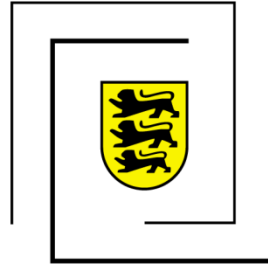


Klimaschutz- und
Energieagentur
Baden-Württemberg
GmbH



KEA

**InEECO – Initiative Energy Efficiency Contracting
in the context of KEA's energy service efforts in
Baden- Württemberg's Public Buildings**

Rüdiger Lohse

Brussels, January, 2017



- Provide information on the structure of the first year of experience with the INEECO project funded by the EIB ELENA program
- Create a basic understanding of how the INEECO effort is integrated in KEA's market development activities
- Target group of this presentation: energy agencies or other regional entities considering to prepare an ELENA proposal



RE& EE
concepts in
buildings,
neighborhoods

Energy Master
Planning (region,
cities, neighborhoods)

market facilitation
for energy services
Contracting Initiative

R&D innovative
financing
instruments

RE& EE in
SME

Implement
regional
climate
protection
concept

User behaviour
programs

EPC /ESC
facilitation

Non- investive
energy
commissioning

Consultants
for policy
makers,
government

Turnover €4M
33 employees
(75% engineers,
architects)



- 1110 municipalities, 35 counties in Baden- Württemberg
- 38% of statal area: woods
- Average number of inhabitants: 10.000 / municipality
- Number of municipalities > 30.000 inh.: 45
- Framework conditions require „sustainable“ projects not „low hanging fruits“ business policies

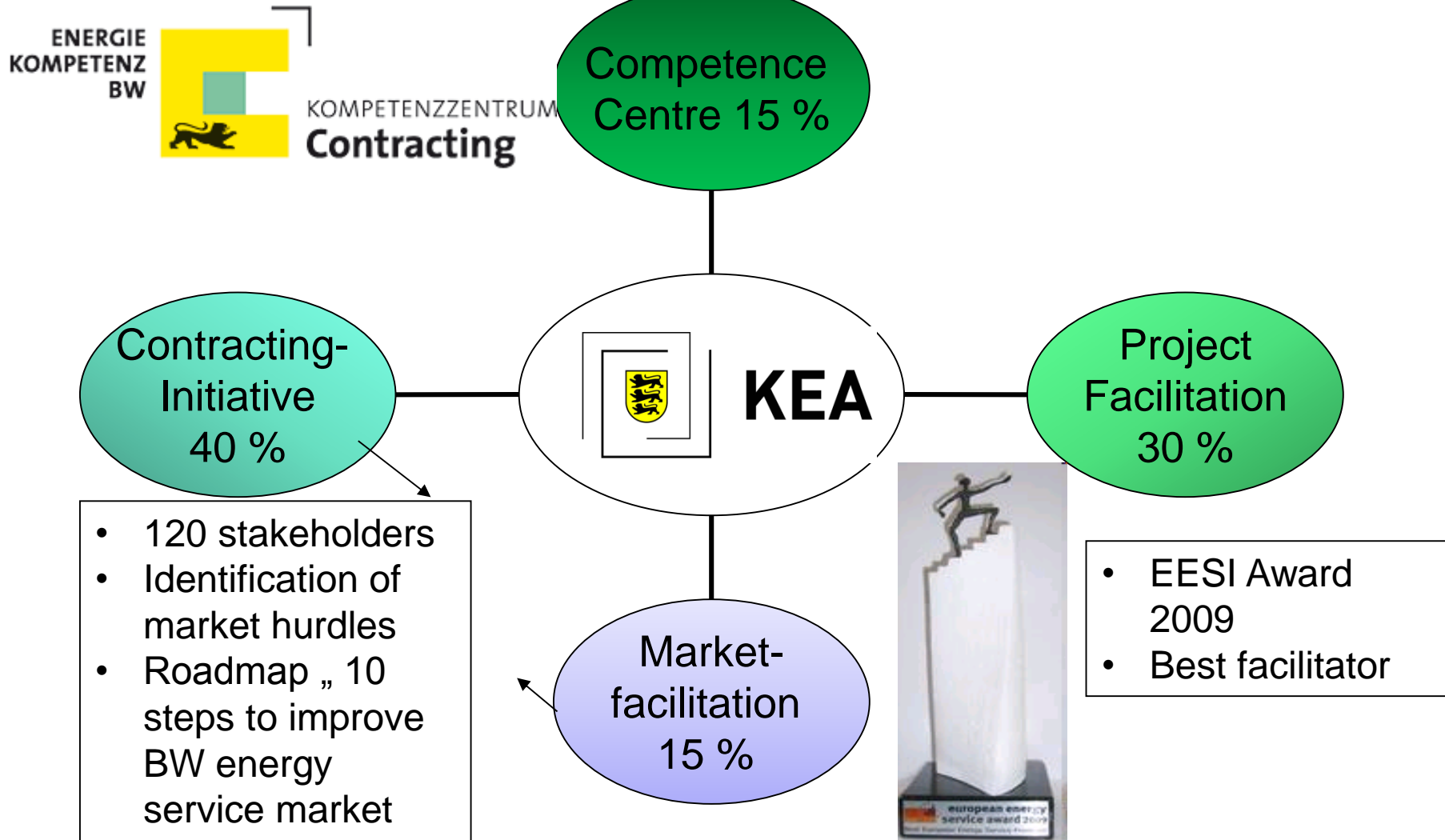
- buildings eligible for energy services: 80.000 (380 Mm²)
- Average age of building fabric and infrastructure: 35 yrs
- Average age of HVAC: 25 yrs
- Potential for deep refurbishment: €250- 300bn < 15 yrs

- **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



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2. Our role in the energy service market



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

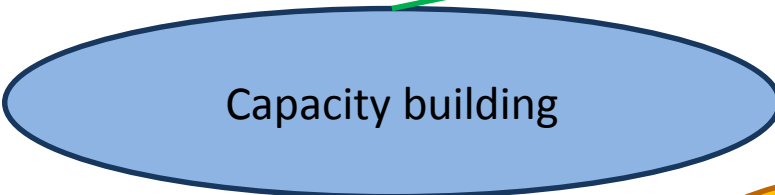
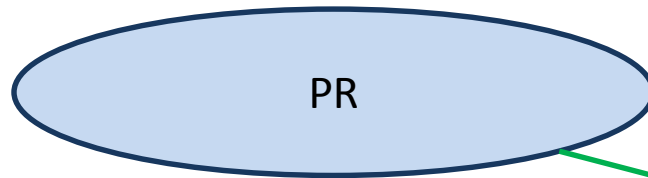
M6: Detox approval process for EPCs in public sector

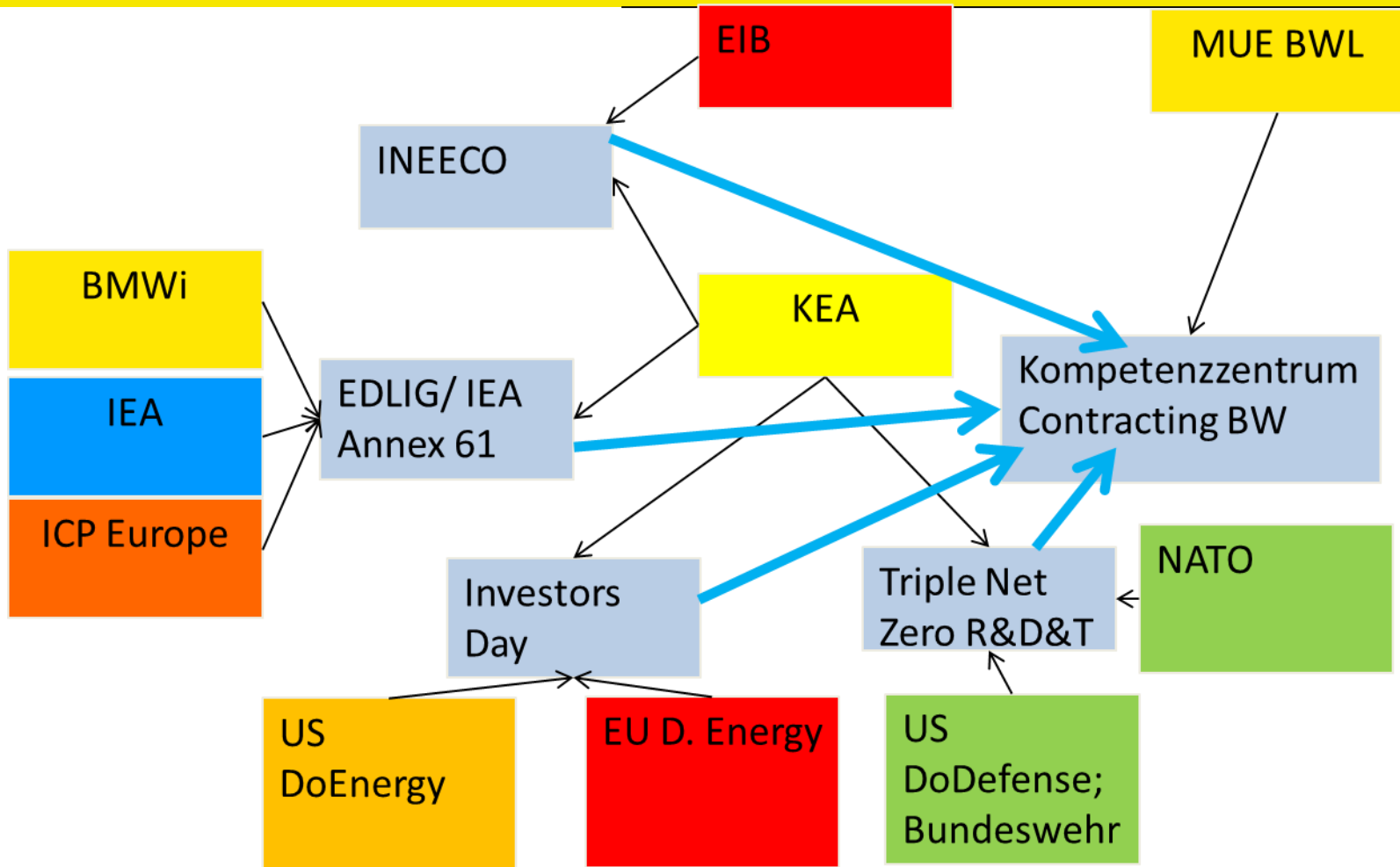
M7: Business Models for nZEB quarters

M8: New business models for small medium sized buildings SMESCOs

M9: Guidelines for target groups

M10: modular contracts







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

- Co- funded by EIB, ELENA program (**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 (Reference: Roadmap of Contracting Initiative BW, Task 3 Promotion of EPC in the public sector)



- **What will be subsidized:** 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 €



Project time period: 3 yrs

Start: January 2015

Timeline:

- March- July 15: information phase
- April 2016: EPC investments appr. €10 M
- April 2017: EPC investments appr. €20 M
- April 2018: EPC investments appr. €30 M
- Meeting of steering committee and interim reports: month 6, 12, 18, 24, 30, 36





Ineeco steering group

- Discussion of terms and conditions between facilitators and building owners
- Discussion and optimization of tendering and stipulation material
- Development of a new re- financing tool for ESCOs
- Development of a information campaign to push the demand
- Assessment of the approval process of EPC in the public sector
- Members: Association of Municipalities, Cities, Counties, public hospitals, public social entities, ESCOs, funding entities

Ineeco working group:

- Lead of Ineeco & risk carrier: KEA
- Project coordination and Quality assurance
- Co- Workers: now 18 (regional EAs, 5 SME facilitator, 8 engineering companies)



- **Ineeco- Task force „Public information campaign“**
- **Target groups**
- Municipal decision makers, stata building management
- ESCOs, handcraft companies, SMEs, municipal utilities
- Facilitators in regional energy agencies and engineering companies
- Funding entities
- Associations of public bodies
- **Core Messages:**
- Ineeco structure (brief)
- Supported activities
- Example calculations
- Coordination with other grant programs
- **Distribution path ways:**
- 50% of activities are put in meetings on local level (decision makers)
- E- mail, Ineeco - homepage





- **Task force group „Financing“**
- 30 M€ to be refunded by ESCOs are a considerable baseline to research on alternative re- funding sources for ESCOs.
- Targets:
 - Set up refinancing pool for EPC projects with attractive fixed mid-term loan interest rates
 - Include forfaiting model
 - Develop project level technical and economical assessment tool for EPC projects
 - Develop mutual federal and stataal funded re- assurance tools for loan program
 - Collect private money



■ **Task force group: Public EPC approval structures**

- Every public EPC project is considered as a loan related debt and has to be assessed in a complex calculation and approval process
- Together with legal advisors from statal department of municipal affairs, asscociation of ESCOs and department of environment a working group will be set up to analyze 10 Ineeco projects with special regard „how to simplify the process and increase the transparency of the assessment process
- Development of a simplified approval process for EPC in public buildings



- Great support from EIB – ELENA Team:
 - during proposal, approval and working phase the ELENA team is a great support, Q&As going quickly at a helpdesk
- 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)
 - A draft version for the guarantee would allow decision making at an early stage
- Contact and exchange with the other ELENA projects:
 - Suggestion is to intensify this a bit to 1 face-to-face meeting a year
 - Set up a tool box with some templates for interim reports, loan guarantees, PR material etc avoids re- inventing wheels from time to time
- New staff on the pay- roll
 - Very good idea but training costs and time for the „unskilled workforce“ needs to be considered in the time frame of the project.



■ Market response: demand side

- The assumption that public entities wait for such programs and that target group will get excited just from the benefit of „almost no- preparation costs“ is WRONG in our case
- It took us 3 months to counter steer that by initiating a PR campaign on the INEECO project which led to a significant increase of newly started projects
- To have it cost- free is very interesting but the approach and reliability of the Ineeco project managers is making the deal- so a strong support by experienced sales staff is required in year 1
- The time it takes from a more or less mature feasibility study to a signed and countersigned EPC contract is never < 6 months
- Especially smaller project pools with baselines < 400k€/yr have been attracted
- Up to now 12 projects totalling 8.6 M€ of investment are in the facilitation process, 5 are in the implementation phase,
- 6 projects totalling 8 M€ are in the aquisition and execution phase



- ELENA is a great program, attractive and not really complex
- A few organisational topics must be considered carefully in the proposal (i.e. loan guarantee, staff recruiting) and the implementation phase (PR campaign)
- The interaction of market participants is significantly improved
- We can recommend this program to other entities
- Regions starting the market from scratch need at least 1 yr of prep- phase to bring all stakeholders on board and in a supportive position



- **Set up Advanced Energy Master Planning process to guideline the process:**
 - Sinks and sources of RE, EE, excess heat,
 - Smart energy concepts- knitting together sinks and sources with target of local production and local usage
 - Regional, local, neighbourhood and building level, sectoral differentiated

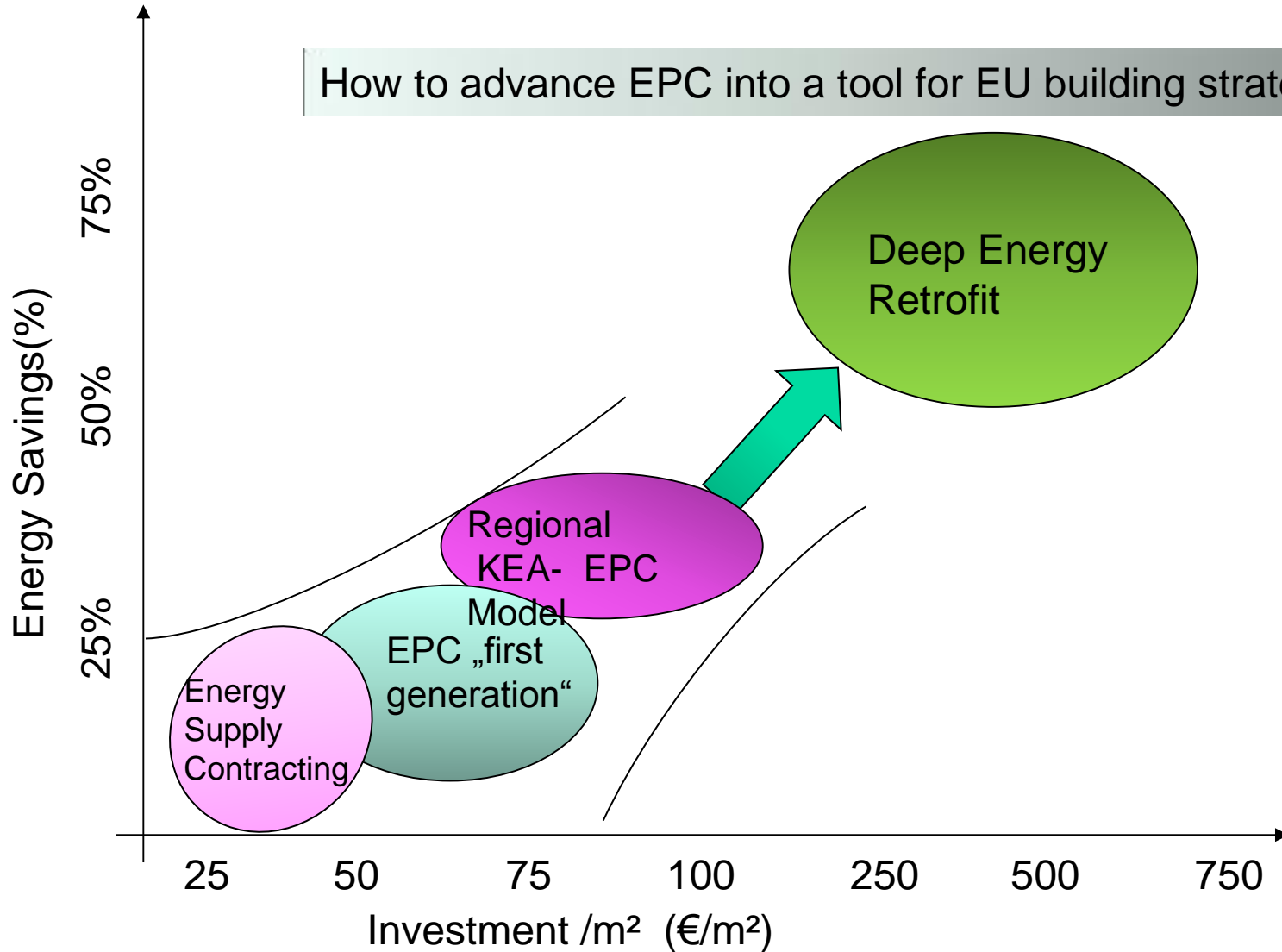
- **Derive building sector action plan:**
 - Identification and deployment at the hand of EUIs, age, need for repurposing and constructive measures
 - Aggregation of building clusters, neighborhoods
 - Estimation of investments and benefits
 - Discussion of different business models for implementation
 - EPC project roster



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4 Regional energy efficiency strategies in buildings and neighborhoods

How to advance EPC into a tool for EU building strategy





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4. Regional energy efficiency strategies in buildings and neighborhoods

- **Regional Framework Conditions:** require approaches respecting regional decision making criteria- what works in Berlin will not automatically find acceptance in high developed non- urban regions:
 - High identification with public infrastructure
 - Money inserted into EE, de- carb, RE projects will be tracked over time by administration and an interested community
 - Reluctance to financing tools – only spend what you have
 - Decision making will always refer to strong SME structures
- in the case **Energy Performance Contracting** and **Energy Supply Contracting** Solutions this means in comparison with the first generation of EPC projects in GER:
 - No **low- hanging fruits-** investments
 - Include a **mix of energy and non- energy related measures** when you touch the building anyway
 - Specific investment costs initiated in Regional EPC: **80- 150 €/m² (compared to 30- 50 €/m² average in DE)**



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3. Regional energy efficiency strategies in buildings and neighborhoods

- Measures to implement a **sustainable regional EPC strategy**:
 - **First generation of EPC** is not yet perceived as an important part of EU building strategy as it focuses only parts of the buildings and low- hanging fruits (Association of German Cities 2011)
 - **Although DE energy service market** is widely considered „mature“ energy services especially EPC is far away from a remarkable market share for EE
- How to overcome that....
- **Plan** of technical measures: a feasibility study is a necessary prerequisite to identify + set up individual contracting project objectives and to achieve maximum energy conservation
 - **Terms of rating**: to get ESCOs engaged to create solutions for individual project targets it is necessary to design **corresponding terms of rating** which do not only account for NPV criteria
 - Quality assurance from the perspectives of: the investor (ICP EU) and the building owner (KEA EPC due dilligence)



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4. Deep Energy Refurbishment EPCs Tendering and terms of rating

Preparation:

Feasibility study, list of measures, decision making process of the public administration

Call for Tenders: References, experience in foreseen measures (Green ESPC, integrative concepts...)

Tendering Documents: ESPContract, procurement guideline, **terms of rating**, measure list

Negotiation phase, optimization of bids, last call, final rating and evaluation of bids → winner gets 1. Step of ESPContract (planning+design)

Quality Assurance
ICP / KEA
DD

Evaluation II: Evaluation of 1. step results, small divergence of results → 2. step of ESPContract (construction and performance phase)



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4. Deep Energy Refurbishment EPCs - Terms of Rating

	ESPC classic (i.e. Berlin model)	KEA's ESPC integrative
Terms of rating	Net Present Value of savings in total and remaining with administration 70- 80%	Net present value of savings in total and remaining with administration 40- 50%
	Contract period 10- 20%	Measures (Quality) 40 %
	Carbon Footprint 10-20%	Carbon Footprint 10-20%
Additional Terms	-	Avoided maintenance costs for existing installations are part of the saving
Measures Achieved	HVAC, mainly not integrative with short pay back	Integrative measure bundles with demand and supply side measures, Green ESPC, refurbishment measures without e- saving effects



Target: EPC as a major tool for EU building refurbishment strategy

Next step is to implement the thermal envelope in advanced EPC business models

- **Complexity of the projects will be significantly increasing → also cost, contract period and risk**
- **few experience with “design/performance” available on EU level**
- **Long contract periods (>>15 a) → new financing models**
- **ESPC- contracts and existing tendering process is not viable for thermal envelope**
- **→ KEA conducts research programs on national level (EDLIG) and on IEA level (IEA EBC Annex 61) to advance existing performance related business models towards the integration of DER**
- **→ r+d about the synergistic effects of bundles**
- **→ r+d on influence of climate, building application, energy rates and risks on the design of bundles**

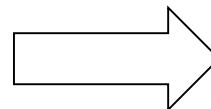


4. Deep Energy Retrofit EPCs- first steps

- 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
-

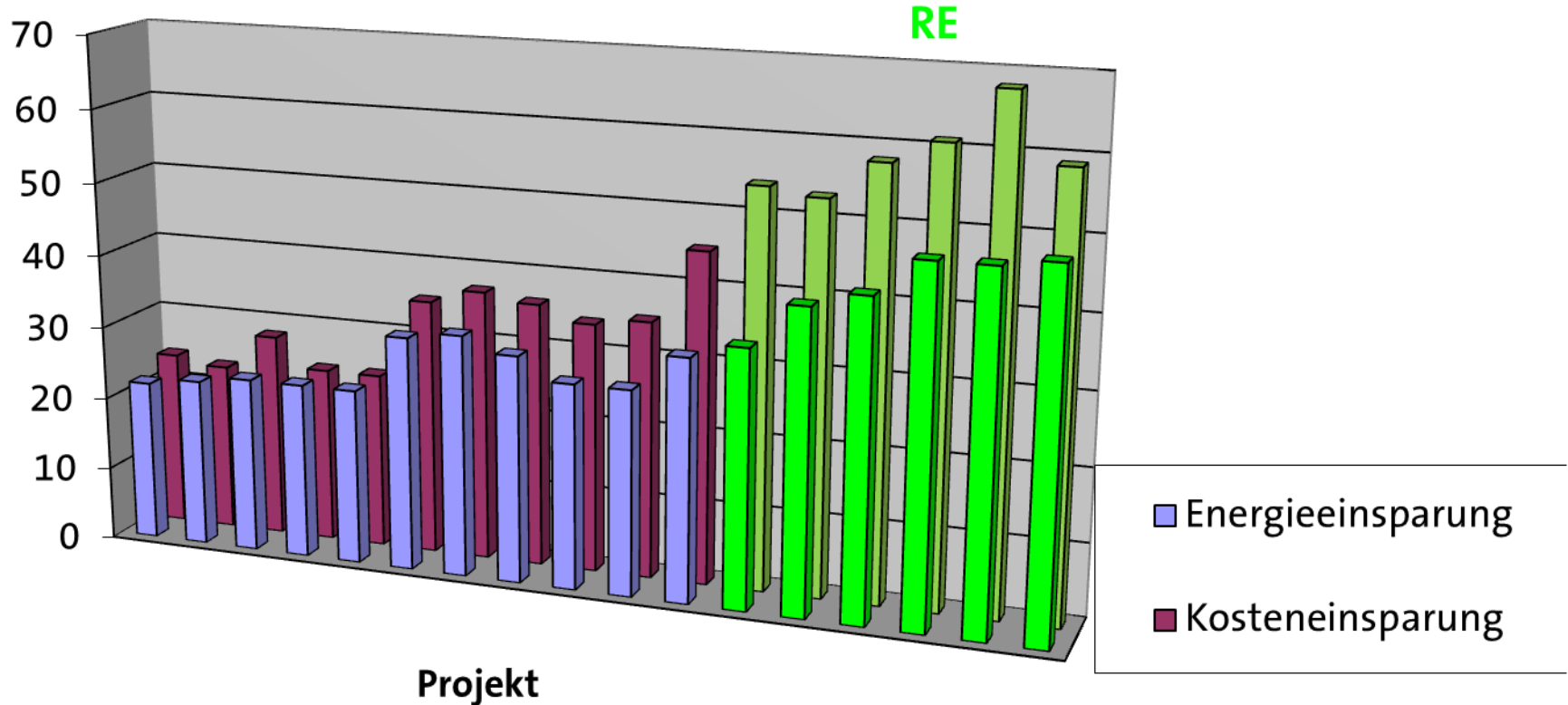




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4. DER EPCs – include renewables into the scheme (→ nZEB EPC!)

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

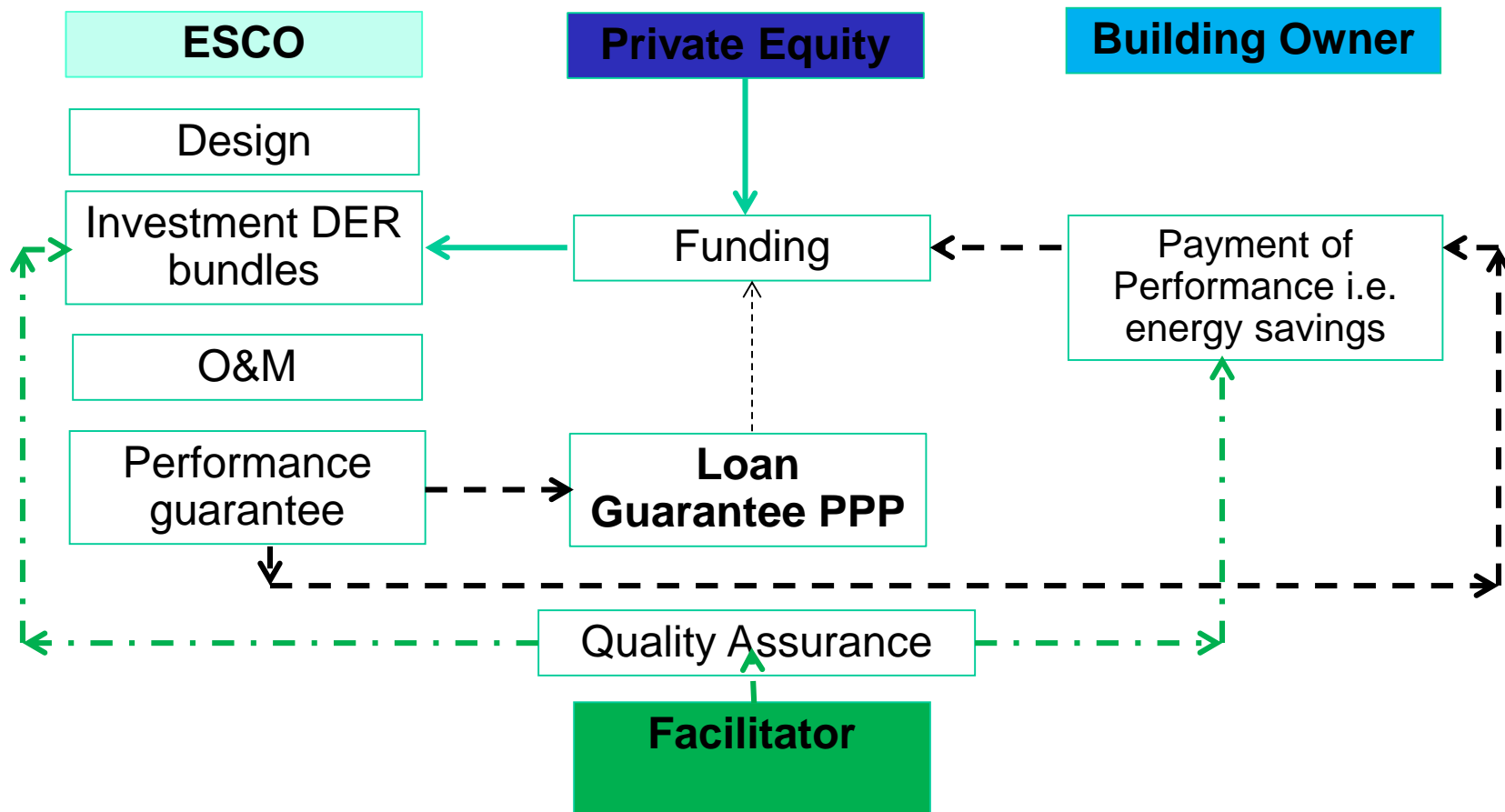




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4. DER EPCs - Deeper concepts with advanced business models

- **Develop of advanced business model** allocating investments and services between building owner and ESCOs, development of financing mechanism



LCC- considerable cost benefits of DER

	Life Cycle Cost	Calculation	Variations and Values
1	Energy savings: effects from improving the e- performance of equipment by maintenance or replacement	kWh savings x energy price	Fixed or flexible energy price; in DER it is expected to at least reduce by 50% Values: Germany office building stock 7-14€/m²yr
2	Energy savings II	kWh <i>RE replacing fossile</i> x energy price (<i>RE- fossile</i>)	kWh replaced by RE; fixed or flexible energy prices;
3	Reduced maintenance I	Maintenance costs for replaced, worn down equipment at the end of its life cycle as a percentage of the new investment value	Average percentage value or end of life cycle value (→ graph LCC maintenance) Values applied at the market: - 0,25\$/ft² in US; EU: - 2 to -4 €/m²
4	Reduced maintenance II	Downsizing of investment in a DER bundle means reduction of investment cost related maintenance	A component downsized by 30% reduces maintenance costs by 30%
5	Reduced operation costs I	Building automation reduce operation workloads	Consider workplans and operation schedules individually



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4. IEA Annex 61 Case study: Dormitory, DER EPC including thermal envelope, Mannheim, Germany



Project 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%**

Buildings Included:

- 4 dormitories



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Questions?

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