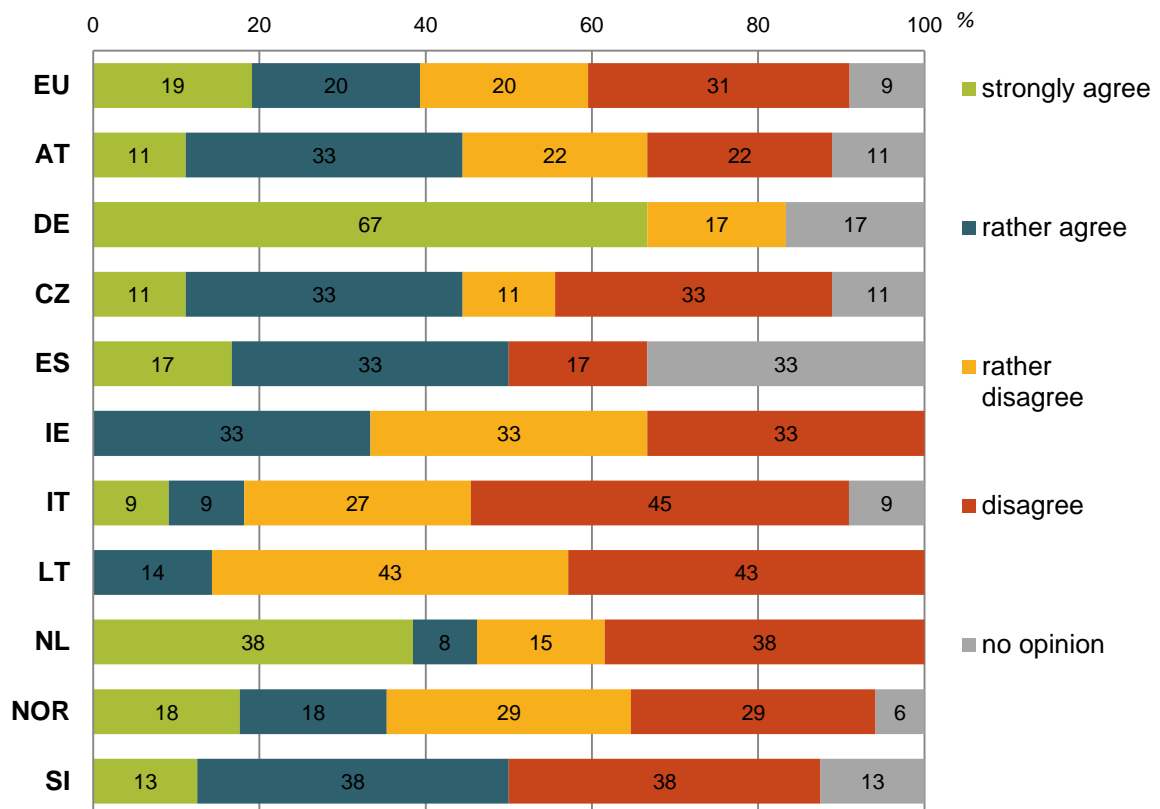
The basic points of the survey were:

- ▶ Time frame: July – August 2016
- ▶ Number of responses: 256
- ▶ Participating countries: Austria, Germany, Belgium, Czech Republic, Spain, Ireland, Italy, Lithuania, Netherlands, Norway, Slovenia.

4.2. Experiences with EPC

Experience with the involvement of ESCOs is only partially available

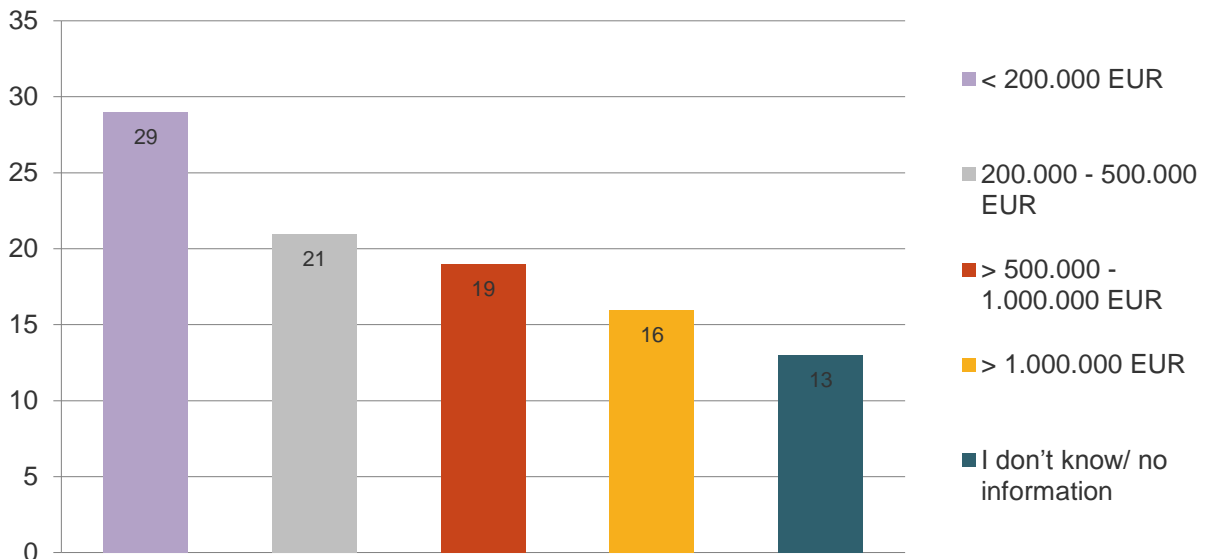
Question: Please indicate whether you agree with the following statements: **We have experience with the involvement of energy service companies (ESCOs).** Base: 89 responses



Half of the projects implemented and accompanied involve investment sums < 500.000 EUR

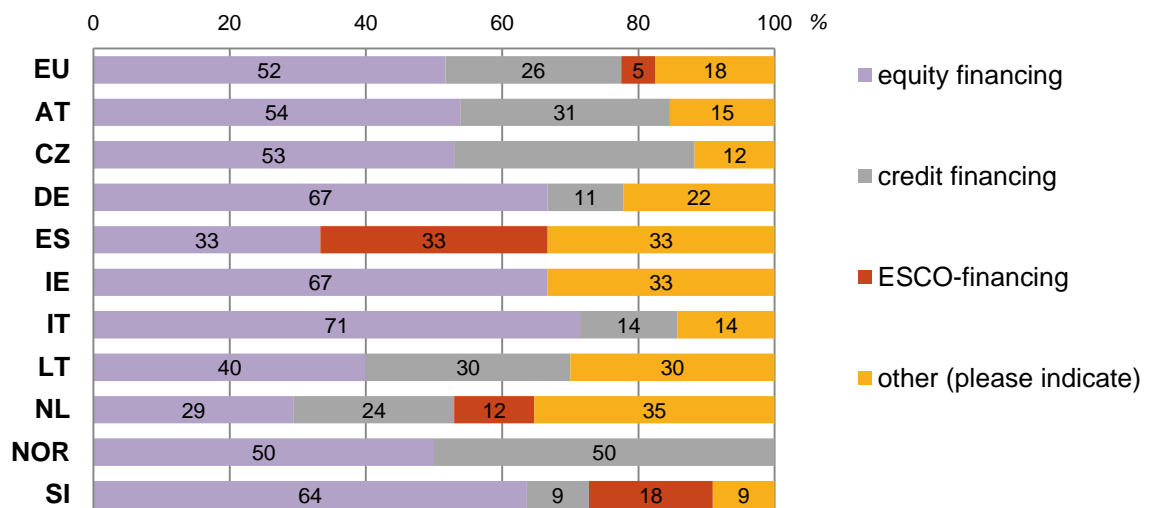
Question: Which sums of investment predominantly encompass the projects your organisation implements or accompanies? **Base:** 98 answers

absolute answers



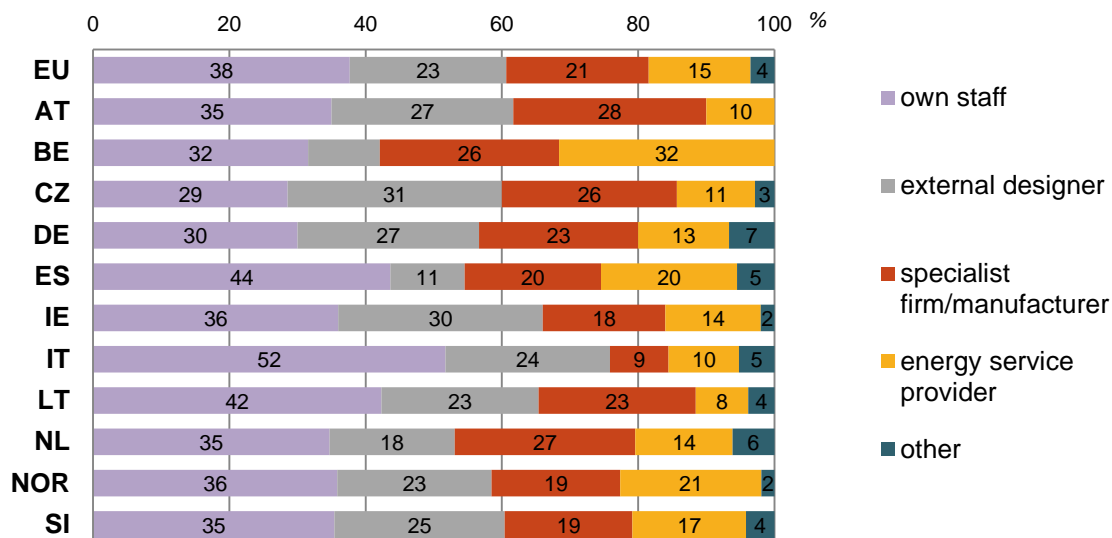
Equity financing predominant form of financing

Question: Which type of financing is chosen most frequently for energy efficient refurbishment? (multiple choice possible). **Base:** 120 responses, indications: 120



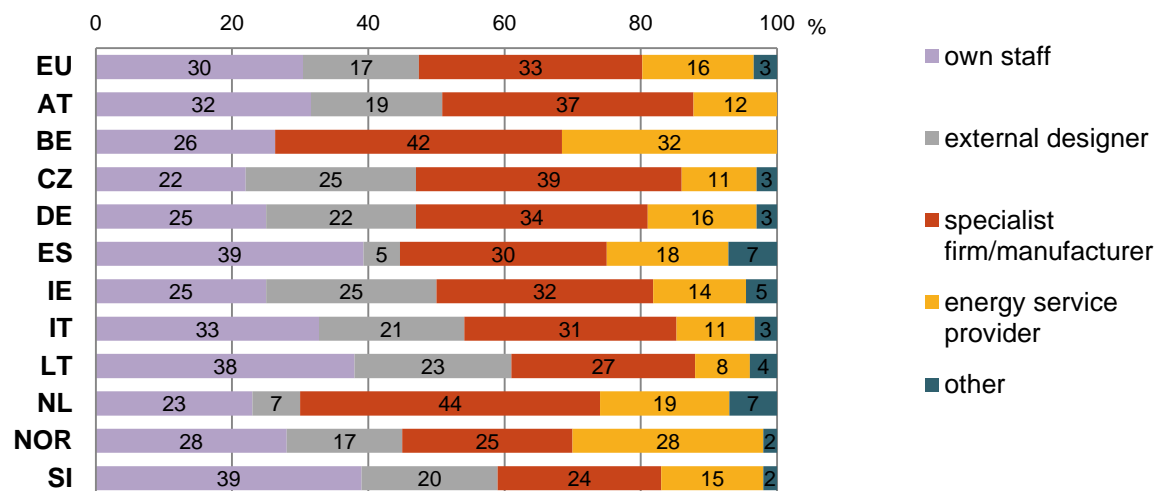
Planning of measures is accomplished predominantly externally

Question: With whom do you normally implement the different phases of energetic modernization? (multiple choice possible). Planning. **Base:** 256 responses, indications: 483



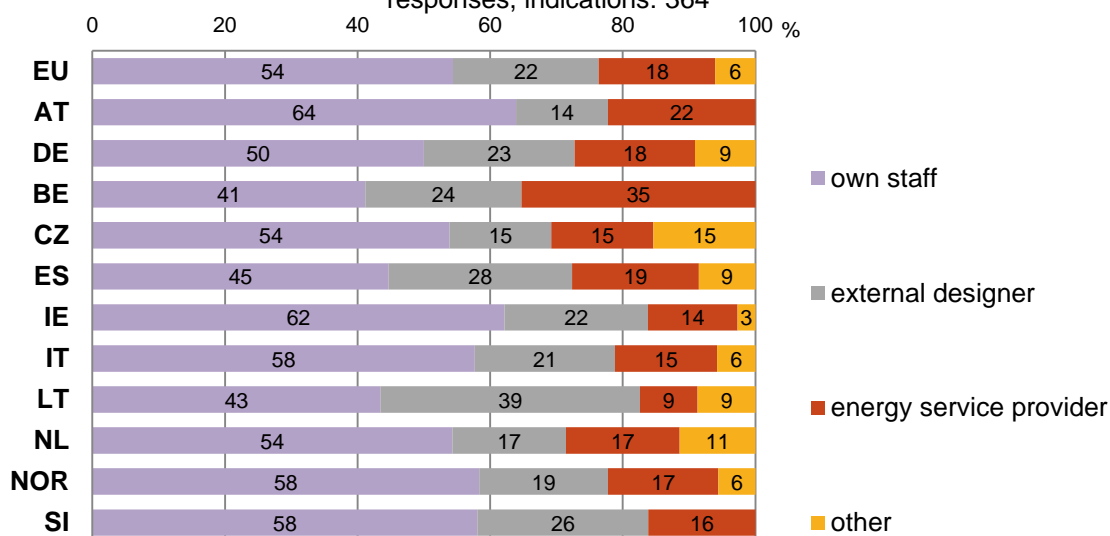
Implementation of measures is accomplished predominantly externally

Question: With whom do you normally implement the different phases of energetic modernization? (multiple choice possible). Implementation. **Base:** 256 responses, indications: 470



Operation of facilities after implementation of measures is accomplished predominantly internally

Question: With whom do you normally implement the different phases of energetic modernization? (multiple choice possible). Operation of facilities after implementation of measures. **Base:** 256 responses, indications: 364

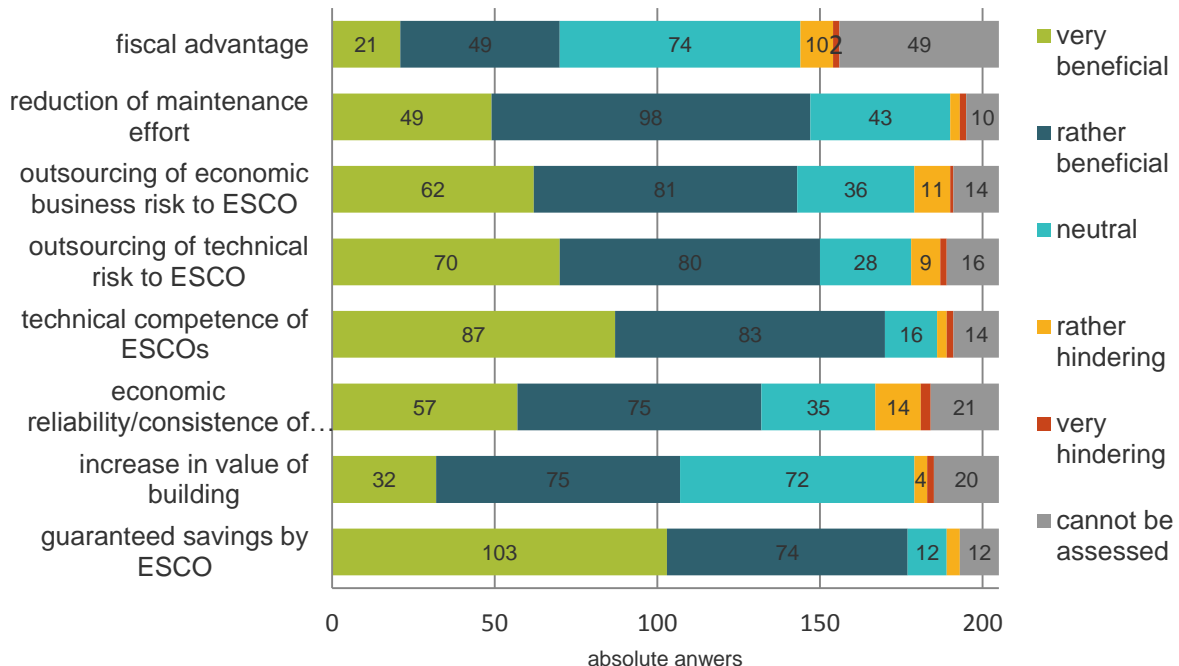


The three graphs above give evidence that measures are mostly implemented by external companies and afterwards maintained and operated by in-house-staff. This might lead to risks on the side of the building owner that can be addressed/solved through EPC.

As expected, the most important reasons for the choice of EPC are:

Most important reasons for EPC: 1. Guaranteed energy cost savings, 2. Technical competence of ESCOs, 3. Outsourcing of technical risk

Question: Please evaluate the subsequent aspects regarding their influence for the implementation of EPC projects. Note: If you cannot evaluate a certain aspect, indicate “cannot be assessed”.
 Economic aspects. **Base:** 205 answers

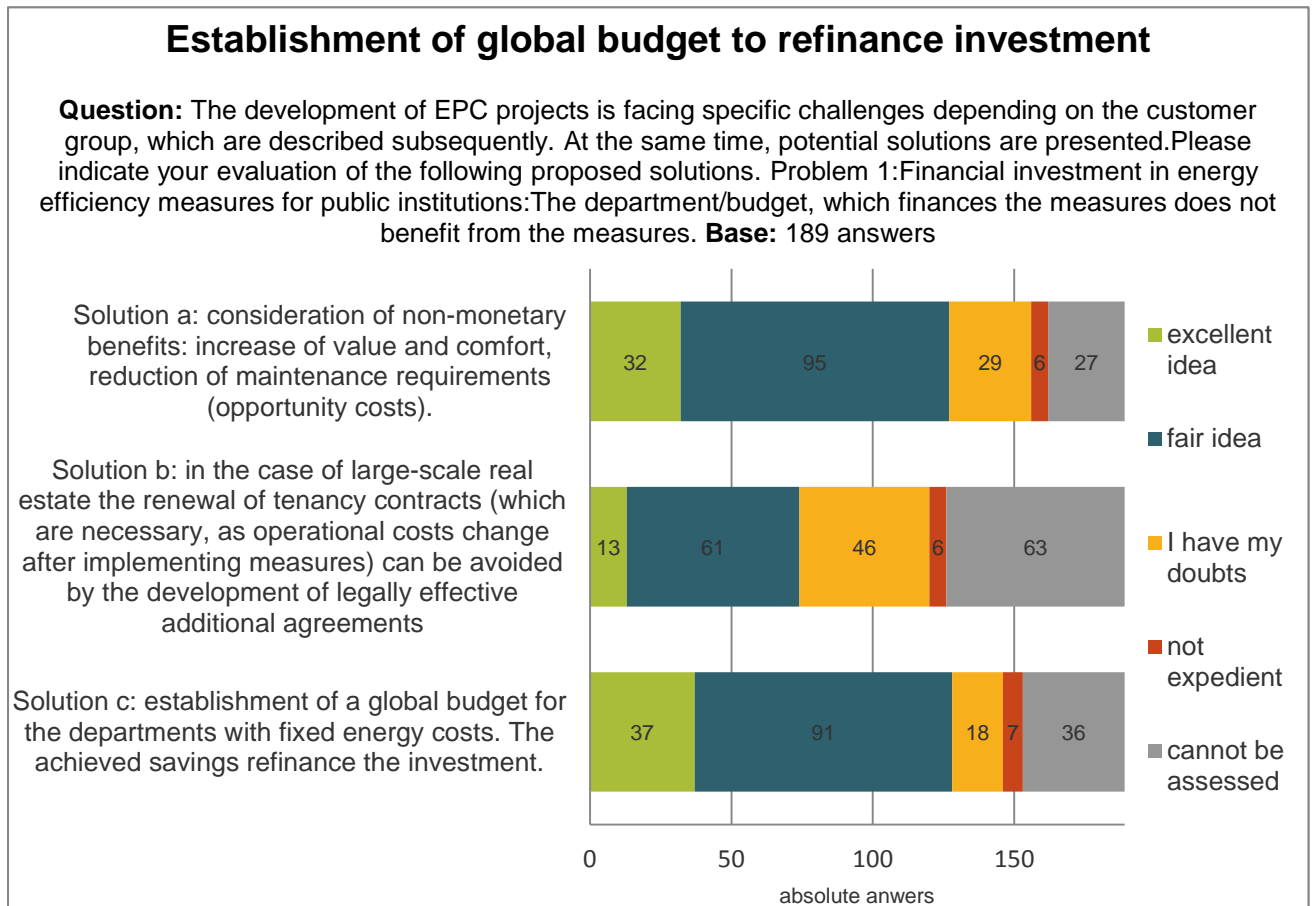


4.3. Problems and potential solutions

The development of EPC projects is facing specific challenges depending on the customer group. These problems were presented and potential solutions offered, which were assessed by the respondents.

- **Problem 1:** financial investment in energy efficiency measures for public institutions: The department/budget that finances the measures does not benefit from the measures.
 - Solution “top”: establishment of global budget for the department with fixed energy cost. The achieved savings refinance the investment.

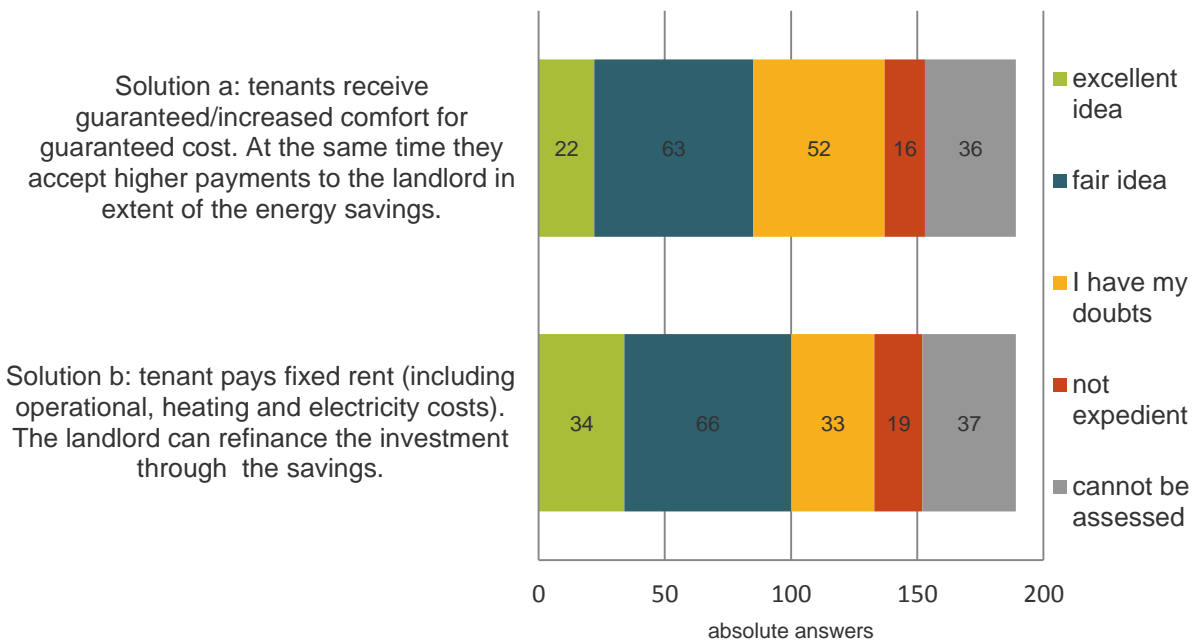
- Solution “flop”: in the case of large-scale real estate the renewal of tenancy contracts (which are necessary, as operational costs change after implementing energy efficiency measures) can be avoided through development of legally effective additional agreements.



- **Problem 2:** tenancy in commercial properties: The landlord invests in energy efficiency measures but cannot refinance those by reduced energy cost, as only the tenant benefits from energy cost savings.
 - Solution “top”: tenant pays fixed rent (including operational, heating and electricity costs). The landlord can refinance the investment through the savings.
 - Solution “flop”: tenants receive guaranteed/increased comfort for guaranteed cost. At the same time they accept higher payments to the landlord in extent of the energy savings.

Problem financing efficiency measures in rented commercial properties: fixed rent (including operational, heating and electricity costs) for financing

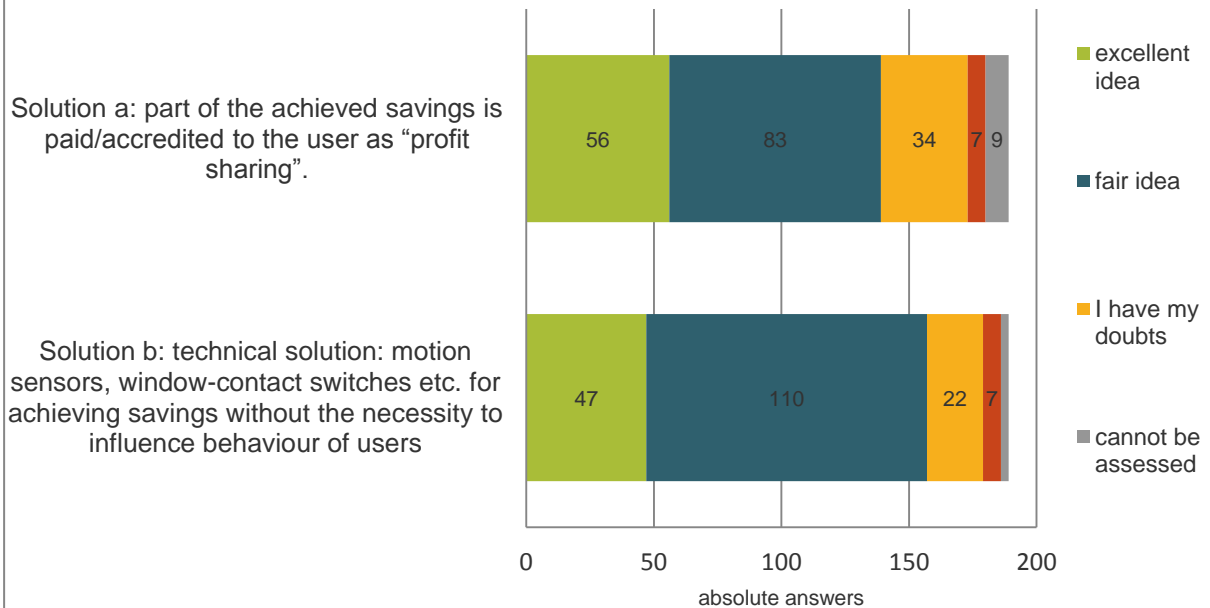
Question: Please indicate your evaluation of the following proposed solutions. Problem 2: Tenancy in commercial properties: The landlord invests in energy efficiency measures but cannot refinance those by reduced energy cost, as only the tenant benefits from energy cost savings. **Base:** 189



- Problem 3:** the behavior of users in buildings influences the energy demand drastically. However, the change of behavior of the user can turn out to be difficult.
 - Solution “top”: Technical solution: motion sensors, window-contact switches etc. for achieving savings without the necessity to influence behavior of users.
 - Solution “flop”: Part of the achieved savings is paid/accredited to the user as “profit sharing”.

Problem efficiency measures and behaviour of users in rented properties: "profit sharing" of user/tenants

Question: Please indicate your evaluation of the following proposed solutions. Problem 4: The behaviour of users in buildings influences the energy demand drastically. However, the change of behaviour of the user can turn out to be difficult. **Base:** 189 answers



References

BEA, <http://www.berliner-e-agentur.de/beratung-information/berliner-energiesparpartnerschaften>

Doffin: www.doffin.no

JRC Science and Policy Report, 2010: ESCO Market Report 2010

JRC Science and Policy Report, 2013: ESCO Market Report 2013

Facility Manager: <https://www.facility-manager.de/>

FEDENE, SNEC, 2016 : Chauffage collectif et efficacité énergétique

TED Europa: <http://ted.europa.eu>

OÖ Energiesparverband, <http://www.energiesparverband.at/startseite.html>

Transparens: www.transparens.eu

VIPA Database, 2016: data on applications for financing energy efficiency projects of centrally owned public buildings (URL: http://vipa.lt/puslapis/centri_pastatai)