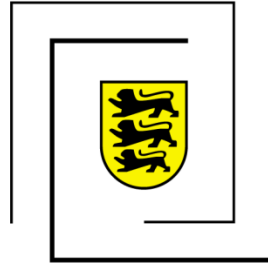


Klimaschutz- und
Energieagentur
Baden-Württemberg
GmbH



KEA

Public Building Renovation through Energy Performance Contracting (EPC)

Rüdiger Lohse

Brussels, March, 2017



- What is Energy Performance Contracting?
- Demonstrate KEA's role in our regional market
- Provide information on the structure of the first year of experience with the INEECO project funded by the EIB ELENA program
- Create some appetite to do EPCs by providing best practice experience
- In the presentation are spare slides which will not be presented but remain for the background information for those downloading the slides

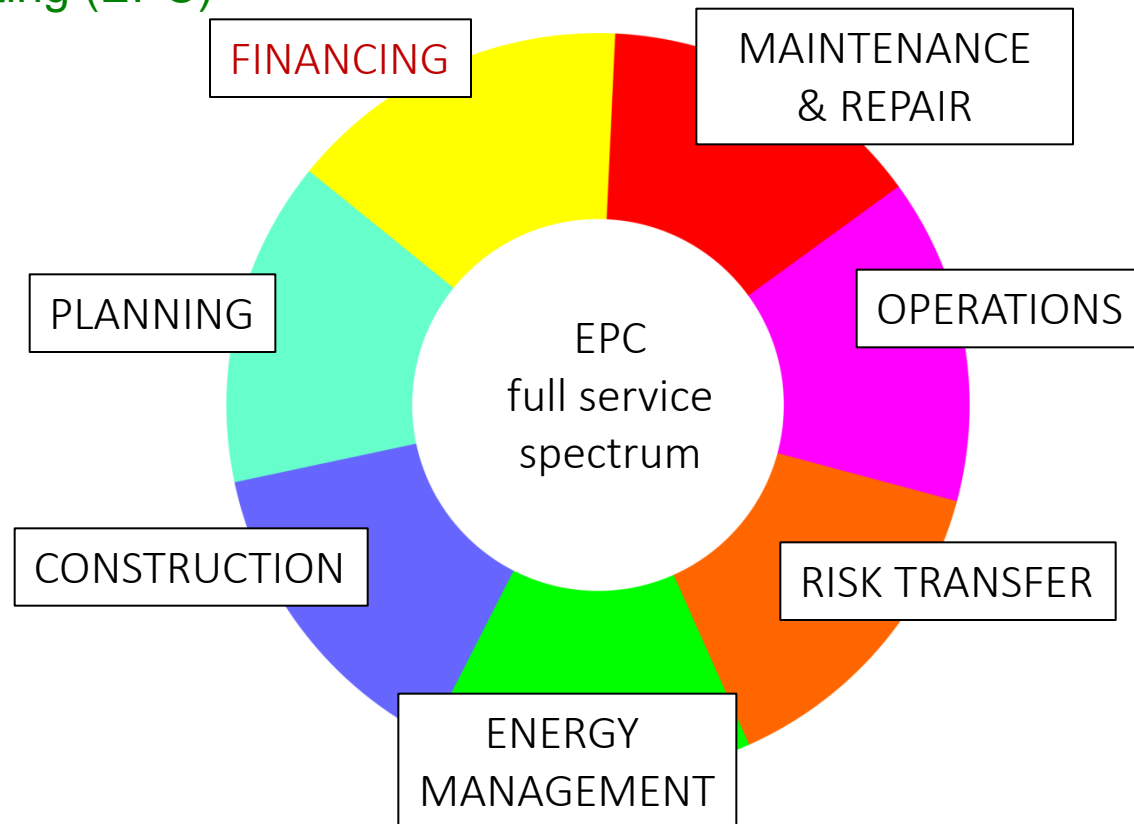


Public building owners can finance energy efficiency measures in general by means of

- Commercial and bank credit (loans)
- National or international subsidy programs and schemes, if available
- Own financing (budget-financed)
- **Energy Performance contracting (EPC)**

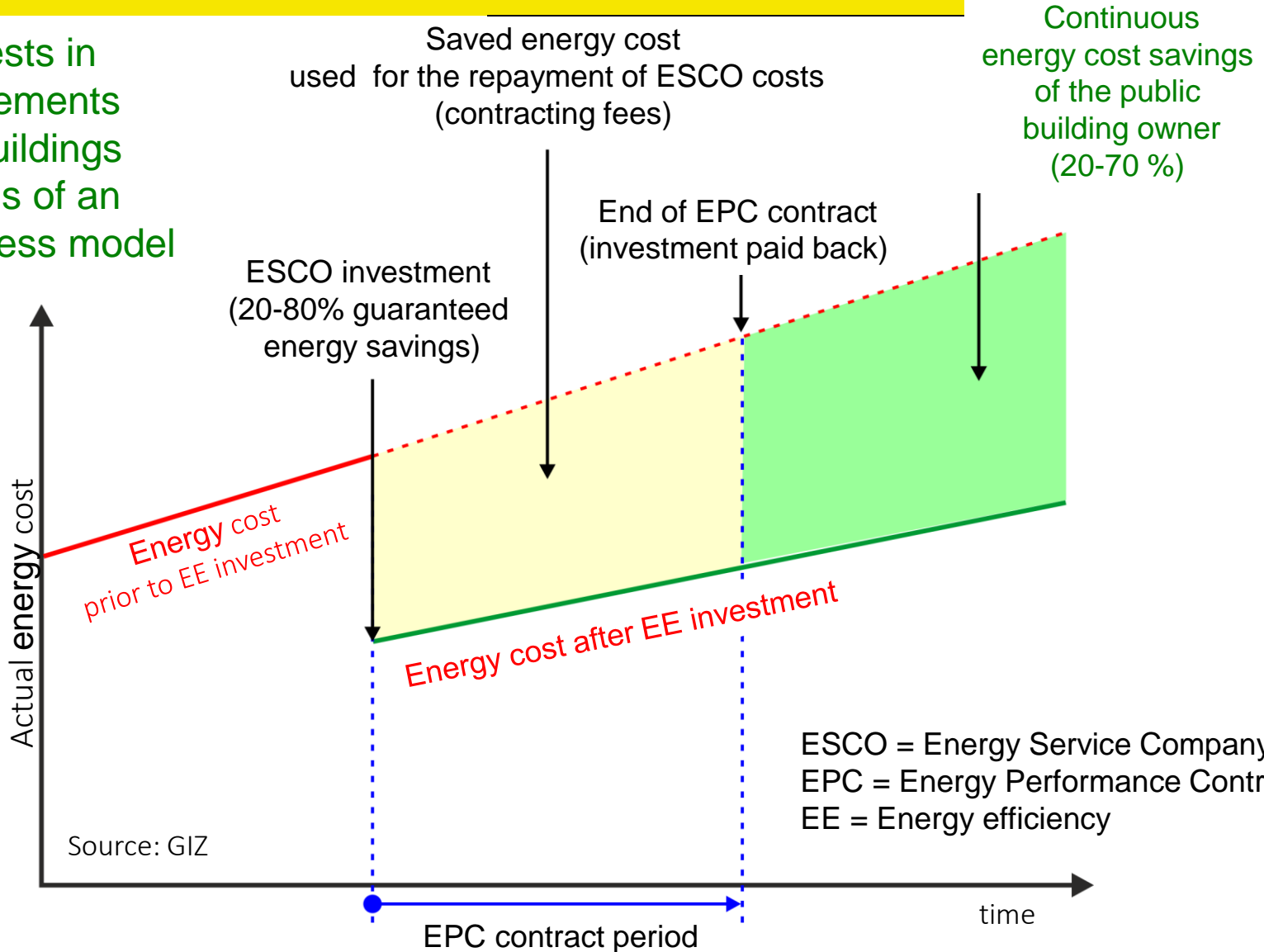
Financing is an important part of the services covered in an EPC.

For many potential customers financing is **the most attractive part** of EPC services for public buildings.





ESCO invests in EE improvements of public buildings on the basis of an EPC business model





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2 Our role in the energy service market



- EESI Award 2009
- Best facilitator



Market.....

- Total turnover Contracting in Baden- Württemberg 2016 (appr.): 300 M€/yr
- EPC: < 50 M€/yr min. 50% in industry
- ESC (energy supply contracting): 250 M€/yr
- (Data Mining Contracting Competence Centre BW, 2017)

....and potential

- buildings eligible for energy services: 80.000 (380 Mm²)
- average age of building fabric and infrastructure: 35 yrs
- average age of HVAC: 25 yrs with significant m&r backlog
- potential for deep refurbishment: **€250- 300bn < 15 yrs**

(Data Mining Contracting Competence Centre BW on the basis of 5.500 public buildings and 50 energy audits in industry, 2017)



National and EU funded R&D to improve the regional energy service market

- Contracting Competence Centre (funded by DoEE, Baden Wuerttemberg)- market and business model development on regional level
- InTrans (H2020)- training and capacity building in emerging markets
- BioVill (H2020)- business model development for energy efficient bio-energy villages in emerging markets
- Technical and Business Models for Deep Energy Retrofit of Public buildings (DoE, Berlin & IEA, Paris)

In Preparation:

- standardized Due Diligence and Bundling of energy efficiency investments in industry and building sector – collaboration with ICP and SEAF (DoE)
- Energy service business models in health sector (DoE)



„Initiative **E**nergiespar- und **E**nergieeffizienz-**C**ontracting in öffentlichen Gebäuden“

- Co- funded by EIB, ELENA (**E**uropean **L**ocal **E**Nergy **A**ssistance)
- Targets:
 - a) direct: initiate €30M in 3 years in approx. 15- 20 EPC projects; guidelines and simplified tools for EPC in public buildings → doubling the current number of projects
 - b) indirect: qualification of facilitators, EPC market development in Baden-Württemberg – at least one in every county
- Implementing instrument in the context of the Contracting Initiative BW
- Steering group with 22 major stakeholders of target group
- Increased number of facilitators: 18 trained experts
- Major publicity campaigns



- **Supports:** facilitation process including the signature of an EPC contract
- **Target group:** public buildings, municipalities, counties, public bodies,
- **Leverage factor:** 20:1
- The leverage factor is supporting projects which aim at medium to high level investments

Case study:

- Investment costs initiated by EPC project : 2.000.000 €
- Facilitation costs: 100.000 €*
- Leverage factor: $2.000.000 \text{ €} / 20 = 100.000 \text{ €}$
- The subsidy may be 90% of 100.000 €



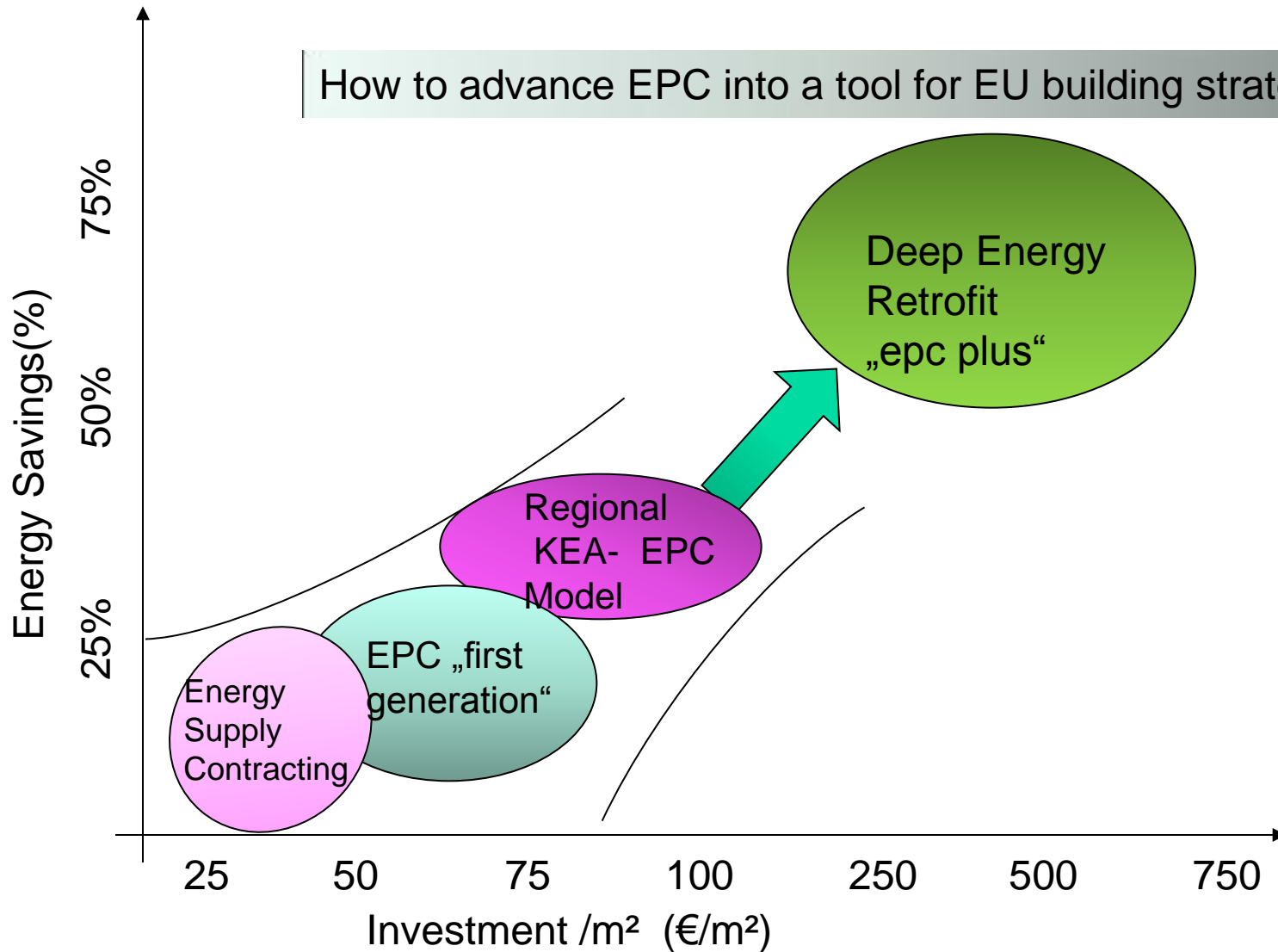
- Great support from EIB – ELENA Team:
 - during proposal, approval and working phase the ELENA team is a great support, Q&As working well
- Approval phase- the loan guarantee
 - For a SMEA like KEA the decision making process for the loan guarantee is a challenge and time consuming → backlog of 5 months (start at May 2015)
- Contact and exchange with the other ELENA projects:
- New staff on the pay- roll
- So far 12 M€ of EPC investments have been triggered by KEA and the 18 facilitators



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4 Regional energy efficiency strategies in buildings and neighborhoods

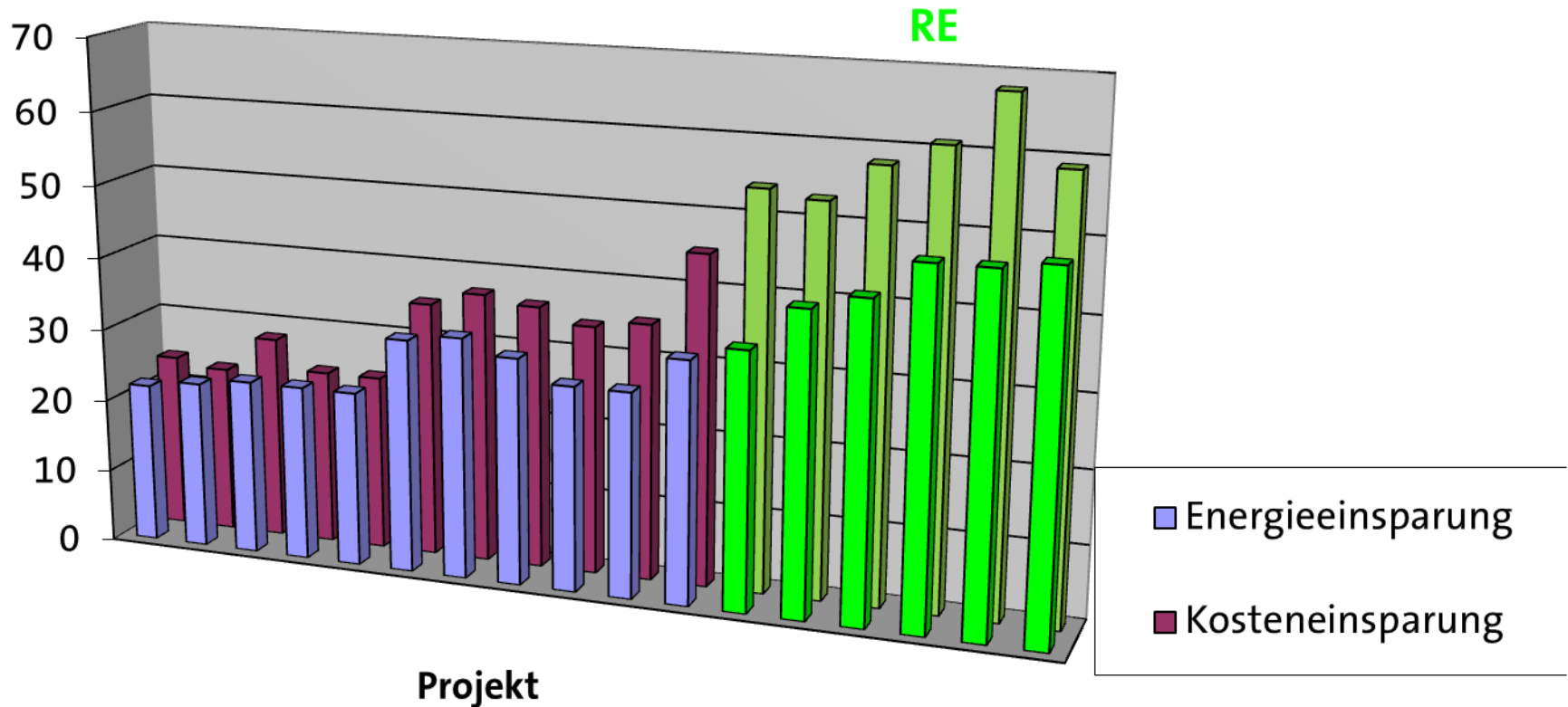
How to advance EPC into a tool for EU building strategy





4 DER EPCs – include renewables into the scheme (→ nZEB EPC!)

Energy and Cost savings of 18 ESC- Projects from 2002- 2014





EE improvements of seven municipal buildings in Oberndorf (Germany)

Measures:

- Establishment of a building management system
- Different renovation measures per building, including e.g.:
 - Replacement/renovation of HVAC units
- - Installation of a **new district heating** in the city centre based on cogeneration / biomass)
 - Rehabilitation of lighting systems in a sports hall
 - Replacement of thermostats in a conference building
 - Insulation of the attics

Results:

- ESCO investment: 2.521 Million Euro
- Guaranteed savings: 0.216 Million Euro (i.e. ~ **64%**) **less energy cost** per year
- Contracting period: 11 years and 8 months

Source of information: KEA

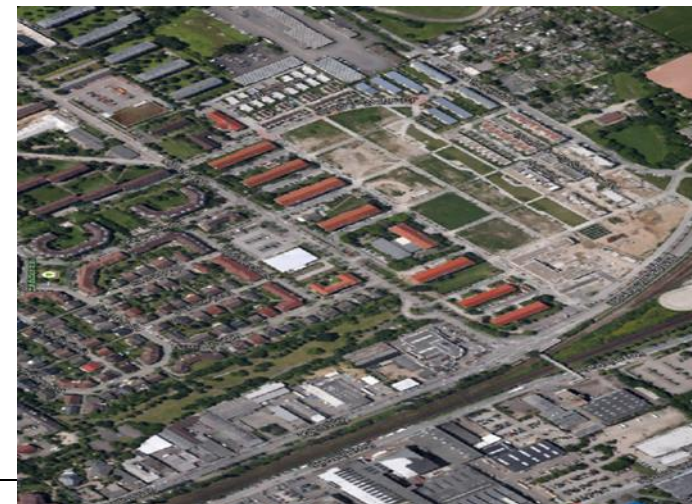




KEA 5 Best practice EPC projects

Deep Energy Retrofit EPC: students dorms Mannheim (Germany) /IEA EBC Annex 61

- Measures:
 - Establishment of a building management system
 - Replacement/renovation of HVAC units, lighting systems, building automation
 - **Thermal envelope, new windows, roof insulation.**
- Facts:
 - Year of Construction: 1960
 - Square Meters useful area: 4 buildings each 2667 m²
 - EUI 120 kWh/m² yr heating; 33 kWh/m²yr el. Power
 - Energy& Water Cost baseline: 440.500 €/yr
 - Maintenance costs: 143.000 €/yr
 - Investment Value: 3.1 M€
 - Annual Energy Cost Reduction: 141k€/yr
+41 k€/yr avoided maintenance
 - **Payback Period : 16 years**
 - Energy Reduction Percentage: 67%



Source of information: KEA Fotos STW Mannheim



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Questions?

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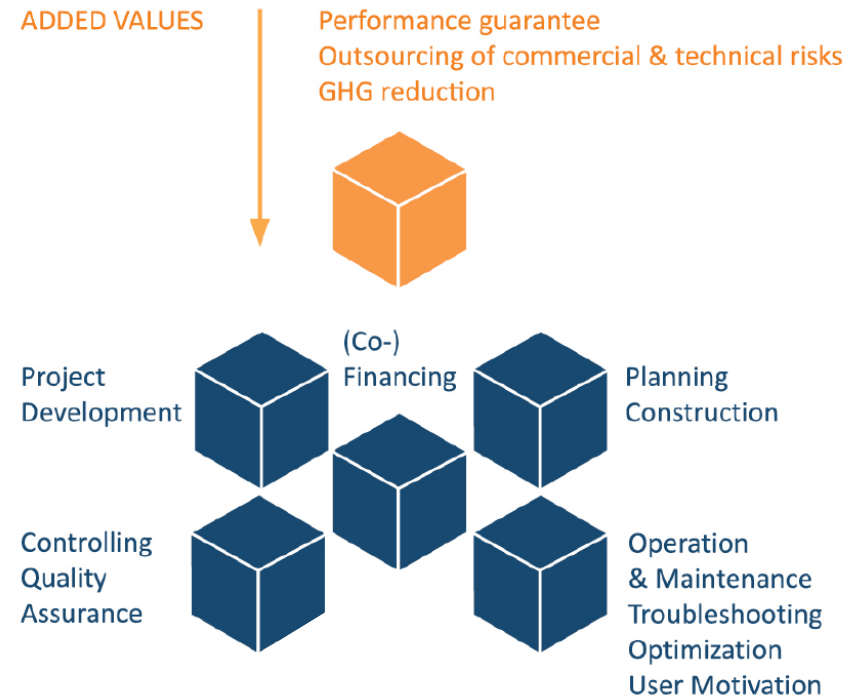


KEA 1 Players and Roles in EPC

- An Energy Service Company (ESCO) implements a **customized energy service package**, consisting of **planning, building, operation & maintenance, optimization, (co-) financing and user behaviour**.

The contract between ESCO and building owner contains **guarantees for cost savings and takes over financial and technical risks of implementation and operation for the entire project duration of typically 5 to 15 years.**

The EPC service or main parts of it is **paid by realized energy cost savings.**



Source: EESI 2010



KEA 1 Features of EPC business models

	EPC light	EPC basic	EPC Plus
Scope of investment	Only equipment and operating costs.	Investments only in fast-paying energy saving measures.	Investments in comprehensive rehabilitation (deep renovation) of buildings including non-energy related measures.
Energy savings achieved	Typically 10-20 %	Typically 20-60%	ideally >70%
Contract duration	In most cases 2-3 years	In most cases 5-15 years	Often >15 years
State of building and planned investment	All public buildings with energy saving potentials.	The building still serves its purposed, but energy systems installed and used in the building are outdated and inefficient.	Building does no longer serve its (current or future) purpose. Building and installed energy systems are outdated and/or dysfunctional, deep renovation is planned.
Design and planning of the EPC project	Building owners or local facilitators.	Building owners or local facilitators.	Building owners or local facilitators.in cooperation with contracted architects, and engineers.
Installation and operation of equipment and facilities	ESCO	ESCO	ESCO



KEA 1 Features of EPC business models

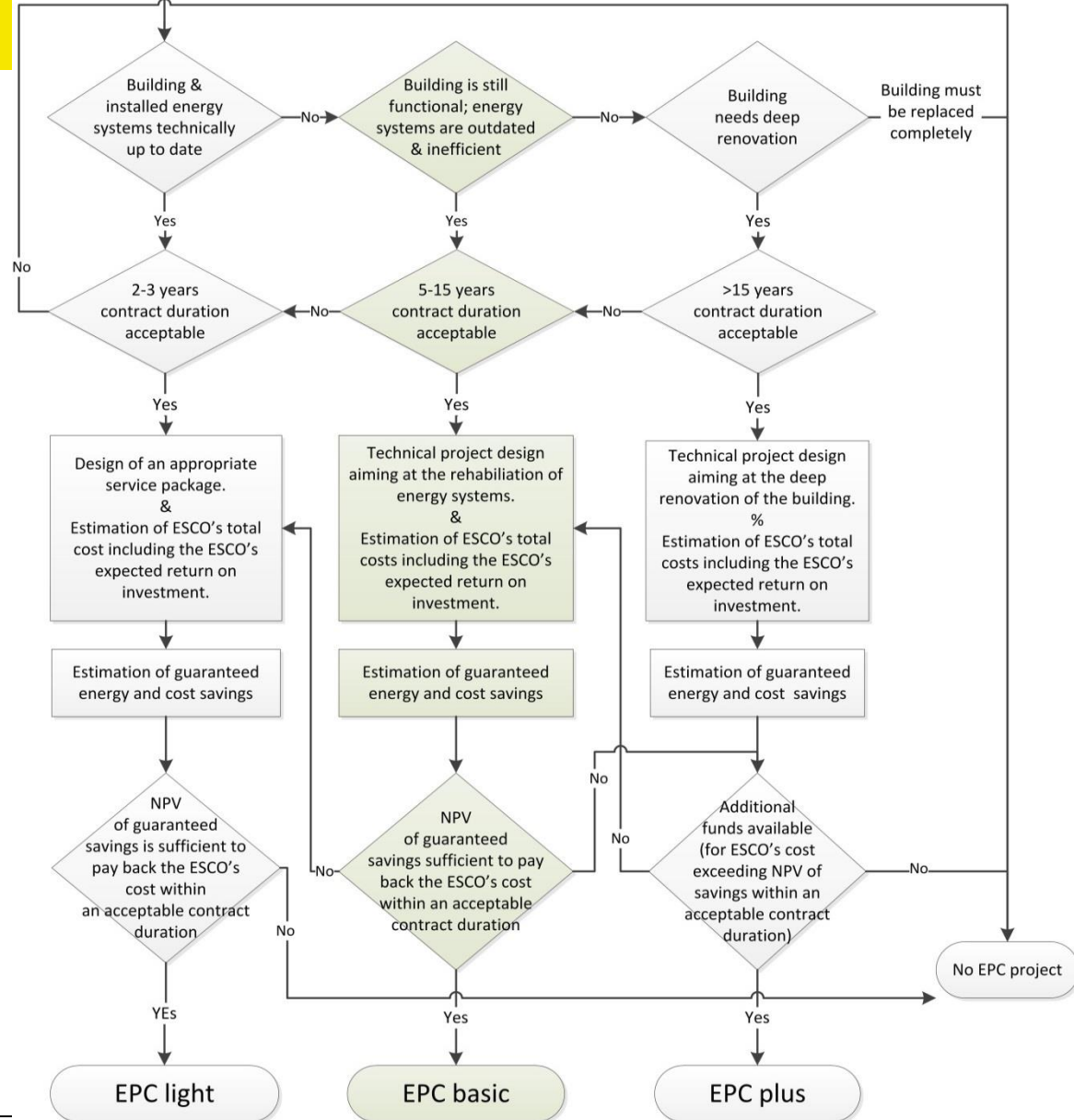
	EPC light	EPC basic	EPC Plus
Ownership of installations	All installations property of the building owner.	Ownership of all equipment and facilities installed in a building is usually transferred to the building owner at the date of acceptance as stipulated in the contract.	
Services (operations) included in the scope of a project.	Management services: Energy accounting and management. Verification of energy bills. Measurement of actual energy consumption and verification of achieved energy savings. Grant applications and approval procedures. Operational services: Optimisation of operation and maintenance. Sometimes additional: auditing and certification procedures.		
Financing	ESCO pays only staff cost.	ESCOs own equity, loans, subsidies, financial contributions from the building owner.	
Calculation of necessary EPC service fees on the basis of guaranteed energy savings	Sufficient to provide for the amortisation of all cost of the ESCO +ESCO's profit.	Sufficient to provide for amortisation of planning and investment cost (- subsidies), financing, services, and maintenance cost, (+ ESCO's profit).	Sufficient to provide for the amortisation of planning and investment cost related to fast-paying ESM (- subsidies), financing, services, and maintenance cost (+ plus ESCO's profit).
Additional financing options that may help reducing EPC service fees.	Usually not necessary.	Down-payments for a part of the public building owner's up-front cost (reduction of the investment cost of the ESCO). Subsidies on interest rates paid by the ESCO (reduced financing cost). Subsidies on specific technical measures (e.g. feed-in tariffs for renewable energies).	
Pay-back of investment	Completely from guaranteed energy savings.		Partially from guaranteed energy savings. The remaining share paid separately (e.g. up-front).

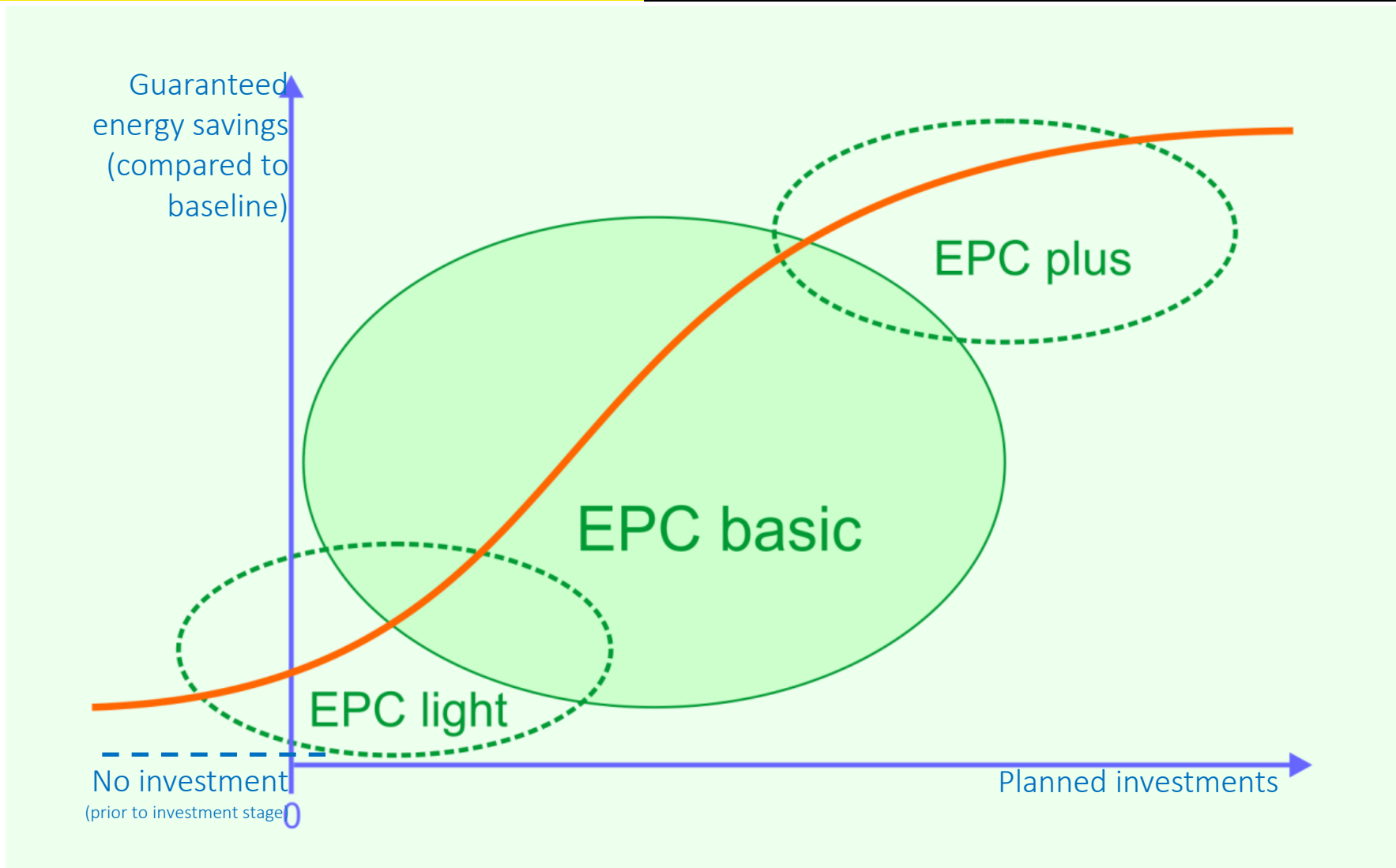


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Selection of EPC projects and of appropriate EPC business models

EPC taken into consideration for EE improvements in public buildings







- 1110 municipalities, 35 counties in Baden- Württemberg
- 38% woods
- Average number of inhabitants: 10.000 / municipality
- Municipalities > 30.000 inh: 45
- Framework conditions require „sustainable“ projects not „low hanging fruits“ business policies
- **Regional ESCOs: bring SMEs into the game!** 25 utilities and 20 handcraft SMEs providing Energy Supply Contracting; EPC providers: 10 from which are 2 SME EPC providers+ 2 utilities
- → New business model: SMESCOs developed in 2016

2 Contracting Competence Centre BW



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M1: Communication initiative „Energy-Contracting“

M2: Capacity building

M3: Competence Centre Contracting

M4: Refunding of Contracting projects

M5: Grant programs for contracting facilitation and investments

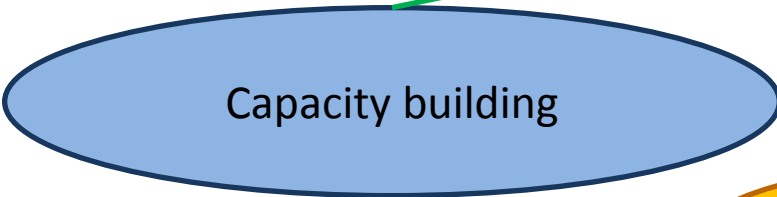
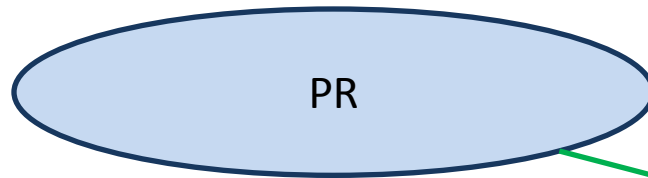
M6: Detox approval process for EPCs in public sector

M7: Business Models for nZEB quarters

M8: New business models for small medium sized buildings SMESCOs

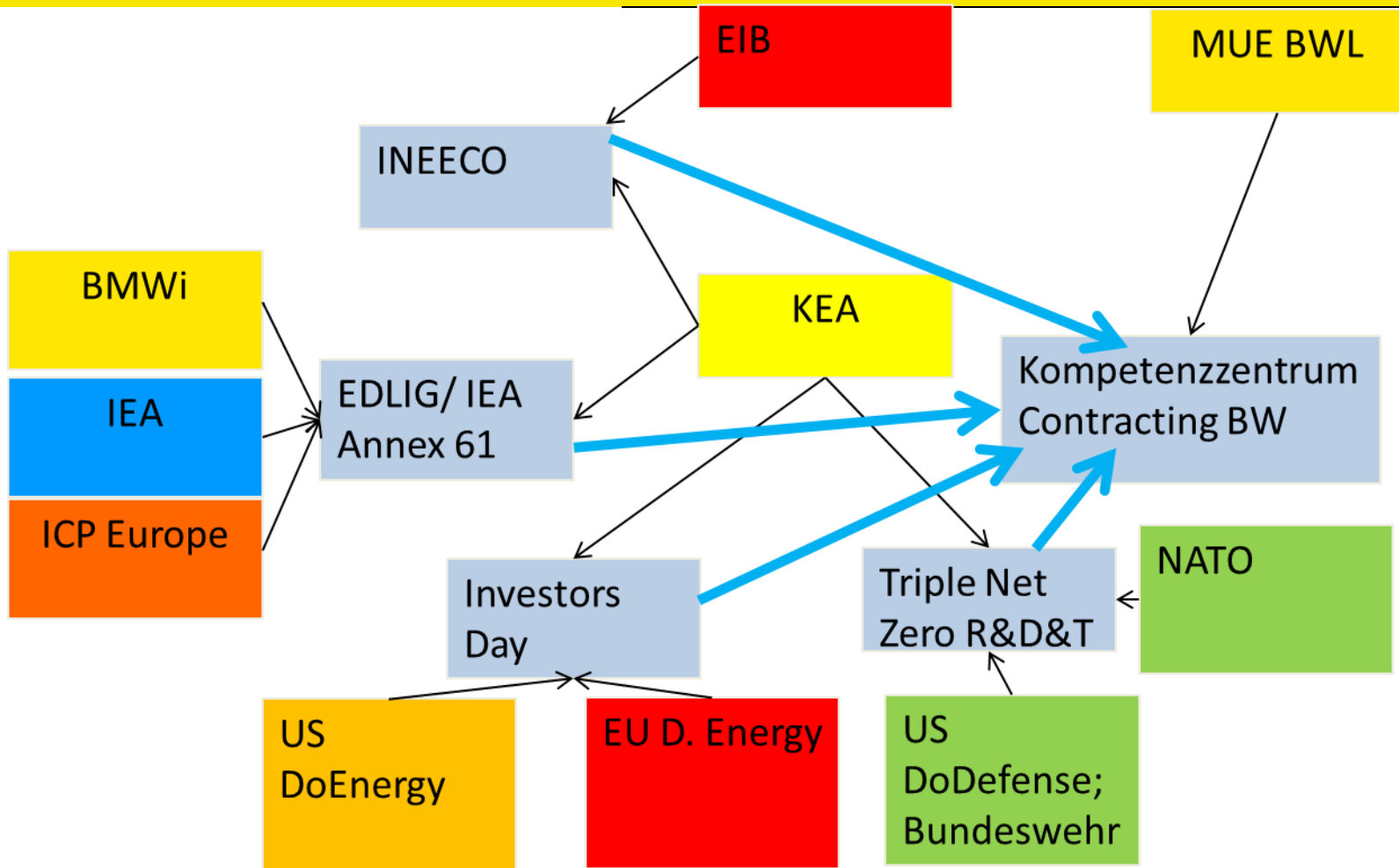
M9: Guidelines for target groups

M10: modular contracts





2 Interacting on different levels to improve the regional market





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5 EPC projects best practice- first steps towards Deep Energy Retrofit (2010)

- Business model integrating **biomass and energy savings** → **increased savings potential allows for non- energy related deep refurbishment:**

PFINZTAL:

- EPC based on biomass and micro grid co- funds the refurbishment of a wrecked swimming pool building
- Energy Baseline: 170 k€/a → energy cost savings 75%
- Payback of 9 years for energetic measures (5 buildings with new micro grid, new lighting, hot water, building control, pumps, biomass boiler with wood and hot water storage
- By increasing from 9 to 15 years: full refurbishment of public swimming pool
-

