

# Success Factors in and Barriers to EPC Market Development

Volker Dragon, Siemens Smart Infrastructure

# EPC project process / business model (in principal)

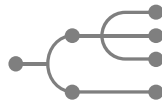
## Approx analysis

Collection of data and evaluation of potential savings



## Detailed analysis and concept

Design of measures and determination of baseline



## Implementation

Execution of measures and verification of savings

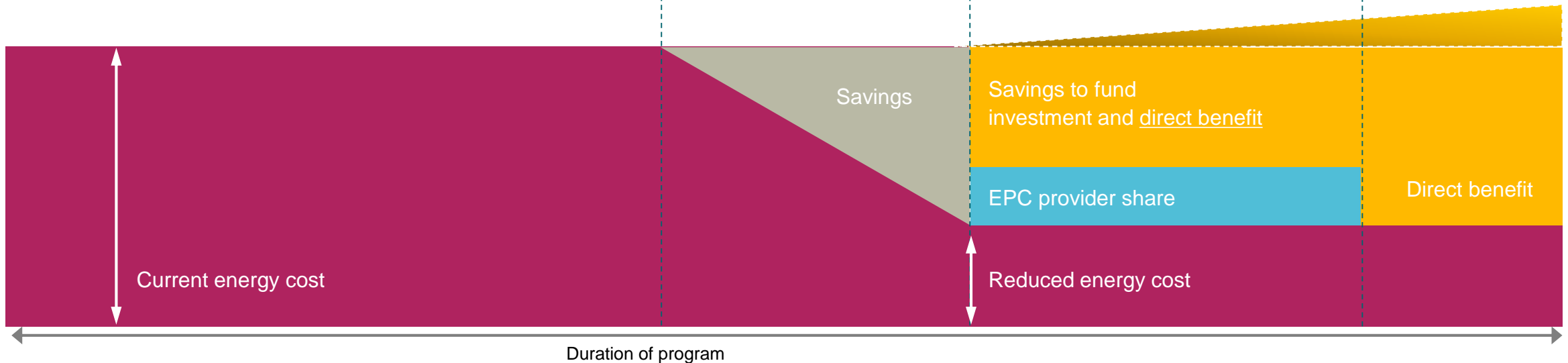


## Service periode

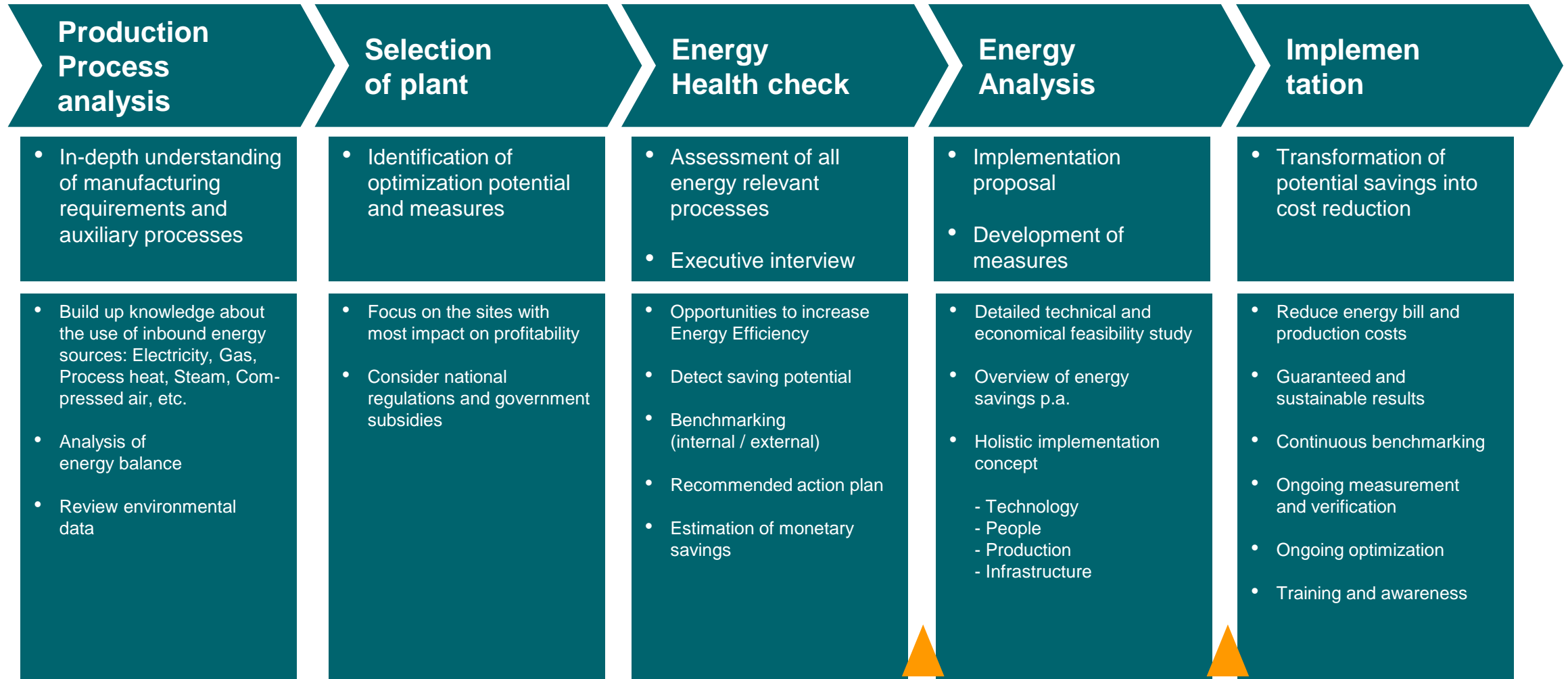
Inspection, maintenance and continuous measuring and verification of savings



End of contract period



# Process for EPC project – focus industry



Exit option

Exit option

# The path forward

## Clear Goals

Define clear financial, performance, savings or other goals and **any other metrics of success and benefit**



## Whole-Facility Approach

Consider / approach all potential opportunities (Projection of energy demand & corporate requirements, development of energy markets, regulatory developments & future trends, technology options & innovations)



## Transparent Baseline

Baseline developed in collaboration with building staff, understood and agreed upon by **all parties involved**



## Lifecycle Cost Analysis

Consider energy, operational, and maintenance savings as well as revenue streams from incentives and compliance risks



**Benefit:** Gain optimal balance of innovation and cost-effectiveness and be prepared for the future

# The path forward

## Sound Investment Proposal

Cost overview and guaranteed savings allows to make investment decisions with confidence. Involve a consultant for verifications.



## Guaranteed Performance

Provide certainty that the installation will perform over periods → up to 15 years



## In-dept commissioning

Realize the full efficiency gain from new and existing systems



## Monitoring, measurement, verification

Ongoing monitoring-based commissioning should also be considered



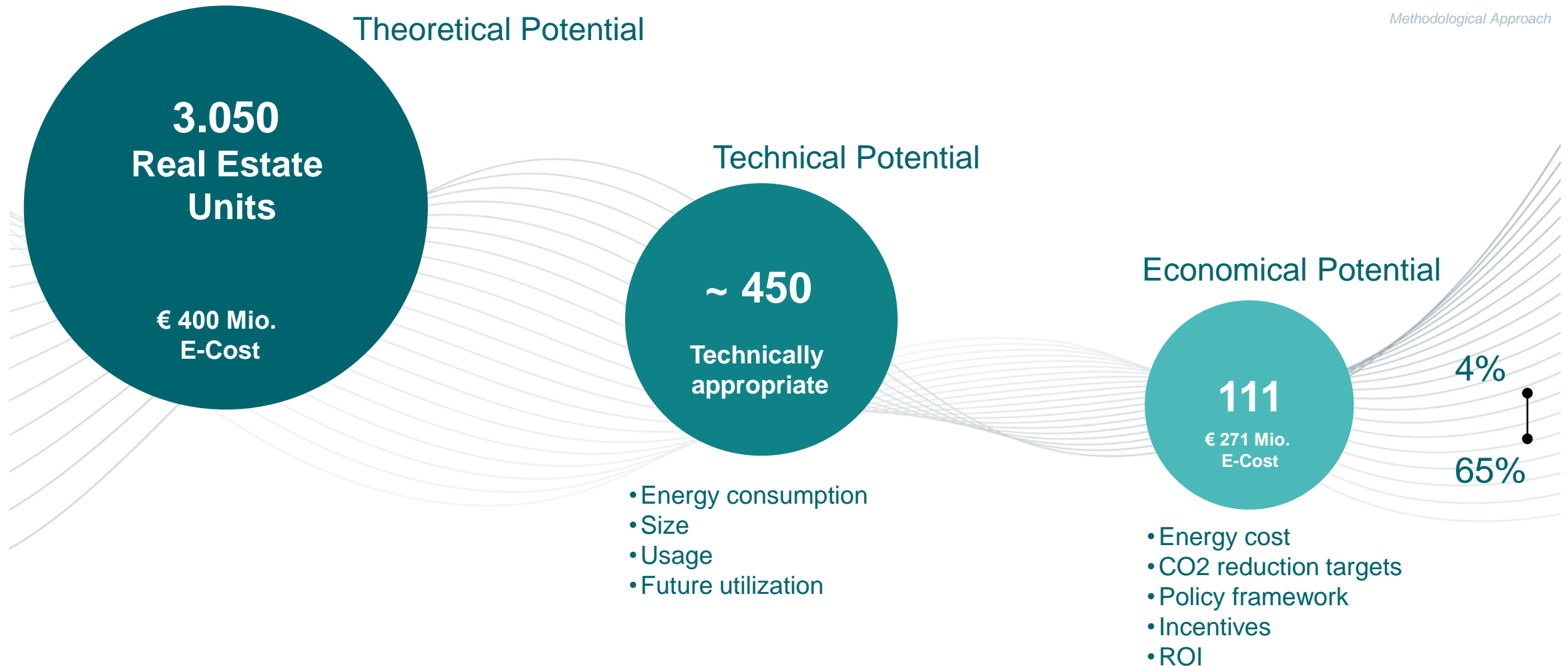
## Benefit:

Project will be executed and perform as designed;  
operations, maintenance, repair and replacement are secured

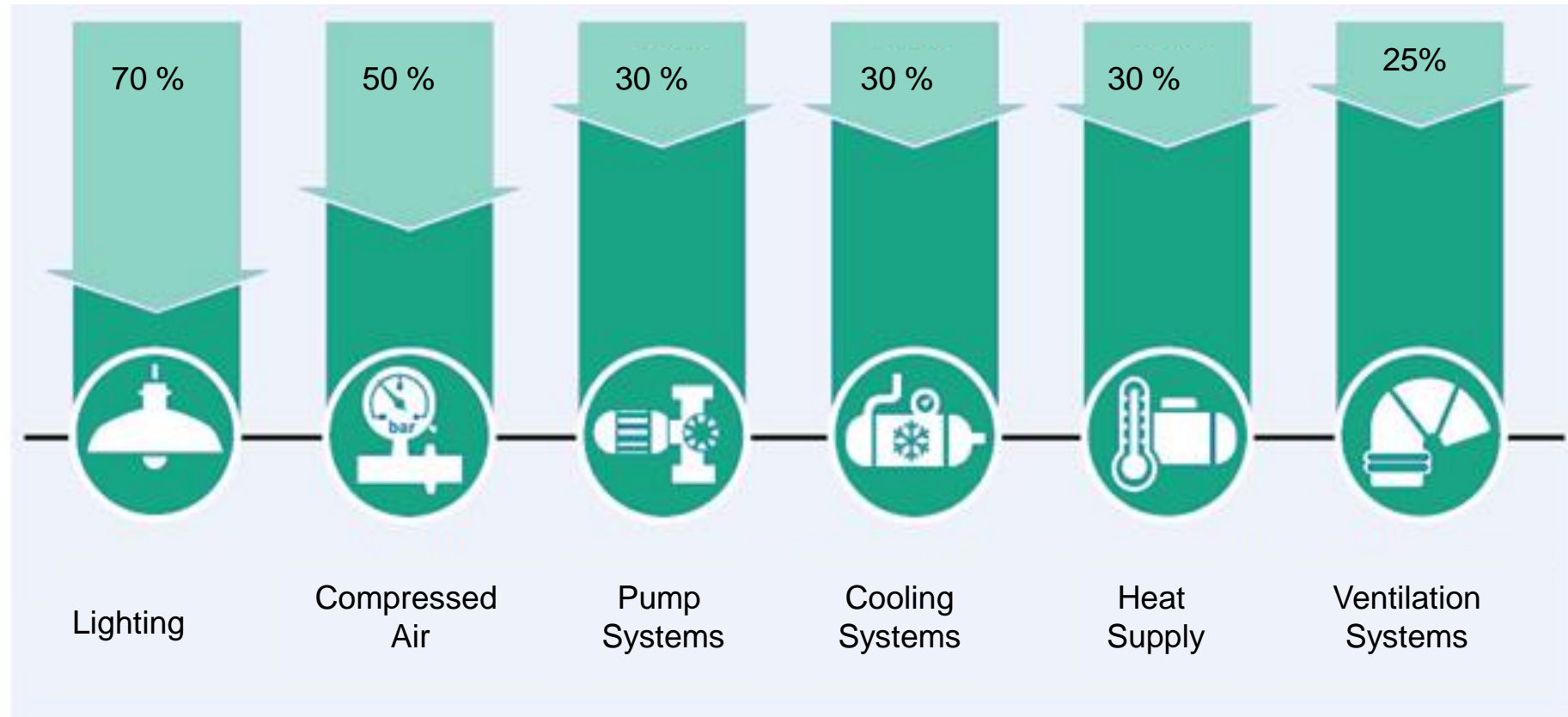
# Identification of optimization potential and measures

- real example

Methodological Approach



## Good opportunities to start in the industrial environment (average savings)



Address cross sectional potentials for energy and cost savings



# The “Buying-Center” on customer side

- Sustainable operation of buildings
- Resident satisfaction
- Costs / value of buildings
- Lifecycle costs guarantee

- Reduction of costs
- Meeting service levels
- Standardization of services

- Approval of financial solution
- Compliance to company guidelines
- Mandate of final go-ahead

- Carbon footprint
- Sustainability targets
- Optimization of media purchasing



- Reliable production
- Short ROI (< 4 Jahre)
- Reduction of costs per unit
- Performance assurance

- High rate of return
- Low capital consumption
- Low risk Investment

- High availability of components
- Process improvement
- Quality of production

- Site certification
- Reporting environmental performance

Various stakeholders have different interests



# Energy savings partnership between Siemens and the Aller-Weser-Klinik in Achim, Germany



## Aller Weser Klinik

- Year of construction 1974
- Floor space 29.000 m<sup>2</sup>
- 145 beds / full medical care
- Investment 1.9 Million EUR



## Challenges

- Cost-neutral modernization of technical building equipment
- Overall energy cost reduction
- Rise energy efficiency
- Increase sustainability

## Solution/portfolio

- Complete replacement of the air condition systems
- Combined heat power plant (CHP) to cover base load
- “Green Building Monitor” informs patients and staff about the building efficiency level of the building and is motivation to changes in energy behavior
- Funding of the measure through energy savings

## Benefits/value to customer

- Energy saving partnership (EPC) / Contractual period of 10 years
- Energy cost savings of EUR 270'000 yearly (-55%)
- - 75% power purchasing from the grid
- 50% CO2 reduction

**“We have made the right decision to implement the renovation of the hospital technology with an external partner”**

Marianne Baehr, CEO  
Aller-Weser-Klinik gGmbH



Germany

# Südzucker Zeitz plant, Germany - Significant savings through optimizing the plant's energy



## Südzucker AG

Europe's leading supplier of sugar products

270.000 t sugar p.a.



### Challenges

- Maximizing energy efficiency in its 29 sugar factories and two refineries (Example plant Zeitz)
- Run more sustainably and make a contribution toward protecting climate

### Solution/portfolio

- SIMOTICS FD motor and speed control to adjust the speed of the fans to adapt the volume of air required
- Financing through Siemens Financial Services through Energy Performance Contracting (no input of equity or third-party capital)
- According to the plan, the efficient technology should be self-financing.

### Benefits/value to customer

- 38% in energy savings = 900 MWh p.a.  
= (275 private households for a whole year)
- Self-financing of efficiency technology
- Customer pays monthly fee corresponding to the energy cost savings

**200 Employees**

**800 Farmers**

deliver 12.000 t sugar beets daily



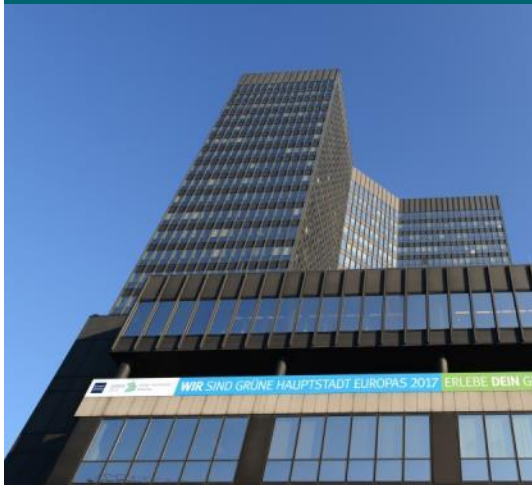
Germany

# Südzucker Zeitz plant, Germany - Significant savings through optimizing the plant's energy



## Essen City Hall

- Putting in operation 1979
- 22 stories / 106 meter high
- 69.000 square meters office space



## Challenges

- Drive down OPEX, increase energy efficiency
- Improve employee satisfaction
- Raise public perception and visitor satisfaction
- Improve overall building performance

## Solution/portfolio

- Replacement of central ventilation system
- Renewal of room air conditioners
- Replacement of control systems
- New energy efficient lighting systems

## Benefits/value to customer

- Immediate and guaranteed cost reduction
- Improved visitor and employee experience
- Better sustainability performance
- High operational security

**10.5 Mio €**

Investment

**1.2 Mio €**

Guaranteed savings per year

**2.700 t**

CO2 abatement per year



Germany

# Energy Performance Contracting - the «beauty» of the business model



# ESCO project benefits from different viewpoints

## Property owner / client

- Energy / utility cost savings
- No or low upfront cost
- Safe and comfortable working environment
- Enhance reputation through sustainability
- Technical basis for reliable and consistent performance
- Competitive advantage

## Municipality / Community

- Jobs – for a more balanced community
- Growth of the value of building stock and more attractive district / area
- Healthier district
- Development of communities
- Competitive benefit for the city / region

## ESCO / Contractor

- Workplace
- Profit
- Long-term, reliable Partnership
- Possible further contracts and cross selling

## Macro economy

- Jobs
- Development of the real estate market
- Growth of GDP
- Motivation of residents and investors to spend money locally
- Growth of energy security, decrease of need for
- Independence from foreign energy production



**Thank you**

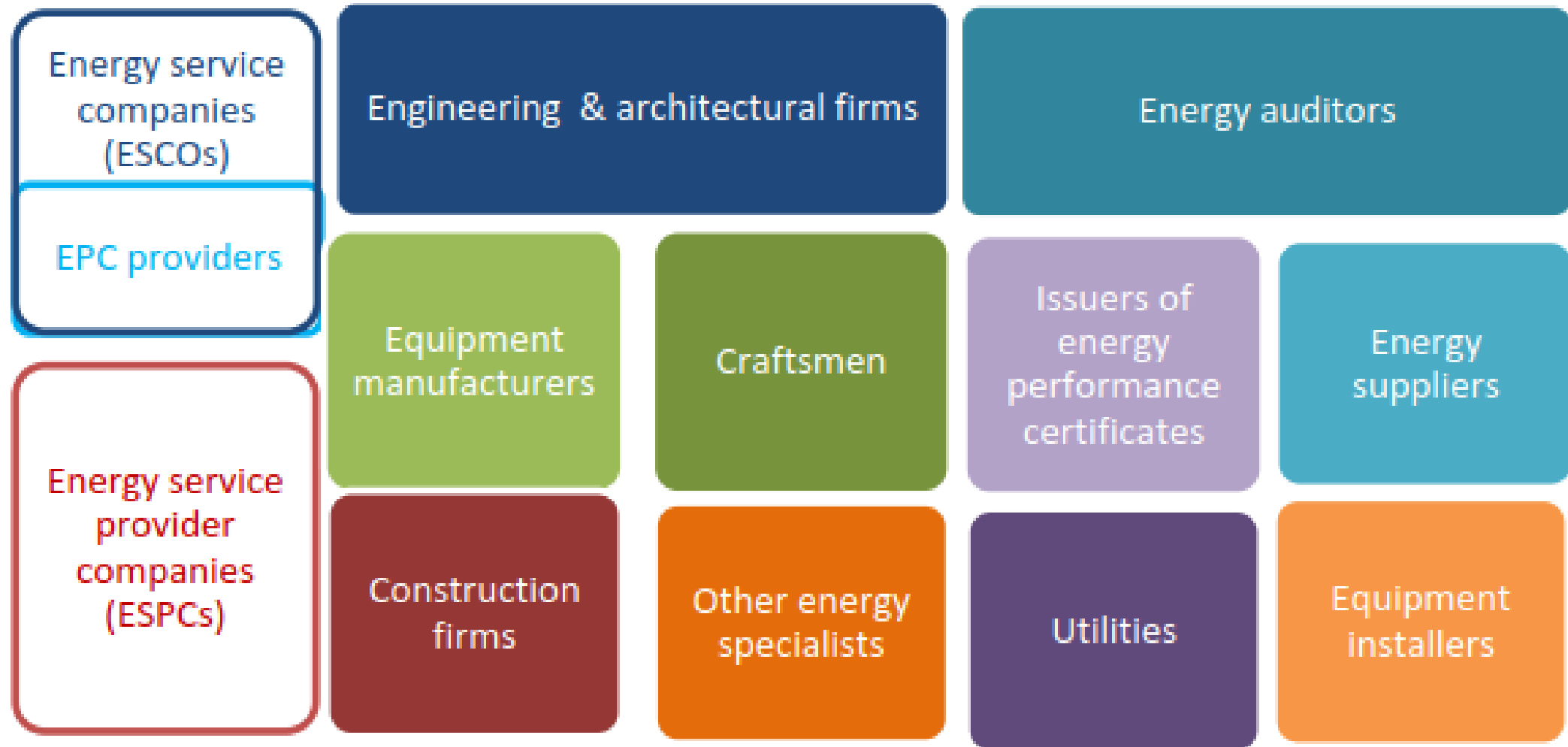
# EPC market barriers direct or indirect addressable

Information & awareness	Institutional & legislative	Financial	Market & external	Technical & administrative	Behavioral
<ul style="list-style-type: none"><li>• Absences of success stories</li><li>• Low client awareness on ESCO concept</li><li>• Lack of awareness on how to access financing</li><li>• Undervalued benefits of energy efficiency improvements</li></ul>	<ul style="list-style-type: none"><li>• Problematic government procurement rules</li><li>• Legislations creating unfavorable conditions towards EE / EPC</li><li>• Lack of accrediting mechanisms to certify ESCOs</li></ul>	<ul style="list-style-type: none"><li>• Difficulties accessing financing</li><li>• Scare or expensive capital / stale banking sector</li><li>• Conventional financing rules are incompatible with EPCs</li><li>• Lack of experience in EE projects of financial Institutions</li></ul>	<ul style="list-style-type: none"><li>• Low energy prices</li><li>• High perceived risk compared to other investment options</li><li>• Small scale projects</li><li>• Multi-party ownership and split incentives</li></ul>	<ul style="list-style-type: none"><li>• Complex administrative procedures</li><li>• High transaction costs</li><li>• Future savings predictability issues</li><li>• Lack of technical skills / experience in EPC projects</li></ul>	<ul style="list-style-type: none"><li>• Client risk aversion about EPC models or future uncertainty</li><li>• Limited confidence in ESCO services</li><li>• Preference for in-house solutions</li><li>• Unwillingness to take on long-term debt</li></ul>

In coordination with the European Commission DG Energy / Joint Research Center



# A diverse landscape of energy service supplier / provider



# The overall benefits for the building owner

**Upgrade buildings with no impact on current operational budgets**

**Reduce building / plant energy consumption by typically over 25%**

**Minimize the risks (price increases or security of supply),  
meet your greenhouse gas emissions targets**

**Include renewable energy and storage capacity and become a “prosumer”**

**Improve the value of your buildings / plants**

**Gain a competitive advantage (financial and image wise) and ensure regulatory compliance**

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# The Navigant Research Leader board (2017)

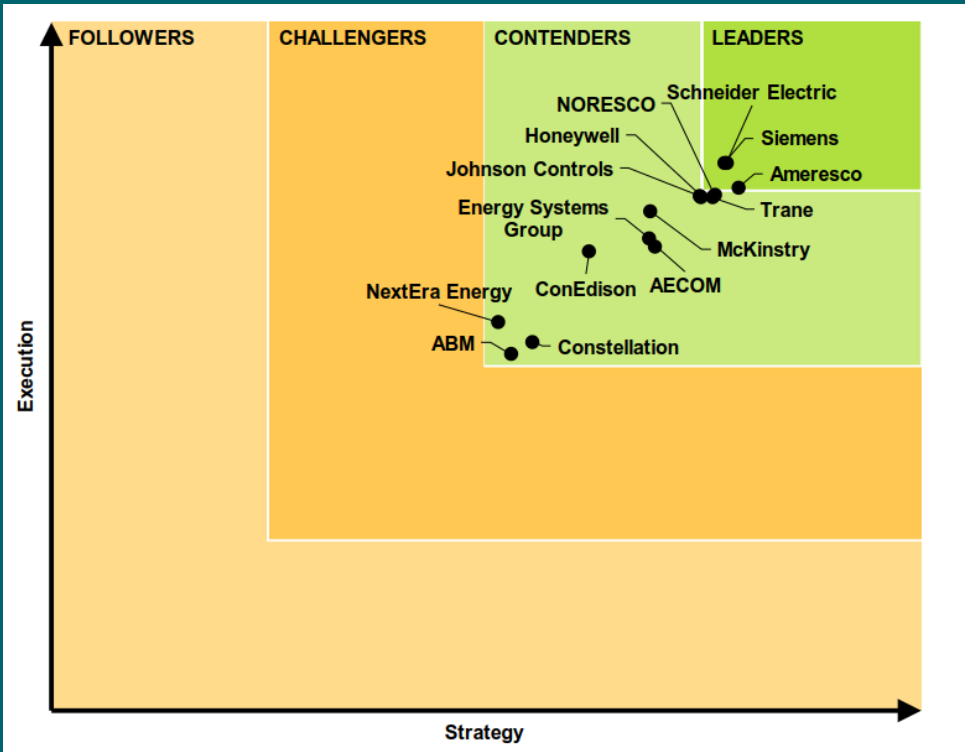
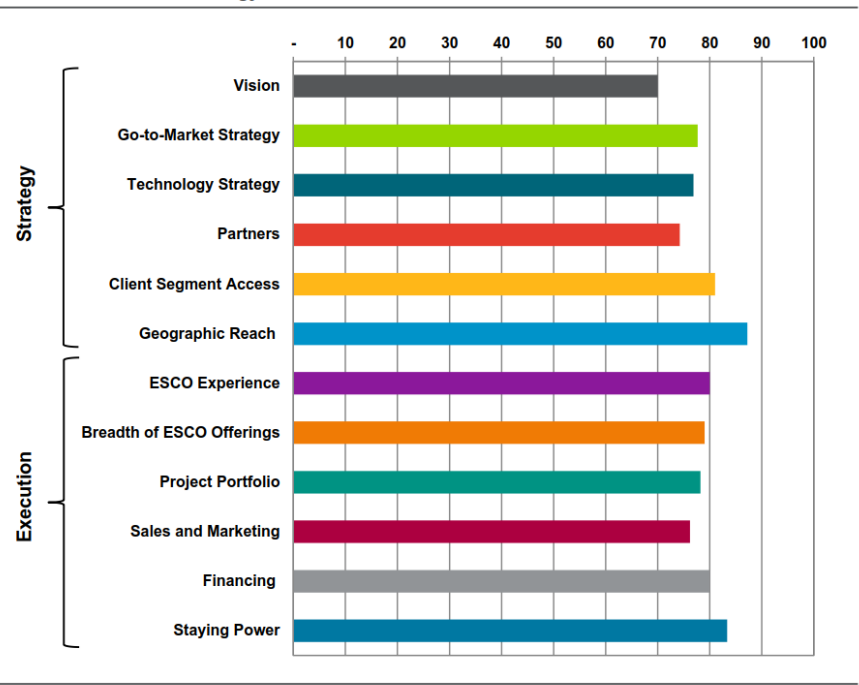


Chart 4.2 Siemens Strategy and Execution Scores

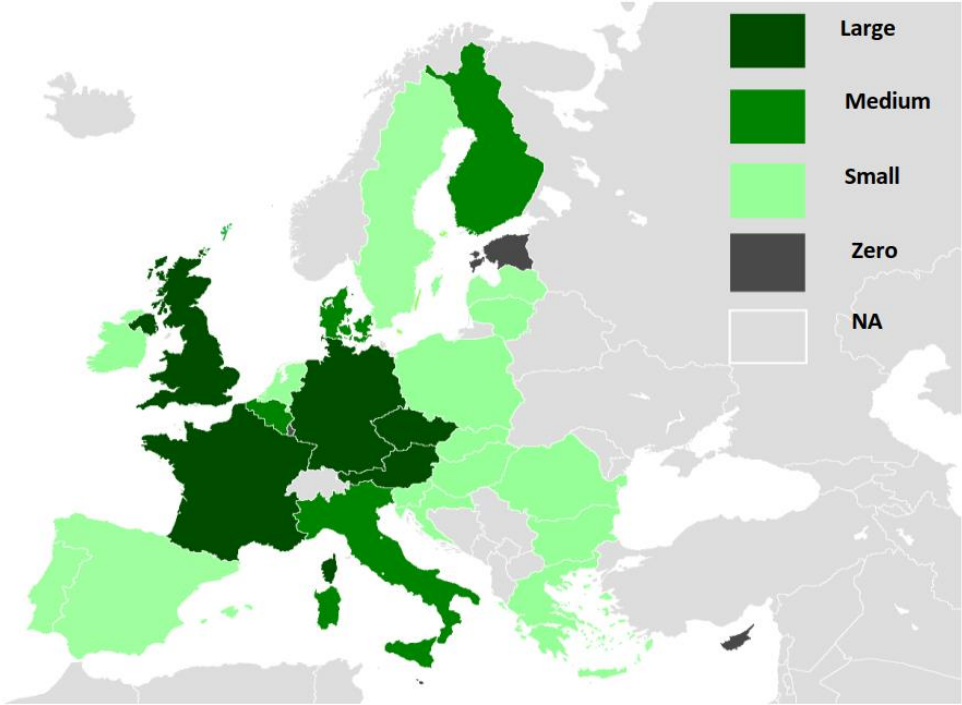


(Source: Navigant Research)

Any company participating in the ESCO market must have a relatively high level of competence in building efficiency projects  
to manage the risk of performance guarantees

# ESCO markets across EU

## based on the qualitative assessment 2016 (EU JRC)



	Level of development of		Change between 2013-2016	
	the complete ESCO market	EPC sector	ESCO part	EPC part
AT	excellent	excellent	slight decrease	slight growth
BE	moderate	moderate	unchanged	slight growth
BG	preliminary	initiation	unchanged	slight decrease (after a previous growth)
CR	preliminary	preliminary - just initiated	slight growth	slight growth
CY	initiation	initiation	only EPC	first trials
CZ	excellent	well developed	unchanged	slight growth
DK	well developed	well developed	unchanged	slight growth but reaching a halt
EE	non-existent	not existent	minor decrease	minor decrease
FI	moderate	moderate	unchanged	unchanged
FR	excellent	moderate	unchanged	unchanged
DE	excellent	excellent	unchanged	slight decrease , but growth in some regions e.g. In Baden-Württemberg
GR	initiation	initiation	unchanged	unchanged
HU	preliminary	preliminary	slight decrease	slight decrease (after some