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Active Managed Buildings and Energy Performance Contracts

AmBIENCe Webinar – Presented

28 October 2020

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Outline

- What is EPC?
- Introduction to AmBIENCe project
- Introduction to the new concept on Active building EPC
 - What is being active
 - The role of DR in the new concept
 - The value chain in the new concept
- Implementation of Active EPC
 - Pre-contracting phase
 - Contracting phase
 - Performance phase
 - Measurement and Verification aspect

First Polling slide

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- Scaling from 1 to 5 (1 meaning the least and 5 the most) how much do you categorize yourself in being familiar with Energy Performance Contracting concept and aspect?
 - **1**

2

- 3
- **4**
- 5

Second Polling slide

- From which Sector are you?
 - Market Aggregator
 - Technical Aggregator
 - **ESCOs**
 - Utility provider (DSO, TSO, retailer)
 - R&D
 - Other

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What is Energy Performance Contracting?

Energy Performance Contracting

• Energy performance contracts (EPC) are a form of financing capital improvements and energy upgrades using the financial savings resulting from the energy savings measures. Under an EPC, an external organisation (typically an ESCO) implements an energy-saving project, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay whole or part of the project.



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What is AmBIENCe?

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Vision and Mission

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<u>VISION</u>: Reduced building emissions in the EU, as well as lower energy consumption, thanks to the application of **electrification combined with active control.**

- Electrification (of heating and hot water production) reduces emissions because compared to gas, electricity produces heat more efficiently and has a lower carbon intensity.
- The carbon intensity of electricity will continue to drop by more investments in wind and PV.
- The carbon intensity varies over the day, and the intra-day variability increases: emissions can be reduced by being smart and conscious about WHEN energy is consumed.



MISSION: Improve the economic attractiveness of building emission reduction measures by combining energy efficiency improvements with electrification and active control.

Active managed Buildings with Energy Performance Contracting



GOALS: WHAT will we do?



Extend the Energy Performance Contracting concept to include Demand Response value streams, valorizing the flexibility that is available in Active Buildings*.



Make this Active Building EPC concept applicable to a broader range of buildings (incl. residential) and clusters of buildings.



Develop a tool that supports the forecast of the DR value stream in the EPC contracting phase, along with a matching M&V methodology for the operational phase.



Validate the concept, tool and M&V methodology through two pilots (real buildings, real ESCOs).



Engage with all relevant actors and stakeholder groups (from building managers to ESCOs, policy makers and financial institutions) to remove barriers and ensure applicability.

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INTENDED IMPACT: WHY are we doing it?



To reduce emissions by actively steering electricity consumption to times when the carbon intensity is low.

To reduce energy costs by actively steering electricity consumption to times when the prices are low*.



To accelerate electrification – thereby further reducing emissions – by leveraging the value of active control of flexibility: lower prices and flexibility services.



To support investments in more wind and PV by increasing demand for emission-free energy, and by offering flexibility services to deal with the generation variability and congestions.

^{*} There should be a coupling between carbon intensity and price: regulatory advice.

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ENERGY SYSTEM

STAKEHOLDERS



Enriched EPC contracts, with higher value and applicable to a wider selection of buildings, will grow the ESCO business opportunity.

Greenhouse gas emissions will be reduced by electrification and by moving electricity consumption to times when the carbon intensity is lowest.

achieved by shifting consumption to times when the cost is low, or by offering flex services.

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Consortium

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AmBIENCe project involves **eight partners** (research and commercial partners) from four countries.





Active Building EPC

Identified barriers to the market uptake of EPC as

- Evaluation and measurement of savings
- □ Lack of integration of Energy and Non-Energy services
- Tenancy in commercial properties (tenants vs owner)
- Behaviour of users in buildings influences the energy demand drastically
- Complexity and cost of EPC contracts
- Lack of pilots / flagships / reference projects
- Lack of trained personnel

New Opportunity: Buildings will become more digital and smarter



Combining EPC & Demand Response



The Active building EPC Concept is an enhanced modular and **performancebased delivery** and financing for the energetic renovation and optimisation of existing and new buildings, tapping into all **passive and active energy and cost saving measures**, while leveraging a comprehensive set of technical, operational, usage, behavioural and dynamic energy or CO2 pricing parameters. The Active building EPC concept is an **enhancement of the basic EPC concept**, through a strong focus on the **electrification** of the local heat supply and the addition of **Active Control measures**.

New Concept

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The AmBIENCe concept extends the traditional EPC concept in **3 dimensions**:





Extending energy performance guarantees related to energy efficiency to include the valorisation of flexibility through Demand Response (DR) services

Tailor EPCs to a broad scope of building types: residential, hospitals, education, offices, commerce, etc

Extending the scope of EPCs to groups/clusters of buildings under the concept of (local) energy communities.

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Factors affecting the demand side flexibility

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Availability of technology



Market Access





Measurement, validation and settlement





The business value of DR in active building EPC



The Value Chain of Active Building EPC

THE EXISTING ENERGY SERVICES VALUE CHAIN



A NEW ACTIVE ENERGY SERVICES VALUE CHAIN



ACTIVE ENERGY SERVICES "ACTORS" VALUE CHAIN

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THE ENERGY MARKET

Energy produced by suppliers is transported and distributed from and to prosumers via distribution netwoeks operated by the TSO and DSO.

THE AGGREGATOR

Agregators acquire flexibility from prosumers, aggregate it into a portfolio, create services that maximize the accumulated flexibility and offer flexibility services to different markets.

THE ESCO

ESCOs can facilitate prosumer access to more than one aggregator with a platform that enables multi-building portfolio management. Asset identification and extended load monitoring capacity is also provided through advanced energy analytics.

THE C&I PROSUMER

An end-user that no longer only consumes, but also produces / ourtails energy: from small- and medium-sized enterprises to large C&I end-users.

New Business Model

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Customer Aggregation

Third Polling Slide

- Scaling from 1-5 (1 being the least and 5 the most), how important do you see the uptake of Active building EPC model in your business activities?
 - □ 1 □ 2

 - 4
 - **5**

Implementation of Active Building EPC

Adapting the EPC procedure

AmBIENCe will test how Active Building EPC contracts provide actual savings together with other benefits to the stakeholders (owner, tenants, users, service providers) by **offering flexibility and demand resoponse services** .



Pre-Contracting phase

Pre-Feasibility		 Site Survey Analyse data Flexibility Assessment 	ס
A general analysis on the potential of a building and its adaptability to AEPC	weeks		tractin
Feasibility Study		 Energy projects outline design Detailed analysis Agreed savings 	Pre-Con
Further calculations on savings and required investment			

Contracting Phase

Contracting	 Define building energy baseline with flexibility Confirm AEPC energy savings Complete the financial analysis and projects 	
Quantitative measures and guarantee numbers Month	s	acting
Deployment	 Implementing installation projects Installation of sensors and flexibility sources 	Contr
Installation of sensors and equipment enabling active control custome		

Performance Phase



Tailored M&V towards flexibility



Fourth Polling slide

- From the adapted energy performance contracting procedure, please select two of the most impactful outcomes of implementing Active building management in comparison to classic EPC
 - Lower energy consumption
 - Higher cost saving
 - □ Higher comfort & wellbeing
 - Guaranteed performance
 - Secure building operation
 - Improved business case through demand response



Questions?





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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No #847054. DISCLAIMER: The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither EASME nor the European Commission is responsible for any use that may be made of the information contained therein.