



H2020-LC-SC3-EE-2019

EUROPEAN COMMISSION

Executive Agency for Small and Medium-sized Enterprises

Grant agreement no. 893857



frESCO

**New business models for innovative energy services bundles for
residential consumers**

Deliverable D3.6

**Report including the annotated template for contract
models**

Programme	H2020-EU.3.3.1. - Reducing energy consumption and carbon footprint by smart and sustainable use
Topic identifier	LC-SC3-EE-13-2018-2019-2020 - Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource
Call	H2020-LC-SC3-EE-2019
Funding scheme	IA – Innovation Action

Project duration	42 months (1 June 2020 – 30 November 2023)
Project adviser	Rebecca Kanallea - CINEA
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Consortium partners	CIRCE, S5, EI-JKU, CARTIF, UBITECH, UBE, KONCAR KET, KRK, COSMA, LCTE, VOLT, VERD, IOSA, RINA-C
Website	http://fresco-project.eu
Cordis	https://cordis.europa.eu/project/id/893857

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ACKNOWLEDGMENT



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n. 893857.

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Deliverable D3.6

Report including the annotated template for contract models

Deliverable number	D3.6
Deliverable name	Report including the annotated template for contract models
Lead beneficiary	EI-JKU
Description	This deliverable contains an annotated contract model for multiple frESCO services, for the service providers (ESCOs and aggregators), and for each of the consumers and stakeholders involved in the delivery of the services. The contract model contains the relevant contract points and indicates, which aspects play a role in relation to the service offered in each case.
WP	3
Related task(s)	3.6
Type	Report
Dissemination level	Public
Delivery date	02.06.2022
Main author	Katrin Burgstaller, Ryan O'Reilly, Francisco Villagarcia, Andrea Kollmann (EI-JKU)
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Document history

Version	Date	Changes	Author
V1 – first draft	09.05.2022		EI-JKU
V1 – reviews	16.05.2022		CIRCE
V1 – consolidated version	20.05.2022		EI-JKU
2 nd review	24.05.2022		S5
V2 – second draft	26.05.2022		EIJKU
Final version	01.06.2022		EI-JKU
Final deliverable submission	02.06.2022		EI-JKU

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ABBREVIATIONS

Abbreviation	Name
DER	Distributed Energy Resource
DSM	Demand Side Management
DSO	Distribution System Operator
EE	Energy Efficiency
EPC	Energy Performance Contract
EPCs GS	Energy Performance Contracts with Guaranteed Savings
EPCs SS	Energy Performance Contracts with Shared Savings
ESC	Energy Sales Contract
ESCO	Energy Service Company
GDPR	General Data Protection Regulation
H2020	Horizon 2020 EU Framework Programme for Research and Innovation
HVAC	Heating, Ventilation and Air Conditioning
PVP	Pay for Performance
PMV	Performance Measurement and Verification
PV	Photovoltaic
VPP	Virtual Power Plant
WP	Work Package

1. EXECUTIVE SUMMARY

This report contains the annotated contract template for energy service providers, which represents a preparation tool when negotiating any particular terms and conditions with end-users about the delivery of selected energy services. The template identifies the key contractual points and provides impetus for the issues to be addressed therein. This template may not adjust to all circumstances encountered at any project site or any applicable legal framework, and thus is not attempted to substitute legal advice or procurement that will adjust to the concrete project needs.

Previous work made by partner organisations (e.g., CIRCE in Deliverable 3.1 “Definition of the novel energy services for residential consumers”) has already explored the most suitable type of contracts that best adjust to the delivery of energy services by an ESCO and/or aggregator company when dealing with residential end-users. In addition, different types of contracts are here described and integrated into a hybrid solution that better serves the needs of the proposed business models offered within the framework of the frESCO project. In the course of the preliminary work and research, we were able to determine the essential contractual points that a service contract must have. These contractual points were prepared and presented for a stakeholder workshop. Contributions of partner institutions were collected through a qualitative survey conducted in a virtual project meeting (which took place in April 2022) where they shared their experiences gained in different European countries.

2. INTRODUCTION OF THE FOUR GROUPS OF SERVICES AND GENERAL REMARKS FOR THE ANNOTATED CONTRACT TEMPLATE

Four types of services were identified in the frESCO project. Each of these services has its specific features that must be taken into account in the contract. Nevertheless, the prepared contract points can be used to a large extent. The project also covers smaller residential units in apartment buildings and therefore requires smaller scale contractual guidance for various intensities of energy services. The following four types of services are presented:

- **RT.** Smart equipment retrofitting. This set of energy services includes the assessment of smart readiness, the installation of the digital platform hardware, sensors, and data communication gate, along with the information interface with the user. It may include conventional building retrofitting services that contribute to further energy performance and smart readiness improvements.
- **EE.** Energy Efficiency and self-consumption optimisation services. This set of services uses the big data platform to deliver implicit and explicit energy efficiency services and self-consumption optimisation.
- **FL.** Demand flexibility services. This set of services delivers explicit demand response services for grid management.
- **NE.** Non-energy services. This set of services relies on the digital platform to convey services related to automation, comfort, air quality, noise reduction, surveillance and other non-energy services.”¹

¹ frESCO - D3.1 Definition of the novel energy services for residential consumers, p 21.

3. FURTHER INFORMATION ABOUT (P4P) SERVICE CONTRACTS

The four types of services each require a suitable remuneration for the service provider that corresponds to the service provided and effort expended. Therefore, at the beginning of a contract, the basic information about the service and the purpose of the contract must be introduced.

The purpose of the (P4P) service contract must be specified at the very beginning of the document. Description of the “Pay for Performance” (P4P) model and the “Performance Measurement and Verification” (PMV) methodology used within the frESCO project can be enclosed as an exhibit to the contract, provided that parties agreed upon its application to the overall contract.

The purpose of the contract specifies the kind of energy services that will be subject of the agreement. As indicated in D3.1², the elicited **frESCO (P4P) energy services are classified into**

- (i) retrofitting services <RT1, RT2 and RT3>,
- (ii) energy efficiency services <EE1, EE2, EE3 and EE4>,
- (iii) demand flexibility services <FL1, FL2 and FL3>, and
- (iv) non energy services <NE1, NE2, NE3 and NE4>.³

Based on the multiplicity of services and service bundles that will be offered within the project and during the contract duration, it is recommended to include all types of services in the Pay for Performance Contract. All four types of services have different aspects to consider. For some of the services, it is necessary to consider P4P and implement it in the contract according to the individual project and customer. For the service type "Non energy services" no P4P contract is needed, because no such service is provided. Here, the calculation is made for the service itself, but it can also be seen as a type of P4P, since the service must be paid for according to its scope.

In contrast with that, an **Energy Performance Contract (EPC)** is the most used agreement between an ESCO and a customer, upon which installation of equipment, service

² Cf. frESCO - D3.1 New business models for innovative energy service bundles for residential consumers, p 22-21.

³ Each of these services can be found in Deliverable 3.1.

performance, saving targets and remuneration is agreed. There are two main types of Energy Performance Contracts depending on which contracting party is supposed to assume the credit risk of the project. These are known as **Energy Performance Contracts with Shared Savings (EPCs SS)** and **Energy Performance Contracts with Guaranteed Savings (EPCs GS)**. “Shared savings” refers to a contract that splits the cost savings for a certain period of time according to a pre-agreed percentage. Therefore, there is no “standard sharing” because it depends on the cost of the project, the duration of the contract and the risks that the energy service provider and the consumer take.⁴ The difference between shared savings and guaranteed savings contracts is that the energy service provider guarantees that a certain level of energy savings will be achieved, and thus shields the customer from any performance risk.⁵ According to the IEA (2018) EPCs GS are the most widespread type of contracts used across Europe⁶, although, Greece can be named as a country where the EPC SS model is used. **Efficiency-as-a-Service (EaaS) contracts** are a type of pay-for-performance contracts that stand in contrast with the EPC discussed above. EaaS contracts are suitable for smaller projects where the ownership of the equipment utilized should remain under service provider property having a minimum impact on the customer’s balance sheets. EaaS contracts are less standardized and have a relatively high complexity, which usually need about 9 months of negotiation on average compared with the one year or longer for negotiating an EPC⁷. **Energy Sales and Performance Contract (ESPC)** is a combination of a performance and a sales contract.⁸

The following table⁹ presents an overview per frESCO-service with the corresponding basic information for the source of income of the service and the main contractual issues.

⁴ “Energy Performance Contracting”, E3P, T (available under: <https://e3p.jrc.ec.europa.eu/node/246>)

⁵ “Energy Performance Contracting”, E3P, T (available under: <https://e3p.jrc.ec.europa.eu/node/246>)

⁶ IEA (2018), *Energy Service Companies (ESCOs)*, IEA, Paris <https://www.iea.org/reports/energy-service-companies-escos-2>

⁷ For a more detailed comparison of EaaS and EPCs see:

<https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/BBC%20Financial%20Allies%20Resource%20ESPC%20vs.%20EaaS%201.8.2021.pdf>.

⁸ frESCO - D3.1 New business models for innovative energy service bundles for residential consumers, p 14.

⁹The content of the table was compiled using the information from Deliverable 3.1 (frESCO - D3.1 New business models for innovative energy service bundles for residential consumers).

Table 1: Compilation of all services and their source of income and contractual specifics. **Source:** frESCO - D3.1 New business models for innovative energy service bundles for residential consumers, 23-76.

Service RT	Revenue stream	Contractual arrangements and issues
RT1: Smart equipment retrofitting, sensors and meters	<ul style="list-style-type: none"> Initial fee Alternatively: the price could be included in any service bundle, or combination of service bundles, and the cost be paid as service monthly instalments for a given payment period. The charge could be included in any service bundle, or combination of service bundles, and the cost be paid back as part of the service revenues to the service provider. 	<ul style="list-style-type: none"> product or service contract. Terms and conditions of the service delivered. Contract duration: The installation is a one-time service. However, this service goes with RT2 providing visualisation and monitoring of real-time energy performance. This is a service that can be provided as long as it is demanded. From 1 to 10 years.
RT2: Data monitoring and Personalized Informative Billing	<ul style="list-style-type: none"> Initial RT1 system installation fee. Alternatively: Interface licence for a given period (1 year, 5 years, 10 years). The charge could be included in any service bundle, or combination of service bundles, and the cost be paid back as part of the service revenues to the service provider. 	<ul style="list-style-type: none"> product or service contract. Contract duration: service can be offered as long as demanded or up to 11 years.
RT3: Smart readiness assessment and Certification	<ul style="list-style-type: none"> RT3 one-time service fee. Included in the initial RT1-RT2 system installation fee. The charge could be included in any service bundle, or combination of service bundles, and the cost be paid back as part of the service revenues to the service provider. 	<ul style="list-style-type: none"> pre-contract for a one-time service. Contract duration: one-time service. Terms and conditions of the service delivered. On-premises service. Scope of the audit, results and recommendations.
Service EE	Revenue stream	Contractual arrangements and issues
EE1: Energy Management for Energy efficiency	<ul style="list-style-type: none"> Energy savings for energy efficiency events, verified with the frESCO Performance Measurement methodology and paid according to the P4P contract. Savings are directly enjoyed by the consumers/prosumers. A part of it would be dedicated to pay back the ESCO proportionally to the results achieved. These payments would be aggregated and settled at the end of a period (monthly), together with the service report detailing savings per event / service. 	<ul style="list-style-type: none"> P4P energy service contract. Terms and conditions of the service delivered. Opt-out clauses. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs

<p>EE2: Personalised Energy Analytics for Energy Behaviour optimization</p>	<ul style="list-style-type: none"> Energy savings for energy efficiency behavioural changes and recommendation implementation. Savings are directly enjoyed by the consumers/prosumers. A part of it would be dedicated to pay back the ESCO proportionally to the results achieved. These payments would be aggregated and settled at the end of a period (monthly), together with the service report detailing savings per event. 	<ul style="list-style-type: none"> P4P energy service contract Terms and conditions of the service delivered. Opt-out clauses. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs. Comment regarding revenue stream: The results obtained by this service depend a lot on the ability of the user to follow the recommendations given and the continuity of this behavioural change. In the long run and as the users' behaviour changes permanently, savings become more apparent. Due to the different nature of the efficiency actions, it is still to be assessed how these savings can be verified with the frESCO Performance Measurement methodology and paid according to the P4P contract. Guaranteed saving contracts are not recommended with this energy service.
<p>EE3: Holistic self-consumption maximization service</p>	<ul style="list-style-type: none"> Economic savings from the additional savings made when increasing the self-consumption energy and verified with the frESCO Performance Measurement methodology and paid according to the P4P contract. The savings are made by decreasing the energy supply from the grid and make use of the otherwise PV energy surpluses. It is not expected that this service delivers any actual energy savings since, moving loads from periods of PV energy surplus to others with PV energy shortage may not bring about any energy reduction. The economic savings then are calculated as the difference in cost between energy supply tariffs and compensation / sales tariffs of energy surplus according to the national self-consumption scheme in place. The PMV method will use the forecasting algorithms to calculate the load shifted during the event and from it, the actual remuneration derived from it. 	<ul style="list-style-type: none"> P4P energy service contract. Terms and conditions of the service delivered. Opt-out clauses. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs.
<p>EE4: Automation and optimal device scheduling</p>	<ul style="list-style-type: none"> Economic savings for energy price elasticity events, verified with the frESCO Performance Measurement methodology and paid according to the Pay for Performance contract. Savings are directly enjoyed by the consumers/prosumers. A part of it would be dedicated to pay back the 	<ul style="list-style-type: none"> P4P energy service contract. Terms and conditions of the service delivered. Acceptance of explicit operation of DERs (Distributed Energy Resources) while respecting users' comfort preferences. Opt-out clauses.

	<p>ESCO proportionally to the results achieved. These payments would be aggregated and settled at the end of a period (monthly), together with the service report detailing savings per event.</p> <ul style="list-style-type: none"> If savings come from a market price-signal device scheduling (shifting loads from peak periods to valley periods) there may not be any energy savings at all. In this case, this is an event-type efficiency action and the economic savings are derived from the difference of tariff prices between the periods. The P4P model will use the PMV to calculate the actual energy shifted during the event to calculate the final remuneration. 	<ul style="list-style-type: none"> Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs.
Service FL	Revenue stream	Contractual arrangements and issues
<p>FL1: Flexibility analytics services (Awareness and Knowledge of Users' flexibility)</p>	<ul style="list-style-type: none"> Amount of Flexibility dispatched in the demand response events, verified with the frESCO Performance Measurement methodology and paid according to the P4P contract. The amount of flexibility upward and downward is measured and reported along with the bid prices obtained at DSO-managed local flexibility markets or TSO-managed balancing markets. The final revenue paid by those markets is transferred to the flexibility providers (consumers and prosumers) after deducting a percentage for the aggregator as a payment of the flexibility management, aggregation and market trading. This service does not entail any remuneration by itself as it only provides the algorithms for flexibility awareness. Revenues are realised by using FL1 jointly with FL2 and/or FL3. 	<ul style="list-style-type: none"> P4P energy service contract. (The service of FL1 should be bundle with the service of FL2 and FL3) Terms and conditions of the service delivered. Acceptance of explicit operation of DERs while respecting users' comfort preferences. Opt-out clauses. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs.
<p>FL2: Explicit automatic DR (Demand Response) services</p>	<ul style="list-style-type: none"> Amount of Flexibility dispatched in the demand response events, verified with the frESCO Performance Measurement methodology and paid according to the Pay for Performance contract. The amount of flexibility upward and downward is measured and reported along with the bid prices obtained at DSO-managed local flexibility markets or TSO-managed balancing markets. The final revenue paid by those markets is transferred to the flexibility providers (consumers and prosumers) after deducting a percentage for the aggregator as a payment of the flexibility management, aggregation and market trading services. 	<ul style="list-style-type: none"> P4P flexibility energy service contract. (This contract could be organized according to a settlement mechanism, which would be possible with a blockchain-enabled protected smart contract). Terms and conditions of the service delivered. Acceptance of explicit operation of DERs while respecting users' comfort preferences. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs.

<p>FL3: Virtual Power Plant and Optimal Flexibility Activation Scheduling</p>	<ul style="list-style-type: none"> Amount of Flexibility dispatched by the VPP in the energy market, verified with the frESCO Performance Measurement methodology and paid according to the P4P contract. The amount of flexibility upward and downward is measured and reported along with the bid prices obtained at DSO-managed local flexibility markets or TSO-managed balancing markets. The final revenue paid by those markets is transferred to the flexibility providers (consumers and prosumers) after deducting a percentage for the aggregator as a payment of the flexibility management, aggregation and market trading service. 	<ul style="list-style-type: none"> P4P flexibility energy service contract. Terms and conditions of the service delivered. Acceptance of explicit operation of DERs while respecting users' comfort preferences. Contract duration: service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs.
<p>Service NE</p>	<p>Revenue stream</p>	<p>Contractual arrangements and issues</p>
<p>NE1: Thermal Comfort preservation</p>	<ul style="list-style-type: none"> Service monthly fee. P4P approach: service charges are calculated based on measurable performance metrics, such as the time that the system keeps the indoor temperature within the desired range chosen by the user. These temperature boundaries could be explicitly selected by the user or calculated by the system using the data platform to analyse the user interactions with the system to modify the temperature setpoint or operation conditions when they do not feel comfortable at home. P4P second approach: the service is provided at a constant monthly fee but a P4P variable penalty is deducted from this fee proportional to the time the indoor temperature stays off the comfort boundaries selected by the user. 	<ul style="list-style-type: none"> EPC or P4P energy service contract. (It is difficult to offer these services under a P4P basis because they have no influence on energy performance and the intended benefit performance is rather subjective and difficult to measure, they are presented here as P4P services. Alternatively, constant service fees might be charged.) Terms and conditions of the service delivered: Comfort boundaries, time of response. Contract duration: service can be offered as long as demanded or up to 11 years. By itself, no payback of the initial investment is expected.
<p>NE2: Indoor air quality</p>	<ul style="list-style-type: none"> Service monthly fee. P4P approach: service charges are calculated based on measurable performance metrics, such as the time that the system keeps the air quality metrics within the desired limits chosen by the user or the recommended range. P4P second approach: the service is provided at a constant monthly fee but a P4P variable penalty is deducted from this fee proportional to the time the air quality metrics stay off the target boundaries. 	<ul style="list-style-type: none"> EPC or P4P energy service contract. Terms and conditions of the service delivered: Healthy air quality boundaries, time of response. Contract duration: service can be offered as long as demanded or up to 11 years. By itself, no payback of the initial investment is expected.

<p>NE3: Noise reduction</p>	<ul style="list-style-type: none"> • Service monthly fee. • P4P approach: service charges are calculated based on measurable performance metrics, such as the time that the system keeps the noise level within the desired target chosen by the user or the recommended range. • P4P second approach: the service is provided at a constant monthly fee but a P4P variable penalty is deducted from this fee proportional to the time noise level stays off the target boundaries. 	<ul style="list-style-type: none"> • EPC or P4P energy service contract. • Terms and conditions of the service delivered: Healthy air quality boundaries, time of response. • Contract duration: service can be offered as long as demanded or up to 11 years. By itself, no payback of the initial investment is expected.
<p>NE4: Security and surveillance services</p>	<ul style="list-style-type: none"> • Service monthly fee. • P4P approach: service charges are calculated based on measurable performance metrics, to be defined. 	<ul style="list-style-type: none"> • EPC or P4P energy service contract. • Terms and conditions of the service delivered: To be defined. • Contract duration: service can be offered as long as demanded or up to 11 years. By itself, no payback of the initial investment is expected.

4. STRUCTURE OF THE ANNOTATED CONTRACT TEMPLATE

The contract guideline is divided into three sections. In particular, the main section is crucial for the particular service selected and must be adapted to the individual case or project.

- **General part:** description of the service(s) and the scope of the contract
- **Main part:** concretization of the service(s) and related obligations of the service provider and the customer, method of calculation, new/existing equipment, ownership of the equipment, data, remuneration
- **Closing formulas:** Termination conditions, liability, place of jurisdiction and formalities

Below is the annotated contract template for all frESCO services. Care has been taken to ensure that the essential elements and contractual points for service contracts have been worked through. Under each point of the contract there are notes about what is to be regulated and which points are not needed for one or another service.

5. ANNOUNCED TEMPLATE FOR ENERGY SERVICE CONTRACTS

The following explanations¹⁰ concern the essential contents that a service contract must have in order to be efficient and flexible. The headings (contractual points) below and their order provide a template for a **hybrid service contract**. The contractual points are oriented towards Europe-wide applicability. Each heading also includes a brief explanation of what content must be included in the contract to ensure the legal and administrative requirements for the functioning of the service. The individual national legal requirements may include special requirements for such a contract, which must be taken into account. The exact services to be provided in each individual case must be considered in more detail depending on the customer and the services offered, and the contract must be adapted accordingly.

Disclaimer: This contract template is a non-binding guidance that aims to assist the contracting parties. Included are approaches for individual cases. This template is not suitable to be used without extensive customization. Depending on the scope of the (P4P) energy services, technical and economic possibilities of the individual case, specific content arrangements should be made. The contract points listed here are an ordered summary of the necessary contract points and not a conclusive list.

The following are the main contractual points defined for a (P4P) energy service contract within the project frESCO.

Listing of the required contract points that can be adapted according to the service and the individual case. This table is a basic framework for a service contract.

¹⁰ The basis for the following explanations are the deliverables 3.1 “Definition of the novel energy services for residential consumers” and 3.4 “Definition of the frESCO PMV methodology” of this project and the result of a stakeholder meeting in April, which was held in the context of this deliverable.

Table 2: Overview of the contract points with notes.

SECTIONS OF CONTRACT	CONTRACT POINTS	NOTES
GENERAL PART	Scope of the P4P energy service contract (services included)	<ul style="list-style-type: none"> - description of the service and the goal of the service performance - signing parts - definitions and acronym
MAIN PART	Contract duration	depends on the service <ul style="list-style-type: none"> - one-time service - service can be offered as long as demanded or up to 11 years
	Obligations and responsibilities <ul style="list-style-type: none"> - Part obligations and responsibilities (in general) for customer and service provider - Service provider obligations and responsibilities for flexibility contracts 	In this point, the necessary rights and obligations that the service provider needs to be able to perform the service are regulated. The rights and obligations of the customer are to be defined to enable the smooth fulfilment of the service.
	Retribution for Service Provider	Here, one-time payments and monthly remunerations are to be determined that are appropriate for the service. It compares with the PMV methodology- and the ownership-, funding-, billing-section
	Service level agreement	
	PMV methodology <ul style="list-style-type: none"> - Ex-ante data provision - Baseline model and construction - Ex-post data measurement - Reporting and settlement 	
	Description of existing facilities	Features, performance, etc.

	Description of new installations <ul style="list-style-type: none"> - Data platform infrastructure and frESCO end-user applications - Building retrofitting solutions (optional) 	This item specifies all the necessary information that concerns the new installations, data platforms used and/or adjustment of buildings.
	Property of new installations	Property resides usually in the entity service provider. At the end of the contract and once paid back, the property may move to the user
	Maintenance and operation	Regular activities for preventive and scope for the corrective maintenance
	Modification of Equipment	Per ESCO or per user request
	Replacement of damaged equipment	Damaged by the user or by other reasons not related to the user.
	GDPR compliance obligations <ul style="list-style-type: none"> - Data ownership - Data management plan 	Clarify what data is collected and what the data is used for. Consent with GDPR absolutely necessary for data processing.
	Payment arrangements <ul style="list-style-type: none"> - P4P percentage sharing 	Depending on the service how the P4P is composed and calculated.
	Billing procedures	Periodicity, payment procedures and deadlines
	Early contract termination conditioning and caveat	<ul style="list-style-type: none"> - Triggered by service provider - Triggered by end user/customer - Mutual agreement - Uninstallment of E-box, sensors and meters and return to ESCO.
	Extension of the contract at end	
CLOSING FORMULAS	Penalties for non-compliance and liability	
	Procedures in case of disagreement	
	End of the contract procedures	<ul style="list-style-type: none"> - Determines which court has jurisdiction (place of jurisdiction)

		<ul style="list-style-type: none"> - Both parties can change the contract only if the agreement is made in writing - If points of the contract are annulled, the rest of the contract continues to be in force, etc.
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I. SCOPE OF THE (P4P) ENERGY SERVICE CONTRACT (SERVICES INCLUDED)

At the beginning of the service contract, it must be made clear what the contract is about and which services are covered. These are the core areas of the service which must be formulated.

It is important for the delimitation of the service that one-time services and permanent services are described. This aspect is necessary for payment, monthly/annual remuneration, financing, calculation and ownership of the equipment and facilities.

The following topics need to be addressed in this area:

- Services included: With the description of the exact service, the framework of the contract is created. The frESCO project has thereby classified four energy services. See the description above.
- Signing parties
- Defined term in the contract

SIGNING PARTIES

As discussed above, who signs the contract depends on the individual case of the service being offered. In addition, there are differences in what kind of company wants to offer a service. Several possible service providers and customers are defined in the project. However, the focus was placed on ESCOs as service providers.

Possible **service providers**¹¹ can be:

- For Energy Efficiency service providers:

¹¹ Another possible service provider is the ICT (Information and Communication Technology) companies, this business actor is nothing in the focus of the project.

- ESCOs (Energy Service Companies)
- Building and Facility owners and managers
- For Flexibility service providers: demand response aggregators, retailers acting as flexibility aggregators

Potential **customers** of this service can be:

- Domestic consumers and prosumers, building residents
- Energy communities (like communities that use renewable energy sources)
- Building and facility owners and managers

For example:

“This agreement is concluded between the service provider “XX, with full name and address” and the customer “XX, full name and address, Apartment number”.”

DEFINITIONS OF THE CONTRACT

Definitions listing: Some definitions that are needed for the contract.

- Customer:
- Service Provider: ESCO-user / Aggregator-user
- “PMV” methodology is the acronym for “performance, measurement, and verification”;
- P4P means “pay for performance”
- etc

II. CONTRACT DURATION

The required contract period is to be determined depending on the service and for the specific project. The service type **RT** is an on-time service or also possible for shorter and longer periods. The **EE** service type can be offered for as long as demanded or needed to return the initial upfront costs. This is also valid for the service type **FL**. For the last type of service **NE**, the contract period can be offered as long as demanded.

Regarding the duration of the contract for each of the services offered by an ESCO, deliverable 3.1 has already determined certain criteria that have to be agreed upon depending on the

customer-specific circumstances (e.g., available equipment, level of smart readiness, etc.). This criterion is shown in the following table.

Table 3: Criteria applicable for contract duration of services offered with in fresco. Source: frESCO - D3.1 New business models for innovative energy service bundles for residential consumers, 23-76

Service	Type of contract	Duration
RT1	product or service contract	one-time service
RT2	product or service contract	service can be offered as long as demanded or up to 11 years
RT3	product or service contract	one-time service
EE1	P4P energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
EE2	P4P energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
EE3	P4P energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
EE4	P4P energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
FL1	P4P energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
FL2	P4P flexibility energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
FL3	P4P flexibility energy service contract	service can be offered as long as demanded or up to 11 years, considering the time needed to return the initial upfront costs
NE1	EPC or P4P energy service contract	service can be offered as long as demanded or up to 11 years
NE2	EPC or P4P energy service contract	service can be offered as long as demanded or up to 11 years
NE3	EPC or P4P energy service contract	service can be offered as long as demanded or up to 11 years
NE4	EPC or P4P energy service contract	service can be offered as long as demanded or up to 11 years

In case a contract duration is chosen based on a payback evaluation, it is highly recommended to perform an energy audit of the project site. This energy audit will serve as a basis for negotiation of the contract duration and remuneration for the service provider. The estimated period of payback for the investments planned has to be enclosed as part of the contract (eventually as an appendix). In case the duration of the contract is expected to be extended, that has to be agreed additionally (see section XVI “Extension of the contract” below).

III. OBLIGATIONS AND RESPONSIBILITIES

OBLIGATIONS AND RESPONSIBILITIES (IN GENERAL - RT, EE, NE, FL)

On each side of the contract, it is necessary to specify which obligations and rights are necessary, depending on the service chosen, to achieve a smooth fulfilment of the contract. Various aspects of the individual phases must be explained. Obligations and responsibilities depend on the type of contract applicable and should be addressed in different sections for each phase of the project e.g.

- The initial start of service
 - Clarification of the question which facilities and equipment are available. What equipment, devices, software, etc. must be purchased at the beginning? Who bears the financial burden? This is to clarify how to deal with necessary initial investments and how they are financed.
 - Depending on the service and equipment required, approval must be obtained from the relevant parties. If systems/devices/sensors are to be installed, the corresponding approvals from the owner of the house, authorities, etc. must be obtained. Regulations of the respective country must be observed (such as property rights, co-ownership, tenancy law, private law, etc.).
 - e.g., providing data; energy audit, etc.
- Realisation of the service
 - installation/construction phase, post-installation/construction phase
- Operation during the contract period

- Access to equipment to perform repairs and maintenance. Right to dismantle the facilities/devices/sensors, provided that after the termination of the contract these are returned to the service provider.
- Permanent access to data necessary for the respective service.
- Access to property for maintenance.
- (Mutual) information obligations
 - Like notice of an upcoming move, change of contact information, such as phone number and email address, of any significant incidents affecting the operation and availability of the service etc.
- Obligations for customers that facilitate the provision of energy services
- Protection of the property of the service provider (see section XVII “Penalties for non-compliance and liability”)

SERVICE PROVIDER OBLIGATIONS AND RESPONSIBILITIES FOR FLEXIBILITY MARKETS (FL SERVICES)

When drafting a contract for flexibility services, the agreement on comfort ranges (temperature ranges, duration of demand shift, humidity range, permitted number of system over-rides, etc.) should be described here as any deviation from the baseline energy consumption will impact the comfort of the customer. The advanced analytics used to adjust electrical loads should then use the comfort agreement as input for additional constraints in the optimization procedure.

IV. Retribution for Service Provider

In this point it is necessary to specify how the remuneration of the service provider is obtained. As described above, it must be broken down how the one-time service, such as the installation of a system or device, is billed and how much the permanent service is billed in terms of efficiency and/or flexibility. Under this arrangement, the PMV methodology calculations listed in the contract will be used and possible repayments of installation and product costs to the service provider. It compares with the PMV mythology and the ownership, funding, payment arrangements and billing contract points of this contract (see below).

V. SERVICE LEVEL AGREEMENT

In particular, this point of the contract is relevant for those services where the definition of the comfort level is important. This concerns in particular the following aspects:

- Due to the technical possibilities of the services that can be provided, clear agreements must be made at what time which technical possibilities are controlled by the service provider.
- Under this point, clear agreements about the methods used for defining the boundary values. Based on this determination of the method, the comfort preferences are determined and can be regulated accordingly in the contract.
- Quality of service, timing of service delivery, points of contact if something doesn't work.
- There should be an opt-out choice for end-users in flexibility events to remove a particular DER from the available DER list for aggregators' virtual power plant (VPP) configurations.

VI. PMV METHODOLOGY

Energy services provided by end-users, ESCOs and aggregators are remunerated based on the Pay-for-Performance (P4P) approach. The "Performance" is determined from the Performance Measurement and Verification (PMV) process which is described for the three novel frESCO energy services below - Energy Efficiency, Demand Flexibility, and non-energy services. The provision of the novel frESCO energy services requires hosting, processing, forecasting, and determining the optimal implicit and explicit strategies to maximise energy savings or facilitate demand flexibility subject to the requirements of end-users. The starting point of the PMV methodology for each service is to determine a baseline energy profile of an end-user. This could be at device level (i.e., air conditioning (AC), heating, water heating, etc.), building level, or even at cluster level for a group of energy users. The baseline profile of energy use is dynamic and established for different scenarios, such as time of year (seasons), weather, and occupancy of a building, for example. To accurately create a viable baseline that determines appropriate remuneration for the performance of the energy service requires the

collection, storage, and processing of historic profiles and other factors, such as outside temperature and thermal preferences of the end-user. Establishing a realistic baseline is essential for compensating providers of the energy service and payment for deviating from the status-quo of end-users' baselines.

Energy Efficiency PMV

The cost saving generated through end-users' use of ESCOs energy efficiency services is measured holistically at the dwelling or building level in long periods (billing periods). As mentioned above, an appropriate baseline would first need to be established for the domain the service is operating in (hot water provision, heating, cooling, local consumption with production of RE, etc.) One energy efficiency service could be optimising the thermal domain of an end-user subject to dynamic energy tariffs and thermal requirements of the end user. The generated savings derived from the service is then split between the end-users and the ESCO that provided the services. The level of compensation would depend on the level of service provided and the required payback time of the ESCO.

Non-energy services

The non-energy services can cover comfort, noise control, and air quality, among others. Again, a baseline would need to be established for comparison of ex-ante and ex-post implementation of the non-energy services. However, the performance of these optional services is not based on energy measurements but on compliance to the contractual service levels.

Demand Flexibility PMV

To simplify, we will outline the Demand Flexibility PMV strategy through the lens of an end-user's air conditioning (AC) operation. However, the methodology can be applied to many electrical devices in residential homes. After determining a baseline of an end-user's AC use, the next component relies on processing real-time dependent (actual AC use and energy consumption) and independent variables (i.e., temperature, time of year, presence data, etc.) to produce dynamic short-term forecasts under varying comfort conditions and temperature set-points, thus enabling the extraction of context-aware demand flexibility profiles. Such profiles consist in the primary source of information for defining the flexibility capacity of the

AC device and allowing the aggregator and the consumer to negotiate on the flexibility availability and activation fees for the portion of the flexibility capacity that can be securely delivered with the minimum nuisance over consumers' lifestyles. Upon agreement on the flexibility capacity and the characteristics of its activation (number of events, duration of events, frequency, etc), the monitoring period comes in place that will enable the verification of the provided flexibility based on real data streams from the flexible asset (AC) and their comparison with the baseline (i.e. the forecasted performance of the device if no event was put in place for the triggering of flexibility). The verification of the provided flexibility, will in turn determine the remuneration amount the end-user would receive from the P4P process, according to the relevant agreements recorded in the contract. As mentioned previously this methodology can and is applied to all devices participating in the frESCO service. Additionally, this process can also be aggregated up to the next level. Namely, the P4P process between the ESCO and aggregator. Where the ESCO can be compensated for supplying grid flexibility from its customers by the aggregator who purchases said flexibility.

For the methodology presented above, it is necessary to clearly regulate the following sub-items and thereby ensure consent for the receipt of the data.

EX-ANTE DATA PROVISION

Collection and storage of historical data needed to establish a baseline. This point should consider the extent to which historical data is required. For efficiency measures, at least one year of historical data should be available and consent should be obtained for its use in the context of the service.

BASELINE MODEL AND CONSTRUCTION

As described in the PMV methodology section above the baseline model is a function of historical data that is unique to each end-user. Technical details about the baseline construction should be contained in an annex to the contract.

EX-POST DATA MEASUREMENT

After implementation of the energy service, the deviation from the baseline profile of the energy service domain is measured. This stage establishes the value generated as a direct result of the service which is then distributed according to the P4P contractual agreement.

REPORTING AND SETTLEMENT

This is where the historical collection of value from services is stored. The reporting and settlement period is determined in the contract between the customer and the service provider (monthly, quarterly, ... , yearly). The final settlement would be a direct result of the PMV methodology applied to all energy services provided and the agreed upon P4P structure.

VII. DESCRIPTION OF EXISTING FACILITIES

Here you should enter the description of the technical equipment that already exists and belongs to the subject of the contract. The detailed information should be given in an annex.

The following listing can include the end- user's Distributed Energy Resources (DER):

- Heating, Ventilation and Air Conditioning (HVAC)
- lighting
- sensors
- metering
- monitor and control
- renewable generation
- batteries
- electric vehicle
- electric vehicle charger, etc.

In particular, the customer shall provide the following information:

- All technical information about the facilities/stations/devices necessary for the efficient provision of services by the service provider, such as the size of the facilities/stations/devices and the technical characteristics of the stations, as well as any other relevant information that may be requested by the service provider.
- Complete data from the metering systems of the facilities/stations/devices for the last one to two years, if available for this period, otherwise for as long as there are records to adjust and optimize the respective service.

VIII. DESCRIPTION OF NEW INSTALLATIONS

Under this item the information and description of new installations, such as smart devices are described. This point is to be adapted to the individual case to deal with the individual conditions in the building or the housing unit. Depending on the individual case, different new installations will be required. The detailed information should be given in an annex.

New installations provided by service provider:

- Data gateway equipment (E-box)
- metering
- comfort sensors like indoor temperature, humidity.
- Presence sensors
- Smart plugs and actuators.
- air quality sensors
- noise sensors

DATA PLATFORM INFRASTRUCTURE AND FRESCO END-USER APPS

Services are provided by a number of web-based modules providing the data analytics and intelligence from the data stored in the frESCO data platform. Within the scope of the service, data processing in a powerful data platform and presentation via a bundle of end-user applications is a key offering for increasing awareness and engagement. Therefore, stepping on the data platform and high-quality data offered through it, the frESCO end-user applications and their basic features should be presented here together with an explanation

of the contents and functions for the customer. This is also related to the possible energy savings and effective use.

OPTIONAL: BUILDING RETROFITTING SOLUTIONS

In individual cases, it is only necessary to carry out individual retrofits of the existing technical solutions or smart devices or improvements to the building. It is necessary to specify exactly what will be done to the building, the planning of its implementation and how the financing will be carried out in the process. These points are reflected in the other points of the contract and must be taken into account accordingly. This point is optional.

IX. PROPERTY OF NEW INSTALLATIONS

Ownership arrangements of new installations are established in this section. Depending on the service, there are different aspects to consider for determining the ownership of the installations. However, the tendency is that depending on the technical system that is installed, ownership remains with the service provider. Deviation from the tendency of the service provider as the owner of new installations can occur when an agreement on the transfer of ownership from the service provider to the customer is established or in cases when the installations cannot be deconstructed or removed from the property. Another point the contract regulates is the liability for the new installation. With the provision of devices/installations, corresponding situations are also to be regulated, which concern the repair and replacement of this equipment (see next section).

X. MAINTENANCE AND OPERATION

Maintenance and operation of the installation are the responsibility of the service provider. Under this point, it is generally regulated that the operation and maintenance are also taken over for existing facilities, which are part of the contract. This point must also be considered on a case-by-case basis, as individual circumstances are depending on the contract concluded and the individual service (per building or residential unit). These should still be within the

scope of the defined service. Communication through the gateway is powered by the user's internet connection, which implies an explicit acceptance of this usage.

XI. MODIFICATION OF EQUIPMENT

As part of the service, it is necessary to clarify how to deal with the existing and newly installed equipment. Here, special attention should be paid to modifications during the contract period.

There are two aspects to be considered in this point:

- From the service provider's point of view, it may be necessary to make further optimizations in terms of energy efficiency or flexibility.
- The customer himself shall not install or incorporate anything in the equipment without consent, which restricts the measurement, function or use and as a result, the service objective cannot be achieved.

Therefore, a provision should be made that during the term of this agreement, the owner of the existing facility shall not, without the prior written consent of the service provider, attach or install any ancillary equipment or device to the equipment that alters or impairs the originally intended functions, value, or use of the equipment, unless previously agreed to in writing by the service provider.

It should be noted that depending on the service, it is necessary to consider whether such a contract item is necessary at all. Instead of consent for the replacement or upgrade of devices or equipment, an information obligation from the customer (who owns the respective devices or equipment) to the service provider can be integrated.

REPLACEMENT OF DAMAGED EQUIPMENT

If existing or new installations or equipment ceases to function, an arrangement should be made to provide for an equal or better replacement, depending on the ownership of the equipment/installations/appliances and the service.

This is necessary so that the service can be fully provided again. Reasonable times should be established as to how quickly replacements must be made. This point is also to be seen in

connection with an early termination of the contract, that reasons are defined why no replacement can be provided (reasons for customers and service providers).

If a device is intentionally destroyed, then one is in the area of liability per se and can consider early termination of the contract. These aspects must be considered depending on the service.

XII. GDPR COMPLIANCE OBLIGATIONS

Protecting and keeping data secure are important matters for the service provider and especially customers. Personal data processing strictly follows the principles and requirements laid down in the data protection provisions as applicable. In particular, the service provider and customer commit themselves to comply with the General Data Protection Regulation (GDPR 2016/679¹² of 27 April 2016) and the national data protection provisions as applicable. In addition to the European data protection regulations, the other national regulations in connection with the specific service offered in this contract must be observed. Personal data will be protected even after the termination of the contract and deleted immediately.

Within the framework of the lawful processing of personal data, it is necessary to clearly and understandably inform the customer about the use of the data for the service. The data processing must correspond to a specific purpose, and deviations from it are not covered by the consent. Therefore, it is important to obtain the consent of the customer for all necessary data, because if there is no consent for the processing of these data, the use of these data is illegitimate. Depending on the service, different data is collected and made available (see section “Data management plan”).

DATA OWNERSHIP

It must be regulated that the service provider has access to the data of the customer that is necessary for the service. At the same time, the customer should also have the right to receive

¹² Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) OJ L 2016 L 119/1.

data collected about them by request to the service provider or to get access to it. If data is collected from the equipment/devices of the service provider, the customer also has access to it. At the end of the contract, data that generally establishes a personal reference must be deleted. The customer is the owner of the data that is collected.

DATA MANAGEMENT PLAN

Here you must specify which data is required for the service. A list of which data is required in each case and how it is used in the service must be integrated. These are e.g., normal electricity consumption data, but also data collected via sensors, etc. The plan should also contemplate the security measures to ensure non-disclosure and the data treatment and deletion procedures after use.

XIII. PAYMENT ARRANGEMENTS

Payment modalities, description of how the concrete payments are made (one-time payment, prepayment, etc.). This point depends on the service and financing sources.

P4P PERCENTAGE SHARING

This point of the contract is provided for those services where the savings are included as part of the remuneration. This point is more relevant for two types of frESCO services:

- energy efficiency P4P services. Share of savings with the ESCO.
- Demand flexibility P4P services. Share of market remuneration with the user.

This point of the contract is to be adjusted according to the service and the accompanying amortisation period for the concrete project. To determine the P4P sharing system, it is necessary to consider the level of service provided and the required payback period of the service provider and adjust it accordingly. As the payback time decreases, the service provider's share is expected to increase.

Notice: Each type of service has its approach to its revenue stream. This is in general the following points:

- RT: Initial fee, regular, fee, licence fee, service charge, P4P on savings

- EE: P4P on savings
- FL: P4P on flexibility
- NE: P4P on service performance¹³

XIV. BILLING PROCEDURES

Breakdown of the service. It must be described how the service is billed (monthly/annually).
Periods of calculations for billing, etc.

XV. EARLY CONTRACT TERMINATION CONDITIONING AND CAVEAT

In this context, arrangements shall be made to allow for earlier termination of the contract on the part of the service provider and the customer. In principle, it is in the interest of both contracting parties that the service is provided properly. Depending on the service, there may be different reasons why an early termination option is appropriate. These are to be considered depending on the service. For each sub-item, an example was given as to why early termination might be necessary. In this point it must be taken into account that possible compensation payments are necessary to achieve compensation for the premature termination, this is for those situations where the customer terminates early¹⁴ and such payment is justified. An early termination fee should be considered that reflects e.g., the initial cost of the service corresponding to the early termination. This is a financial calculation that should be included here. The return of the devices/sensors/systems provided by the service provider must also be returned or dismantled immediately. An appropriate deadline should be set for this.

¹³ Cf. frESCO - D3.1 New business models for innovative energy service bundles for residential consumers, p 22.

¹⁴ Cf. In this context, the national regulations concerning the fees for early termination must be taken into account, especially with regard to aggregators ("contract termination fees") (see Art 12 (2) ED 2019 (Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ 2019 L158/125)).

Notice: In the case of intended changes to the terms and conditions of the contract, the customer must be informed of this in a timely manner and informed of their right to cancel the contract.¹⁵

TRIGGERED BY SERVICE PROVIDER

The reasons and situations that make it impossible for the service provider to fulfil the contract and therefore the contract can be terminated must be specified here (such as bankruptcy, lack of economic feasibility, misuse of equipment, change in the original conditions at the contract signing, or the customer does not fulfil its obligations under the contract).

TRIGGERED BY END USER/CUSTOMER

In general, situations are to be defined here where a premature termination by the customer is triggered. e.g., service provider does not comply with his contractual obligations or service provision is not satisfactory or too intrusive.

MUTUAL AGREEMENT

Early termination can also be made by an agreement between the service provider and the customer, which is made for a variety of reasons. Common reasons for early termination may be, for example, the demolition of the entire building or the residential unit, as a result of which the service can no longer be provided. Another example, could be large changes to the building energy profile which make the services provided inadequate as a result of new building uses. In this case, a provision could be made to modify the service contract in order to find an appropriate solution for the service provider and the customer. E.g., by amending the contract or by concluding a new contract with the consent of all parties. However, it is up to the discretion of the energy service provider.

XVI. EXTENSION OF THE CONTRACT AT END

¹⁵ Cf. Art 10 (4) ED 2019.

Before the end of the contract, it should be possible to extend the contract with the express written consent of both parties. For this purpose, a procedure should be defined as to how this is possible.

XVII. PENALTIES FOR NON-COMPLIANCE AND LIABILITY

In connection with non-compliance with the contract, it must be considered on the basis of the selected scope of the service which measures and steps are sensible and legally possible and economical. In these considerations, consumer protection regulations must be observed. The following listing is presented as an example.

- The customer is solely liable for the accuracy and completeness of the data and information provided by them. The service provider is not liable in case of defective performance or inability to provide the services to the customer, by virtue of the present, if this is attributed to the provision of inaccurate or incomplete data by the customer. It should also be specified who is responsible for theft and loss of the new installations/devices/sensors. Since these new installations are at the customer's site, a provision should be made that the customer is liable for theft, loss, or damage (if caused by them).
- The service provider remains the owner of the newly installed equipment/devices/sensors provided to the customer as part of the service. The customer shall be liable for any damage to equipment/devices/sensors caused by the customer.
- The service provider can be held liable for untimely service performance or damages caused by him. These calculations must also take into account the nature of the service provided and the national regulations. Depending on the service, the appropriate and useful specific provisions shall be established for the cases of non-compliance with agreed services. In this context, provisions on mutual liability for damages should generally be included. Care should also be taken to ensure that the damage is reported

to the contractual partner. The national regulations on compensation for damages must also be observed here.

- Non-compliance with agreed services, such as overriding the control signals triggered by the aggregator in a flexibility contract, should be taken into account in liability. Adequate compensation fee for overriding control signals in excess to what is agreed upon in section III could be considered for this. It should be taken into account who the contractual partner is and what protected position¹⁶ it has in the legal system (taking into account national and European regulations). Generally it should also be considered that the contract can be terminated early if the service provider does not comply with the contract. An appropriate approach should be regulated here, which takes into account the early termination and an adequate compensation fee (if applicable).
- A penalty may be provided for cases where the customer does not return the equipment/sensors within a reasonable time or in good working order.

XVIII. PROCEDURES IN CASE OF DISAGREEMENT

In connection with the EU standards¹⁷, an out-of-court dispute resolution is provided for, which the individual member states have to implement in their countries. Therefore, a procedure should be established here on how out-of-court dispute resolution would be possible.

XIX. END OF THE CONTRACT PROCEDURES

In this last point, general contract law regulations are to be specified, e.g.

¹⁶ E.g., household customers (Art 2 No. 4 ED 2019).

¹⁷ Cf. Based on the regulation on suppliers in connection with consumers, it makes sense to integrate an out-of-court dispute resolution in the contract. For this purpose, Art. 10 Par. 3 lit. g in conjunction with Art. 26 Electricity Market Directive 2019 (Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ 2019 L 158/125) was used.

1. Determining which court has jurisdiction when the procedures in case of disagreement have not worked.
2. Contractual changes are only allowed if they have been made in writing.
3. If parts of the contract are invalid, the rest of the contract stays valid.
4. Determination of when the contract comes into force. Determination with a date.
5. Date and signatures of the parties.

6. REFERENCES

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