ESCO Framework for Public / Federal Buildings

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ICEBO
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Climate Change and Global Warming
Not a new topic, but now with the right attention!

No environmental awareness without economic interests

climate change and global warming threaten our existence

climate change and global warming threaten our economy

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What are Current Market Drivers?

Energy is at the top of any agenda

- Demand for energy continues to grow
- 40 percent of the world’s energy is consumed in buildings
- Megatrend - Urbanization: 50%+ population now in urban centers
- Energy is a growing topic on corporate agendas

Rising energy and CO₂ emission costs

Public awareness on climate changes

Crude oil price on 7th November 2007: $98

Source: U.S. Department of Energy, Energy Information Administration
What we know about buildings...

40% of the world energy demand*  
- Transport: 28%  
- Industry: 31%  
- Buildings: 41%

.Produces global 21% of the greenhouse gases***

- Industry (Primär-energieverbrauch): 22%  
- Industry (Elektrizität): 11%  
- Buildings (Primär-energieverbrauch): 14%  
- Buildings (Elektrizität): 13%  
- Forestry: 8%  
- Agriculture waste management: 14%  
- Transportation: 18%

40% of the building life-cycle-costs are energy costs**

- Use & Revitalize: 80%  
- Design & Build: 20%  
- Demolition: 0 - 1

*International Energy Association, auf weltweiter Basis, im Jahr 2002  
** Dena Congress, Berlin, 2008  
*** „Global Mapping of Greenhouse Gas Abatement Opportunities up to 2030“, Building Sector deep dive, June 2007, Vattenfall AB, basiert auf Information von IEA, 2002, % der weltweiten Treibhausgasemissionen; Total 40 Gt CO2e
Challenges for Building Owners

Buildings

- Need for stability and predictability...
- Doing more with less...
- Capital funding needs...
- Business Pressure
  - Reliable & Secure Energy Supply
  - Business Results / Cost Control
  - Aging Infrastructure
  - Corporate & Environmental Responsibility
  - Legislations, Directives, Initiatives
  - Government “efficiency” mandates
- Indoor Air quality & Green strategy...
**Potential & Perspective**

**Results of public studies**

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**Potenziale: Steigerung der Energieeffizienz in Nichtwohngebäuden.**

- Lebenszykluskosten eines Gebäudes: 20% Investitionskosten und 80% Betriebskosten (davon 50% Energiekosten, Tendenz steigend)

- in Dienstleistungsgebäuden (Büro- und Verwaltungsgebäude, Geschäftsbauten, Schulen, etc.) sind wirtschaftliche Energieeinsparpotenziale in Höhe von 30 – 40 % vorhanden,

- ein beträchtlicher Anteil der Dienstleistungsgebäude und der energietechnischen Anlagen in diesen Gebäuden ist sanierungsbedürftig,

- das wirtschaftlich optimale Maßnahmenpaket bei der Durchführung von Instandsetzungsmaßnahmen führt zumeist zu sehr hohen Einsparungen

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**Example:**

**Germany**

- 80% of the Building-Life-Cycle-Costs are driven by operating expense (thereof min. 50% Energy)

- 30-40% of the energy costs in commercial buildings are seen as potential that can be exploited in an economic way - today

- EU-Studies point out, that this potential can be exploited by ESCOs with up-to-date technology.
Energy savings measures in buildings could account for more than half of London’s overall emissions reduction potential, cutting emissions by 10.6 Mt, or nearly one-third, by 2025.

Almost 90% of this carbon abatement potential is based on technological levers that will payback their initial investment through energy savings.

Installing energy-efficient lighting is the single most cost-effective measure identified for buildings, cutting 0.4 Mt of emissions while providing savings of €270 per tonne of CO2 abated.

Businesses have a wide array of carbon-cutting options at their disposal, ranging from more efficient equipment to optimized building automation.
What are the main levers to exploit the tremendous potential?

1. Right Approach
2. Advanced Technology
3. Appropriate Business Models
4. Available Financing
5. Favorable Legislations
6. Professionals
1. Right Approach: Sustainability requires right sequence and holistic approach

- Building Envelope
- Energy Supply
- Energy Distribution
- Heating
- Cooling
- Ventilation
- Indoor Air-Quality
- Lighting
- Water
- Building automation
- User behavior
- Operator qualification
- Energy Management
- Maintenance

30-40% Energy savings can be achieved on a sustained basis
1. Right Approach: Energy-Management an ongoing and evolving process

- No Transparency > No Overview & Control > No Improvement... !
- Sustainable Efficiency is an ongoing process.
- .... it’s not the target to maximize Savings > Maximize the Efficiency !

You normally know the energy consumption of your car.

What about your building ?

... and compared to others - are you good enough ?

Energy supply  Core and auxiliary processes  Buildings

BT BAU
Improves the energy efficiency in buildings

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2. Advanced Technology: Total Building Solution – The Efficiency Enabler

**Scope of BMS:**
- Secure & smooth Operation
- Efficient Operation
- Event Management
- Remote Connectivity
- Monitoring
- Reporting
- Benchmarking
- Data Storage
Today energy-efficiency is mainly seen as product feature.

Main priority in the up-to-date procurement is best price for the investment – GC-Model.

User-investor Dilemma - Distinct responsibility for operations and investment.

No standard procedures for Life-Cycle-Calculation available.

How do you purchase your Energy-Efficiency today?
3. Appropriate Business Models: Performance Contracting

Characteristics

- Specially tailored to customer’s requests
- Guarantee promise ensures success
- Innovative technical solutions
- Optional financing of the investment possible
- Integration of user motivation and operators qualification
- Integration of mandatory measures
- Standardized procedure (EUROCONTRACT)
- Energy-price changes are neutralized in the baseline
4. Available Financing: Global Example (CCI)

**OBJECTIVE**
Significantly reduce greenhouse gas emissions in large cities throughout the world

**STRATEGY**
Increase energy efficiency of municipal and private buildings in C40 cities

**METHODOLOGY**
Performance Contracting and large-scale energy retrofit projects

**C40 CITY COORDINATION**
CCI City Directors

**ENERGY RETROFIT PROJECT EXECUTION**
SIEMENS or other ESCO

**PROGRAM PARTICIPANTS**
C40 cities and private building owners

**PROJECT FINANCING**
$5 billion total commitment from five major global banks

**Greenhouse Gas Reduction**

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4. Available Financing: European Example
Germany (KfW)

Förderberater Sanierung

Start

Soll ein Wohngebäude oder ein Wohnheim saniert werden?

NEIN

Wurde das Haus vor 1984 errichtet?

NEIN

Mit Durchführung der geplanten Maßnahmen wird das EnEV-Neubau-Niveau oder 30 % besser erreicht (= Kategorie A)?

JA

Für Eigentümer von zu sanierenden Ein- oder Zweifamilienhäusern bzw. Eigentumswohnungen

NEIN

Wurde das Haus vor 1995 errichtet?

NEIN

Erfüllen die geplanten Maßnahmen die Kriterien eines der fünf Maßnahmenpaketes (= Kategorie B) Prüfung?

JA

Für Eigentümer von zu sanierenden Ein- oder Zweifamilienhäusern bzw. Eigentumswohnungen

NEIN

Werden CO₂-reduzierende Einzelmaßnahmen durchgeführt?

JA

Alternative

Werden Instandsetzungs- oder Modernisierungsmaßnahmen durchgeführt?

JA

Förderberater Neubau

Für Nichtwohngebäude: Förderberater KfW Mittelstandsbank bzw. KfW Infrastrukturprogramme

NEIN

Soll eine Photovoltaik-Anlage errichtet werden?

NEIN

Wird ein Wohngebäude oder ein Wohnheim errichtet?

JA

Solarstrom Erzeugen

Alternative

CO₂-Gebäudesanierungsprogramm, Kategorie A, als Darlehen

plus 5 % bzw. 12,5 % Tilgungszuschuss

CO₂-Gebäudesanierungsprogramm, Kategorie A, Zuschuss 10 % bzw. 17,5 %

CO₂-Gebäudesanierungsprogramm, Kategorie B - Darlehen

CO₂-Gebäudesanierungsprogramm, Kategorie B, Zuschuss 5 %

Wohnraum Modernisieren in der Variante OKO-PLUS

Wohnraum Modernisieren in der Variante STANDARD

Stand: Januar 2007

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5. Favorable Legislation: Example Europe

- **Directive 2002/91:**
  EPBD - ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

- **Directive 2006/32:**
  EEUES ENERGY END-USE EFFICIENCY AND ENERGY SERVICES DIRECTIVE

- **EU’s / National Energy Efficiency Action Plan**

  - Promoting the improvement of the energy performance of buildings via:
    - Framework for performance calculation
    - Minimum performance requirements for buildings
    - Energy certification of buildings
    - Inspection of installations (heating & cooling)

  - National action plans to achieve 1% p.a. savings
  - Public sector to have an exemplary role
  - Member States to provide guidelines
  - ESPC as an public procurement measure
  - Model contracts for financial instruments

  - Implementing the EEUES Directive
  - Financing energy efficiency
6. Professionals: What is an ESCO?

ESCO = Energy Service Company

- Develop, design, and finance energy efficiency projects
- Install and maintain the energy efficient equipment involved
- Measure, monitor, and verify the project’s energy savings
- Assume the risk that the project will save the amount of energy guaranteed
6. Professionals: What is an Energy Consultant?

- Coach public customer in tender process for energy efficiency projects
- Project manager for implementation phase
- Assist customer in the guarantee phase
6. Professionals: It’s all about People!

- Often lack of information and awareness
- Shortage of energy professionals (Sales, Consulting, Engineering, Services, Remote)
- Too few universities offering curriculum in energy engineering
- ESCO’s are looking for substantial increase of capacity
The necessary framework for ESCO-Business

To make it happen ....

- Establish and engage ESCO-Industry: Change procurement behavior - Procure Efficiency instead of Products or Solutions
- Build up Energy Professionals (Education, Consultants)
- Use available financing and implement special tax incentives
- Use available advanced technology to explore the existing potential
- Look for sustainable solutions instead of low hanging fruits
- Establish a favorable legislative (e.g. Europe – Building Certificates)
Success Story – City of Berlin, Germany
The Energy Saving Partnership (ESP)

Basic Data
- Prior energy costs: 17.2 m € / year
- 164 buildings such as schools, kindergartens, day-care centers, gyms, indoor swimming pools, the JVA Tegel correctional facility, Technical University of Berlin, and Berlin University of the Arts (EU Green Building partner)

Solution
- Energy management system
- Heat generation / distribution
- Air-conditioning & ventilation
- Water technology
- Control, monitoring, maintenance
- Education

Customer Benefits
- Guaranteed total savings: 5.3 m € / a
- Immediate budgetary savings for Berlin: 1.14 m € / a
- Contract duration: 9 to 12 years
- Initial investment: 28.5 m €
Energy Performance Contracting
Success Story – Clinics Bremerhaven-Reinkenheide

Basic Data
- Prior energy costs 2004: €2.0 million / year (Baseline)
- 680 beds
- Less modernization during last 20 years

Solution
- Energy management system
- Heat generation / distribution
- Air-conditioning & ventilation
- Water technology
- Control, monitoring, maintenance
- Education

Customer Benefits
- Guaranteed total savings: €0.52 million / year
- Contract duration: 9 to 12 years
- CO2 emission reduction: 45%
- Initial investment: €5.2 million
- Higher plant availability
- Secured financing
Energy efficiency for buildings made by Siemens

**BAU winner of the 2006 and 2007 European Energy Service Award**

- 1'500+ energy projects since 1994
- 7'500+ buildings updated with latest energy saving technologies
- 1"5 EUR total saving reached for customers
- 700'000 tones CO₂ reduction per year (= 230'000 cars driven 20'000 Km per year)

**Achievements**

**BAU is a lead participant in sustainability Initiatives**

- Partnership with Clinton Climate Initiative resulted in projects with City of Houston and Allegheny College, PA USA

- 1st LEED Platinum Project Completed in USA - The Tahoe Center for Environmental Sciences at Sierra Nevada College

**Greenbuilding Award 2008**

EU commission commended Building Technologies for outstanding achievements in support of its GreenBuilding Program

* Activities include: Contact with CCI’s City Director to introduce how energy efficiency project works, contact with the city’s staff responsible for buildings and working with them and the CCI Directors to begin the RFQ/RFP process. In some cities, we are in RFQ process to get qualified as one of the ESCOs to bid on projects.
Thank you for your attention!

How green is your building?
Maximize Efficiency! - Our answer for your infrastructure

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