



# **Energy services – Hotspot Berlin as a national and international role model**

**Dipl.-Ing., Dipl.-Wirtschaftsing. Michael Geißler**  
**Managing Director**  
**Berliner Energieagentur GmbH**

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## Overview

- **Berliner Energieagentur: Facts and Figures**
- **Surveys of the Contracting Market in Germany**
- **Hotspot Berlin – Energy Service Models**
- **International Know-how-Transfer**





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## BEA – Facts and Figures

### *Foundation*

- in 1992 as Public-Private-Partnership

### *Shareholders*

- Federal State of Berlin
- Vattenfall Europe Wärme AG
- GASAG
- KfW Banking Group

### *Disposes of*

2.5 million € of capital stock

### *Annual Turn-Over*

8.2 million €

556 k€ Company earnings (EBIT)

### *Know-how*

55 members of staff

### *Energy Services*

- Contracting
- Consulting
- International Know-how-Transfer

### *Based in*

Französische Straße 23

10117 Berlin

Phone: +49 - 30 - 29 33 30 - 0

e-mail: [office@berliner-e-agentur.de](mailto:office@berliner-e-agentur.de)

Internet: [www.berliner-e-agentur.de](http://www.berliner-e-agentur.de)





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## BEA – Track Record

- Developing **PPP-scheme/Energy Saving Partnership** Berlin for public buildings since 1996  
(1,300 buildings; 25 % guaranteed savings; 50 mio Euro private ESCO-Invest)
- Providing **Energy service model projects** in the field of Combined Heat & Power (CHP), CHP cooling (trigeneration) and solar energy for housing sector, industry and commerce since 1994
- Facilitating **Know-how-Transfer** and **Market Development** since 1999 in Central and Eastern Europe, Western Europe, Brazil, Chile, Mexico, India

### *Technology-based Generation Data*

- At about 60 sites in the region of Berlin; incl. CHP-, Solarthermal-, PV-sites
- 36 CHP-units, annual electricity generation approx. 5,600 MWh
- Direct electricity supply for around 2,500 households in Berlin
- CO<sub>2</sub>-savings of > 2,500 t/a

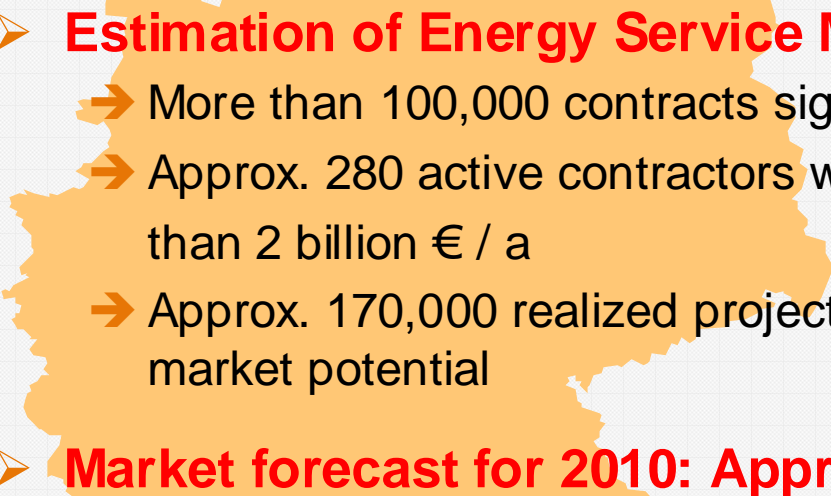




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## Energy Services – German Market

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- **Estimation of Energy Service Market (2008):**
    - ➔ More than 100,000 contracts signed
    - ➔ Approx. 280 active contractors with total revenue of more than 2 billion € / a
    - ➔ Approx. 170,000 realized projects, this represents 12 % of the total market potential
  - **Market forecast for 2010: Approx. 220,000 projects**

Source: various sources, figures based on calculation by BEA, Sept. 2007





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## Energy Performance Contracting Market

- 
- **Market Distribution** (*realised investments*)
    - ➔ 80 % Energy Supply Contracting
    - ➔ **15 % Performance Contracting**
    - ➔ 5 % Maintenance and administration of technical installations
  - **EPC: Relevant share of the market**
  - **Growing market sector**

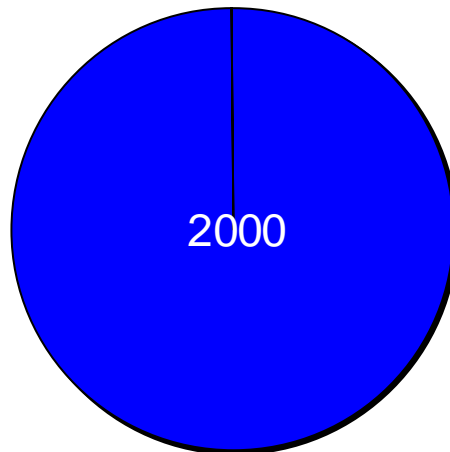


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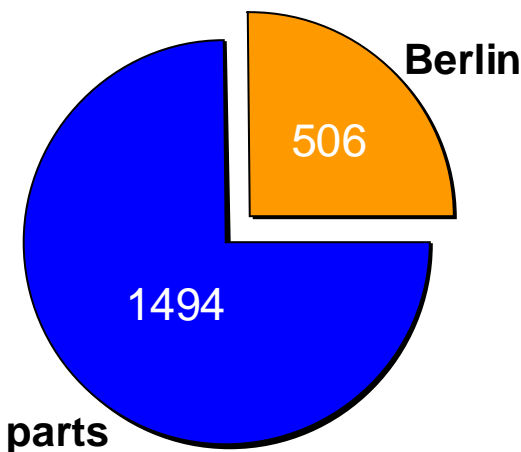
## EPC Hotspot Berlin

EPC in public estate in Germany



Dena/Prognos 2007

Proportion EPC in Germany / Berlin



→ Hotspot: More than 25% of EPC in Berlin



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## Prototypes of Energy Services

### 3 role models in Berlin:

- Energy Saving Partnership
- Traffic light contracting
- Provision of CHP



Picture: Stadtlicht GmbH

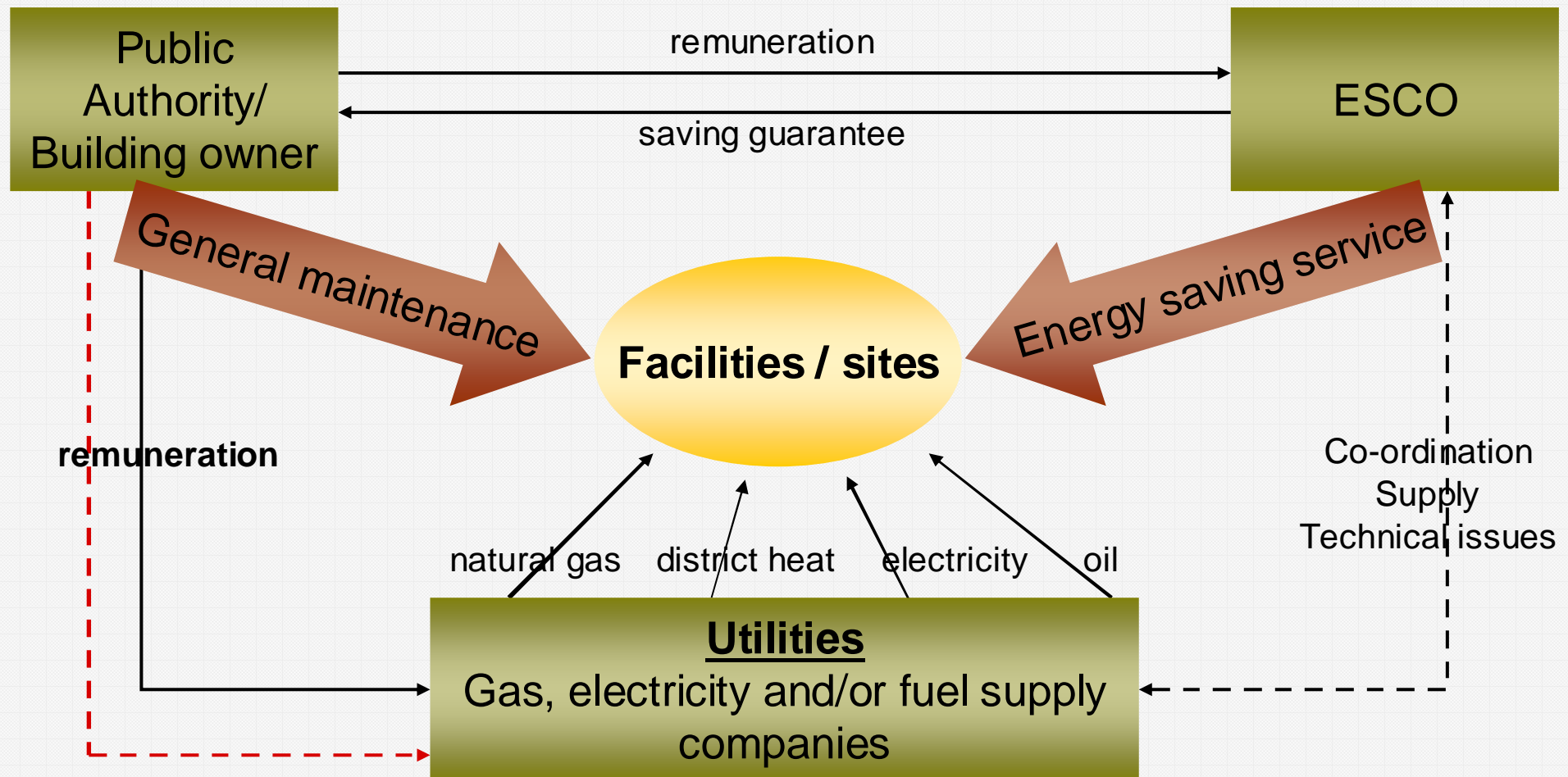




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## Hotspot Berlin: Energy Saving Partnership (ESP)





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## Energy Saving Partnership Berlin – A Model of Success

	Pool 1	Pool 2	Pool 3	Pool 4	Pool 5	Pool 6	Pool 8	Pool 9, driehshain
Liegenschaften	Total number of Pools: 25							30
Baseline-Kosten in €/a	more than 1,300 buildings							1.090.529 €
Baseline-Verbrauch in MWh/a	74.810	100.990	52.540	49.512	27.476	17.121	18.031	21.952
Energiesparpa	Guaranteed savings in total: € 10.75 million (26 %)							Energie AG
Vertragsbeginn	Annual plus to the public household: € 2.7 million							E mit WFM
Beginn Hauptleistungsphase	01.04.1996	01.04.1996	01.10.1998	01.03.2000	01.01.2001	01.02.2001	01.11.2004	01.10.2001
Dauer der Hauptleistungsphase	10,75 Jahre	10,75 Jahre	10 Jahre	11 Jahre	11 Jahre	11 Jahre	8 Jahre	10 Jahre
Dauer der Hauptleistungsphase	Total CO <sub>2</sub> -reduction (1996-2008) : approx. 398,000 t							10,00
Erstinvestition in €	Total net Investment: € 49.20 million							939.243 €
Garantieeinsparung in %								19,67%
Garantieeinsparung in €	789.705 €	1.369.025 €	423.787 €	502.147 €	348.519 €	14.656 €	224.000 €	214.507 €
CO <sub>2</sub> -Einsparung in t/a								925
Garantierte Heizkostenersparnis %								3,46%
Garantierte Heizkostenersparnis €/a								37.753 €
Zusätzliche Beteiligung des AG in %	ab 20 % Einsparung: 70 ab 25 % Einsparung: 60 ab 30 % Einsparung: 50	ab 30 % Einsparung: 50	10	80	50	50	80	90
Bedienung / Instandhaltung von Altanlagen durch AN	ja	ja	ja	ja	ja	ja	nein	nein





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## EPC – Risk Allocation

<b>Risk of use</b>	by building owner; change of use => modification of guaranteed savings
<b>Energy price risk</b>	by building owner; rising prices => protection of contractor decreasing prices => benefit for building owner
<b>Technical risk</b>	by contractor; guarantee of performance, technical condition & availability
<b>Economic risk</b>	by contractor; for the total investment into ESC schemes
<b>Ownership</b>	Equipment transferred into the property of building owner at the moment of installation and/or hand-over

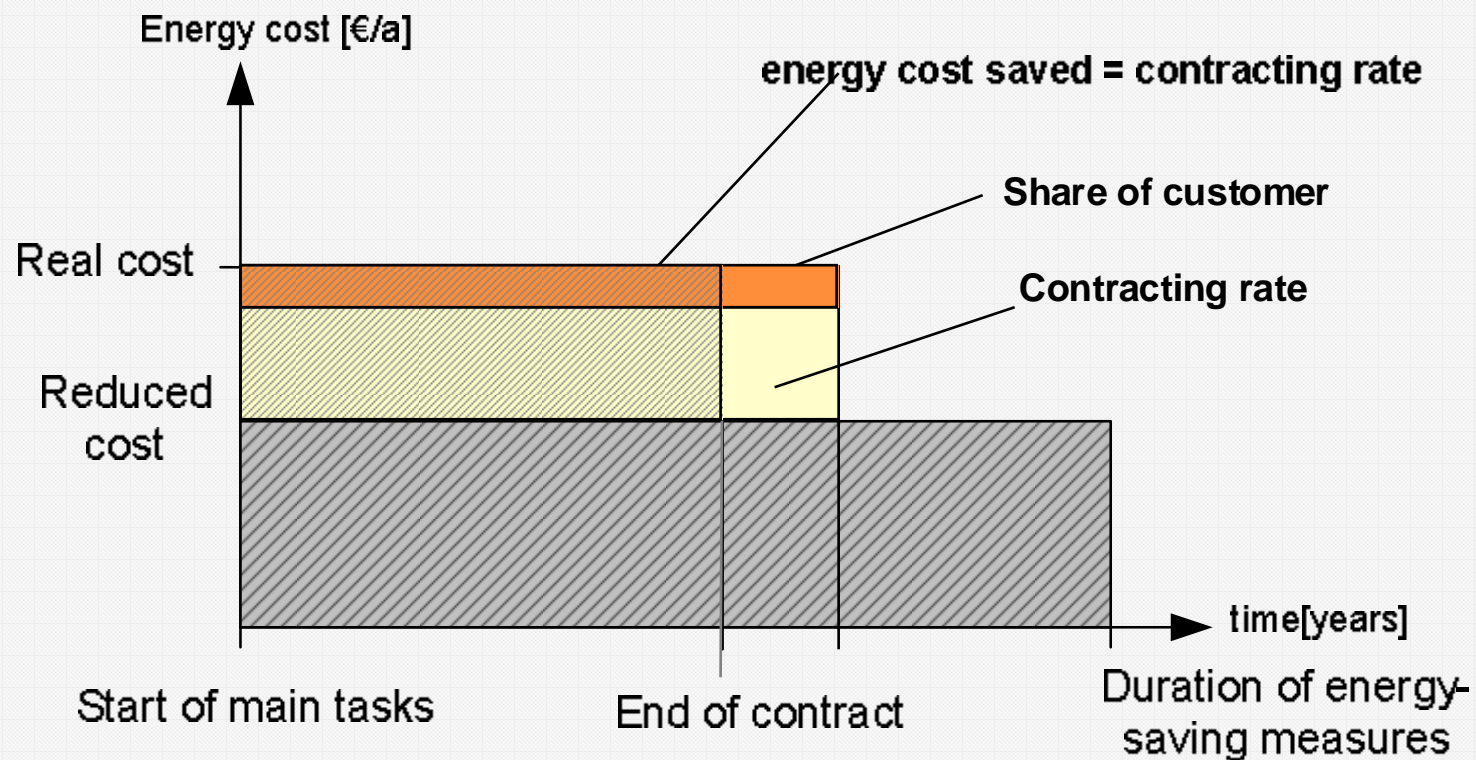


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## EPC – Third Party Financing

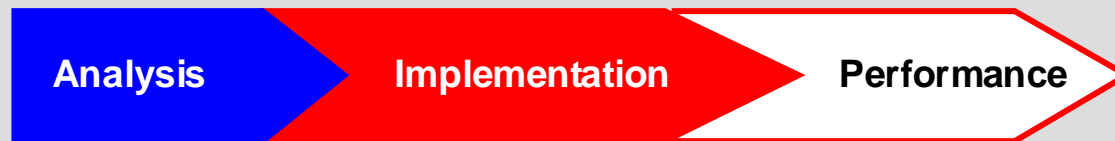
### Duration Model / Participation Model





## ESP - Contract Types

### Single-stage Contract



### Two-stage Contract





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ESP – Many years of extensive experience

## Preparatory phase

- Sufficient time for adjustment of measures needed
- Intensive communication between client and contractor is essential

## Phase of main obligation to perform

- Change in use of building have to be discussed
- Additional efficiency measures are possible during the complete contract phase

## Energy Savings

- Achieved savings are usually within the scope of guarantee or higher
- **Energy savings can be even higher when extending the contract or after re-tendering**

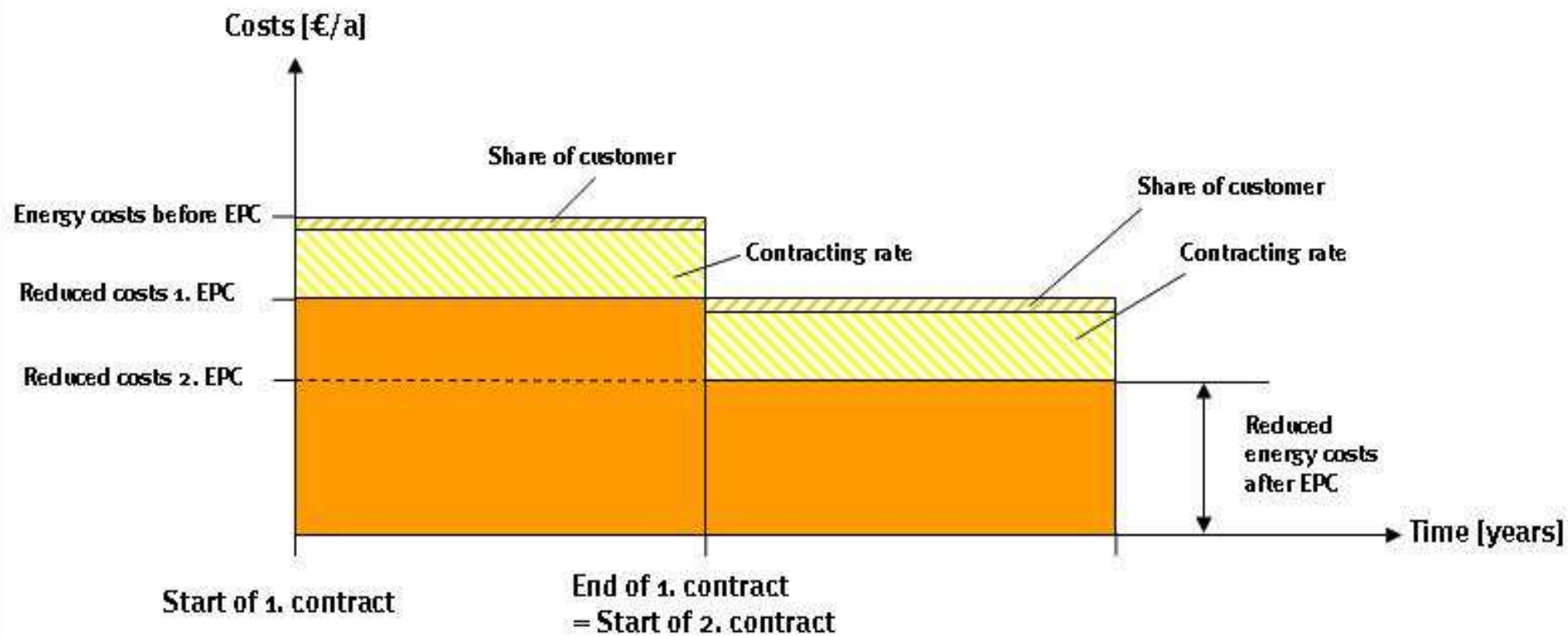




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## ESP – Gained Experience





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## Best Practice – Berliner Immobilienmanagement GmbH (Pool 24)

### Re-tender after expiration of first ESP contracts (Pools 1 + 2)

- **Pool 24:** 18 office buildings (approx. 300,000 m<sup>2</sup> GFA)
- **Baseline 2007:** 2.07 Mio. €/a
- **Guaranteed savings:** 21 % = 433,757 €/a
- **Investment:** approx. 2.4 Mio. €
- **CO<sub>2</sub>-reduction:** 2,208 t/a
- **Duration:** 10 years
- **Measures (selected):** boiler replacement,  
CHP-unit, optimizing of ventilation  
systems, renewal of CBCS



**Special feature: obligation of maintenance  
of all old systems**





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## Hotspot Berlin: Lighting Services

**More than 2,000 traffic lights in Berlin**

**1/3 with outdated high-voltage technology**

**High energy consumption**

**High maintenance costs**

**→ Tendering of all traffic lights**

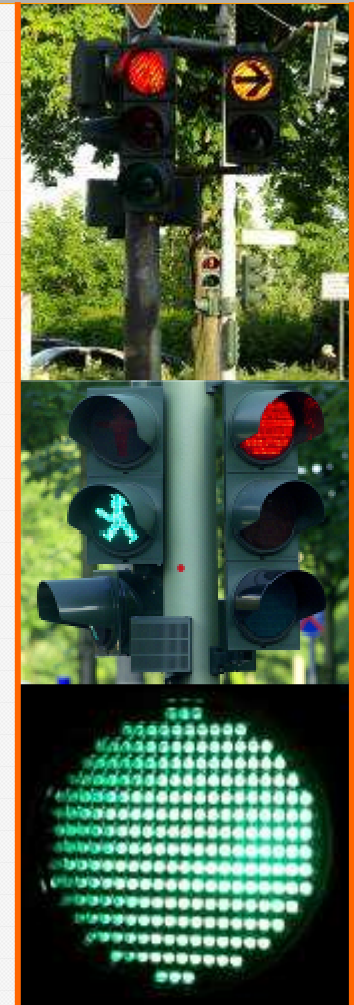


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## Traffic lights in PPP

- **Since 2006 Public Private Partnership (PPP) between the State of Berlin and Stadtlicht GmbH**
- **Stadtlicht GmbH is responsible for**
  - Management
  - Modernisation
  - Construction
  - Operation
  - Maintenance
- **Contract duration**      10 years
- **Total volume**            126 Mio. Euro





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## Results and Experience

- **Application of LED technology**
  - Energy saving of up to 80 % (compared to high voltage lights)
  - Less failures
  - Higher light intensity
  - 20-times longer lifetime
- **618 traffic light systems modernised with LED**
- **Professional management and innovative ideas**
- **Green Light Partner since 2007**



<b>Energy savings</b>	2.75 GWh/a
<b>Budget relief</b>	1 Mio. Euro/a
<b>Climate benefit</b>	1,650 t CO <sub>2</sub> /a



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## Hotspot Berlin: Combined Heat & Power (CHP)



- „CHP Model City Berlin“
- CHP-Hotspot Berlin
  - ➔ 42 % CHP share of electricity production
  - ➔ 1,500 km community heating
  - ➔ Location for research and production
- Targets of the Initiative
  - ➔ Inform about advantages of CHP
  - ➔ Contribution to further development of CHP

CHP electricity produced per capita 2005 (in kWh)

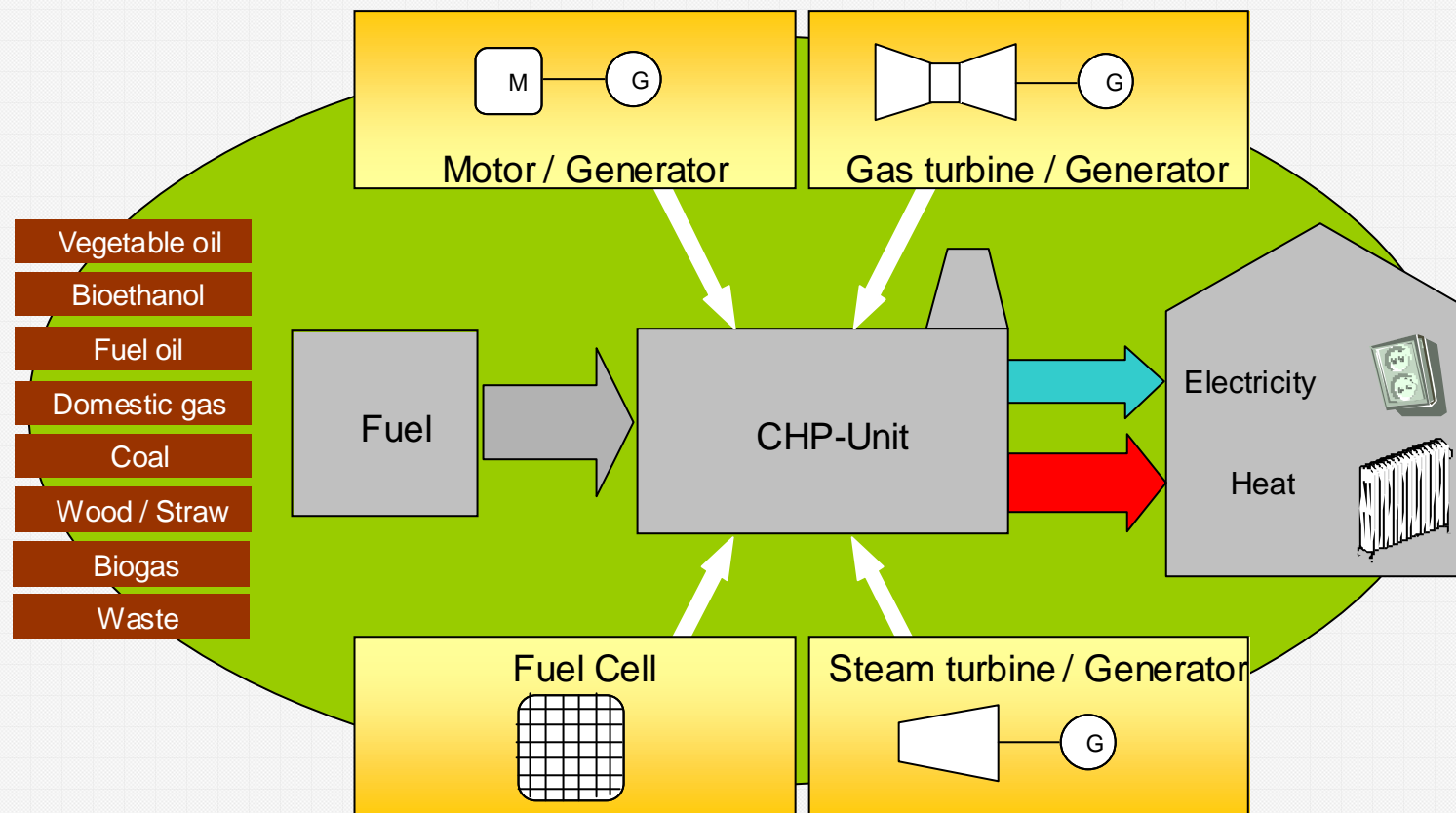




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## Provision of CHP





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Micro-CHP works in many cases...

with more and more customers



CHP Lindenhof  
20 kW<sub>el</sub> / 46 kW<sub>th</sub>



CHP Pulvermühle  
50 kW<sub>el</sub> / 95 kW<sub>th</sub>



CHP Bremer Höhe  
18 kW<sub>el</sub> / 42 kW<sub>th</sub>



CHP Ostseeplatz  
34 kW<sub>el</sub> / 78 kW<sub>th</sub>



CHP BSR  
50 kW<sub>el</sub> / 95 kW<sub>th</sub>



CHP Stadt & Land  
50 kW<sub>el</sub> / 95 kW<sub>th</sub>



CHP BIM  
34 kW<sub>el</sub> / 78 kW<sub>th</sub>



CHP Lindenhof  
20 kW<sub>el</sub> / 46 kW<sub>th</sub>



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## Hotspot Berlin: International Activities



- Model contracts and tender documents (A, D, F, FIN, GR, I, N, S)
- Core target: getting projects off the ground
- Results: 17 new EPC-projects kick-started



### – Clearinghouse for Energy Contracting in CEE

- Model contracts and tender documents for eight CEE countries
- Local capacity building (LV, LT, PL, CZ, SLO, SK, BG, H)
- CZ: >10 contracts signed since 2003

### Berlin experience transferred – individual know-how transfer

- Slovenia, Bulgaria, Latvia, Poland, Mexico, Estonia
- ongoing: Chile, Brazil, India, Belgium, Romania, Serbia





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## EPC Pilot Project Hospital Barros Luco Trudeau, Santiago de Chile

70,000 sqm, 600 beds

### Energy consumption

- 11,059,185 kWh electricity
- 1,548,706 m<sup>3</sup> natural gas (2005)

### Proposed Contract

- guarantee of 5 % energy savings on historical gas consumption
- Installation of control and maintenance system





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## CHP / Trigeneneration in India

### Tamil Nadu Guest House, in New Delhi (under development)

- Houses of ministers, public representatives and state VIP`s
- 2 buildings: Old & New Tamil Nadu Guest house, distance 4,000 m between them
- Energy supply by trigeneration for New Tamil Nadu Guest house:  
Peak electrical demand of 250 kW; peak chilling demand of 932 kW<sub>0</sub> (265 TR)



### Configuration of the co-generation plant:

- Gas based cogeneration: 347 kW<sub>el</sub> along with a 369 kW<sub>0</sub> (105 TR) VAM
- Additional chilling demand of 563 kW<sub>0</sub> (105 TR) is proposed to be covered by centrifugal chillers





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Berlin is Hotspot for Energy Services

➤ **General:**

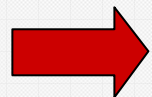
- Implementation of EPC since 1994
- Constant increase and development of projects
- Today: ESP in 1,300 buildings (25 pools)
- ~ 300 CHP (centralized/decentralized) cover 30% of total heat

➤ **Driving forces:**

- Decision makers who take on the responsibility
- Willingness for privatisation
- Berliner Energieagentur supports project development / implementation

➤ **Standardized procedures and contracts:**

- Time and cost effectiveness for implementation, reliability
- Competition and transparency



**Berlin sets standards for energy services in Europe  
and shares its experience worldwide since 1998**





## European Energy Service Initiative - EESI

- June 2009 – May 2012
- **Project coordination: Berliner Energieagentur (BEA)**
- 9 Partner: Belgium (Cenergie), Sweden (IVL), Norway (NEE), Czech Republic (SEVEN), Slovakia (ECB), Slovenia (IJS), Romania (ARCE), Austria (GEA), France (RAEE)

### Objectives

- Advanced quality standard for EPC
- Enhanced capacity-building
- Transnational information via help-desks
- Innovative pilot projects
- Concerted advice to policy-makers (NEEAP 2011)
- European Energy Service Award 2009 - 2011







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*Thank you for your attention!  
For more information please visit:*

**[www.berliner-e-agentur.de](http://www.berliner-e-agentur.de)  
[office@berliner-e-agentur.de](mailto:office@berliner-e-agentur.de)**