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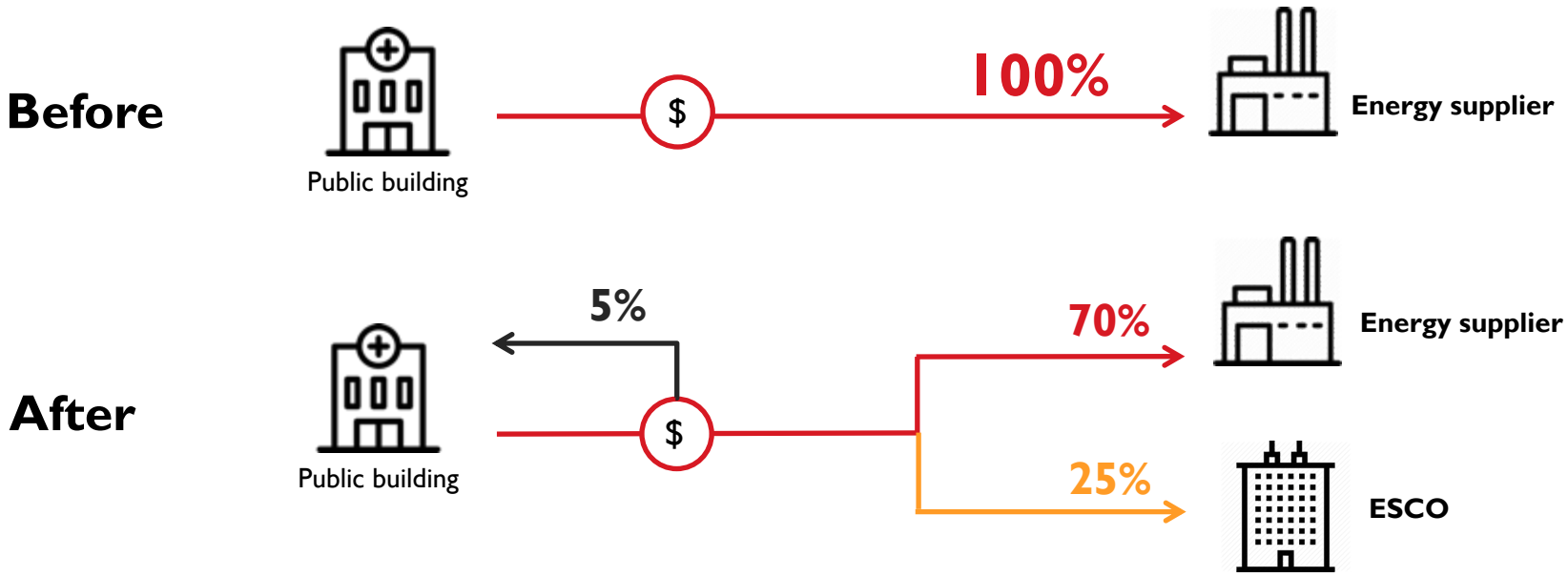
Enhancing energy efficiency through ESCO/EPC: Pathways to sustainable development

Nicolae Zaharia,
Expert in ESCO, SECCA

Stantec | intec | ACTED | European University Institute | Robert Schuman Centre for Advanced Studies | FSR ENERGY Florence School of Regulation

UNDERSTANDING ENERGY PERFORMANCE CONTRACTING (EPC)

Definition of EPC Agreement: a contractual arrangement between a beneficiary and a provider (normally an ESCO), where the investments in that project are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed performance criteria



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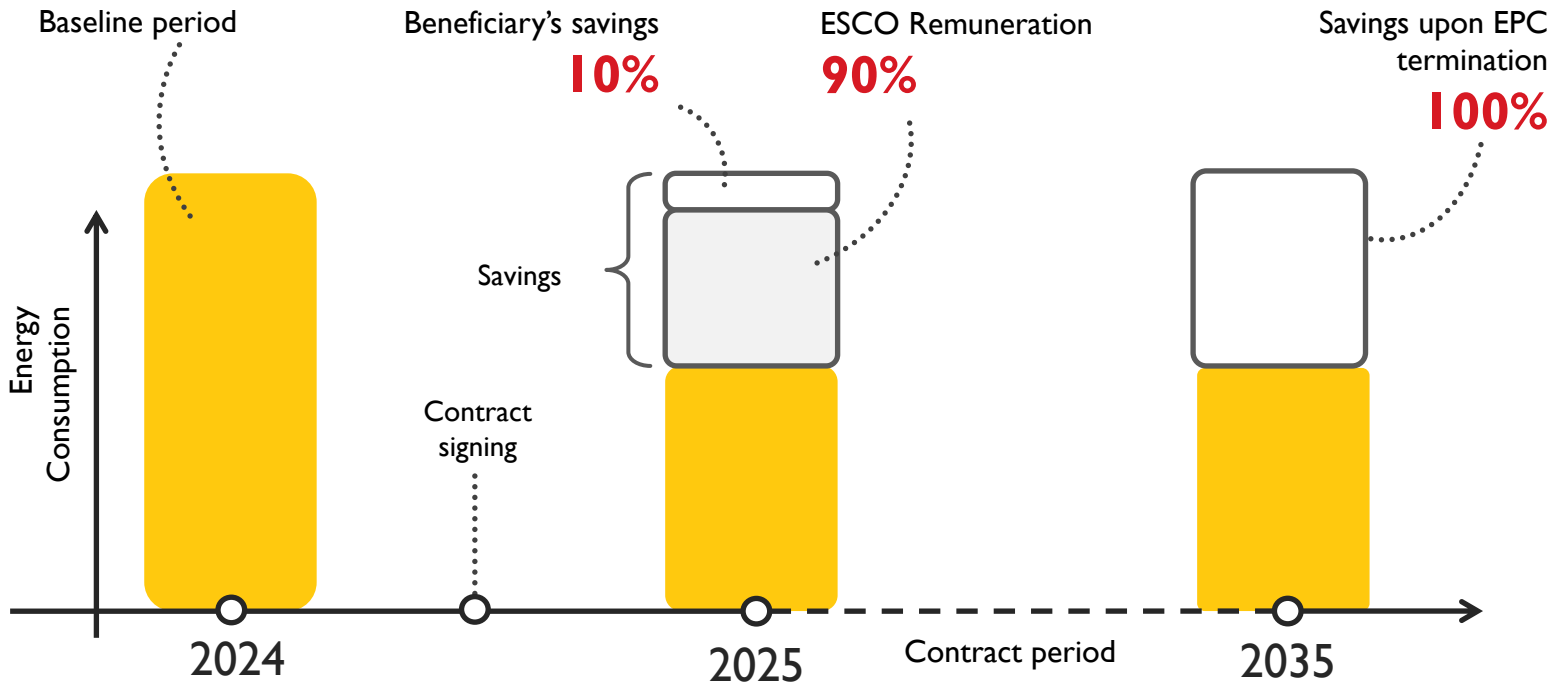
UNDERSTANDING ENERGY PERFORMANCE SERVICES

Energy Performance Services: Services that focus on improving the energy performance of a facility through renovations, upgrades, and efficiency measures. The key characteristic of these services is that their results (in terms of energy savings) are quantitatively confirmed and tracked over time



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PURPOSE OF ESCOs

Energy **S**ervice **Co**mpanies (**ESCO**s) focus on improving the energy efficiency of buildings and facilities through comprehensive energy service solutions by providing:

- **Energy management**
- **Financial solutions**
- **Performance guarantee**
- **Projects' sustainability**

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Benefits of ESCO/EPC

Energy efficiency and cost savings

- Reduced energy consumption
- Lower operational costs
- Financial gains

Risk management

- Risk transfer
- Guaranteed performance
- Stability and predictability

Sustainability and environmental impact

- Reduction in carbon footprint
- Compliance with env. regulations
- Promotion of renewable energy

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Implementation of ESCO/EPC

Steps in Implementing an EPC Project

- Initial energy audit and feasibility study
- Design and planning phase
- Implementation and monitoring
- Measurement and verification of energy savings

Key Players and Stakeholders

- Roles of government agencies, private sector, financial institutions, and technology providers
- Importance of collaboration and partnerships

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BARRIERS IN IMPLEMENTATION

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LEGAL BARRIERS

1. Lack of ESCO market enabling policy and legal framework
2. Lack of standardized tender documents and contracts
3. No mandatory M&V procedures adopted
4. No methodology for calculation, calibration and adjustment of the baseline energy consumption
5. Lack of enforced energy performance standards for cooling, indoor lighting and domestic hot water (DHW)
6. Noncompliance with sanitary norms
7. Lack of legal expertise regarding performance guarantee for EPC
8. Public debt – on-balance sheet treatment of EPC

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FINANCIAL BARRIERS

1. High transaction costs
2. Inadequate risk assessment
3. Difficulties securing collaterals and guarantees for EPCs
4. Lack of capacity and experience in the banking sector dealing with EPCs
5. Difficult access to EPC project financing
6. No trust in performance guarantee provider
7. Limited ESCO borrowing capacity

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TECHNICAL BARRIERS

1. Lack of technical understanding which facilities and measures shall be implemented through EPC
2. Lack of experience in similarity, complexity and magnitude of projects
3. Lack of skilled and knowledgeable professionals
4. Inadequate technical risk assessment

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RECOMMENDATIONS TO SUSTAINABLE ESCO MARKET DEVELOPMENT

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POLITICAL COMMITMENT

1. **Legal framework adjustment:** Creation of a favourable environment by modifying the existing legal framework to ensure that Energy Performance Contracts (EPCs) are fully operational

2. **Awareness promotion and incentive provision:** Active promotion of the ESCO concept among potential beneficiaries, coupled with the offering of financing options and other incentives

3. **Mandatory energy efficiency goals:** Establishment of specific, enforceable energy efficiency (EE) goals for authorities at all levels to drive commitment and action

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CAPACITIES OF LOCAL COMPANIES AND INSTITUTIONS

1. **Local company expertise assessment:** An evaluation of the capability of local companies to adopt the ESCO model
2. **Training program development:** Creation of dedicated training programs for engineering and financial companies
3. **Service provider certification programs:** Development of certification programs for service providers

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CAPACITIES OF LOCAL FINANCIAL INSTITUTIONS

1. **Local financial institutions expertise assessment:** An evaluation of the capability of local banks & FI to finance EPCs

2. **Training program development:** Creation of dedicated training programs for banks and financial institutions

3. **Develop dedicated financing products for EPCs:** Development of dedicated products for EPCs in different sectors and for different target groups of facilities

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ENERGY EFFICIENCY POTENTIAL FOR EPCs

1. **Energy efficiency potential assessment for target facilities:** An evaluation to determine the energy-saving potential within the target facilities

2. **Cost estimation for efficiency measures:** An analysis of the costs associated with implementing the most efficient measures to reduce energy consumption

3. **Inventory of building typologies for EPC implementation:** A categorized list of buildings that have the highest potential for Energy Performance Contracting (EPC) implementation

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CASE STUDIES

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CASE STUDY #1

VINGÅKER, SWEDEN

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BACKGROUND AND OBJECTIVES OF THE EPC PROJECT IN VINGÅKER

Project background:

- Small municipality with 9,000 inhabitants and a public building stock of 50,000 m²
- Struggled with insufficient maintenance and increasing dependency on ad-hoc external services

Objectives:

- Implement extensive installation and renovation, including heating system conversion and ventilation improvements
- Transfer significant risks and responsibilities to the ESCO
- Enhance the municipality's energy self-sufficiency by transitioning from oil-fired to pellet-fired boilers and installing heat pumps

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RESULTS AND IMPACT OF THE EPC PROJECT

Implementation details:

- Project included major upgrades to 43,500 m² of the initial 50,000 m² due to some buildings being too remote
- Key improvements: conversion of heating systems, refurbishment of HVAC systems, installation of a building management system, and staff training

Outcomes:

- Total project cost was approximately €2.6 million, partially funded by a state grant
- Achieved energy savings of 22%, reducing annual energy consumption from 10 GWh to 8 GWh
- Financial savings of €220,000 per year, enhanced by rising oil prices
- Reduced annual CO2 emissions by 400 tons and sulfur emissions by 0.8 tons

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