



COUNTRY REPORT ON THE ENERGY EFFICIENCY SERVICES MARKET AND QUALITY

Austria



QualitEE Project

This document has been developed as part of the "QualitEE – Quality Certification Frameworks for Energy Efficiency Services" project supported by the EU's Horizon 2020 programme.

The QualitEE consortium comprises 12 partner organisations covering 18 European countries, an expert advisory board, including the European standards body CEN/CENELEC, and 59 supporters from major financial institutions, government bodies, trade associations and certification bodies.

Date

February 2018

Authors

Margot Grim

margot.grim@e-sieben.at

Susanne Kuchar

ee15b037@technikum-wien.at

e7 Energie Markt Analyse GmbH

Austria

<http://www.e-sieben.at/en/>

Disclaimer

The QualitEE project receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 754017. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission is responsible for any use that may be made of the information contained herein.

Contents

1	EXECUTIVE SUMMARY	9
2	INTRODUCTION	11
2.1	Objective of the report	11
2.2	Scope of the report and definitions	11
2.2.1	<i>Energy Efficiency Services (EES)</i>	11
2.2.2	<i>Energy Performance Contracting (EPC)</i>	12
2.2.3	<i>Energy Supply Contracting (ESC)</i>	12
2.2.4	<i>Other types of energy efficiency services</i>	13
2.2.5	<i>Market actors</i>	13
2.3	Sources of data and methodology	14
2.3.1	<i>Sources of data</i>	14
2.3.2	<i>Survey and interviews</i>	14
2.3.3	<i>Literature and other sources of data</i>	15
3	LEGAL AND REGULATORY FRAMEWORKS	17
3.1	Key governmental institutions	17
3.1.1	<i>Federal Ministry of Sustainability and Tourism</i>	17
3.1.2	<i>“Nationale Energieeffizienz-Monitoringstelle” - National Energy Efficiency Monitoring Agency</i>	17
3.1.3	<i>Federal energy consultants</i>	17
3.1.4	<i>Federal real estate contracting</i>	17
3.2	Implementation of the EU Energy Efficiency Directive	18
3.2.1	<i>Federal Energy Efficiency Law</i>	18
3.2.2	<i>Register for Energy Service Providers</i>	18
3.2.3	<i>Energy Efficiency Directive</i>	18
3.2.4	<i>Energy Efficiency Guideline</i>	18
3.3	National strategy documents	18

3.3.1	National Energy Efficiency Action Plan (NEEAP)	18
3.3.2	Energy Strategy Austria	19
3.3.3	Energy saving in the public sector	19
3.3.4	Energy savings in buildings	20
3.3.5	Guidelines for civil engineering	20
3.3.6	Klimaaktiv climate protection initiative	20
3.4	Standardisation for energy efficiency services	20
3.4.1	Model documents	20
3.4.2	Project implementation guidelines	21
3.5	European Code of Conduct for EPC	21
3.6	Support schemes	22
4	ENERGY PERFORMANCE CONTRACTING MARKET	23
4.1	EPC market actors	23
4.1.1	Providers	23
4.1.2	Facilitators	24
4.1.3	Clients	25
4.1.4	Associations and decision makers	25
4.2	EPC market developments	27
4.3	EPC business models	31
4.4	EPC market sectors	33
4.5	EPC measurement & verification	34
4.6	EPC market barriers	35
4.6.1	Regulatory and administrative barriers	36
4.6.2	Structural barriers	37
4.6.3	Financial barriers	38
4.7	EPC financing	38
4.8	EPC quality determinants	41

5	ENERGY SUPPLY CONTRACTING MARKET	44
5.1	ESC market actors	44
5.1.1	<i>Providers</i>	44
5.1.2	<i>Facilitators</i>	45
5.1.3	<i>Clients</i>	45
5.1.4	<i>Associations and decision makers</i>	46
5.2	ESC market developments	47
5.3	ESC business models	51
5.4	ESC market sectors	53
5.5	ESC market barriers	53
5.5.1	<i>Regulatory and administrative barriers</i>	55
5.5.2	<i>Structural barriers</i>	55
5.5.3	<i>Financial barriers</i>	55
5.6	ESC financing	56
5.7	ESC quality determinants	57
6	OTHER ENERGY EFFICIENCY SERVICES	60
6.1	Integrated Energy Contracting (IEC)	60
6.2	Re-Commissioning (RECO)	61
7	RECOMMENDATIONS TO SUPPORT MARKET DEVELOPMENTS	62
7.1	Government policy, regulation and standardisation	64
7.2	Financial instruments	65
7.3	Information distribution, education and networking	66
8	CERTIFICATION OF ENERGY EFFICIENCY SERVICES	68
8.1	General framework for certification of products and services	68
8.2	Certification of products and services in the energy sector	68
8.3	Certification of energy efficiency services	68

8.3.1	<i>“Umweltzeichen Energie-Contracting“</i>	68
8.3.2	<i>“DECA Qualitätssiegel“</i>	69
9	REFERENCES	79

Definitions and glossary

Term	Definition
Client	means any natural or legal person to whom an energy service provider delivers energy service
Energy Efficiency Directive (EED)	means Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency
energy efficiency improvement*	means increase in energy efficiency as a result of technological, behavioural and/or economic changes
energy efficiency*	means the ratio of output of performance, service, goods or energy, to input of energy
energy efficiency service (EES)**	means an agreed task or tasks designed to lead to an energy efficiency improvement and other agreed performance criteria
energy efficiency improvement*	means an increase in energy efficiency as a result of technological, behavioural and/or economic changes
energy management system*	means a set of interrelated or interacting elements of a plan which sets an energy efficiency objective and a strategy to achieve that objective
energy performance contracting* (EPC)	means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings
energy supply contracting*** (ESC)	means a contractual arrangement for the efficient supply of energy. ESC is contracted and measured in Megawatt hours (MWh) delivered
energy savings*	means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption
energy service*	the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings
energy service provider*	means a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises
energy*	means all forms of energy products, combustible fuels, heat, renewable energy, electricity, or any other form of energy, as defined in Article 2(d) of Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics
EPC provider	means an energy service provider who delivers energy services in the form of Energy Performance Contracting
ESC provider	means an energy service provider who delivers energy services in the form of Energy Supply Contracting

energy service project facilitator (facilitator)	means an advisory company working on behalf of the client to procure and/or implement an energy service project
Integrated Energy-Contracting (IEC)	means a combination of energy efficiency measures with energy supply contracting typically with short term 'operational verification' rather than ongoing Measurement & Verification
Savings	means energy savings and/or related financial savings; the financial savings include the costs of energy provision and can also include other operational costs, such as the costs of maintenance and workforce
The International Performance Measurement and Verification Protocol (IPMVP)	is the widely referenced framework for "measuring" energy or water savings, which is available at www.evo-world.org

Notes:

*Definitions according to the Energy Efficiency Directive

**Definition according the European standard EN 15900:2010

***Definition is a simplified version of IEA DSM Task Force 16 definition

1 EXECUTIVE SUMMARY

The objective of this report is to compile evidence to underpin the development of European and national quality criteria and the implementation of quality assurance schemes for energy efficiency services (EES). This report has been developed as part of the "QualitEE – Quality Certification Frameworks for Energy Efficiency Services" project supported by the EU's Horizon 2020 programme. The QualitEE project aims to increase investment in EES and improve trust in service providers.

Information has been collected through a market survey as well as literature review. An analysis has been conducted and conclusions have been derived to be presented in this report as well as in the online database on the QualitEE project website.

This report aims to improve the market knowledge of stakeholders so that they can make better informed decisions based on evidence. The barriers and success factors for energy efficiency services, their quality determinants as well as the related legal, political and institutional framework have been mapped. Lessons learned from existing certification frameworks will serve to establish strategies for the implementation of national quality assurance schemes.

There has been a lot of effort to increase the development of the EPC market in Austria but in the last 7 years the market stagnates. Still it has a high potential in both the public and the private sector. Major barriers to the market are the low energy prices and mainly due to them the low customer demand. The complexity of the EPC business model and the lack of information should be addressed for improving the market, because the survey and interviews state that these are the core barriers to EPC projects. The financing of EPC projects is a considerable barrier due to strict financial regulations. Here it is recommended to counteract by expanding the well-established subsidy scheme of the federal state of Oberösterreich. EPC providers shall bear in mind that preliminary technical-economic analysis and energy audit are the main quality determinants to EPC projects and the user information and motivation are key to a successful project completion.

The ESC market in Austria has been decreasing slightly over the last 4 years. Nevertheless, its potential especially in the private sector is large, but the low energy prices affect the ESC market noticeably. Split incentives of landlords and tenants are a barrier which cannot easily be overcome. Survey results show that financing of ESC projects is clearly easier than of EPC projects. To improve ESC projects providers must increase the quality of their preliminary technical-economic analyses and energy audits, the communication with the client, and operation and maintenance.

A small number of Integrated Energy Contracting and Re-Commissioning projects have been realised however these services still do not constitute a regular market.

A great step has been achieved in the certification of EES with the quality label "DECA-Qualitätssiegel" that was released in November 2017.

Overall this report shows that the Austrian EES market is well established but since it has been stagnating for the past years only high efforts such as subsidy programmes in all federal states and support for clients through information centres during the tendering process and negotiating could help it boost.



2 INTRODUCTION

2.1 Objective of the report

The objective of this report is to compile evidence to inform the development of European and national quality criteria and the implementation of quality assurance schemes for Energy Efficiency Services (EES). The report has been developed as part of the "QualitEE – Quality Certification Frameworks for Energy Efficiency Services" project supported by the EU's Horizon 2020 programme. The QualitEE project aims to increase investment in EES and improve trust in service providers.

Information has been collected through a market survey in the form of an online questionnaire and personal interviews. In addition, literature review has been conducted in existing local and national publications and documents. An analysis has been conducted and conclusions formed to be presented in this report as well as in the online database on the QualitEE project website.

This report aims to improve the market knowledge of stakeholders so that they can make better informed decisions based on evidence. The barriers and success factors for energy efficiency services, their quality determinants as well as the related legal, political and institutional framework have been mapped. Lessons learned from existing certification frameworks will serve to establish strategies for the implementation of national quality assurance schemes.

2.2 Scope of the report and definitions

2.2.1 Energy Efficiency Services (EES)

The European standard EN 15900:2010 defines EES as an agreed task or tasks designed to lead to an energy efficiency improvement¹ and other agreed performance criteria. EES shall include an energy audit (identification and selection of actions, e.g. according to EN 16247) as well as the implementation of actions and the measurement and verification (M&V, e.g. according to IPMVP) of energy savings. A documented description of the proposed or agreed framework for the actions and the follow-up procedure shall also be provided – often referred to as an Investment Grade Proposal. The improvement of energy efficiency shall be measured and verified over a contractually defined period of time through contractually agreed methods (Amann S., Leutgöb K. et al. 2015).

This report focuses on the following key types of energy efficiency services:

-  Energy Performance Contracting (EPC);

¹ According to the EED "energy efficiency improvement" means "an increase in energy efficiency as a result of technological, behavioural and/or economic changes".

- ✔ Energy Supply Contracting (ESC);
- ✔ EPC and ESC are not the only types of energy efficiency services applied in the Austria. Other types of EES, such as Re-Commissioning and Integrated Energy Contracting (IEC) are described in chapter 6.

2.2.2 Energy Performance Contracting (EPC)

According to the Energy Efficiency Directive, "EPC means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings."

The energy efficiency measures as above may also be based on low or no up-front investment. EPC may also include additional services related to efficient energy supply.

Within the report, the focus will be on EPC projects where the above mentioned "contractually agreed level of energy efficiency improvement" is **guaranteed** by the EPC provider. The **guarantee of energy efficiency improvement** is the commitment of the service provider to achieve a quantified energy efficiency improvement (EN 15900:2010).

This is in line with the EED, Annex XIII of which lists guaranteed savings among the minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications. Moreover, in Article 18 of the EED, Member States are required to promote the energy services market and access for SMEs to this market by, among other things, disseminating clear and easily accessible information on available energy service contracts and clauses that should be included in such contracts to **guarantee energy savings** as well as final customers' rights.

The European Code of Conduct for EPC (2014) defines that the EPC provider assumes the **contractually agreed performance risks of the project** throughout the duration of the EPC contract. These include the risks of not achieving contractually agreed savings as well as design risks, implementation risks and risks related to the operation of installed measures. If an EPC project fails to achieve performance specified in the contract, the EPC provider is contractually obligated to compensate savings shortfalls that occurred over the life of the contract. The excess savings should be shared in a fair manner according to the methodology defined in the contract.

2.2.3 Energy Supply Contracting (ESC)

"ESC means a contractual arrangement for the efficient supply of energy. ESC is contracted and measured in Megawatt hours (MWh) delivered". This definition is a simplified version of the IEA DSM Task Force 16 definition.

2.2.4 Other types of energy efficiency services

In Austria, other energy efficiency services cover mostly:

- ✔ **Integrated Energy-Contracting (IEC)** means a combination of energy efficiency measures with energy supply typically provided by use of renewable energy. (Bleyl-Androschin, October 2009);
- ✔ **Re-Commissioning (RECO)** “is done to ensure that systems and equipment in existing buildings meet the original design intent” and brings commissioning up to date. “Commissioning is done to ensure that systems, subsystems, and equipment in new buildings operate properly. It includes performing design reviews, functional testing, system documentation, and operator training throughout the project.” (US Department of Energy, 06.10.2017).

The market volume for these other services is small, nevertheless their possible impact will be considered in this study.

2.2.5 Market actors

The main actors operating on the EES markets are the EES providers, clients and project facilitators.

Within the QualitEE project, we use the EED's definition of energy service provider:

- ✔ "An '**energy service provider**' means a natural or legal person who delivers energy services² or other energy efficiency improvement measures in a final customer's facility or premises."

We use the commonly used term "ESCO" as an equivalent of energy service provider. We also use the above-listed definitions to define the following terms:

- ✔ "An '**EPC provider**' means an energy service provider who delivers energy services in the form of EPC.";
- ✔ "An '**ESC provider**' means an energy service provider who delivers energy services in the form of ESC.";
- ✔ "A '**Client**' means any natural or legal person to whom an energy service provider delivers energy service.";
- ✔ "An energy service project '**Facilitator**' means an advisory company working on behalf of the client to procure and/or implement an energy services." In the QualitEE project we use the shorter term "facilitator" to denote an energy service project facilitator.

² According to the EED: "An 'energy service' means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings."

2.3 Sources of data and methodology

2.3.1 Sources of data

The contents of this report are based on two main sources:

- ✔ The results of an EES survey conducted in Austria and across a further 14 European countries;
- ✔ interviews of Austria's main actors within the EES market; and
- ✔ a literature review (publications and studies, legislative documents, official statistics and databases) and the market knowledge of the authors based on 20 years of supporting EES market.

2.3.2 Survey and interviews

To collect the data used in this document, the market actors have been approached in the following manner:

- ✔ An online questionnaire was distributed to the country's most relevant EES providers and facilitators;
- ✔ Personal semi-structured interviews have been conducted with financial institutions and client organisations implementing EES projects.

The market and quality survey focusing on energy efficiency services gave the stakeholders an opportunity to provide their input and steer the development of quality assurance. The surveys and interviews contained questions regarding the EES market, barriers and success factors, EES quality determinants, minimum financial information requirements for financial institutions and certification frameworks, as well as EES-related legal, political and institutional frameworks. The answers were then analysed, and the results are presented in this report in aggregated form.

There were 11 respondents to the online survey in Austria:

- ✔ 6 representatives of ESCOs,
- ✔ 5 representatives of EES facilitators.

Throughout this study the results from the online survey in Austria are compared with the results from the online survey across **All Countries** that responded. In total, there were 188 respondents to the online survey across **All Countries in the survey**:

- ✔ Respondents operate in 15 European Countries; Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK.
- ✔ Respondents include 109 representatives of ESCOs, where 53 of them operate on the EPC market only, and 11 operate on the ESC market only and 45 on both the EPC and ESC markets.

- ✔ Respondents include 79 representatives of EES facilitators, where 37 of them operate on the EPC market only, and 17 operate on the ESC market only and 25 on both the EPC and ESC markets

Note - Full results from the QualitEE project's survey across 15 European countries - and trend analysis via comparison with previous surveys conducted in 2013 and 2015 by the Transparence project - can be explored through an interactive online navigation tool on the project website. (<https://qualitee.eu/market-research/>).

In addition, there were 7 respondents to the personal interviews:

- ✔ 2 representatives of financial institutions;
- ✔ 3 Energy Efficiency Service clients;
- ✔ 1 Energy Service project facilitator;
- ✔ 1 Energy Service provider.

2.3.3 Literature and other sources of data

Apart from the surveys, the report builds on research of local and national literature (legislative documents, publications and studies, official statistics and databases) and the market knowledge of the authors based on 20 years of implementing EES projects and supporting the EES market.

The key sources of information were up-to-date national sources, including:

- ✔ Publications by Federal Ministry of Sustainability and Tourism (Bundesministerium für Nachhaltigkeit und Tourismus- BMNT);
- ✔ Publications by the Federal Ministry for Digital and Economic Affairs (Bundesministeriums für Digitalisierung und Wirtschaftsstandort – BMDW)
- ✔ Publications by the Austrian Energy Agency (Österreichische Energieagentur);
- ✔ Publications by the Austrian Society for Environment and Technology (Österreichische Gesellschaft für Umwelt und Technik – OEGUT).

The report also builds on the data and information gathered primarily by the **Transparence** project and other previous European projects (**EESI2020**) and projects running in parallel (**GuarantEE**).

The following documents are key to this report:

- ✔ QualitEE D2.1 online survey (some questions are listed in the sections of this report);
- ✔ QualitEE D2.2 interviews (some questions are listed in the sections of this report);
- ✔ Transparence:
 - D2.5A Country Report on Recommendations for Action for Development of EPC Markets in Austria;
 - D4.9 Quality Certification for EPC services;
 - European Code of Conduct for EPC.

 GuarantEE:

- Market Report on the Austrian EPC Market.

 EESI2020:

- Guideline for project developers of EPC projects.

 JRC EU report:

- Energy Service Companies in the EU: Status review and recommendations for further market development with a focus on Energy Performance Contracting.

3 LEGAL AND REGULATORY FRAMEWORKS

The following institutional, legal and political frameworks apply to EES projects in Austria.

3.1 Key governmental institutions

3.1.1 Federal Ministry of Sustainability and Tourism

Within the Federal Ministry of Sustainability and Tourism (BMNT) the Division VI/2 Energy Balances and Energy Efficiency (Energiebilanz und Energieeffizienz) is responsible, among others, for these topics:

- ✔ Federal Energy Efficiency Law – Implementation;
- ✔ Energy Efficiency Directive;
- ✔ Energy Efficiency Guideline;
- ✔ Energy conservation in the public sector;
- ✔ Energy efficiency in buildings.

3.1.2 “Nationale Energieeffizienz-Monitoringstelle” - National Energy Efficiency Monitoring Agency

In Austria, the Austrian Energy Agency acts as the National Energy Efficiency Monitoring Agency and is commissioned to evaluate energy efficiency measures and exercise monitoring functions according to the specifications of the EU Directive 2012/27 / E and the Federal Energy Efficiency Law. (BMNT, 31.10.2017)

3.1.3 Federal energy consultants

Federal energy consultants (Energieberater des Bundes) record and optimize the energy consumption of federal agencies. Between 1979 and 2015 they have for example, reduced the heating energy index by around 51 percent. (BMNT, 31.10.2017)

3.1.4 Federal real estate contracting

Federal real estate contracting (Bundesimmobiliencontracting) aims to reduce the energy consumption and CO₂ emissions of buildings in the federal building sector. Through this model, already 600 buildings have been energetically optimized and modernized. On average, 20 percent of energy costs and about 40,000 tons of CO₂ per year are saved. (BMDW, 31.10.2017).

The federal real estate contracting is executed by the Federal Real Estate Company (Bundesimmobiliengesellschaft - BIG) with the Federal Ministry for Digital and Economic Affairs (Bundesministerium für Digitalisierung und Wirtschaftsstandort – BMDW) as cooperation partner.

3.2 Implementation of the EU Energy Efficiency Directive

Directive 2012/27/EU on energy efficiency (EED) establishes a common framework of measures for the promotion of energy efficiency within the EU in order to ensure the achievement of its 2020 20% headline target on energy efficiency.

Article 18 of the EED also imposes obligations on member states to support the energy services market. In Austria, the following obligations have been transposed so far:

3.2.1 Federal Energy Efficiency Law

The aim of the Federal Energy Efficiency Law (Bundes-Energieeffizienzgesetz 2014 - EEEffG) is to implement the EU Directive 2012/27 / EU and to promote energy efficiency measures. (BMNT, 31.10.2017)

3.2.2 Register for Energy Service Providers

From January 1st, 2015, the Federal Energy Efficiency Law obliges large energy-consuming companies to carry out energy audits or to introduce energy or environmental management systems. For this, a registration at the Register for Energy Service Providers (Register für Energiedienstleisterinnen und Energiedienstleister) and the fulfilment of reporting obligations are required. (BMNT, 31.10.2017)

3.2.3 Energy Efficiency Directive

The Energy Efficiency Directive (Energieeffizienz-Richtlinienverordnung 2016 - EE-RL-VO) sets out, among other things, specifications regarding documentation, reporting, evaluation and allocation of energy efficiency measures that the National Energy Efficiency Monitoring Agency must comply with when implementing the Federal Energy Efficiency Law. To ensure the most recent measurement, control and testing system, new generalized efficiency methods are being developed on an ongoing basis and existing methods have been revised. (BMNT, 31.10.2017)

3.2.4 Energy Efficiency Guideline

The Energy Efficiency Guideline (Energieeffizienz-Richtlinie 2012/27/EU - EED) translates certain aspects of the Energy Efficiency Plan by the European Commission into binding measures, which Member States must comply with, such being progress reports and National Energy Efficiency Action Plans. (BMNT, 31.10.2017)

3.3 National strategy documents

3.3.1 National Energy Efficiency Action Plan (NEEAP)

In 2017, the second National Energy Efficiency Action Plan (Zweiter Nationaler Energieeffizienzaktionsplan der Republik Österreich 2017) according to the Energy Efficiency

Guideline 2012/27/EU was established. On the one hand it contains the national energy efficiency targets and the savings that should be achieved; on the other hand the implementation measures. (BMNT, April 2017)

The targets are:

-  Energy consumption target (total final energy consumption) 2020 1050 PJ;
-  Final energy savings target (cumulative savings) 2020 217,728 TJ.

The implementation measures are, among others:

-  Energy efficiency obligation systems and alternative strategic measures;
-  Energy audits and energy management systems;
-  Availability of qualification, accreditation and certification systems;
-  Energy services;
-  Recording of consumption and billing;
-  Energy efficiency measures in buildings;
-  Energy efficiency measures in public institutions.

3.3.2 Energy Strategy Austria

The Energy Strategy Austria is based on the EU's Climate and Energy Policy 20/20/20 targets and specifies the Austrian targets to be reached until 2020:

-  34% share of renewable energy;
-  20% increase in energy efficiency;
-  16% reduction of GHG emissions in non-ETS sectors.

With the strategy's three pillars being energy efficiency, renewable energy and security of supply, the final energy consumption in Austria should be stabilized at 1.100 PJ corresponding with an increase of energy efficiency by approximately 200 PJ. (BMNT, 04.11.2017)

3.3.3 Energy saving in the public sector

According to the plan of energy efficiency measures for federal buildings the main measures in accordance with §16 (7) (1) Federal Energy Efficiency Act (EEffG), BGBl. No.72 / 2014 and energy saving in accordance with Article 5 of the Energy Efficiency Directive (EED 2012/27 / EU) are:

-  Energy contracting;
-  Energy management;
-  Renovation measures and reduction of spaces.

This shall lead to an energy saving target of 48.2 GWh for buildings that are owned and used by the federal government between 2014 and 2020 and shall be reached by an annual refurbishment rate of 3 percent. (BMNT, 31.10.2017)

3.3.4 Energy savings in buildings

The federal states are responsible for building regulations and related regulations. Therefore, the federal and state governments have concluded, among others, the following agreements (BMNT, 31.10.2017):

- ✔ Agreement on the saving of energy, (Vereinbarung über die Einsparung von Energie, BGBl. Nr. 388/1995);
- ✔ Agreement on measures in the building sector for reducing the emission of greenhouse gases, (Vereinbarung über Maßnahmen im Gebäudesektor zum Zweck der Reduktion des Ausstoßes an Treibhausgasen, BGBl. II No. 251/2009).

3.3.5 Guidelines for civil engineering

The Austrian Institute of Construction Engineering (Österreichische Institut für Bautechnik - OIB), which is a coordination platform for the Austrian federal states, has developed the following documents, among others (BMNT, 31.10.2017):

- ✔ OIB Guideline 6 - Energy Saving and Thermal Protection (OIB-Richtlinie 6 - Energieeinsparung und Wärmeschutz);
- ✔ OIB document defining the NZEB and establishing intermediate targets in a National Plan in accordance with Article 9 (3) of 2010/31 / EU (OIB Dokument zur Definition des Niedrigstenergiegebäudes und zur Festlegung von Zwischenzielen in einem Nationalen Plan).

3.3.6 Klimaaktiv climate protection initiative

Klimaaktiv is the climate protection initiative of the Federal Ministry of Sustainability and Tourism (Bundesministeriums für Nachhaltigkeit und Tourismus - BMNT). Its aim is to supplement the climate protection regulations by developing quality standards, training and educating professionals, with offering advice, information and a large network of partners. (BMNT, 05.11.2017)

3.4 Standardisation for energy efficiency services

3.4.1 Model documents

On behalf of BMNT, the Austrian Society for Environment and Technology – OEGUT has drawn up model contracts for EPC and ESC, which can be used by both public and private clients. These model contracts can be downloaded from the webpage of OEGUT as well as

BMNT either without or with comments. The comments shall enable clients to understand contracts and adapt them to their needs. (OEGUT, 12.11.2017, BMNT, 12.11.2017)

The Grazer Energieagentur has different model contracts for EPC for download on their webpage. (Grazer Energieagentur GmbH, 12.11.2017)

3.4.2 Project implementation guidelines

The Grazer Energieagentur also provides the following guidelines for implementing EES projects (Grazer Energieagentur GmbH, 12.11.2017):

- ✔ Guidelines for profound renovation of buildings through energy-saving contracting;
- ✔ Financing models for energy services;
- ✔ Notes on proposal preparation – principles of placing;
- ✔ Regulations for the proof of energy savings;
- ✔ Procurement process for contracting projects.

3.5 European Code of Conduct for EPC

The European Code of Conduct for EPC defines the basic values and principles that are considered fundamental for the successful preparation and implementation of EPC projects. The Code of Conduct has been developed within the Intelligent Energy Europe project Transparense in cooperation with EPC providers, clients and European ESCO associations, among others. The two organisations representing ESCOs at the European level – the European Association of Energy Service Companies (eu.esco) and the European Federation of Intelligent Energy Efficiency Services (EFIEES) – endorse the European Code of Conduct for EPC and support its use when implementing EPC projects and continue in administering and maintaining the Code of Conduct. By the end of October 2017, the Code of Conduct had 234 signatories across Europe. This includes 148 EPC providers, 13 national associations (with 160 members in total), two European associations of ESCOs and 70 facilitators and other signatories. The European administrators organise regular conference calls with national administrators to exchange information about regulatory developments and new projects.

It is expected that the European Code of Conduct for EPC will serve as a harmonised European quality standard of EPC projects, raise potential clients' confidence in the business model and thus lead to higher demand for EPC projects.

The list of the Code signatories is available online and promoted within eu.esco and EFIEES activities (press releases, articles, national and international events). EPC providers who become signatories of the EPC Code commit to conduct EPC projects in compliance with the EPC Code of Conduct. It is a voluntary commitment of the EPC providers and is not legally binding.

The Code has vast potential to support EPC market development, which can be exploited. For example, it has been used as a discussion guideline between client and EPC provider,

guidance for the preparation of tender dossiers and contracts, and as a marketing tool. Within the QualitEE project, it is being used as a starting point for developing an energy service quality assurance scheme.

In Austria, the DECA has signed the Code of Conduct in September 2014. The endorsement of the code is of high interest to the DECA, its members and the market. The effective implementation of the code is also in consistence with the implementation of the DECA quality seal for energy efficiency services in November 2017. (DECA, 11.01.2018)

3.6 Support schemes

The following public support schemes and funding are available to clients or ESCOs in Austria:

- ✔ **Subsidies for energy saving** are granted by the Kommunalkredit Public Consulting (KPC) for companies, that implement energy efficiency measures in industrial and commercial production processes, in existing buildings and for heat recovery processes. (Austrian Energy Agency, 12.11.2017)
- ✔ **Subsidies for energy saving measures** can be applied for at the KPC by small and medium sized companies located in the federal state of Tyrol. This shall support energy saving projects or renewable energy sources. (Austrian Energy Agency, 12.11.2017)
- ✔ **Subsidies for energy efficiency programs** in Vienna are promoted by the municipal department for energy strategy (MA20) for energy efficiency programs that include far-reaching measures which directly cause energy savings or energy efficiency improvements and are of high relevance for Vienna. (Austrian Energy Agency, 12.11.2017)
- ✔ The **Energy Contracting Program** of the federal state of Upper Austria (Energiecontracting-Programm (ECP) des Landes Oberösterreich) supports clients of small EPC and ESC projects with a subsidy up to € 75.000. (Land Oberösterreich, 12.11.2017)
- ✔ **Corporate environmental subsidies** are provided by the BMNT and partly co-financed by the European Union. They are an important funding instrument at federal level for Austrian companies for measures that lead to a reduction of environmental pollution. (Kommunal Kredit Public Consulting, 12.11.2017)
- ✔ **Feed-In tariffs** are granted for energy that is supplied to the grid by subsidized green power plants (Energie-Control Austria, 10.01,2018)
- ✔ There is the possibility of **investment subsidies** and special **federal state subsidies**, but also occasional **special support programs** of the government, for example the photovoltaics promotion campaign of the Austrian Climate and Energy Fund. (Energie-Control Austria, 10.01,2018)

4 ENERGY PERFORMANCE CONTRACTING MARKET

This chapter describes the Austrian EPC market and its development through combining the results of the online survey, the interviews and other sources of information.

4.1 EPC market actors

The structure of the Austrian EPC market consists of providers, facilitators, clients, associations and decision makers, which are listed in the chapters 4.1.1, 4.1.2, 4.1.3 and 4.1.4.

Each list comprises a selection of market actors. As there is currently no central register for EPC projects and/or clients in Austria, market actors can primarily be found via internet research, therefore their number is unverifiable. The lists contain those market actors, who declare themselves as EPC market actors and have been registered in one of the following sources: ÖGUT (08.12.2017), DECA (08.12.2017 and 09.12.2017), OÖ Energiesparverband (08.12.2017), e7 Energie Markt Analyse GmbH (08.12.2017). Therefore, those providers who offer EPC services but do not publicly declare, are not included.

4.1.1 Providers

The Austrian EES market includes numerous ESCOs offering EPC services. The following list presents the 27 designated EPC providers.

- ✔ AAE Naturstrom Vertrieb GmbH;
- ✔ Axima Gebäudetechnik GesmbH;
- ✔ Bacon Gebäudetechnik GmbH & Co KG;
- ✔ Caverion Österreich GmbH;
- ✔ con4 GmbH;
- ✔ easy ENERGY GmbH;
- ✔ ees energy environment solutions GmbH;
- ✔ EffiCent Energieeffizienz Dienstleistungen GmbH;
- ✔ ELIN GmbH & Co KG;
- ✔ ENERGIEALLIANZ Austria GmbH;
- ✔ Energiecomfort Energie- und Gebäudemanagement;
- ✔ ENGIE Energie GmbH / ENGIE Gebäudetechnik GmbH;
- ✔ EQ Energie & Bau GmbH;
- ✔ Grazer Energieagentur GmbH;
- ✔ Honeywell Austria GesmbH - Building Solutions;
- ✔ PORREAL Facility Management GmbH;

- ✔ Siemens AG Österreich;
- ✔ SW – Energietechnik (SWET) GmbH;
- ✔ Verbund GETEC Energiecontracting GmbH;
- ✔ Municipal and regional utility companies.

4.1.2 Facilitators

In Austria, EPC facilitators assist mainly municipalities realising public procurement for EPC projects. Their assignments range from project development to assistance in the tendering procedure and other project management tasks. Some of these facilitators also act as providers so the borders between their different services become blurred.

The Austrian EES market includes numerous facilitators offering diverse services regarding consultation and mediation for EPC services. The following list presents 23 facilitators in alphabetical order that describe their EPC activities on the web.

- ✔ ACECon e.U. – Environmental & Efficiency Consulting;
- ✔ Acetec Ing. Franz Hoinig KG;
- ✔ aqotec GmbH;
- ✔ Aschauer & Koppenberger Energie-Elektro-Heizungstechnik OG;
- ✔ CP i-invest GmbH;
- ✔ Dr. Rausch GmbH, Klagenfurt;
- ✔ e7 Energie Markt Analyse GmbH;
- ✔ ECONS Consulting GmbH;
- ✔ Elektro Klienstein GmbH;
- ✔ En2 - Consulting e.U.;
- ✔ Enelteco Energie-Consulting GmbH;
- ✔ Energetic Solutions;
- ✔ ENERGIEALLIANZ Austria GmbH;
- ✔ Energy Changes Projektentwicklung GmbH;
- ✔ ETHUS GmbH;
- ✔ EUDT Energie- und Umweltdatentreuhand GmbH;
- ✔ ff-energy, Gschwandt;
- ✔ Grazer Energieagentur GmbH;
- ✔ Güssing Energy Technologies GmbH;
- ✔ heise fleetconsulting GmbH;
- ✔ Mastermind Ingenieurbüro GmbH;
- ✔ OFI Technologie & Innovation GmbH;

- ✔ KPC Public Consulting;
- ✔ TÜV Austria Consult GmbH.

4.1.3 Clients

In Austria clients for EPC projects can basically be split into two main groups: the public sector and industry.

The **public** sector (municipalities & public buildings) is the largest EPC market. The most important client groups are the “BIG – Bundesimmobiliengesellschaft n.b.H.” (The Federal Real Estate Company, which manages Austrian publicly owned real estate) and the 2.100 municipalities (update May 1st, 2017), which own most of the public buildings in Austria.

Former public and private clients can be found with the search mask for EPC projects via the contracting portal of ÖGUT (12.12.2017). Nevertheless, this list is not complete since it dates from November 2016, and various projects, especially the replacement of street lighting, are carried out as EPC projects but are not documented as such.

The following list is a selection of Austrian clients from the **industrial** sector showing the variety of companies implementing EPC projects:

- ✔ Austro Control - Zentralgebäude und Air Traffic Control Centre (transportation services);
- ✔ Baxter Vaccine AG (pharmaceutical preparations);
- ✔ Green Building Hotel Wende (hotel);
- ✔ Großbäckerei Oberösterreich (bakery products);
- ✔ Kapsch Components (transportation and digitalisation);
- ✔ Reform-Werke Bauer (farm machinery & equipment);
- ✔ Schifffahrtszentrum Wien (water transportation)
- ✔ Wiener Privatklinik (health care).

4.1.4 Associations and decision makers

The Austrian EES market includes various associations supporting EPC services. A selection of these is described below. Some of them operate as facilitators at the same time.

An important association is the DECA. It was established in 2005 by renowned Austrian ESCOs as the “Dachverband Energie-Contracting Austria - DECA”. At the end of 2012, it was transformed into the “**Dienstleister Energieeffizienz und Contracting Austria – DECA**”. This independent platform aims to sensitise and inform decision makers and customers of EES and therefore develop the market for high quality energy efficiency services. In November 2017, the DECA presented a quality seal for energy efficiency services (See chapter 8.3).

The **“Oberösterreichischer Energiesparverband”** is an association that advises, promotes, informs, networks and trains households as well as communities and businesses regarding energy efficiency services.

The **“Energieagentur und Umweltagentur des Landes Niederösterreich – ENU”** is an energy agency providing consultancy for cities and municipalities in the federal state of Niederösterreich to increase energy efficiency through – among others - EPC.

The **“Österreichischer Städtebund”** is a municipal advocacy group for 253 cities and larger municipalities. It supports and connects cities that have carried out and are interested in EPC projects.

The **Austrian Energy Agency** (Österreichische Energieagentur) is an energy research and policy institution which offers scientifically founded advice for decisionmakers in politics, business and administration. It manages programmes and campaigns, provides advice on energy programmes and participates in various projects as project coordinator or partner.

The Federal **Ministry for Sustainability and Tourism** (Bundesministerium für Nachhaltigkeit und Tourismus – BMNT), respectively the department of energy and mining, is one of the key actors in implementing Austrian energy policy. It acts as the highest organ of the federal government in all matters of supply of the Austrian economy and population with energy and is for example responsible for the **“Umweltzeichen Energie-Contracting”** (See chapter 8.3)

4.2 EPC market developments

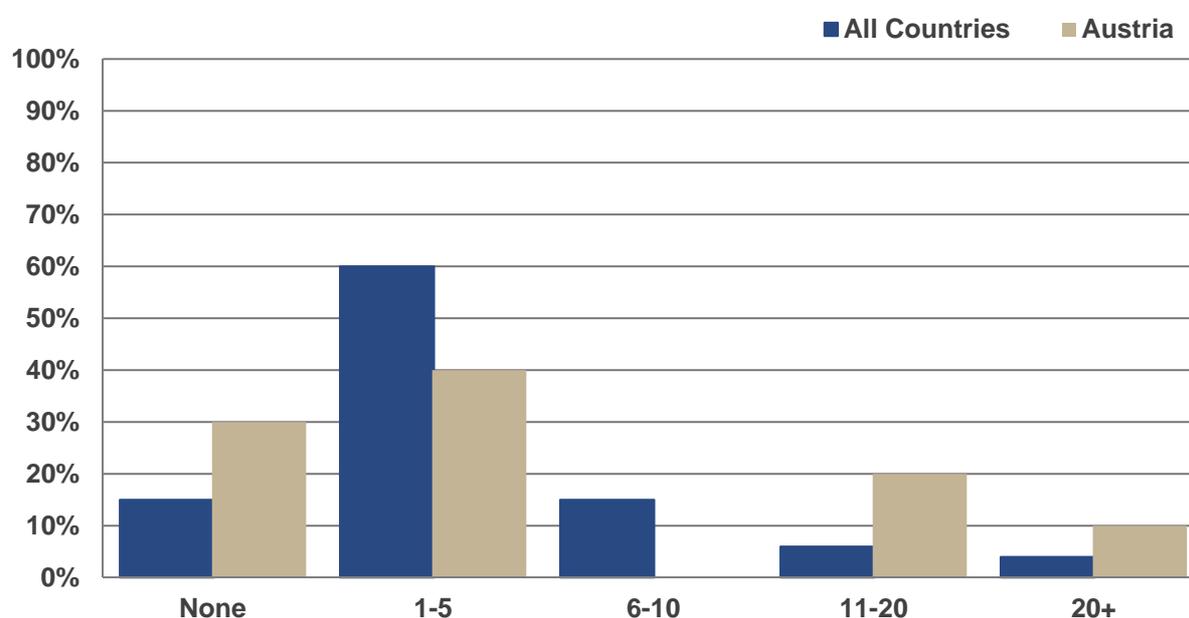
The Austrian EPC market emerged in the mid-1990s with a steady development up to recent years. The first major step was the “Performance Contracting Project” (renovation of two pools containing 50 Viennese schools) in 1998, which led to various regional projects. (Amann, 2015)

Through the federal contracting offensive - “Bundescontracting Offensive” about 450 buildings and 250 properties were optimised since 2001 (BMDW, 03.01.2018).

In the federal state of Oberösterreich, the market for EPC is particularly lively because of an EPC (and ESC) subsidy scheme that started in 2006 and was prolonged until the end of 2020 (Land Oberösterreich, 03.01.2018).

Forty percent of the Austrian survey respondents – EPC providers and facilitators – were involved in up to 5 EPC projects in the last year. Twenty percent of the Austrian respondents were involved in 11-20 projects and 10 percent were involved in more than 20 projects. However, also 30% of respondents were not involved in any project in the last year, which is about twice as much as the share of respondents across All Countries in the survey.

Figure 1: How many EPC projects (that have reached Contract Signature) has your organisation initiated / become involved with in the last 12 months? (Percentage share of responses by providers and facilitators, QualitEE, 2017)



The Austrian EPC market did not grow significantly. This is reflected by the responses of the survey respondents, who on the one hand stated that their orders have seen little change to slight growth within the last 12 months (50% of Austrian respondents). 30% of Austrian respondents even saw a decline in orders, while the largest number of respondents across All

Countries in the survey see little change (37%) or growth (49%). On the other hand Austrian respondents assumed that the EPC market in total had little change to slight growth (90% of respondents; see Figure 2 and Figure 3).

Figure 2: In the last 12 months your EPC orders have seen: (QualitEE, 2017)

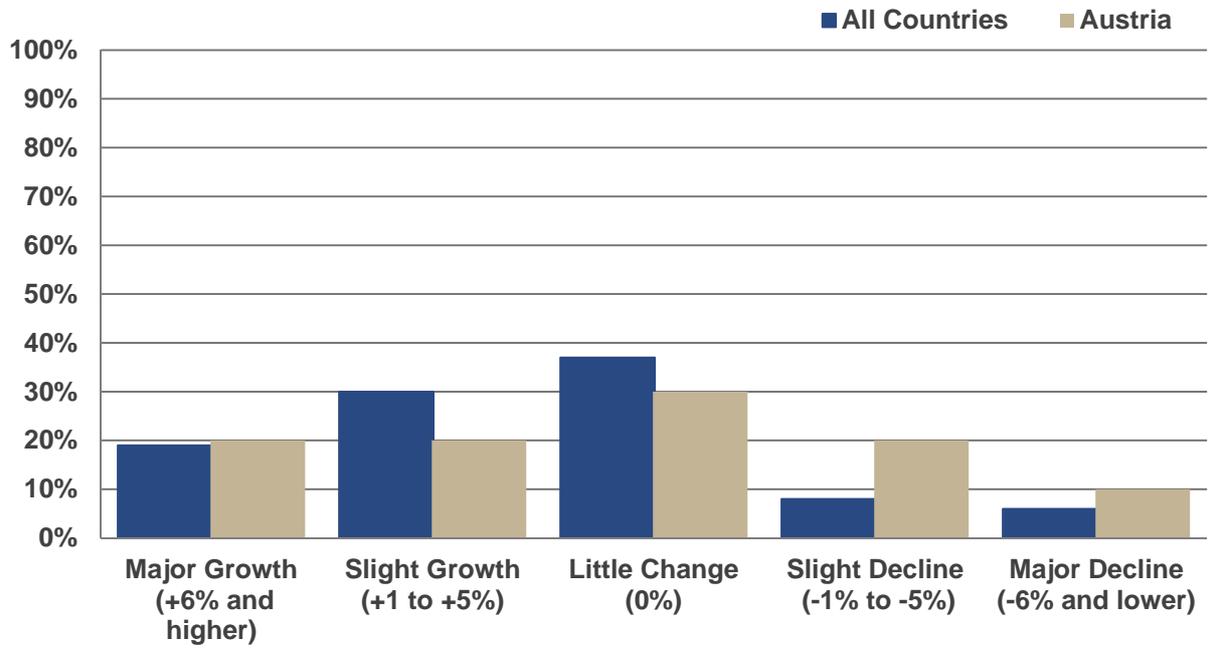
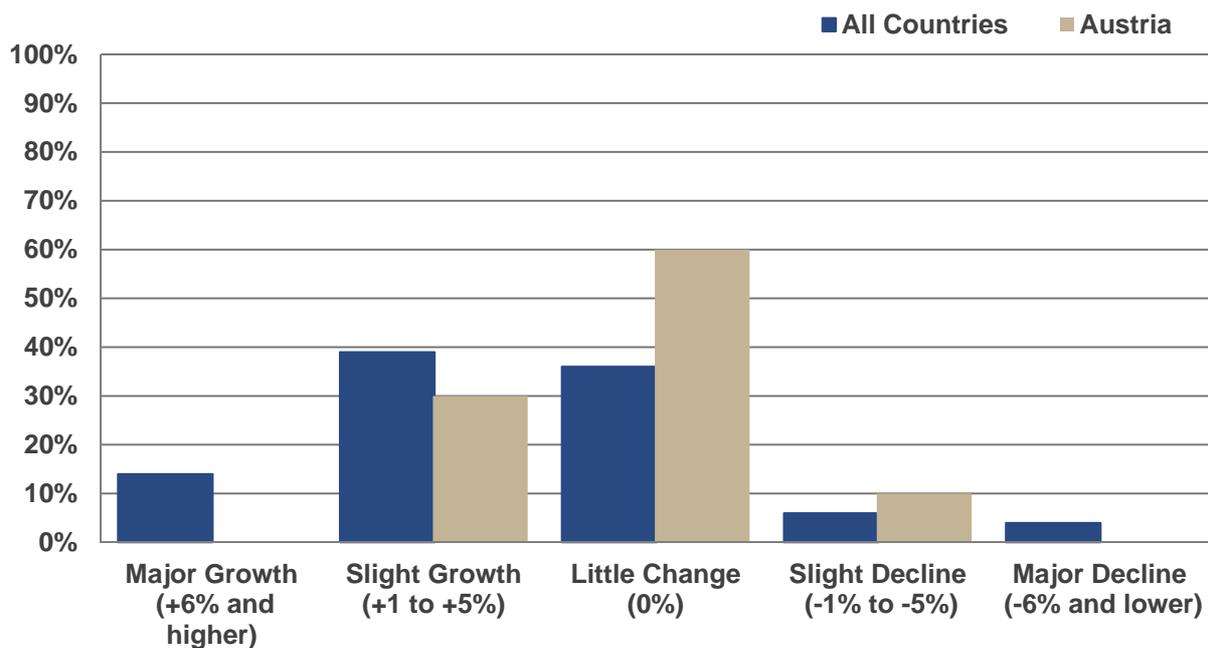


Figure 3: Over the last 12 months, the market for EPC in your country has seen: (QualitEE, 2017)



The number of running EPC projects increased strongly between 2000 and 2005. After that, they remained nearly stable until 2011 and were pursued by a small decrease. Since then the number kept steady with about 25 - 28 EPC projects per year. (JRC, 2017)

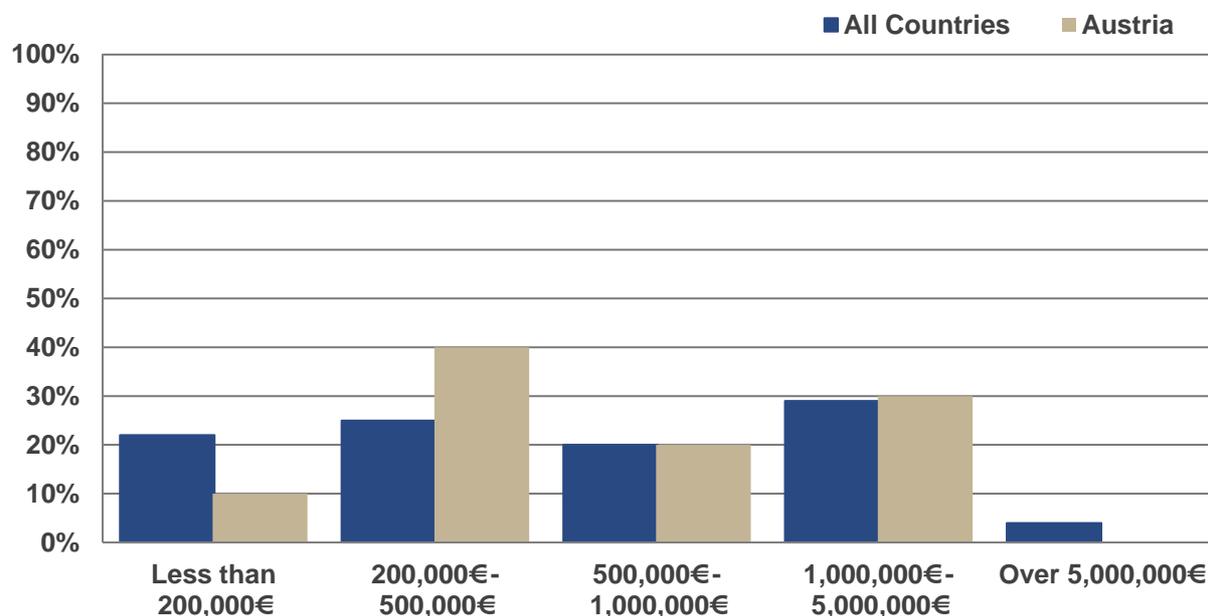
The comparison of results of a survey of the Transparense project from 2015 (e7 Energie Markt Analyse GmbH, 2018) and of Figure 1 underlines the flat market as most respondents in both years had 1 to 5 EPC projects within the last 12 months.

Until 2015 the Austrian EPC market stagnated but had high potential. Since then the situation has not changed significantly. Its future depends primarily on the development of energy prices and European legislation initiatives. (Grazer Energieagentur GmbH, 2015)

According to the JRC Science for Policy Report, the average size of investment in an EPC project is about € 500,000 per project (JRC, 2017). This is consistent with the survey results, which show that size of EPC projects in Austria varies between the range of € 200,000 – € 500,000 (40% of respondents) and € 1 million – € 5 million (30% of respondents) per project (See Figure 4).

The EPC project values of projects in All Countries in the survey are spread evenly between the categories less than € 200,000 (22% respondents from All Countries surveyed) and € 1,000,000 – 5,000,000 (29% of respondents from All Countries surveyed).

Figure 4: What is the most common overall value (investment outlay) of the EPC projects you are involved in? (QualitEE, 2017)

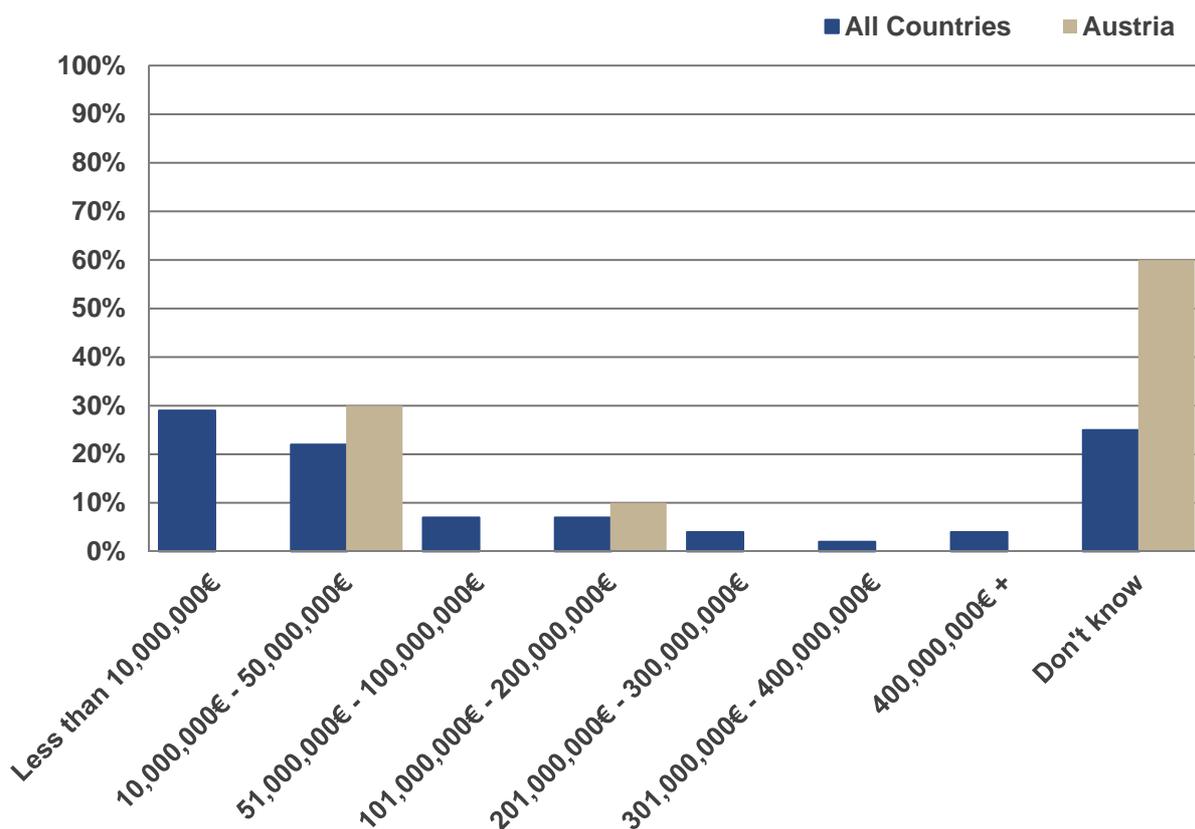


The total investments in EPC projects were about € 26.7 million in 2008. The market potential was estimated to be more than €10 million in 2016. (JRC, 2017)

Nevertheless, 60% of the respondents cannot estimate the generated revenue of the entire EPC market in Austria while there are 30% who estimate it between € 10 and € 50 million and 10% who estimate it between € 101 and € 200 million.

Compared to All Countries in the survey it is significant that the amount of respondents who cannot estimate the generated revenue is 35 percentage points higher in Austria than of respondents across All Countries in the survey and there are 29% of respondents from All Countries who estimate the generated revenue to be less than € 10 million while there are none who do that in Austria. Twenty one percent of respondents from All Countries surveyed assume the revenue to be € 10,000,000 – € 50,000,000. (See Figure 5)

Figure 5: Roughly how much revenue do you think the EPC market in your country generated in 2016? (QualitEE, 2017)



4.3 EPC business models

In Austria similar to All Countries in the survey, the most common contract length of an EPC project is 5 - 10 years. Besides there are 30% of EPC projects which last 11 – 15 years, only 10% which last less than 5 years and none that last longer than 15 years. Austrian respondents state a similar project length structure compared to all respondents of the survey. (See Figure 6)

Figure 6: What is the most common duration of the Energy Performance Contracts you are involved in? (QualitEE, 2017)

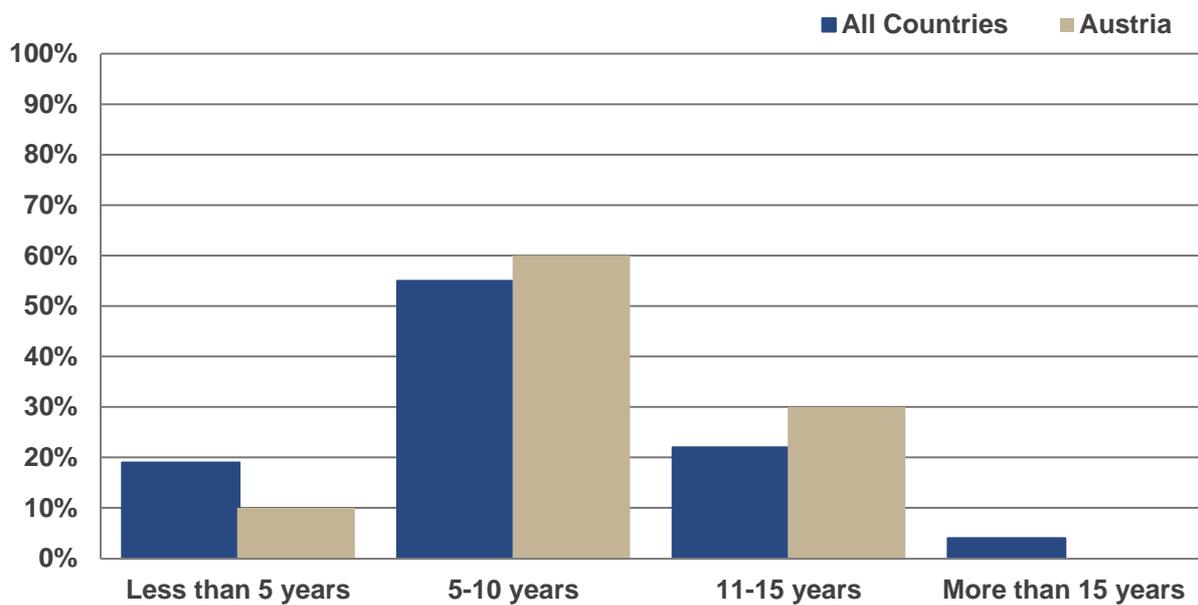
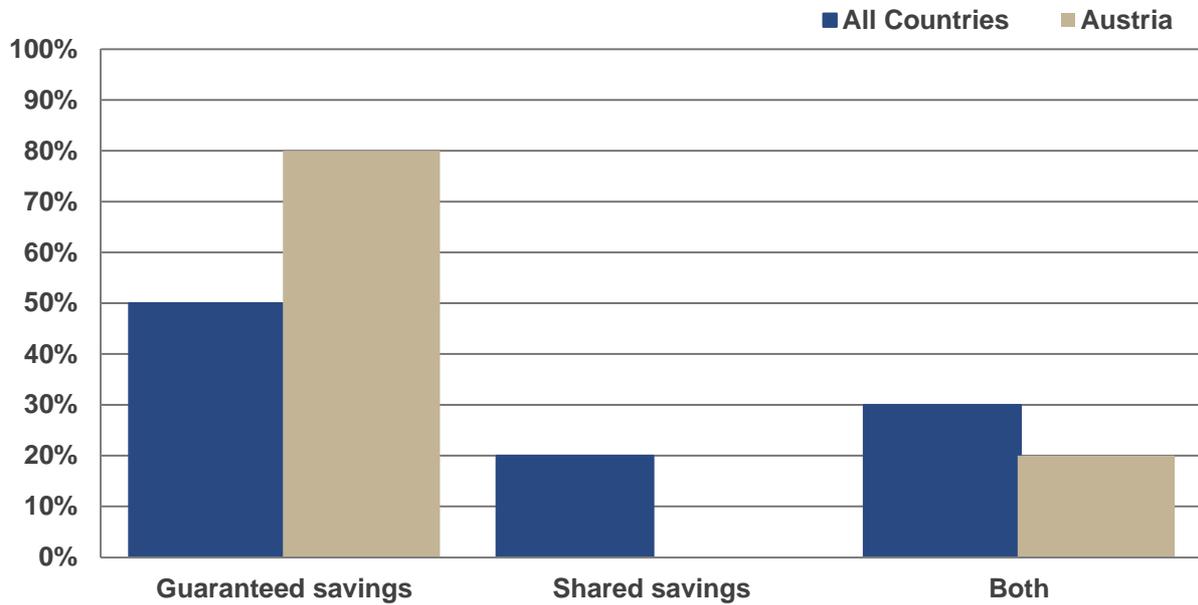


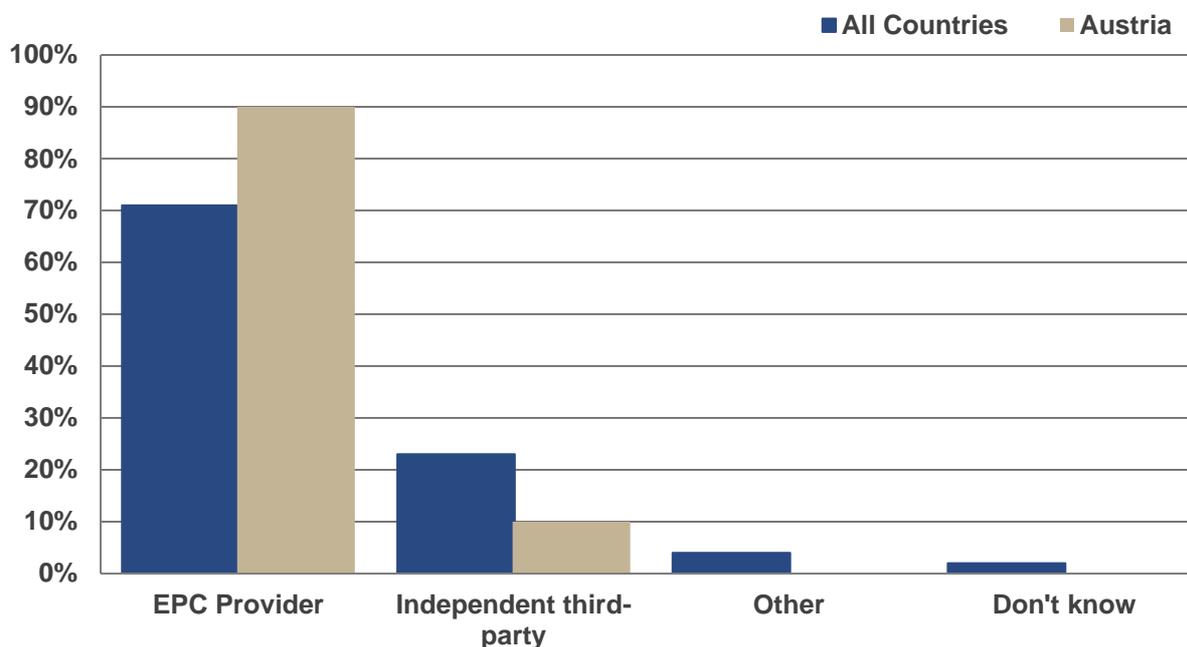
Figure 7: What type of energy savings model is offered in the EPC projects you are involved in? (in a shared savings model, the client pays the ESCO a pre-determined percentage of its achieved cost savings from the project) (QualitEE, 2017)



The predominant energy savings model (stated by 80% of Austrian respondents) used in EPC projects is the guaranteed savings model. This is considerably higher than the 50% share across All Countries in the survey offering the guaranteed savings model. Shared savings as an alternative energy savings model is not relevant in Austria, whereas a combination of guaranteed savings and shared savings is offered in 20% of the EPC projects. (See Figure 7)

Within the projects in Austria as well as across All Countries in the survey, the energy savings performance analysis is primarily delivered by the EPC provider. In Austria this applies to 90% of the projects. In the remaining 10% of the EPC projects the energy savings performance analysis is delivered by an independent third party. Different to Austria, some respondents from All Countries in the survey stated that there are other parties involved (4%) or that they do not know who delivered the energy savings performance analysis (2%). (See Figure 8)

Figure 8: Who typically delivers the energy savings performance analysis in the EPC projects you are involved with? (QualitEE, 2017)

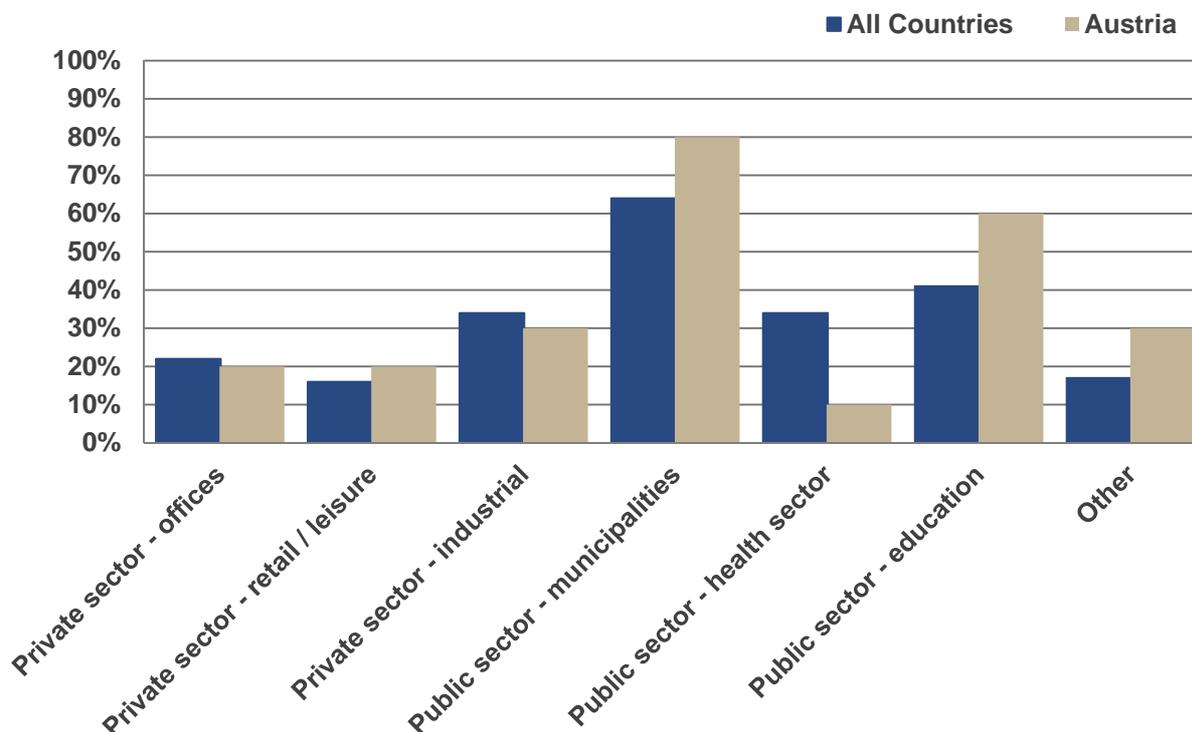


4.4 EPC market sectors

The public sector continues to be the major client for EPC in Austria. Figure 9 shows that, in general, the clients come from municipalities (80%) or the educational sector (60%). In comparison to All Countries in the survey, the dependence on municipal clients is higher in Austria. Especially municipalities and education play a major role for Austrian EPC providers, which are less important to providers from All Countries surveyed (64% and 41 % respectively). Based on the survey results, the health sector (10%) is currently less relevant for EPC in Austria, while this is the third most important sector for All Countries in the survey (34% of respondents) (See also chapter 4.6.2).

The respondents have significantly fewer clients from the private sector than from the public sector in Austria as well as in All Countries in the survey and the projects in the private sector vary from offices (20%) to rental/leisure (20%) with slightly more projects in the industrial sector (30%). (See Figure 9). 30% of Austrian respondents state that their EPC clients come from other sectors.

Figure 9: Which sectors do your EPC clients generally come from? (QualitEE, 2017)

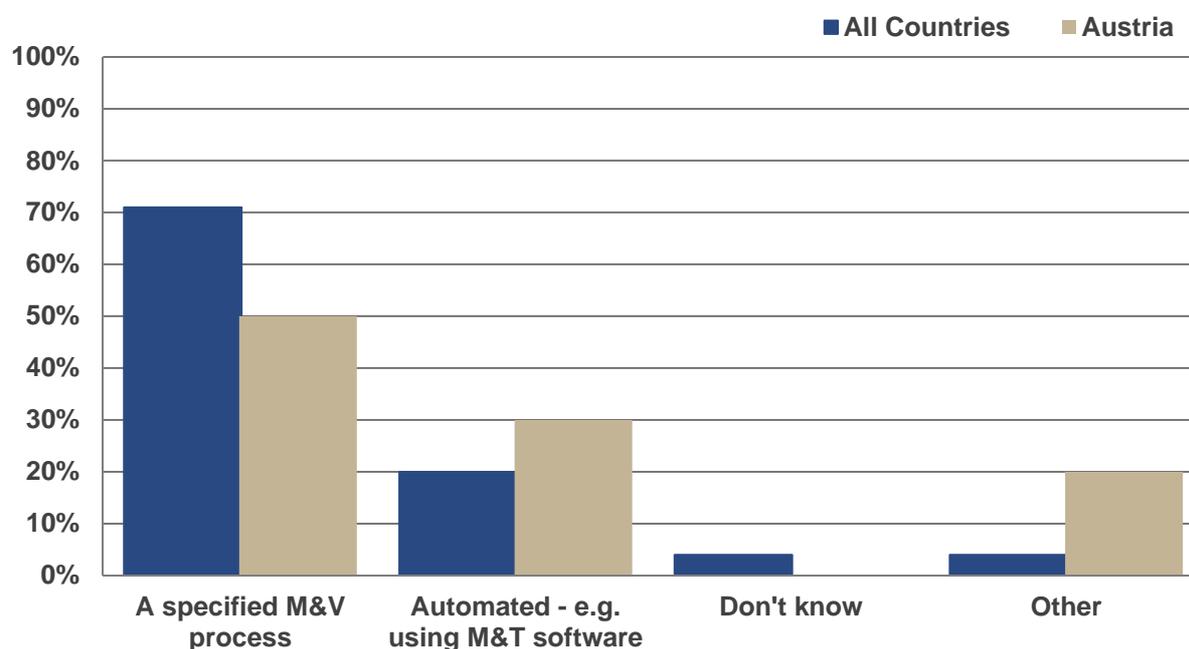


4.5 EPC measurement & verification

M&V is the process in which measurements are used to determine the actual energy savings achieved to confirm the savings guaranteed in an EPC project.

Fifty percent of Austrian respondents use a specific M&V process to record the energy savings performance which is notably lower than reported across All Countries in the survey (70% of respondents). More EPC providers use special, automated M&T software (30%) and other M&V tools (20%) compared to All Countries surveyed (20% and 5% respectively). (See Figure 10)

Figure 10: How is the energy saving performance of the EPC projects you are involved with typically measured and quantified? (QualitEE, 2017)



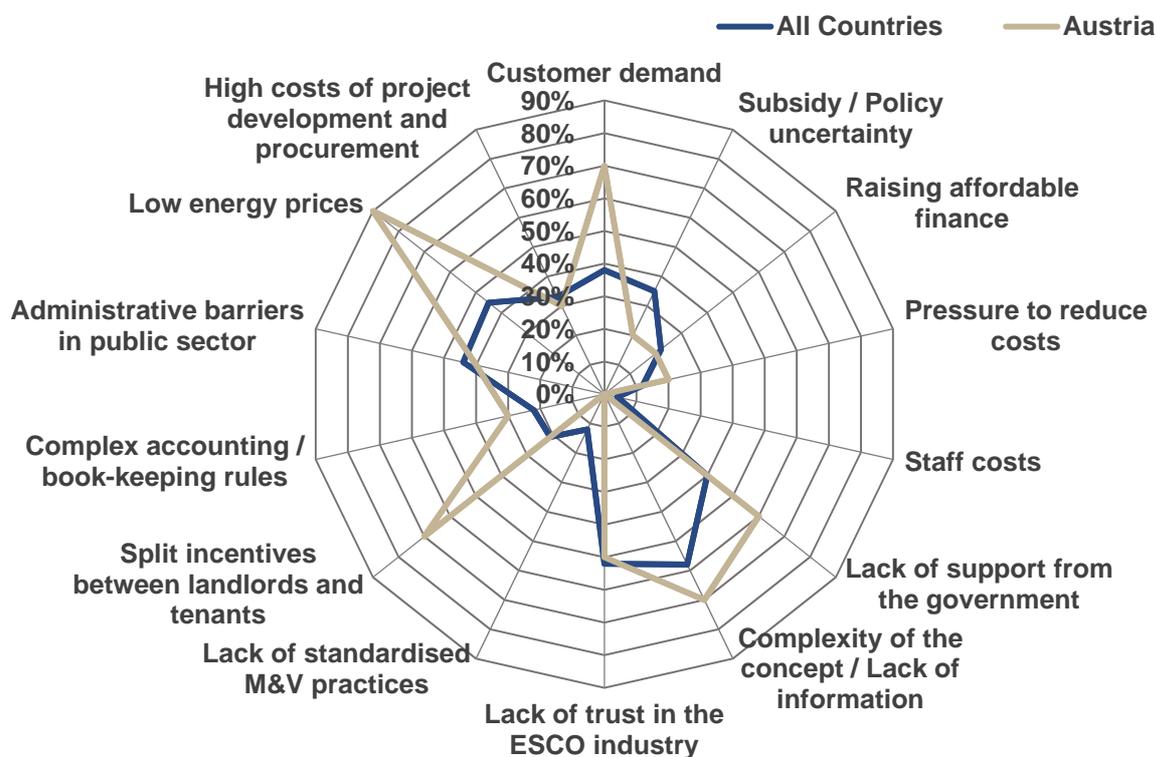
4.6 EPC market barriers

A variety of market barriers for EPC exist. The main market barriers for EPC according to the Austrian respondents of the survey are low energy prices (90% of respondents), split incentives between landlords and tenants (70% of respondents), the complexity of project/lack of information (70% of respondents) and customer demand (70% of respondents).

There are two other major market barriers according to the respondents of the survey: the lack of support from the government (60% of respondents) and the lack of trust in the ESCO industry (50% of respondents). Other market barriers such as administrative barriers in the public sector (40%), complex accounting/book-keeping rules and high costs of project development and procurement (both 30%), subsidy/policy uncertainty, raising affordable finance and pressure to reduce costs (all three 20%) have minor impact. Staff costs and lack of standardised M&V practices (both 0%) have no impact on the EPC business in Austria at all.

In comparison to All Countries in the survey the shares of the main Austrian barriers are significantly higher. The shares of the barrier 'split incentives between landlords and tenants' are 50 percentage points higher in Austria, the shares of the barrier 'low energy prices' are 45 percentage points and the barrier 'customer demand' 32 percentage points higher compared to those of All Countries in the survey. The tendency of the other barriers is more or less the same in Austria and across All Countries surveyed (Figure 11).

Figure 11: Based on the activities of the last 12 months: what do you think are the main BARRIERS to the EPC business? (QualitEE, 2017)



4.6.1 Regulatory and administrative barriers

This section provides an overview of the main regulatory barriers, with a focus on barriers in the public sector.

General regulatory barriers:

EPC projects generally depend on public subsidies, not all of which are available in all federal states of Austria. (Auer, Bayer, November 2013)

“The Austrian tax law has different regulations for service contracts and construction contracts regarding the payment date of the value added tax. This uncertainty means a relevant risk for all EPC project partners.” (Auer, Bayer, November 2013, page 10)

Regulatory and administrative barriers in the public sector:

In the public sector on the one hand, EPC projects depend on the political will of the federal or local government, on the other hand some municipalities are not familiar with the legal requirements for public tendering of contracting projects according to public procurement law. There is also a lack of market facilitators providing technical and legal support for clients during tendering procedures. (Auer, Bayer, November 2013)

In the public sector, there are often split budgets and separate responsible departments for energy costs and investments. Therefore, savings caused by energy measures cannot automatically be used for refinancing investments.

There are cities where the finance department rejects contracting generally, as stated in a personal interview with a client on 28.11.2017.

4.6.2 Structural barriers

Split incentives:

In residential buildings, there is a conflict between the interests of landlords and tenants. Tenants profit from energy saving measures, landlords pay investment costs and do not directly profit from this energy saving measures. Passing on the investment costs to the tenants is problematic due to regulations in the tenancy law.

In condominium buildings, apartments are often owned individually. To achieve an approval for an EPC project the majority of the owners is required by the condominium law. Achieving this can be difficult since usually some owners rent their apartments out, which leads to the split incentive phenomenon again. (Auer, Bayer, November 2013)

Complexity of the concept/lack of information:

In general, there seems to be little awareness of the magnitude of energy saving measures through EPC. As a client mentioned in a personal interview on 23.11.2017, most decision makers judge EPC only as a financing instrument but not as a tool to improve energy efficiency.

There were few individual negative experiences in previous EPC projects but those were spread effectively as two clients reported in personal interviews on 26.10.2017 and 28.11.2017. It must be clearly communicated that these were few individual cases.

Customer demand

Especially in larger cities, the finance department pre-finances the project if the energy department can demonstrate that the investment for energy savings pays off within 7 years. An ESCO is no longer needed and therefore the customer demand in the public sector decreased. This practice emerged because EPC was often more expensive than if the city implemented it itself. This was mentioned by two clients in the personal interviews on 16.11.2017 and 28.11.2017.

Low energy prices

The energy prices in Austria have been falling for five year in a row since the beginning of 2012, with only a slight increase in 2017 (Austrian Energy Agency, 11.01.2018). This results in a decrease of the size of possible financial savings.

Health sector / responsibilities

The transfer of responsibilities and work load from the public health sector client towards the ESCO is a challenging task. Sometimes the duties are considered too

delicate to be outsourced, sometimes there is concern of the technical staff regarding the takeover of duties by a private company.

4.6.3 Financial barriers

The availability of financing is a barrier to the market in Austria for 50% of the respondents of the survey. For financing institutes, financing EPC is difficult because of the regulations by the Austrian Financial Market Authority (FMA). FMA influences for example the establishing of collateral and collateral documentation. Additionally, the operability of earnings must be verifiable. Because of creditworthiness this is difficult with EPC, except for projects with large contractors. But, as mentioned by a financial institution in a personal interview on 23.11.2017, large contractors usually do not work with financing institutes.

Granting of credits by financing institutes is also an obstacle for small and medium sized ESCOs, which makes it more difficult to enter the market.

Therefore, subsidies suitable for EPC projects are an important measure to tackle the energy saving potential in Austria. Nevertheless, this financial support is implemented scarcely in Austria. (Amann, Leutgöb, et al. August 2015)

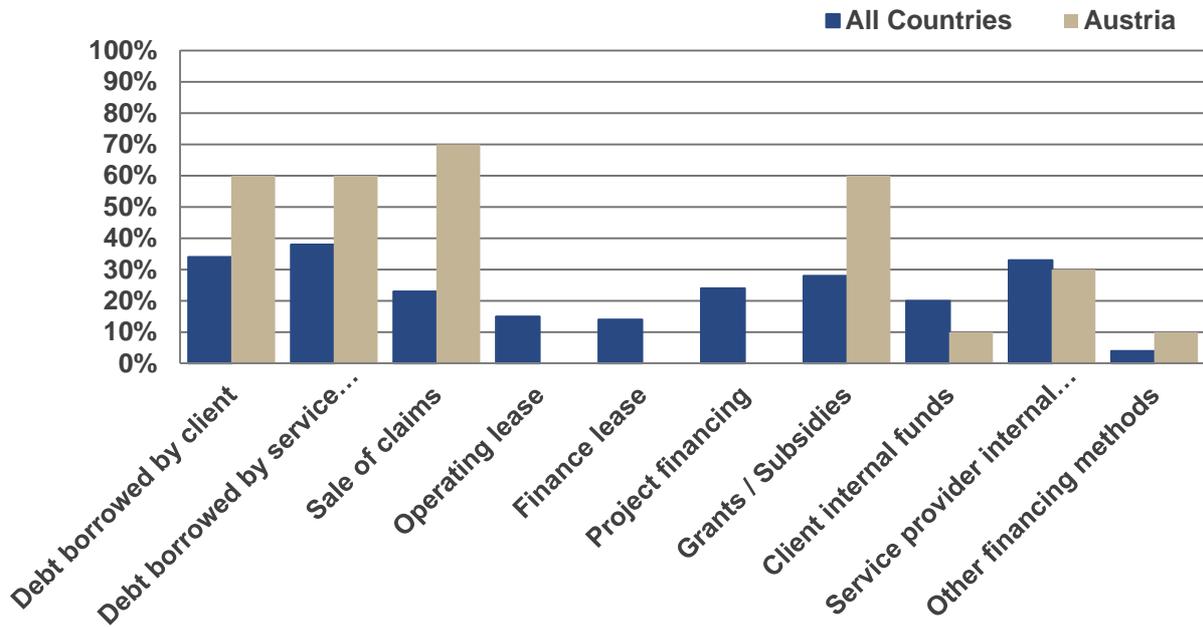
4.7 EPC financing

EPC projects in Austria are primarily financed by the following concepts:

- ✔ Debts borrowed by client (60% of respondents);
- ✔ Debts borrowed by service provider (60% of respondents);
- ✔ Sales of claims (70% of respondents);
- ✔ Grants/Subsidies (60% of respondents).

Financing through operating lease, finance lease and project financing are not used in Austria but are used in All Countries in the survey in 14% of cases. (See Figure 12).

Figure 12: How are the EPC projects you are involved with financed? (QualitEE, 2017)



Only 40% of respondents see the sale of claims (sale of receivables) as main collateral for EPC projects and the same share of respondents does not know if the sale of claims is accepted as the main collateral for EPC projects. Further 20% of respondents see the sale of claims (sale of receivables) as collateral for EPC projects in a minority of cases. The Austrian figures are similar to the values from All Countries in the survey, only the percentage of respondents who see the sale of claims (sale of receivables) accepted as the main collateral for EPC projects in the majority of cases is significantly higher in Austria than in All Countries surveyed (40% versus 24%). (See Figure 13).

Figure 13: From your experiences, is the sale of claims (sale of receivables) accepted as the main collateral for EPC projects? (QualitEE, 2017)

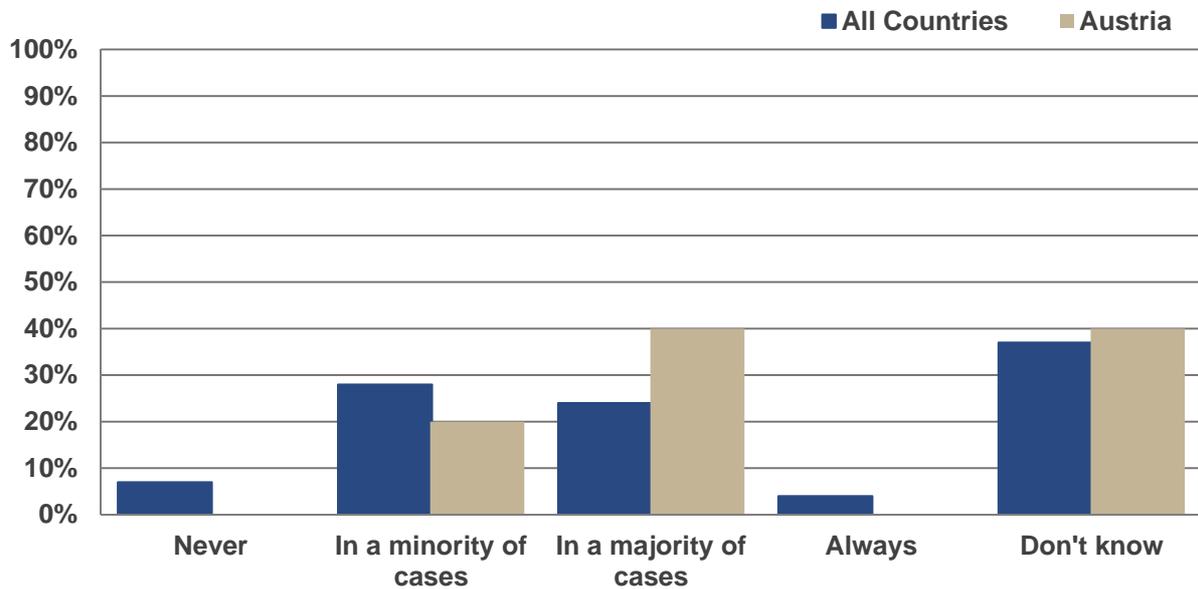
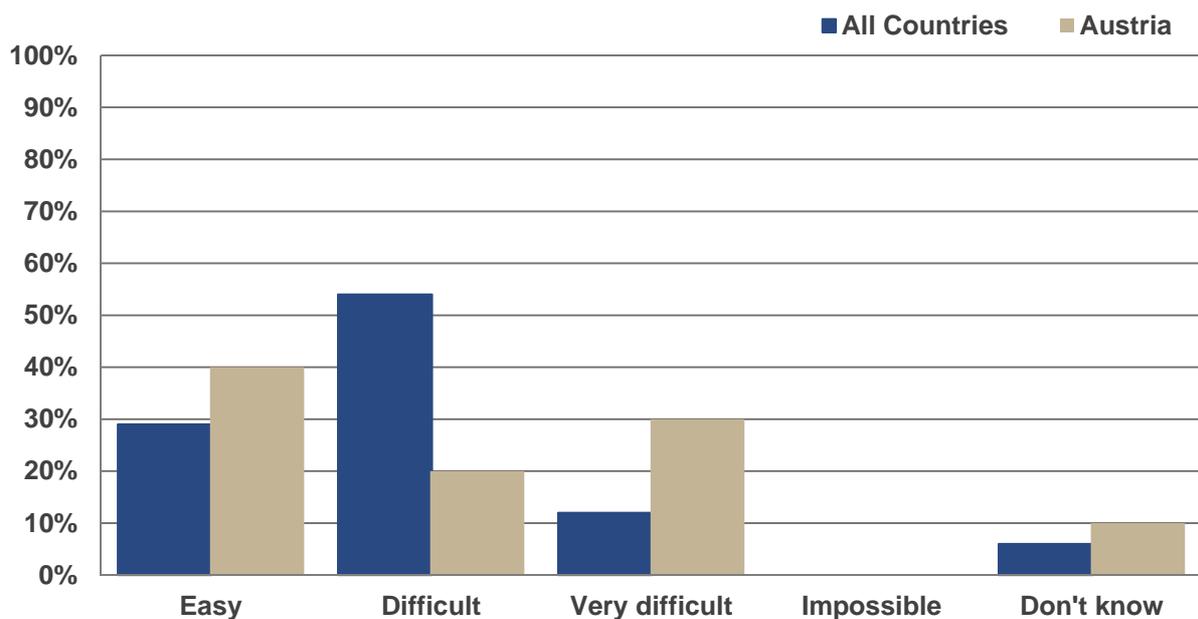


Figure 14 shows that obtaining viable finance in Austria is very difficult for 30% of EPC projects, difficult for 20% and easy for 40%. This differs considerably from the picture across All Countries in the survey. Obtaining viable finance for an EPC project is very difficult only for 12%, but difficult for 54%, while 29% of all respondents find it easy.

Figure 14: Overall, do you consider that obtaining viable finance for an EPC project is: (QualitEE, 2017)



Financial institutions in Austria primarily offer the borrowing of debts by the service provider as the form of financing in EPC projects.

Future claims from EPC will not be accepted as main security. This means no credits will be given on future claims. This is done because if the guaranteed energy savings are not achieved, contractual penalties will come into effect, and the amount of these cannot be estimated.

When financial institutions make investment decisions, there are a lot of conditions which must be met by EPC projects in Austria to receive funding. These are for example:

- ✔ The solvency and reliability of the client must be proven;
- ✔ The provider must be creditworthy;
- ✔ The project must be profitable;
- ✔ The project must be legally stable;
- ✔ The contract is well formulated (rights of intervention, penalties, claims, bankruptcy etc.);
- ✔ The project has integrity (meets ethical requirements).

Another aspect of good project quality, which would be of great importance for funding, but is not yet considered, is that (publicly owned) buildings are charged with the owner's liability. A financial institution mentioned in a personal interview on 23.11.2017, that this would make it easier for financial institutions to finance EPC projects.

4.8 EPC quality determinants

The quality of an EPC project defines how well the EPC service level delivered by the EPC provider matches client's expectations. (Amann, Leutgöb, et al., August 2015)

The results from the survey show that one EPC quality determinant is important for all Austrian respondents:

- ✔ Preliminary technical-economic analysis / energy audit (100% of respondents).

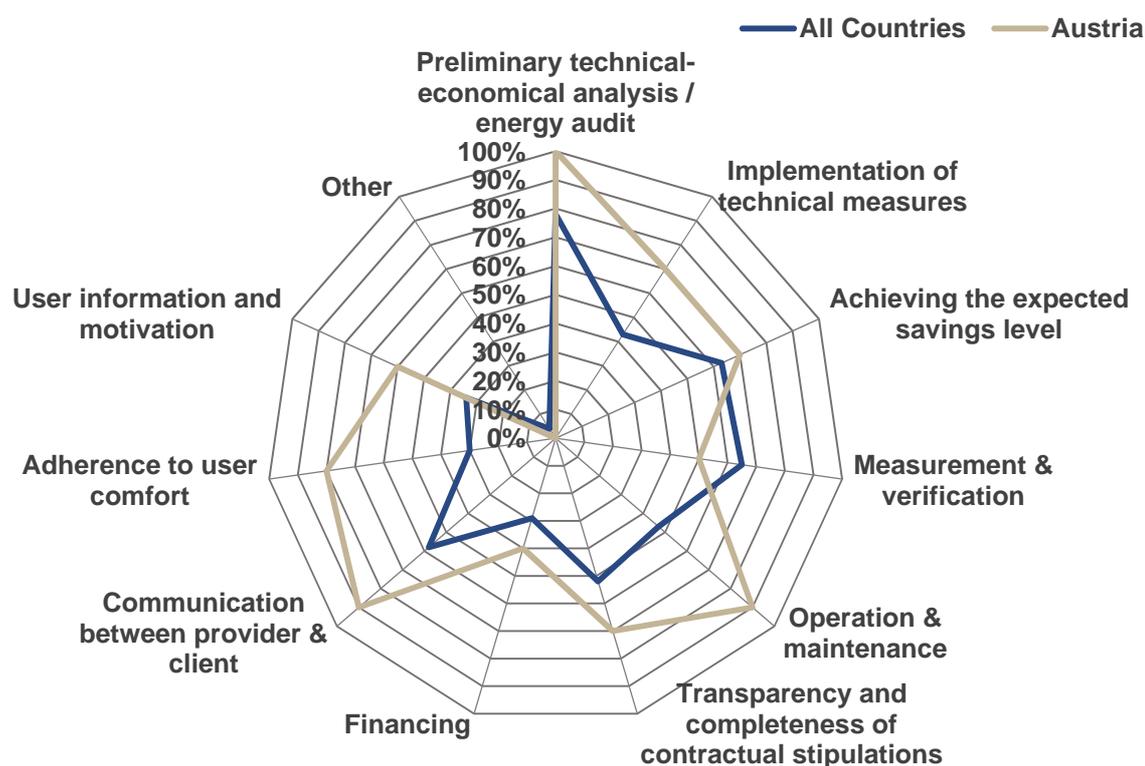
Furthermore, three other determinants are outstanding:

- ✔ Operation & maintenance (90% of respondents);
- ✔ Communication between provider & client (90% of respondents);
- ✔ Adherence to user comfort (80% of respondents).

The other determinants such as transparency and completeness of contractual stipulations, achieving the expected savings level, implementation of technical measures, user information and motivation, measurement and verification and financing are selected by 40 to 70% of respondents showing their relevancy.

The relevance of quality determinants is higher for Austrian respondents than for all respondents. The largest discrepancy between the Austrian and all responses applies to the quality determinants adherence to user comfort (80% versus 30%), operation and maintenance (90% versus 47%) and communication between provider and client (90% versus 58%). (See Figure 15)

Figure 15: In your opinion what are the most important determinants of quality in EPC projects? (QualitEE, 2017)



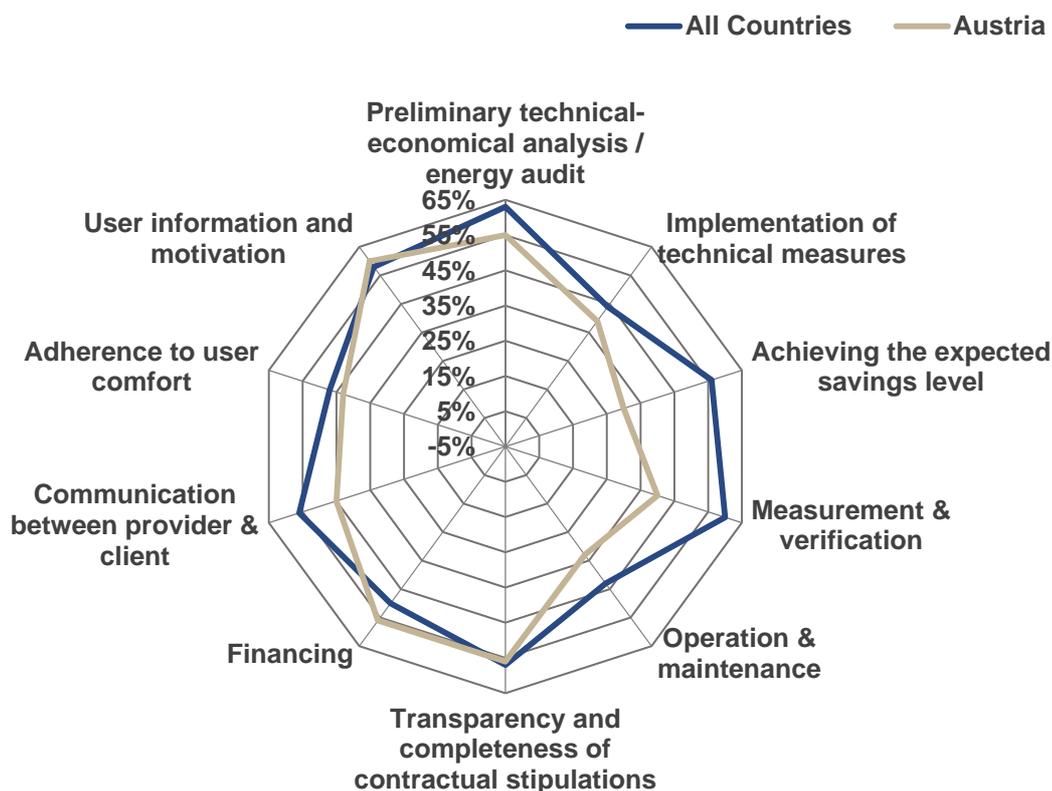
There are four areas in which quality improvement in the preparation and implementation of EPC projects is most needed in Austria:

- ✔ User information and motivation (60% of respondents);
- ✔ Financing (56% of respondents);
- ✔ Transparency and completeness of contractual stipulations (56% of respondents);
- ✔ Preliminary technical-economic analysis / energy audit (55% of respondents).

The results above are similar to the picture across All Countries in the survey, however there are areas of substantially lower importance in Austria compared to All Countries surveyed: achieving the expected savings level (35% versus 56%), measurement and verification (40%

versus 60%), operation and maintenance (33% versus 43%) and communication between provider and client (45% versus 56%). (See Figure 16)

Figure 16: In which areas are quality improvement most needed in EPC project preparation and implementation? (QualitEE, 2017)



Note: respondents were asked to rank each determinant using the following options 'not needed', 'needed', 'strongly needed' and 'don't know'. An indicator was created by assigning a weighting of 0%, 50% & 100% to 'not needed', 'needed' & 'strongly needed' respectively and dividing by the number of responses. Where 'don't know' was selected this was excluded from the calculation of the indicator.

5 ENERGY SUPPLY CONTRACTING MARKET

This chapter describes the Austrian Energy Supply Contracting (ESC) market and its development through combining the results of the online survey, the interviews and other sources of information.

Data of the Austrian ESC market must be considered with caution due to the situation that some sources state that ESC is the predominant EES with approx. 85 % of all EES projects (Grazer Energieagentur GmbH, November 2016), others refer to ESC as “not a mass market” (personal interview with a client on 23.10.2017) and there are definitely several ESC projects which are not indicated as ESC.

5.1 ESC market actors

The structure of the Austrian ESC market consists of providers, facilitators, clients, associations and decision makers, which are described in the chapters 5.1.1, 5.1.2, 5.1.3 and 5.1.4. Since there is no current central register for ESC projects and/or market actors in Austria, the listing comprises a selection. The lists contain those market actors, who declare themselves as ESC market actors and have been registered in one of the following sources: ÖGUT (08.12.2017), DECA (08.12.2017 and 12.12.2017). Therefore, those providers who offer ESC services but do not declare publicly, are not included.

5.1.1 Providers

The Austrian EES market includes the regional and municipal utilities and more than 36 providers offering ESC. The following list presents the designated EPC providers.

-  Aestus GmbH;
-  Aigner Energiecontracting GmbH;
-  Austrian Power Technologies GmbH;
-  Axima Gebäudetechnik GesmbH;
-  Bacon Gebäudetechnik GmbH & Co KG;
-  Bioenergie NÖ reg. Gen.m.b.H;
-  Caverion Österreich GmbH 1230 Wien;
-  con4 GmbH;
-  e2 Wärmepartner GmbH;
-  easy ENERGY GmbH;
-  Eco Engineering 2050 GmbH;
-  ELIN GmbH & Co KG;
-  Energie Mobil GmbH;

- ✔ ENERGIEALLIANZ Austria GmbH;
- ✔ Energiecomfort Energie- und Gebäudemanagement;
- ✔ Energiecontracting Krobath GmbH;
- ✔ Energietechnik Urbanich GmbH;
- ✔ Energiezone GmbH;
- ✔ ENGIE Energie GmbH / ENGIE Gebäudetechnik GmbH;
- ✔ EQ Energie & Bau GmbH;
- ✔ Fernwärme Waldviertel Gen.mBH;
- ✔ FIX Gebäudesicherheit + Service GmbH;
- ✔ Gadermeier GmbH;
- ✔ Heizwert Schörkhuber & Hörmann OHG;
- ✔ Honeywell Austria GesmbH - Building Solutions;
- ✔ HYPO NOE First Facility GmbH;
- ✔ Illumina-Licht Service GmbH;
- ✔ Lang Holzwärme Contracting GmbH;
- ✔ Maschinenring Bioenergie Burgenland GmbH;
- ✔ nahwaerme.at Energiecontracting GmbH;
- ✔ PORREAL Facility Management GmbH;
- ✔ Siemens AG Österreich;
- ✔ Strebelwerrk GmbH;
- ✔ Technisches Büro Ing. Bernhard Hammer GmbH;
- ✔ Verbund GETEC Energiecontracting GmbH;
- ✔ Wirkungsgrad Energiecontracting GmbH;
- ✔ Regional and municipal utilities.

5.1.2 Facilitators

The facilitators for ESC are basically the same as for EPC (See chapter 4.1.2) complemented by small companies.

5.1.3 Clients

The following list is a selection of Austrian clients from the private sector showing the variety of companies implementing ESC projects:

- ✔ Biogasanlage Fliegerhorst Zeltweg;
- ✔ Biomasseheizwerk Puchenau;

- ✔ Hotel Schloss Fuschl;
- ✔ Krumböck Messelager;
- ✔ Nahwärme Hard;
- ✔ Pflegeheim Höchsterstraße Dornbirn;
- ✔ Siedlungsgenossenschaft Oberwart;
- ✔ Wohnanlage Breitenau;
- ✔ Wärmeversorgung Waldviertler Recycling Park;
- ✔ Ökodorf Unterschützen.

5.1.4 Associations and decision makers

The associations and decision makers for ESC are the same as for EPC. (See chapter 4.1.4).

5.2 ESC market developments

The ESC market in Austria experienced a sharp increase since its beginnings in the 2000s. A small decline in the number of ESC projects began around 2014. (JRC, 2017)

The Austrian respondents of the survey state that there was primarily little change to the ESC orders (40%) and the ESC market (60%) within the last 12 months. However, there are 20% of respondents who state that the orders and the market are slightly declining or majorly declining. Only 20% of the respondents give evidence that ESC orders have seen a slight growth in the last 12 months. (See Figure 17 and Figure 18).

The Austrian results differ to the total result, since most of the Austrian respondents see little change (orders: 40%, market: 60%) or a decline to the orders and market (both 40%), whereas respondents from All Countries in the survey are more optimistic, stating major growth (orders: 14%, market: 13%), slight growth (orders: 25%, market: 32%) or little change (orders: 47%, market: 45%).

Figure 17: In the last 12 months your ESC orders have seen: (QualitEE, 2017)

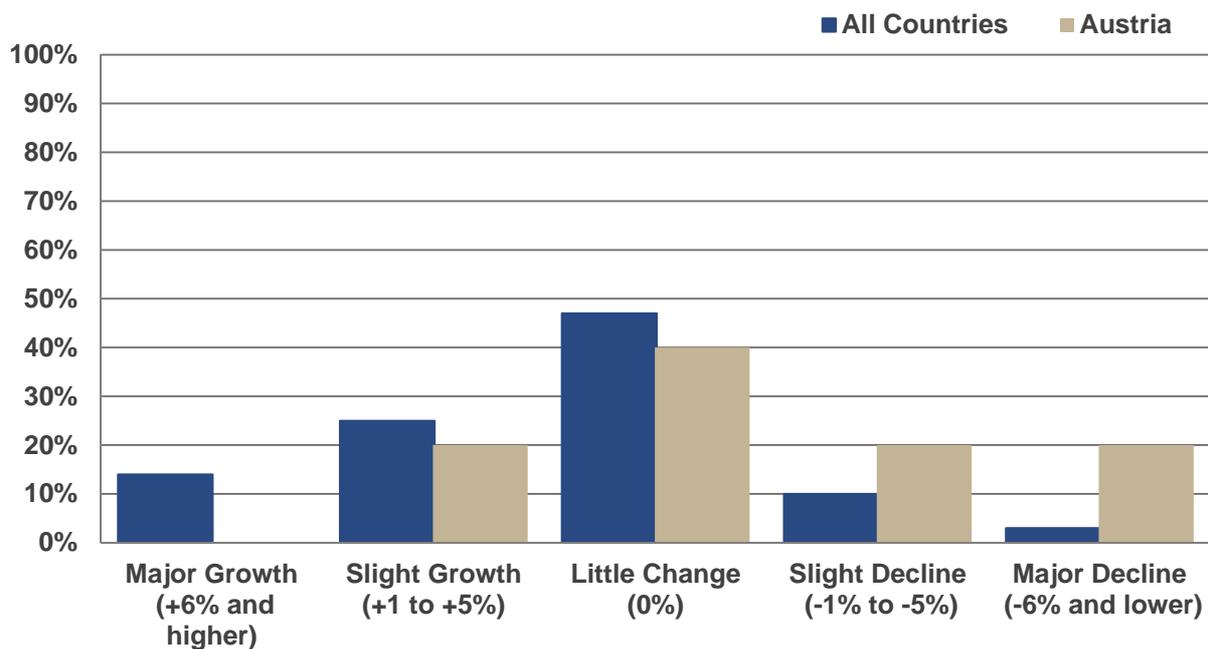
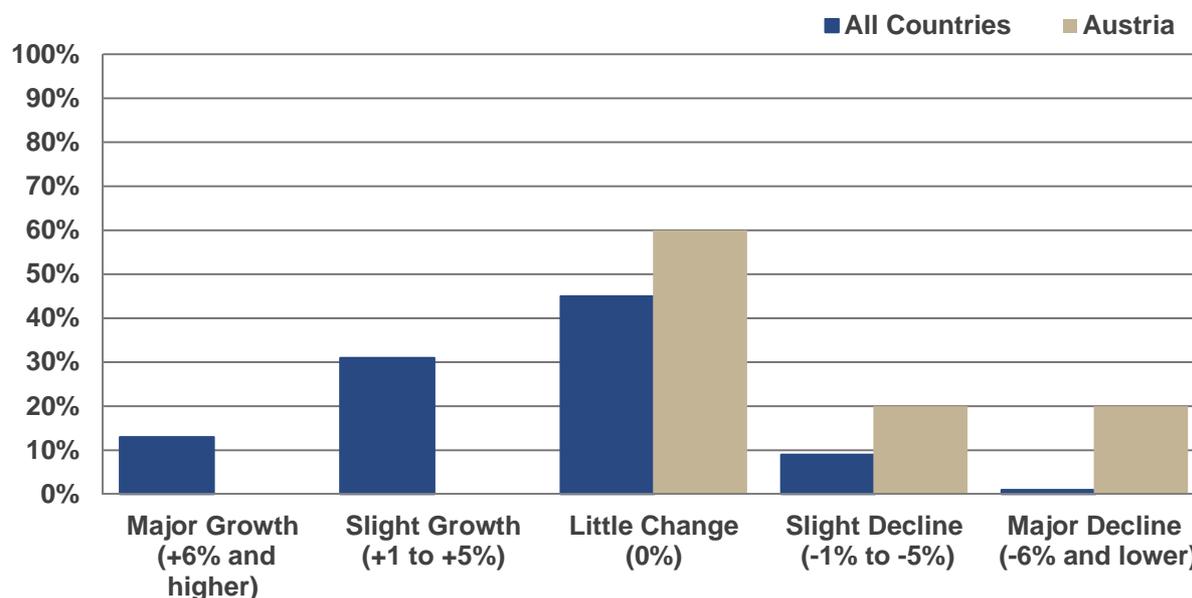


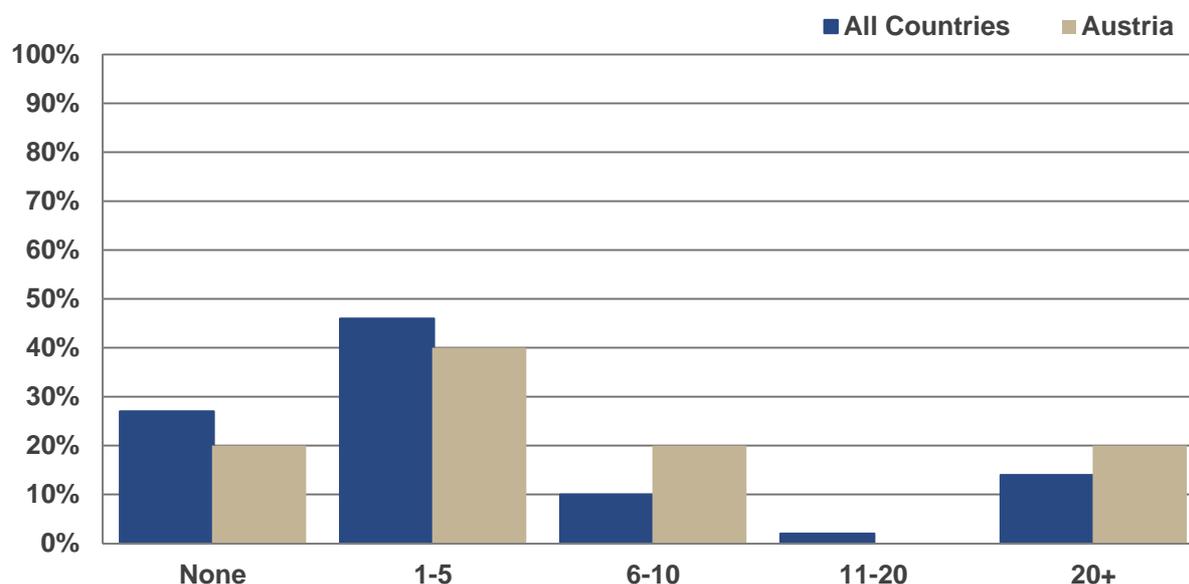
Figure 18: Over the last 12 months, the market for ESC in your country has seen: (QualitEE, 2017)



The overall number of ESC projects has been about 35 per year until 2012 with a predicted decrease starting in 2013 (JRC, 2017). The survey respondents cannot verify this because it shows that organisations have been involved in diverging numbers of ESC projects within the last twelve months (Figure 19).

There is a slight tendency to a larger number of projects per provider in Austria compared to All Countries in the survey. 20% of Austrian respondents and 14% of all respondents were involved in more than 20 projects in the twelve months prior to the survey, while 27% of all respondents and 20% of respondents in Austria have not been involved in any project.

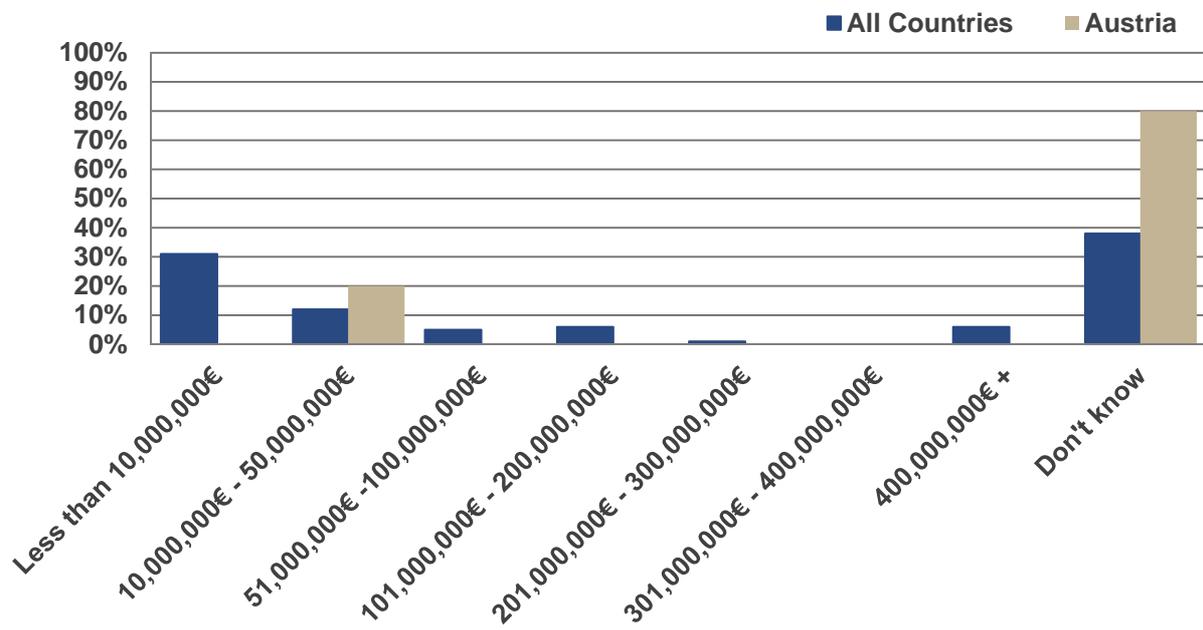
Figure 19: How many ESC projects (that have reached ESC Contract Signature) has your organisation initiated / become involved with in the last 12 months? (QualitEE, 2017)



There are no accurate numbers regarding the revenue generated by the ESC market in Austria which is reflected by the answers of the survey respondents. About 80% of Austrian respondents were not able to assess the value of the ESC market in 2016 but 31% of them estimated, that the market was worth less than 10,000,000 € (See Figure 20).

31% of all respondents estimate the total revenue in their countries to be less than €10,000,000, while 39% state that they do not know.

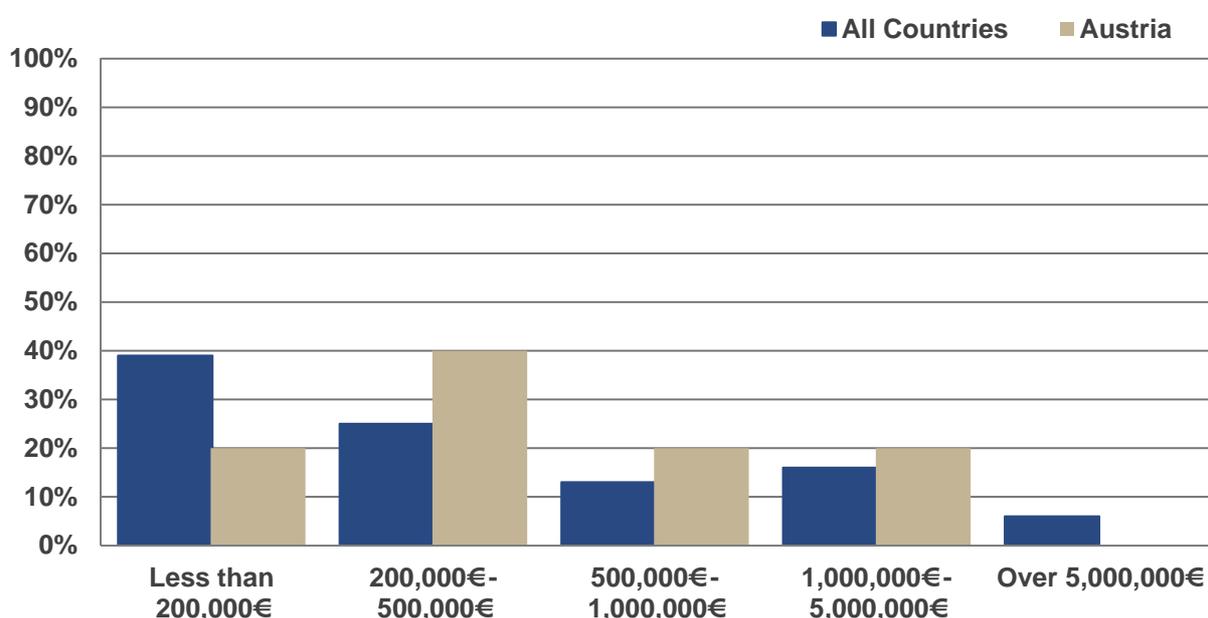
Figure 20: Roughly how much revenue do you think the ESC market in your country generated in 2016? (QualitEE, 2017)



5.3 ESC business models

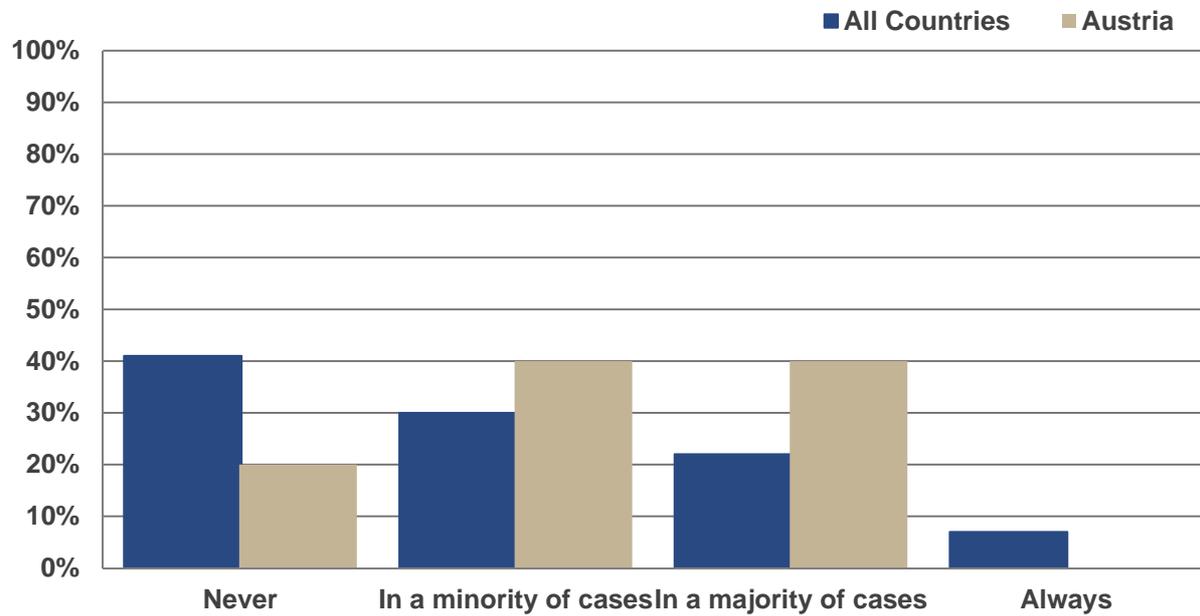
The most common overall value (investment outlay) of the ESC projects in Austria varies between less than € 200,000 and € 1 million, with a tendency to project sizes of € 200,000 to € 500,000 (40% of respondents). This differs to All Countries in the survey, where the most common overall value (investment outlay) of the ESC projects is less than € 200,000 (39%). There are projects with an overall value (investment outlay) of over € 5,000,000. (See Figure 21)

Figure 21: What is the most common overall value (investment outlay) of the ESC projects you are involved in? (QualitEE, 2017)



Generally, ESC plus additional energy efficiency measures is considered to be more common in Austria as a client stated in a personal interview on 23.10.2017. The payments per unit of energy in combination with payments per unit of energy saved (from implemented energy efficiency measures) is deployed differently in ESC projects in Austria compared to All Countries surveyed (See Figure 22). Only 20 percent of the Austrian respondents never combined payments per unit of energy delivered with payments per unit of energy saved in the ESC projects while this has not been used by 40 percent of respondents across All Countries in the survey. About 40 percent of respondent combined them in the majority of cases, making such combination a frequently used method in Austria while shares in All Countries in the survey are lower.

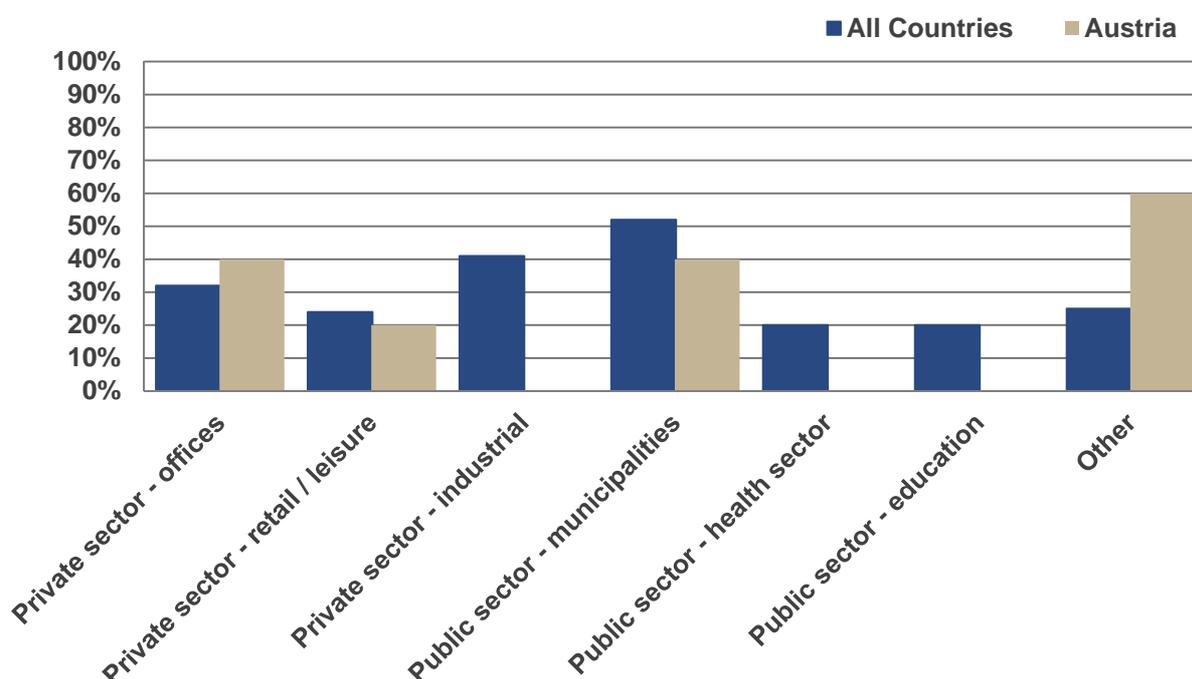
Figure 22: In the ESC projects you are involved in, were payments per unit of energy delivered in combination with payments per unit of energy saved (from installed energy efficiency measures)? (QualitEE, 2017)



5.4 ESC market sectors

The private sector is the major client for ESC. Figure 23 shows that for 40% of ESC providers and facilitators in Austria their main clients are municipalities, which is in range with All Countries in the survey. Involvement of private clients on the ESC market is substantially higher compared to the EPC market, however industry is not a vital client in Austria at all. Interestingly, 60% of respondents state “other” as their most important clients on the ESC market in Austria.

Figure 23: Which sectors do your ESC clients generally come from? (QualitEE, 2017)



5.5 ESC market barriers

The main market barriers for ESC according to the survey (See Figure 24) are the following:

- ✔ Customer demand (80% of respondents);
- ✔ Split incentives between landlords and tenants (80% of respondents).

The following barriers are affecting the ESC market adversely as well:

- ✔ Low energy prices (60% of respondents);
- ✔ High costs of project development and procurement (60% of respondents).

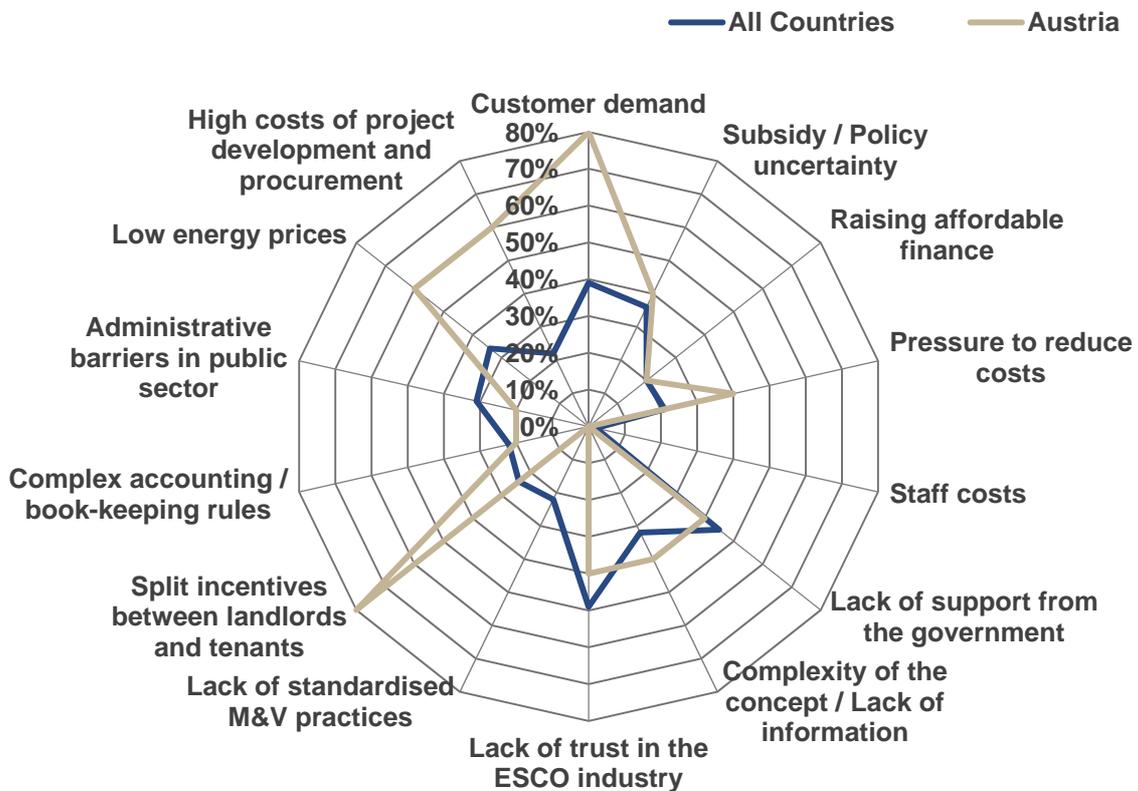
Other barriers such as subsidy/policy uncertainty, pressure to reduce costs, lack of support from the government, complexity of the concept/lack of information and lack of trust in the ESCO industry are important to 40% of the Austrian respondents. Regarded as minor barriers with an importance to 10% or no importance to respondents from All Countries in the survey are administrative barriers in the public sector, complex accounting/book-keeping rules, lack of standardised M&V practices and staff costs.

When comparing the results, it is noticeable that the major barriers differ significantly in Austrian compared to the responses from All Countries surveyed:

- ✔ Split incentives between landlords and tenants (80% versus 24%);
- ✔ Customer demand (80% versus 39%);
- ✔ Low energy prices (60% versus 34%);
- ✔ High costs of project development and procurement (60% versus 23%).

Subsidy/Policy uncertainty, raising affordable finance, pressure to reduce costs, staff costs, lack of support from the government, complexity of the concept/lack of information, lack of trust in the ESCO industry, complex accounting/book-keeping rules and administrative barriers in public sector are evaluated very similarly with differences ranging from 0 to 19 percentage points in Austria and across All Countries in the survey. (See Figure 24)

Figure 24: Based on the activities of the last 12 months: what do you think are the main BARRIERS to the ESC business? (QualitEE, 2017)



5.5.1 Regulatory and administrative barriers

The uncertainty about subsidies and policy has a minor impact on ESC projects. Only 40% of Austrian respondents and 35% of all respondents state that this is a barrier (See Figure 24).

5.5.2 Structural barriers

On the one hand the customer demand is low because energy for cities is delivered by their own public utility companies (interview with a client on 28.11.2017), on the other hand at the moment the low energy prices make ESC projects less attractive (interview with a client on 23.10.2017), thirdly split incentives between landlords and tenants are a major barrier to ESC projects (see Figure 24).

5.5.3 Financial barriers

For ESC projects the main financial barrier is high costs of project development and procurement (60% of respondents), whereas raising affordable finance is only a minor barrier mentioned by 20% of Austrian respondents (See Figure 24).

5.6 ESC financing

The importance of the types of financing for ESC projects in Austria in descending order is as follows:

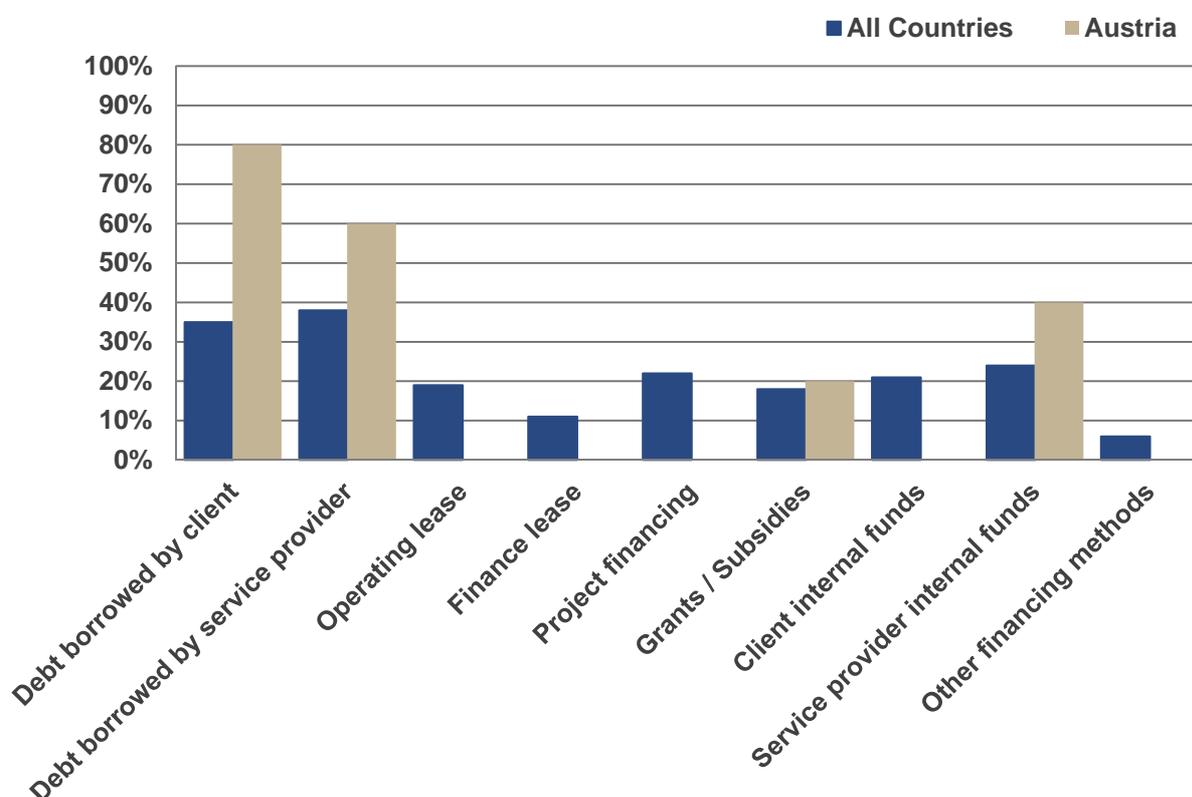
- ✔ Debt borrowed by client (80% of respondents);
- ✔ Debt borrowed by service provider (60% of respondents);
- ✔ Service provider internal funds (40% of respondents);
- ✔ Grants / Subsidies (20 % of respondents).

Other types such as operating lease, finance lease, project financing, client internal funds and other financing methods are not relevant for Austrian respondents at all.

Across All Countries in the survey the financing structure is more diversified. Debts borrowed by the client, debts borrowed by the service provider and service provider internal funds are less important in All Countries surveyed, while operating lease, finance lease, project financing and client internal funds are used for financing ESC projects across All Countries surveyed, which is not the case in Austria. (See Figure 25)

Additionally, it was mentioned in an interview on 28.11.2017 that clients find new forms of financing such as crowdfunding.

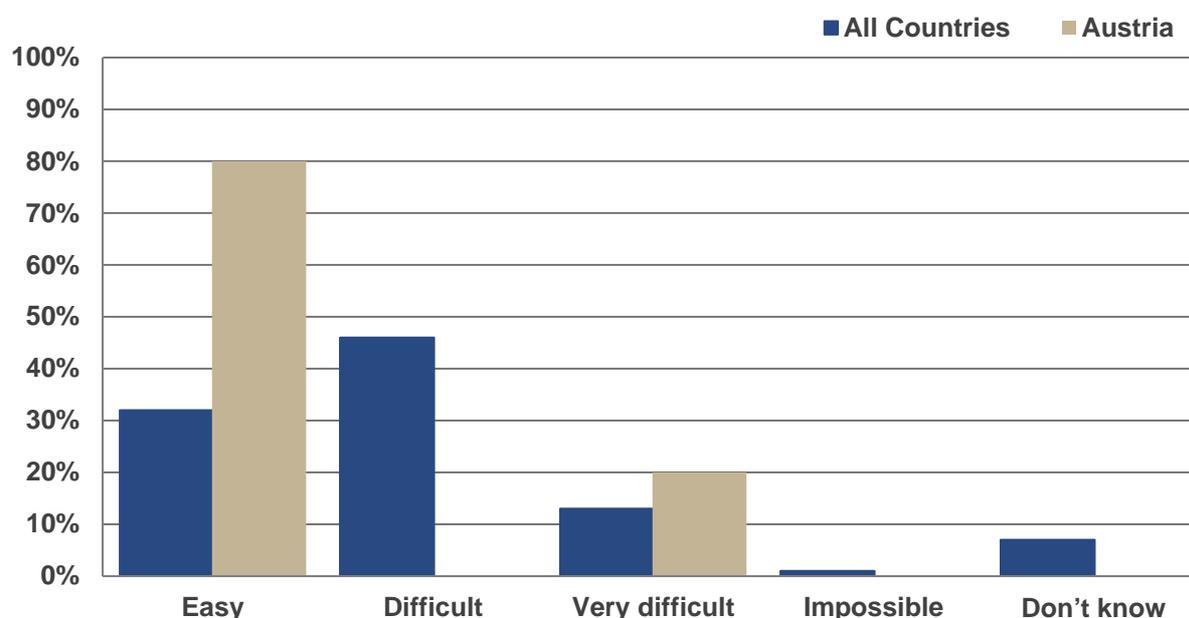
Figure 25: How are the ESC projects you are involved with financed? (QualitEE, 2017)



The majority of the Austrian respondents of the survey (80%) consider obtaining viable finance for ESC project as easy in Austria, whereas 20% see it as very difficult. No respondents consider obtaining viable finance for an ESC project as difficult, impossible or do not know. This result reveals that there is a huge gap in acquiring finance for ESC depending on the company.

This valuation differs substantially to All Countries in the survey, where only 32% of the respondents consider obtaining viable finance for an ESC project as easy, while the largest share of respondents (46%) consider obtaining viable finance as difficult and 13% see it as very difficult. There are few (2%) that consider it impossible and 7% who do not know. (See Figure 26/Figure 25).

Figure 26: Overall, do you consider that obtaining viable finance for an ESC project is: (QualitEE, 2017)



5.7 ESC quality determinants

The results from the survey show that the most important ESC quality determinants in Austria are the:

- ✔ Implementation of technical measures (100% of respondents);
- ✔ Transparency and completeness of contractual stipulations (100% of respondents).

Furthermore, these determinants influence an ESC project considerably:

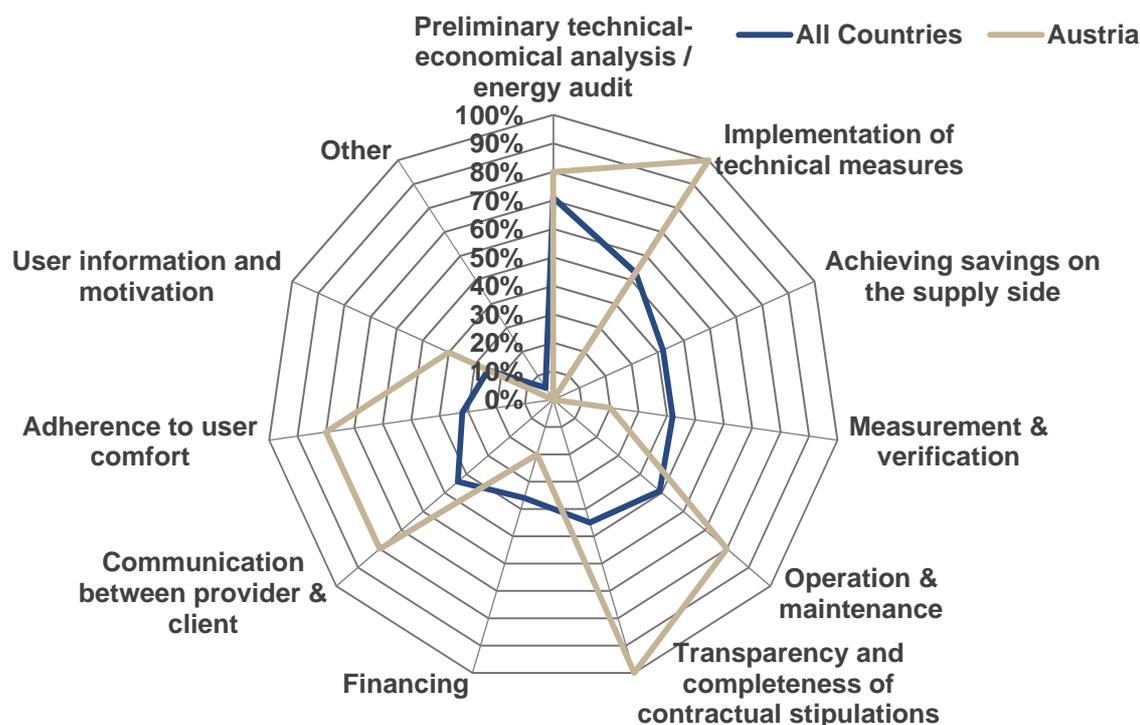
- ✔ Preliminary technical-economic analysis / energy audit (80% of respondents);
- ✔ Operation & maintenance (80% of respondents);

- ✔ Communication between provider & client (80% of respondents);
- ✔ Adherence to user comfort (80% of respondents).

These results are interesting as the Austrian values diverge with the results of respondents from All Countries surveyed. The most important quality determinant for the respondents in All Countries in the survey (71%) is preliminary technical-economic analysis / energy audit, which is also important to Austrian respondents. However, aspects considered most important in Austria are important for only 45% of respondents from All Countries surveyed or less.

Achieving savings on the supply side is not important to Austrian respondents at all, while respondents from All Countries in the survey state this aspect in 40% of cases. (See Figure 27)

Figure 27: In your opinion what are the most important determinants of quality in ESC projects? (QualitEE, 2017)



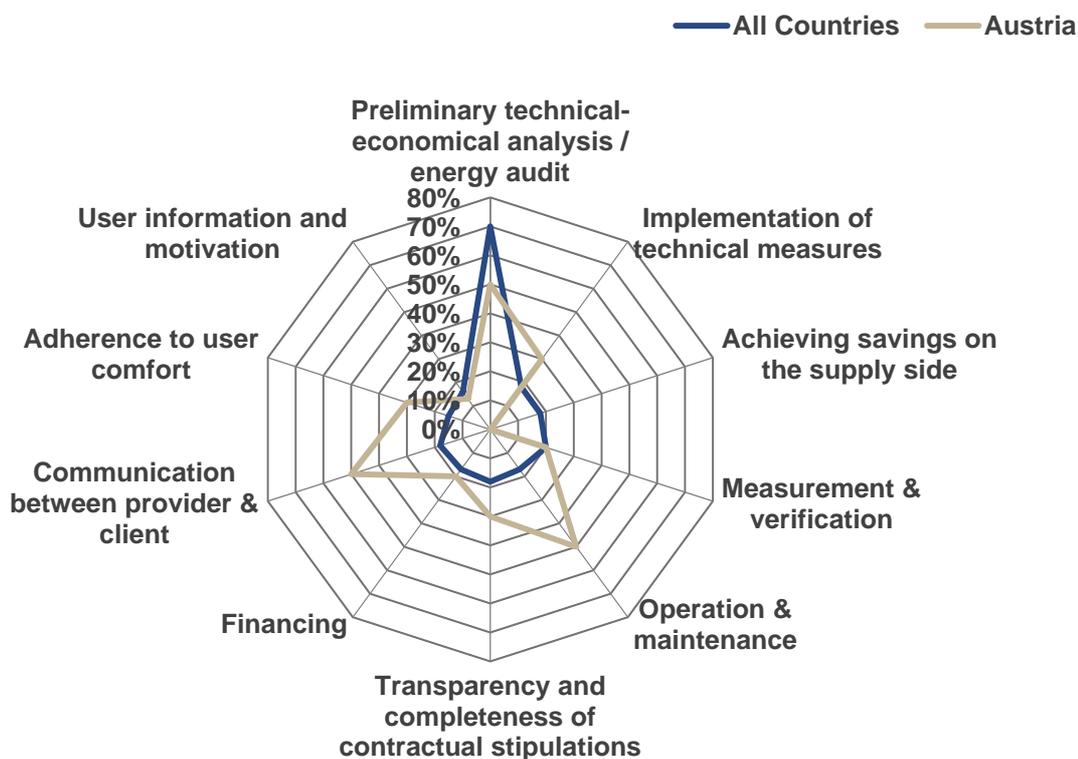
There are three areas in which quality improvement in the preparation and implementation of ESC projects is most needed in Austria:

- ✔ Preliminary technical-economic analysis / energy audit (50% of respondents);
- ✔ Operation & maintenance (50% of respondents);
- ✔ Communication between provider & client (50% of respondents).

The other areas of quality improvements in the preparation and implementation of ESC projects range between 0% and 30%.

As in the previous graph, the Austrian and numbers across All Countries in the survey diverge. Basically respondents from All Countries in the survey value only preliminary technical-economic analysis / energy audit as important (70%). The areas operation & maintenance and communication between provider & client show the largest variation compared to Austrian values. These aspects are quoted more frequently in Austria compared to all responses in the survey (33 and 32 percentage points). In the area of preliminary technical-economic analysis / energy audit the Austrian values are 20 percentage points lower than those of All Countries in the survey. (See Figure 28)

Figure 28: In which areas are quality improvement most needed in ESC project preparation and implementation? (QualitEE, 2017)



Note: respondents were asked to rank each determinant using the following options 'not needed', 'needed', 'strongly needed' and 'don't know'. An indicator was created by assigning a weighting of 0%, 50% & 100% to 'not needed', 'needed' & 'strongly needed' respectively and dividing by the number of responses. Where 'don't know' was selected this was excluded from the calculation of the indicator.

6 OTHER ENERGY EFFICIENCY SERVICES

This chapter contains information on the other energy efficiency services available in Austria.

6.1 Integrated Energy Contracting (IEC)

The Integrated Energy (Performance) Contracting model combines two goals:

- ✔ The reduction of energy consumption through the implementation of energy efficiency measures in the areas of building services engineering, building envelope and user behaviour and
- ✔ The efficient supply of the optimized energy demand, preferably from renewable energy sources.

In contrast to energy supply contracting, the range of services and thus also the usable savings potential extends to the entire building. The scope of supply is not limited to heat energy, so that the model can also be used for other consumption media such as electricity, water or compressed air.

The IEC is applied to projects with energy saving potential on the demand side and the building envelope combined with the demand for modification or modernization of the building energy supply (preferably the heat supply).

Within the IEC business model, the ESCO takes over the implementation and operation of the agreed energy services at its own expenses and responsibility. Therefore, the ESCO gets a remuneration for the useful energy delivered as well as a flat rate service remuneration for operation and maintenance. Financing is a modular component in IEC. Quality assurance instruments for energy efficiency measures are used as a replacement for the energy saving guarantee (Grazer Energieagentur, 2011)

Up until 2009 there have been implemented eight projects mainly in the federal state of "Steiermark" (Grazer Energieagentur, 2009). Current figures of the number of IEC projects are not available.

The challenges IEC is facing are on the one hand its unknownness (interview with a client on 23.10.2017), on the other hand to make it profitable for the energy supplier to sell less energy respectively save energy. (Grazer Energieagentur, 2011)

It is recommended that new projects are developed in the sectors of public institutions, the tertiary sector, trade, industry and housing, to optimize investment decisions and to ensure the results of the energy efficiency measures on a long-term basis. (Grazer Energieagentur, 2011)

6.2 Re-Commissioning (RECO)

Re-Commissioning (RECO) is done to ensure that systems and equipment in existing buildings meet the original design intent and to bring commissioning up to date.

RECO can be characterized as an external audit that is implemented by an internal party. The implementation of the measures is not carried out by external parties. There is only a purchase of know-how, but the measures are implemented by the customer himself. Usually no guarantee of savings is given, but RECO is also possible with a guarantee. Investments in energy efficiency are not necessarily included but often made after savings have been achieved.

The target group for RECO varies compared to EPC since some clients do not want to have the contractor in their building (for example health sector).

Some RECO projects have already been concluded and there is potential in Austria, but as stated in a personal interview with a client on 23.10.2017, there is still no significant market for RECO.

7 RECOMMENDATIONS TO SUPPORT MARKET DEVELOPMENTS

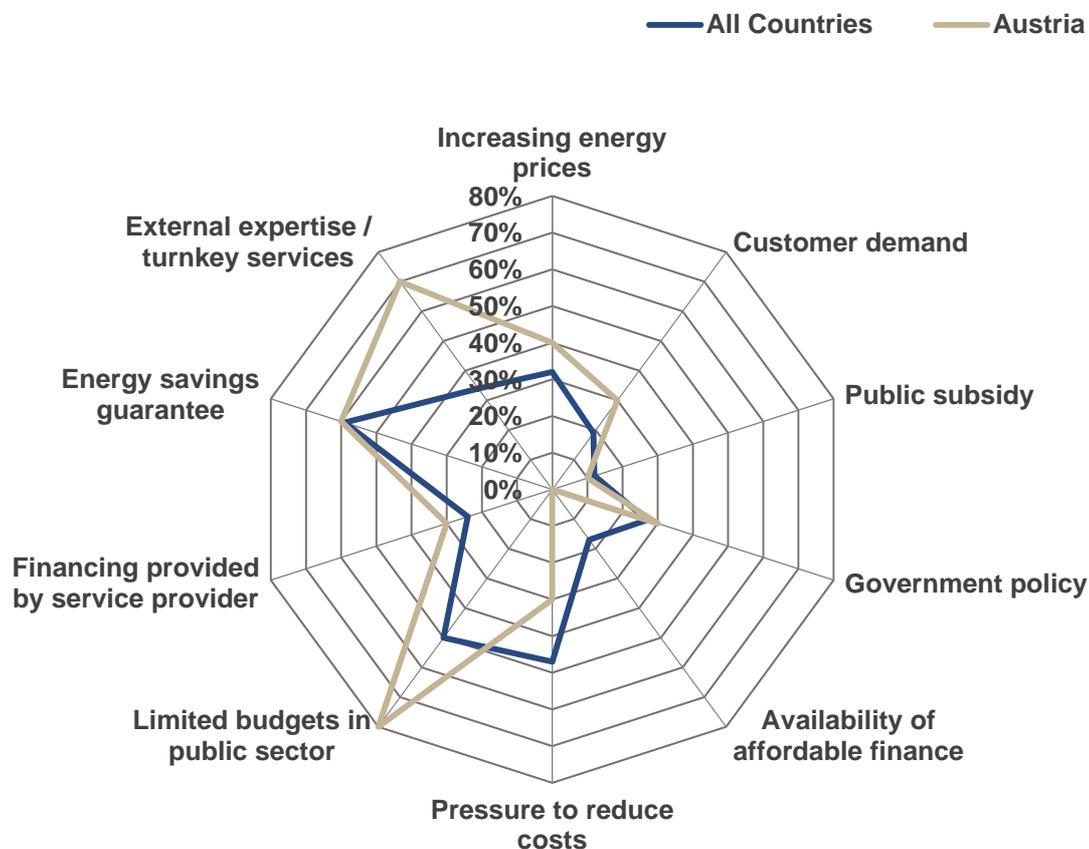
The starting situation regarding market drivers, success factors and barriers to the EES market is the following.

The main **market drivers** for EPC (and ESC) in Austria are:

- ✔ Limited budgets in the public sector (80% of respondents);
- ✔ External expertise / turnkey services (70% of respondents);
- ✔ Energy savings guarantee (60% of respondents).

To a certain extent the general picture in Austria differs from the situation across All Countries in the survey. Only one of the above mentioned drivers, the energy savings guarantee, shows a value which is the same in Austria and in All Countries in the survey. External expertise/turnkey services as well as limited budgets in public sector seem to be much more important as market drivers in Austria compared to All Countries surveyed (70% versus 35% and 80% versus 50%). (See Figure 29)

Figure 29: Based on the activities of the last 12 months: what do you think are the main DRIVERS of the EPC business? (QualitEE, 2017)



There are various **success factors** that helped to develop the Austrian market to date.

First of all, and most important, this is support by public authorities such as the implementation of pilot projects in public buildings and financing models such as funding of EPC and ESC by public entities (See chapter 4.2). Secondly, EPC models have been introduced by EPC facilitators. Thirdly, many projects have successfully bundled several buildings into one EPC project, which helped to achieve a critical mass. (Amann, September 2015).

Barriers to the EES market were identified in chapters 4.6 and 5.5 and are summarised in Table 1 below.

Table 1: Overview of key EES market barriers

Market barrier		EES affected
1	Low energy prices	EPC, ESC
2	Split incentives between landlords and tenants	EPC, ESC
3	Customer demand	EPC, ESC
4	Complexity of project/lack of information	EPC
5	Lack of public subsidies	EPC
6	Availability of financing	EPC

Activities to help overcome the barriers of EES market development in Austria are listed below in chapters 7.1, 7.2 and 7.3. These activities relate to individual stakeholders, interrelate with each other and therefore must be dealt with together, not separately.

7.1 Government policy, regulation and standardisation

Overall policy framework on energy efficiency

The EES market is deeply influenced by the general policy framework regarding energy efficiency investments. This relates mainly to the extent and concrete form under which the requirements of the Energy Efficiency Directive (EED) are implemented in Austria. In particular, the following policy instruments are relevant:

-  Compulsory conduction of energy audits or implementation of an energy management system in non-SMEs: The first round in 2016 partly stimulated the EES market, but only to a limited extent. In this context it would be advisable to support companies more closely during the phase of implementation of measures. Many audit reports have just been produced “for the shelf”.
-  Energy saving obligation for utilities: The current form of voluntary agreement with utilities which obliges them to achieve a certain amount of energy savings is weak and did not give rise to additional investments in energy efficiency, partly due to unambitious targets, partly due to vague M&V rules (see below). Therefore, a comprehensive revision of the system is required.
-  M&V of energy savings: The current M&V procedures set up by the National Energy Efficiency Monitoring Agency (<https://www.monitoringstelle.at/>) are full of loopholes. This led to a huge oversupply of energy saving units, many of which are only virtual savings. A strengthening of the M&V rules is indispensable.
-  Obligations for public building owners: At the moment it is too early to evaluate whether the Austrian regulation that implements Article 5 of EED is sufficient for additional market stimulation.

Regulation directly related to the provision of EES

- 
Coordination of split budgets and separate responsibilities: The provision of EES in the public sector still suffers from split budgets and separate responsible departments for energy costs and investments. On the other hand, several public authorities have already found their way how to deal with the issue of split budgets – e.g. the programme Bundes-Contracting for federal buildings has found a good way to balance the benefits fairly between building owner and building users. Therefore, most probably it is more important to share and disseminate practical experience than to revise the regulatory basis.

- 
Nationwide harmonisation of the tendering procedure: In Austria various kinds of tendering procedures for EES are available depending on the federal state the EES project is developed in. This causes an additional administrative effort for the ESCOs with projects in different federal states. Harmonising these tendering procedures would on the one hand help to reduce the costs to elaborate offers, on the other hand it would make it easier for municipalities to become acquainted with the legal requirements for public tendering of contracting projects according to public procurement law. (Amann, September 2015)

Introduction of a quality assurance system for EES

To enlarge the energy service market in Austria the quality of energy services shall be provided with a label or certificate to ensure an adequate quality and to acquire confidence. For details on certification see chapter 8.

The following activities are suggested to improve the market through certification and a quality assurance system:

Table 2: Activities to improve the market through certification and a quality assurance system

Response to barrier	Action	Who should act	Target groups	Description
3, 4	Set up of a quality assurance scheme constitutive on the Code of Conduct	DECA	Providers Clients	Developing clear traceable quality criteria to provide clients and contractors with more security.
3, 4	Certification of EES	Policy-makers	Providers Facilitators Clients	Guaranteeing the high quality of EES projects

7.2 Financial instruments

Guarantee instruments to improve risk sharing

For small ESCOs the client's risk of bankruptcy is a relevant obstacle for EPC. On the other hand, the bankruptcy risk is also a major barrier for financial institutions to provide off-balance financing. Public guarantee instruments would help to reduce these risks by involving

external risk takers (e.g.: AWS Austria Wirtschaftsservice Gesellschaft mbH). These take over the liability of the customer (the liability of funding), so the risk is shared by the financing institute, the provider, the customer and the external risk taker. (Interview with a financial institution on 23.11.2017).

Subsidy programmes

The well-established and successful funding models to support energy contracting projects (EPC and ESC) in the federal state of “Oberösterreich” could be the basis for further subsidy programmes throughout Austria. “Projects between an investment sum of 50,000 to 500,000 Euro are eligible to apply. The maximum share of support for EPC is 20 % and 13.5 % for ESC projects. In addition, subsidies pay 50% of the costs (max. € 1,000) for “pre-analyses”. Contracting projects with longer payback periods receive higher subsidy rates than those with short payback periods. This system supports the implementation of comprehensive EPC projects with high energy saving rates.” (Amann, September 2015, page 19)

Public support for EES project preparation

Since EES are perceived as complex services, from a customer’s perspective the preparation of an EES project requires time and know-how which usually needs to be covered by external experts. If done properly this requires more effort than assembling a common building or service contract. Up-front costs for project preparation are thus an important barrier for market growth. Therefore, a public support scheme for the required facilitation services would most probably be an easy and relatively cheap instrument to increase the demand for EES.

7.3 Information distribution, education and networking

Independent information centres

Following the example of the federal state of “Oberösterreich” information centres and help desks should be established in the other federal states of Austria to support clients (municipalities and private companies) during the process of tendering and negotiating EES projects. These facilities can improve the quality of energy services and market transparency and should therefore gain financial support from public entities. (Amann, September 2015)

The following activities are suggested to be carried out through independent information centres:

Table 3: Activities to improve market through independent information centres

Response to barrier	Action	Who should act	Target groups	Description
3, 4	Implementation of the European Code of Conduct for EPC	DECA	Providers Clients	Promotion of the implementation of a basic set of values and principles
3, 4	Promotion of best practices	DECA Providers	Potential clients Experts Media	Implementing public relation activities for EES

Events, trainings and workshops

The following activities are suggested to support the market through events, trainings and workshops:

Table 4: Activities to improve market through events, trainings and workshops

Response to barrier	Action	Who should act	Target groups	Description
3, 4	Trainings and workshops for municipalities	Facilitators DECA	Municipalities Facilitators	Making municipalities familiar with the legal requirements for public tendering of contracting projects according to public procurement law.
3, 4	Events and workshops to inform clients about EES	DECA Policy-makers Facilitators	Clients	Developing public communication to reduce complexity of EPC.
3, 4	Trainings about code of conduct	DECA Facilitators	New providers	Sustaining the high quality of EES projects and promoting the use of the Code of Conduct
4	Trainings and workshops	Facilitators DECA	Technical staff of public entities Providers	Diminishing the scepticism of the (technical) staff towards private companies overtaking duties.
5	Workshops for fiscal policy makers	DECA Policy-makers	Fiscal policy-makers	Developing existing subsidy schemes to diminish financial shortfalls.

8 CERTIFICATION OF ENERGY EFFICIENCY SERVICES

This chapter contains summarised information about the certification of EES in Austria.

8.1 General framework for certification of products and services

Generally, **certification** means the granting of a written assurance/certificate by an independent certification body, that a product, service or system meets requirements respectively and complies with specific international standards. These are evaluated and accredited by an authoritative body. This system forms a basis for the national and internal market. However, an increase in quality is not granted because of certification, it can only add credibility.

Accreditation is the formal recognition of a certification body by an independent accreditation body. Its task is to certify that the certification body operates according to international standards.

A certification **label** implies that products or services meet certain standards. Usually a standard-setting body controls the use of a label. For example, ecolabels seek to “educate and increase consumer awareness of the environmental impacts of a product and bring about environmental protection by encouraging consumers to buy products with a lower environmental impact”. (Amann, Leutgöb, et al., August 2015, page 16).

8.2 Certification of products and services in the energy sector

There are several certifications and labels for the energy sector, such as the “Energieausweis”, an energy performance certificate, for green electricity and technology-specific awards.

8.3 Certification of energy efficiency services

8.3.1 “Umweltzeichen Energie-Contracting“

The “Umweltzeichen Energie-Contracting“, an Austrian eco-label, is the only eco-label of the federal government which not only labels ecological products but also ecological services.

The “Umweltzeichen Energie-Contracting“ stands for:

-  Consistent terms for the EES;
-  Defined quality requirements and control mechanisms;
-  Transparent concepts and contract design;

- ✔ Security for contractors and clients;
- ✔ Guarantee for the calculated saving.

The eco-label is awarded to those contracting providers whose services meet the following requirements:

- ✔ Evidence of environmental improvement in the form of energy and emission savings;
- ✔ Compliance with quality standards in the planning and implementation of the contracting measures;
- ✔ Use of environmentally and health friendly products or materials;
- ✔ Ecological requirements for the production site of the provider;
- ✔ Guarantee of projected saving by the contractor.

The achieved environmental effect is presented to the client or user in the “Energieausweis”, an energy performance certificate, as follows:

- ✔ Energy demand before and after the contracting measure in [kWh/year] and [%];
- ✔ Emissions before and after the contracting measure in [tCO₂equ/year] and [%];
- ✔ Emission reduction in [t CO₂eq/year] and [%].

Once an independent testing centre confirms that all criteria are met, the Federal Ministry of Sustainability and Tourism can issue the eco-label to the company.

Further information on the criteria and a list of awarded companies can be found at www.umweltzeichen.at. (ÖGUT, 15.01.2018)

8.3.2 “DECA Qualitätssiegel“

The “DECA Qualitätssiegel“, a quality label, is new to the Austrian EES market since November 2017. It assesses the implementation of EES and defines a basic quality level for them. It can be applied to the following seven energy efficiency services:

- ✔ Energy consulting;
- ✔ Energy Performance Contracting;
- ✔ Energy Supply Contracting;
- ✔ Operational Management Contracting;
- ✔ Implementation of technical energy efficiency measures;
- ✔ Optimisation of existing objects (operation and maintenance projects);
- ✔ Introduction of an energy management system.

Evaluation is based on nine quality criteria (QC) which describe the basic characteristics of quality of a sub-aspect of the service.

QK 1 Adequate analysis

- QK 2 Implementation of technical measures
- QK 3 Saving guarantee
- QK 4 Verification of energy savings
- QK 5 Value preservation, maintenance
- QK 6 Communication contractor – client
- QK 7 User comfort
- QK 8 User information and motivation
- QK 9 Transparency of contract

In each case, those quality criteria that are relevant for their positioning along the value chain are used for the different EES. The quality criteria are specified in each case by assessment criteria. These are verifiable facts which must be verified for the fulfilment of a quality criterion.

For each assessment criterion, a concrete verification procedure is defined which makes it possible to make a traceable decision as to whether an assessment criterion is fulfilled.

The basis for using the quality label for an energy efficiency service is the registration of the service provider with DECA and the signing of the commitment (Principle of self-commitment).

The service provider commits to ensure that all energy efficiency services bearing the quality seal and provided by the company in question comply at least with the currently published DECA assessment criteria for the energy efficiency service in question, unless the customer has agreed to disregard individual assessment criteria.

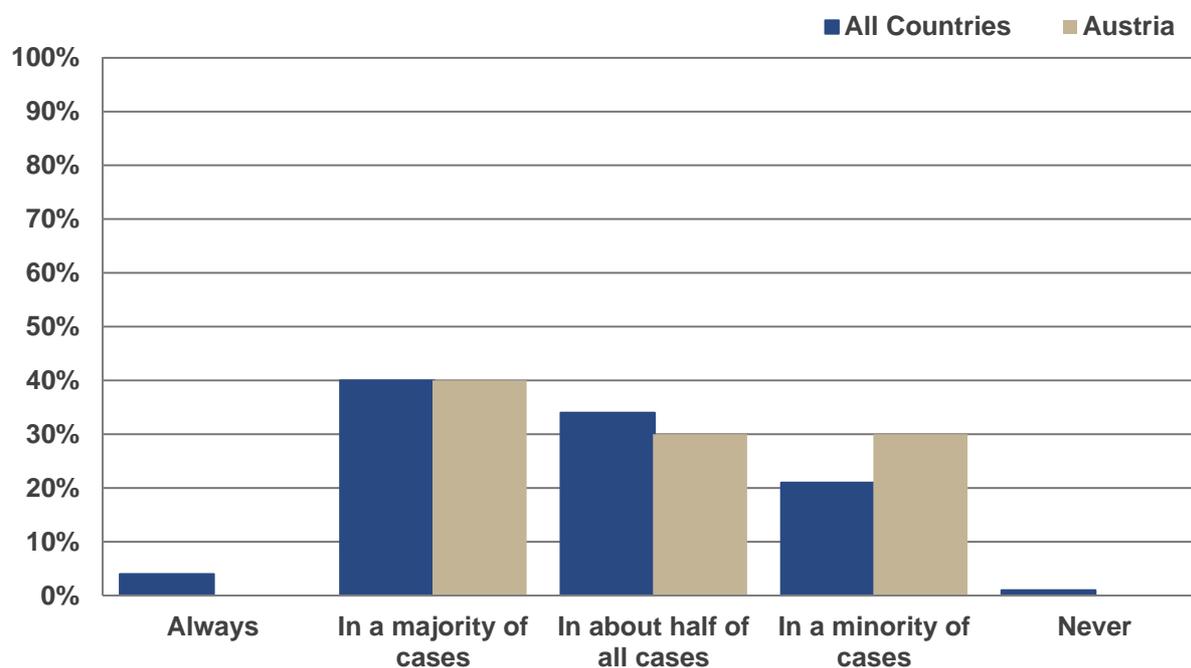
For the offering phase, the DECA quality seal without identification number can be used by independent service providers. When it comes to commissioning an energy efficiency service bearing the DECA quality label, a seal with identification number must be generated through the DECA website.

Since November 2017 already 5 companies are entitled to award services with the DECA quality seal. (DECA, 14.01.2015)

The responses to the survey also show that a quality assurance scheme could improve the quality of EES and that there is demand for it.

Figure 30 shows that there is a lack of trust in EPC/ESC service providers for 40% of the respondents in a majority of all cases and for 30% each in about half of all cases and in a minority of cases. These results are nearly congruent to the results of All Countries in the survey.

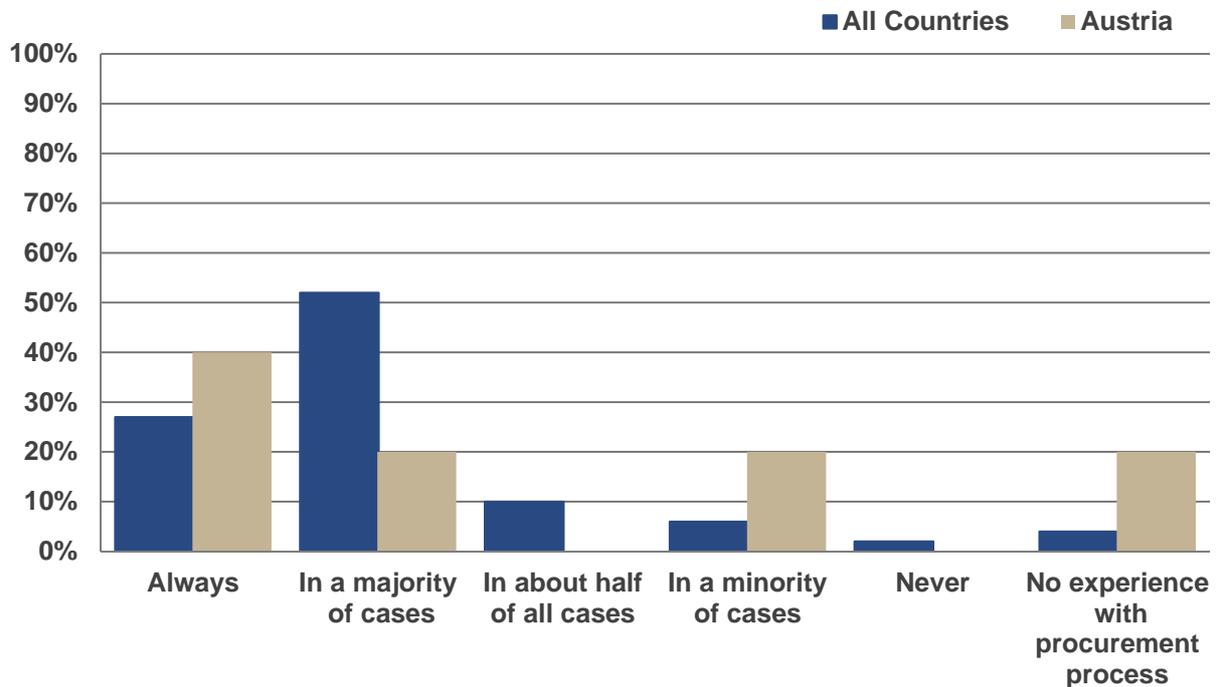
Figure 30: In your experience, is there a lack of trust in EPC/ESC service providers? (QualitEE, 2017)



Forty percent of the respondents of the survey in Austria state that the detailed definition of procurement specifications always increases the quality level of EPC/ESC services, whereas 20% of the respondents experience that this is the case in: a majority of cases or a minority of cases. 20% of the respondents have no experience with the procurement process.

The Austrian numbers differ from the numbers of All Countries in the survey where the majority of respondents from All Countries state that quality increased in a majority of cases (52%) or always (27%). (See Figure 31).

Figure 31: From your experiences, do well defined procurement specifications increase the quality level of EPC/ESC services? (QualitEE, 2017)

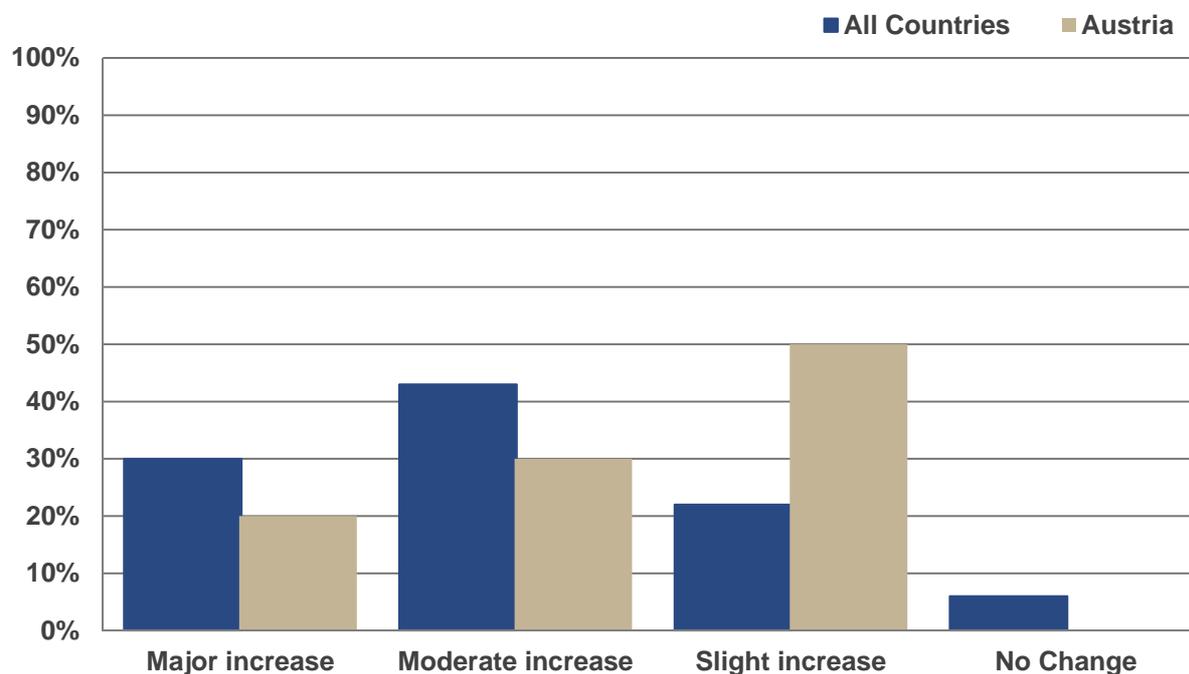


Regarding the extent of increase of the clients’ trust in EPC/ESC services and providers through a quality insurance scheme all Austrian respondents expect an increase. 50% of respondents expect a slight increase, 30% a moderate increase and 20% a major increase.

In All Countries in the survey the results are different. 43% of the respondents expect a moderate increase of the client trust, 30% expect a major increase, 22% a slight and 6% no increase. (See Figure 32)

Comparing Figure 32 and Figure 33 shows that respondents on the one hand believe that a quality assurance scheme would increase the client trust in EPC/ESC services and providers just slightly (50% of respondents in Austria, see Figure 32) but 79% also state, that the main added value of a quality assurance scheme would be the increase of customer trust in EPC/ESC projects (See Figure 33)

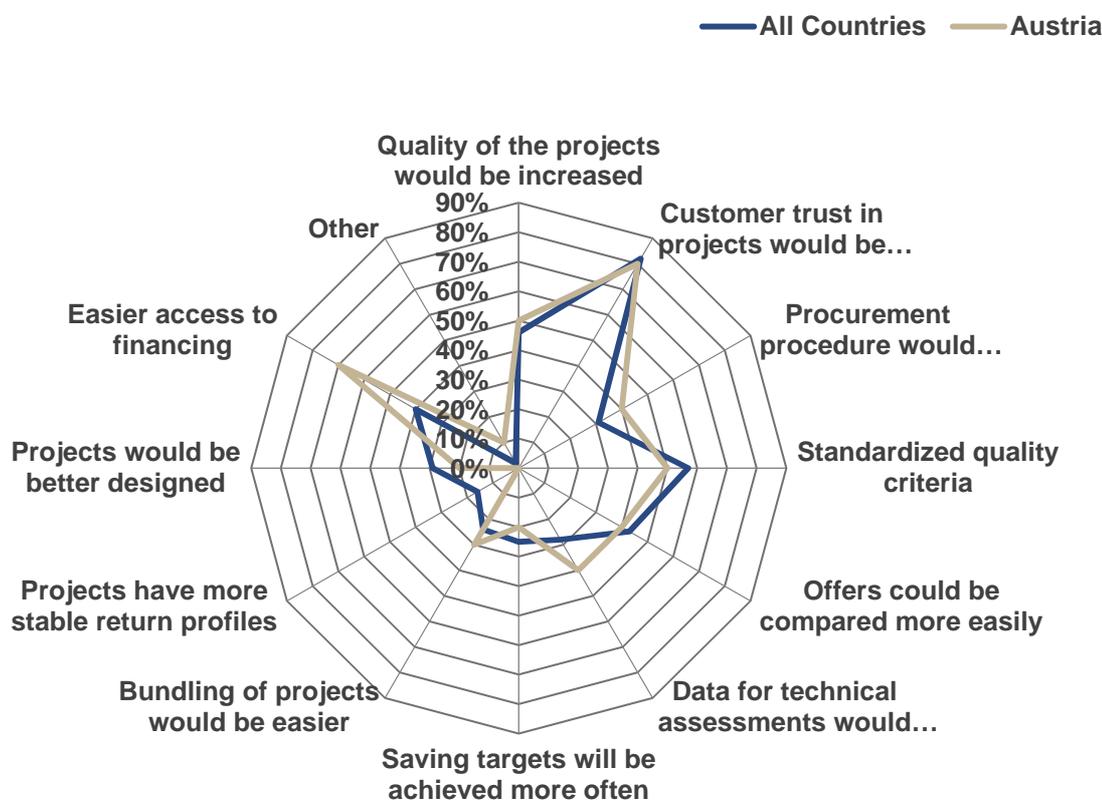
Figure 32: To what extent would a quality assurance scheme increase client trust in EPC/ESC services and providers? (QualitEE, 2017)



Eighty percent of the Austrian respondents of the market survey see the increase of customer trust in projects as the main added value of a quality assurance scheme, followed by easier access to financing (70% of respondents). Increased quality of the projects and standardised quality criteria is an added value for 50% of the respondents each. Other added values were chosen by 40% of the respondents or less.

Basically, the Austrian numbers are similar to that of All Countries in the survey, only the results of the added value “easier access to financing” differ significantly between Austria (70% of respondents) and All Countries surveyed (40% of respondents). (See Figure 33)

Figure 33: In your opinion, what would be the added value of a quality assurance scheme like this? (QualitEE, 2017)



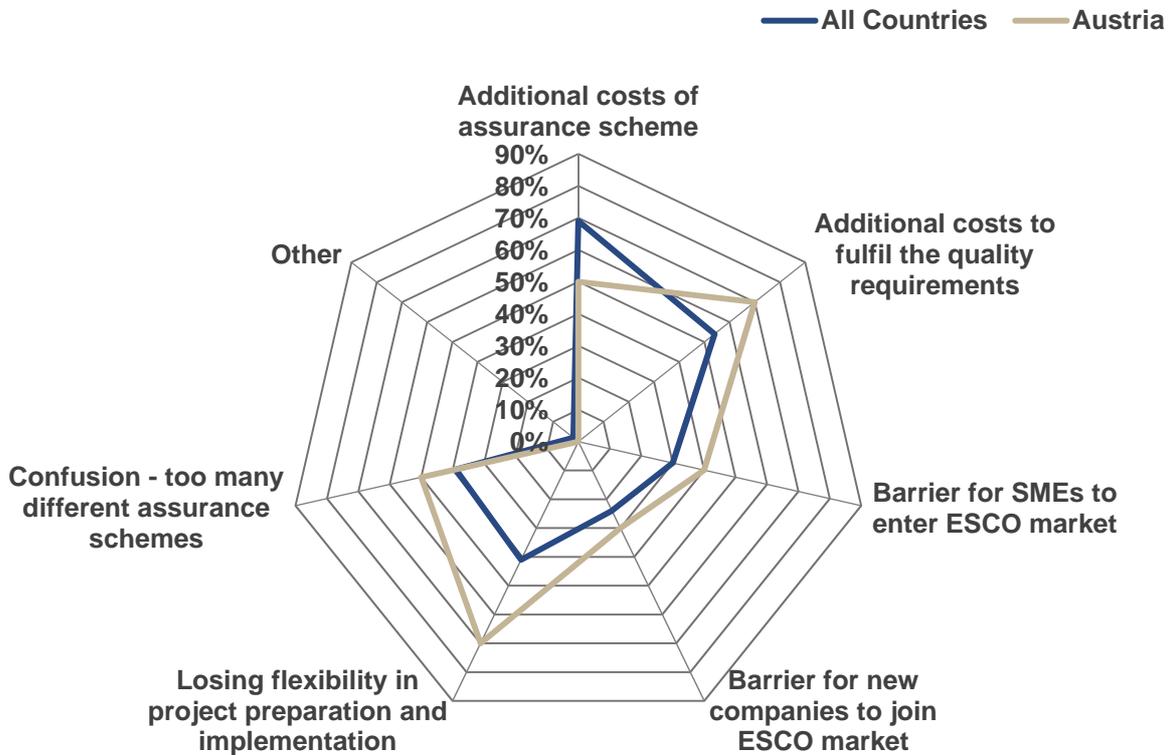
The main drawbacks or barriers created by a quality assurance scheme for respondents of the survey are:

- ✔ Additional costs to fulfil the quality requirements (70% of respondents);
- ✔ Losing flexibility in project preparation and implementation (70% of respondents).

Also additional costs of the assurance scheme and confusion about too many assurance schemes may be drawbacks or barriers for 50% of the respondents each.

Losing flexibility in project preparation and implementation is considered a higher drawback or barrier (30 percentage points) in Austria than across All Countries in the survey. (See Figure 34)

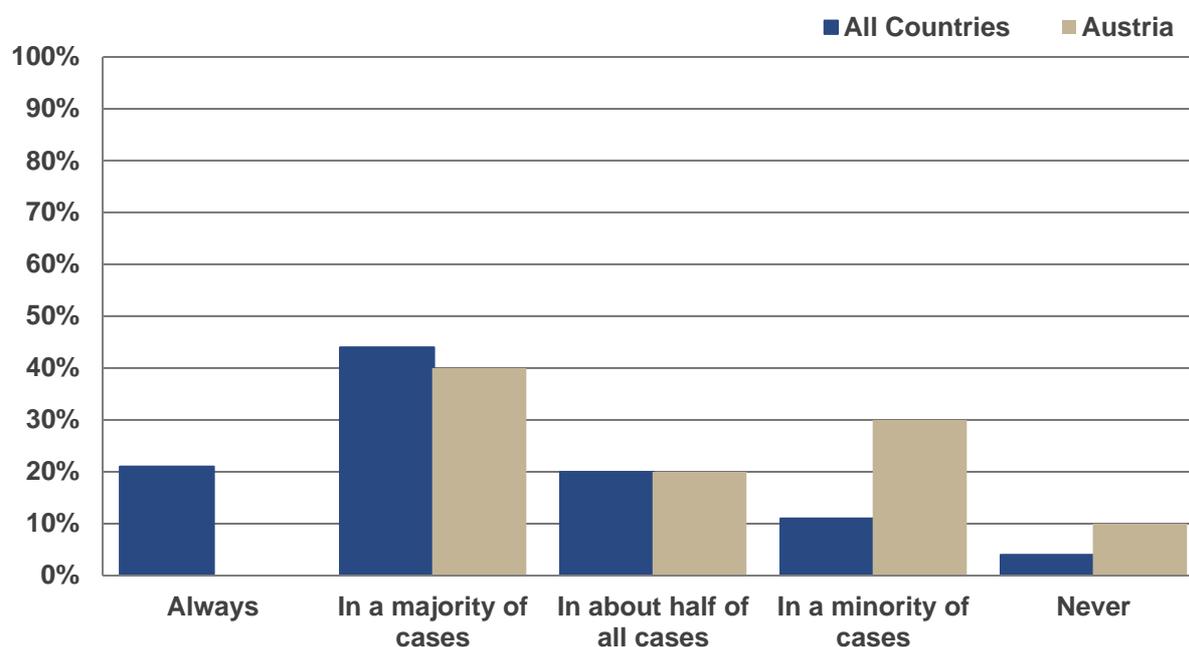
Figure 34: In your opinion, what drawbacks or barriers may be created by a quality assurance scheme like this? (QualitEE, 2017)



The large majority of respondents would prefer a project, which is subject to quality assurance over a project without quality assurance. 40% of respondents prefer it in the majority of cases, but there are also 30% of respondents who would prefer it only in the minority of cases, 20% in about half of the cases and 10% who would never prefer it.

Comparing the Austrian results to the results of All Countries in the survey shows that there are respondents in All Countries surveyed who would always prefer implementing a project, which is subject to quality assurance over a project without quality assurance. This is not the case in Austria. Respondents who would prefer such a project in a minority of cases are remarkably fewer (11%) across All Countries than in Austria (30%) and only 4% of respondents across All Countries would never prefer a project with QA (10% in Austria). (See Figure 35).

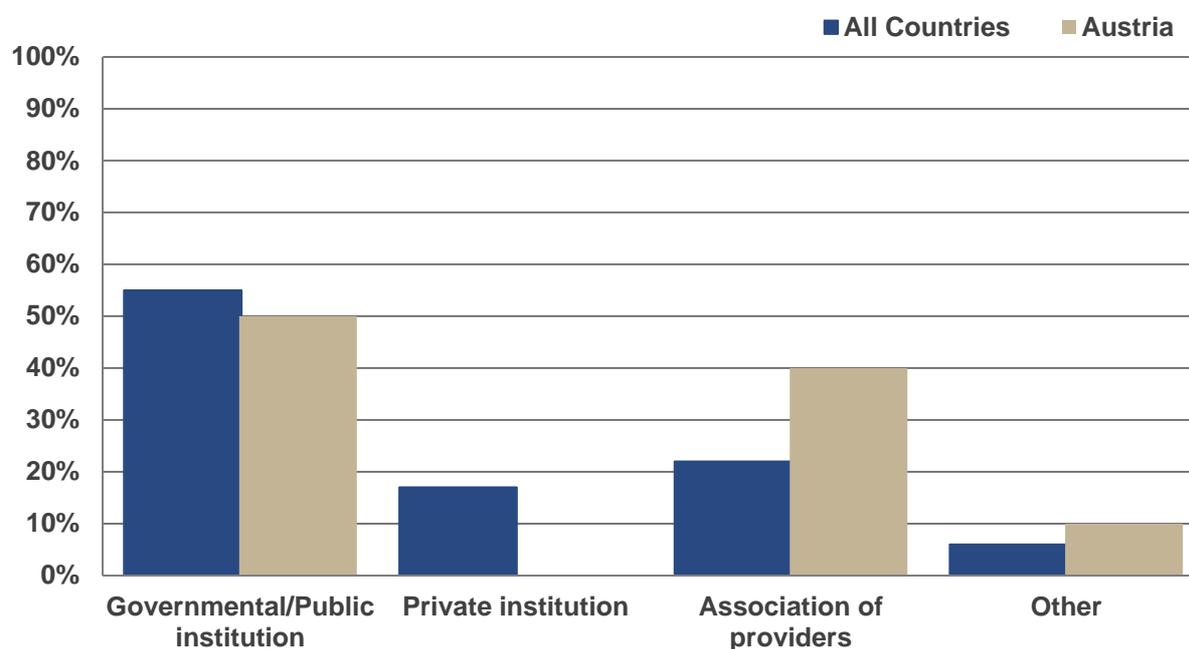
Figure 35: Would you prefer implementing a project, which is subject to quality assurance over a project without quality assurance? (QualitEE, 2017)



Regarding a respected body to issue a quality assurance label, the answers from the survey and the interviews match. A superior authority like a governmental or public institution would be preferred by 50% of Austrian respondents and even more in All Countries surveyed (55%) (See Figure 36 and interview with a client on 28.11.2017). At the same time there are also 40% of the respondents who would prefer an association of providers as a respected body and 10% who would prefer another party.

In All Countries in the survey there are 17% of respondents which see a private institution as a respected body to issue a quality assurance label or certification for EPC/ESC services. The numbers of the respondents who prefer an association of providers are lower in All Countries (22%) than in Austria. (See Figure 36)

Figure 36: Which would be the most respected body to issue a quality assurance label or certification for EPC/ESC services in your country? (QualitEE, 2017)



60% of the Austrian respondents think that the costs for the quality assurance of EPC/ESC projects would be passed over to the client, while only 20% see the costs paid by the provider. 20% see them paid by another party. Within All Countries in the survey the tendency is different, since there are less respondents (53%) who see the costs paid by the client and remarkably more (37%) respondents who think the provider should pay. (See Figure 37)

These additional costs could be an added barrier for EPC/ESC projects depending on the amount of the costs. Nevertheless, 50% of the Austrian respondents and 58% of the respondents in All Countries in the survey believe that a viable fee level for external quality assurance per EPC/ESC project would be only 0 – 1% of the project value and about 40% of the respondents in Austria and in All Countries surveyed estimate the fee level to be 2-5% of the project value. (See Figure 38)

Figure 37: Who should pay for the quality assurance of EPC/ESC projects? (QualitEE, 2017)

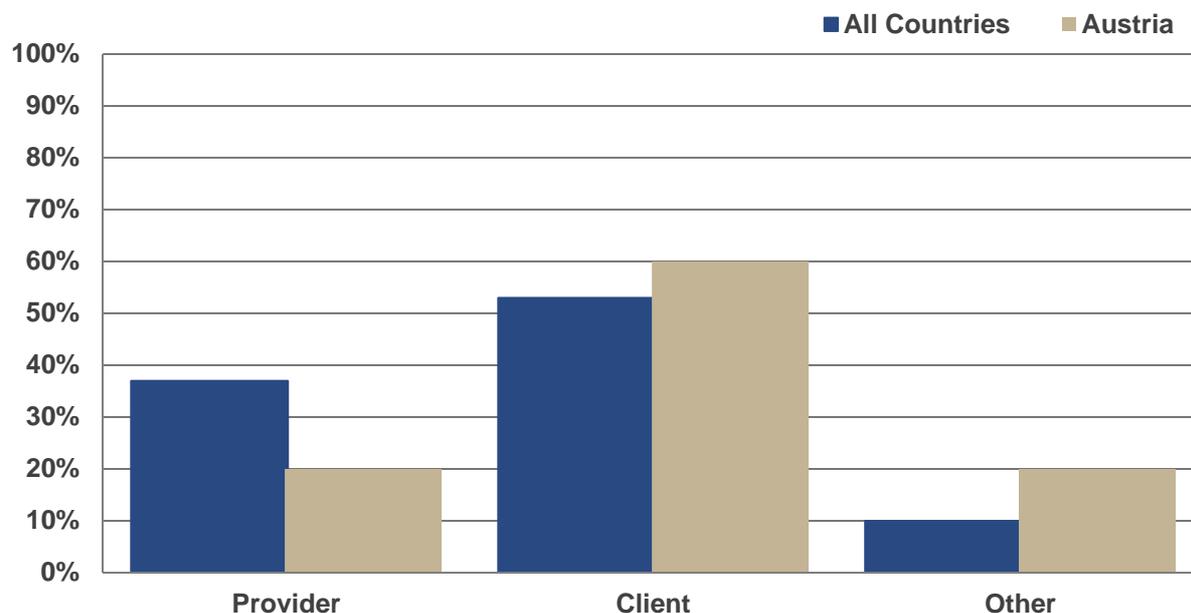
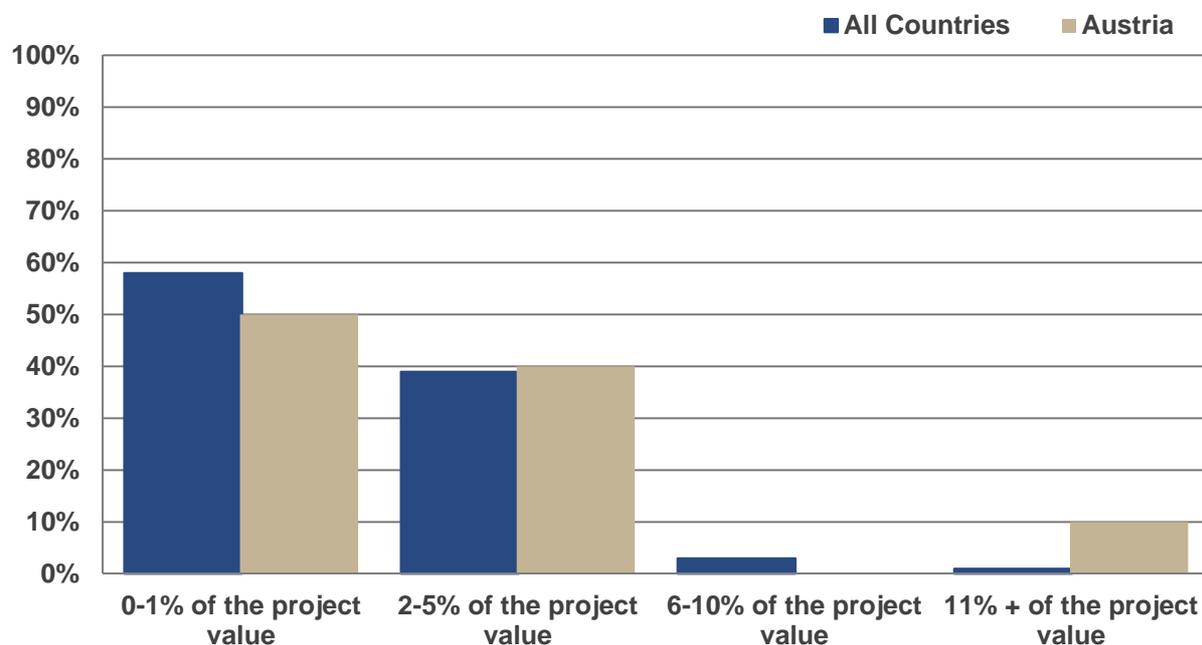


Figure 38: What would be a viable fee level for external quality assurance per EPC/ESC project? (QualitEE, 2017)



9 REFERENCES

Amann S., (September 2015): *Transparens, D2.5A Country Report on Recommendations for Action for Development of EPC Markets – Austria*

Amann S., Leutgöb K. et al. (2015): *Quality Certification for EPC services*. Available for download at <http://www.transparens.eu/download-library/quality>

Amann S., Leutgöb K., et al. (August 2015): *Transparens, D4.09 Report on Recommendations on Quality Certification for EPC services, Case studies from AT to CZ*

Auer M., Bayer G., (November 2013): *Transparens, D2.4 Country Report on Identified Barriers and Success Factors for EPC Project Implementation - Austria*

Austrian Energy Agency (12.11.2017): *Förderungen – Wegweiser – Energiesparmaßnahmen*. Available for download at https://www.energyagency.at/index.php?tx_aeafoerderungen_pi1%5BshowWerberUid%5D=0&tx_aeafoerderungen_pi1%5BshowCatUid%5D=39&tx_aeafoerderungen_pi1%5BshowRegioNUid%5D=0&id=147&searchCall=1&x=134&y=16

Austrian Energy Agency (11.01.2018): *Zahlen und Fakten – Strompreisindex - Aktuelle Entwicklung des ÖSPI*. Available for download at <https://www.energyagency.at/fakten-service/energie-in-zahlen/strompreisindex/chart-strompreisindex.html>

Bleyl-Androschin, J.W. (Oktober 2009): *IEA DSM TASK XVI - Integrated Energy Contracting*

BMNT - Bundesministerium für Nachhaltigkeit und Tourismus (05.11.2017): *Über klimaaktiv*. Available for download at https://www.klimaaktiv.at/ueber-uns/ueber_klimaaktiv.html

BMNT - Bundesministerium für Nachhaltigkeit und Tourismus (April 2017): *NEEAP2017 - Zweiter Nationaler Energieeffizienzaktionsplan der Republik Österreich 2017 gemäß Energieeffizienzrichtlinie 2012/27/EU*

BMNT– Bundesministerium für Nachhaltigkeit und Tourismus (31.10.2017): *Energieeffizienzgesetz (EEffG) - Energieeffizienz-Richtlinie*. Available for download at <https://www.bmfwf.gv.at/EnergieUndBergbau/Energieeffizienz/Seiten/Energieeffizienzpaket.aspx>

BMNT – Bundesministerium für Nachhaltigkeit und Tourismus (04.11.2017): *Energy Strategy Austria*. Available for download at [https://www.bmfwf.gv.at/EnergieUndBergbau/Energiebericht/Documents/Energy%20Strategy%20Austria%20\(engl%20Kurzfassung\)%20\(2\).pdf](https://www.bmfwf.gv.at/EnergieUndBergbau/Energiebericht/Documents/Energy%20Strategy%20Austria%20(engl%20Kurzfassung)%20(2).pdf)

BMNT – Bundesministerium für Nachhaltigkeit und Tourismus (12.11.2017): *Energiesparen im öffentlichen Bereich*. Available for download at <https://www.bmfwf.gv.at/EnergieUndBergbau/Energieeffizienz/Seiten/MitContractingzuEnergieeffizienz.aspx>

BMDW – Bundesministerium für Digitalisierung und Wirtschaftsstandort(03.01.2018): Bundescontracting Available for download at <https://www.bmdw.gv.at/HistorischeBauten/EnergieeinsparungimBundesbereich/Seiten/Bundescontracting.aspx>

DECA (08.12.2017): Mitglieder des DECA – Übersicht, Available for download at http://alt.deca.at/view_site/site.php?lang=de&mid=77

DECA (09.12.2017): Aktuelle Mitglieder - Übersicht und Suche, Dienstleistung: Einspar-Contracting, Available for download at <https://www.deca.at/mitglieder-info?dl=290&ms=&s=>

DECA (12.12.2017): Aktuelle Mitglieder - Übersicht und Suche, Dienstleistung: Anlagen-Contracting, Available for download at <https://www.deca.at/mitglieder-info?dl=296&ms=&s=>

DECA (11.01.2018): DECA-Qualitätssiegel: Mehr Energieeffizienz durch Standards für Dienstleistungen. Available for download at <https://www.deca.at/presentation-q-siegel-2017-nachlese>

DECA (14.01.2015): Liste der selbstverpflichteten Unternehmen, Available for download at <https://www.deca.at/selbstverpflichtete-unternehmen>

e7 Energie Markt Analyse GmbH (04.06.2018): Transparense – EPC Market Databases, Available for download at <http://www.transparense.eu/database/38?year=2015>

e7 Energie Markt Analyse GmbH (08.12.2017): Transparense - Energiedienstleister in Österreich, Available for download at <http://www.transparense.eu/at/epc-market/energiedienstleister>

Energie-Control Austria (10.01.2018): Der Ökostrommarkt in Österreich. Available for download at <https://www.e-control.at/industrie/oeko-energie/>

European Committee of Standardization (2010): *CSN EN 15900:2010 Energy efficiency services - Definitions and requirements*

European Energy Service Initiative – EESI (February 2011): *Advanced EPC documents - Integrated Energy Contracting - IEE/08/581/SI2.528408*

Staničić D., Szomolányiová J., et al. (01.07.2014): *European Code of Conduct for Energy Performance Contracting*, Version as of 11 July 2014, Available for download at <http://transparense.eu/eu/epc-code-of-conduct>

European Union (2012): *Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency*, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. Official Journal L315, pp. 1 – 56

European Union (06.10.2012): *Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency*, Available for download at <http://data.europa.eu/eli/dir/2012/27/oj>

Grazer Energieagentur GmbH (2011): European Energy Service Initiative – EESI, *Advanced EPC documents - Integrated Energy Contracting*, Available for download at: http://www.grazer-ea.at/eesi/upload/download/standard%20documents/eesi_advanced_epc_integrated_energy_contracting.pdf

Grazer Energieagentur GmbH (2015): *GuarantEE, Market Report on the Austrian EPC Market*

Grazer Energieagentur GmbH (November 2016): *guarantee, Report on the European EPC Market*

Grazer Energieagentur GmbH (12.11.2017): *Mustervertrag für Einsparcontracting* Available for download at http://www.grazer-ea.at/eesi/front_content.php?idcat=582

International Energy Agency (06.10.2016): *IEA DSM task 16*, Available for download at <http://www.ieadm.org/wp/files/Task-16-Oct2015.pdf>

Joint Research Centre (2017): *JRC Science for Policy Report - Energy Service Companies in the EU*

Kommunal Kredit Public Consulting (12.11.2017): *Betriebliche Umweltförderung im Inland*. Available for download at <https://www.umweltfoerderung.at/rechtliche-grundlagen-ufi.html>

Land Oberösterreich (12.11.2017): *Richtlinien Energiecontracting-Programm (ECP) des Landes Oberösterreich für den Zeitraum 01.01.2016 – 31.12.2017. Verlängerung bis 31.12.2020.* Available for download at http://www.land-oberoesterreich.gv.at/Mediendateien/Formulare/DokumenteAbt_Ge/Richtlinie_ECP_2016.pdf

Land Oberösterreich (03.01.2018): *ECP – Energie Contracting Programm Oberösterreich*. Available for download at <https://www.land-oberoesterreich.gv.at/22833.htm>

OÖ Energiesparverband (08.12.2017): *Contractorenliste – Anbieter von Contracting in Oberösterreich*, Available for download at <http://www.energiesparverband.at/foerderungen/energie-contracting/contractorenliste.html>

ÖGUT - Österreichische Gesellschaft für Umwelt und Technik (12.11.2017): *Musterverträge Contracting*. Available for download at <https://www.oegut.at/de/projekte/energie/mustervertraege-contracting.php>

ÖGUT - Österreichische Gesellschaft für Umwelt und Technik (08.12.2017): *Contractor suchen*. Available for download at <http://www.contracting-portal.at/show.php?nid=0&mid=69&srchCont=srch>

ÖGUT - Österreichische Gesellschaft für Umwelt und Technik (12.12.2017): *Projekt suchen*. Available for download at <http://www.contracting-portal.at/show.php?nid=0&mid=69&srchProj=srch>

ÖGUT - Österreichische Gesellschaft für Umwelt und Technik (03.01.2018): *Contracting-Portal für Österreich*. Available for download at <http://www.contracting-portal.at/show.php>

ÖGUT - Österreichische Gesellschaft für Umwelt und Technik (15.01.2018): Österreichisches Umweltzeichen Energie-Contracting. Available for download at <http://www.contracting-portal.at/show.php?nid=3&mid=46>

US Department of Energy (06.10.2017): *Commissioning in Federal Buildings*, Available for download at <https://energy.gov/eere/femp/commissioning-federal-buildings>