Ministry of Industry and Trade

Federal Ministry
for Economic Affairs
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Energy Services
Successful Business Models
The German Experience

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Contents

- Energy Services
- German Market
- Financing Schemes / Business Models
- Best Practice
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Berlin Energy Agency (BEA)

- **30 years of experience** in energy efficiency (energy supply and demand)
- founded in 1992 by the State of Berlin to develop and implement **innovative, replicable pilot projects and services**
- specialist in **energy efficiency in buildings** by means of **energy services**
- owns and operates more than **150 decentralized energy generation systems** (mostly micro-CHP units and PV systems)
- uses technical know-how to provide **consultancy on energy concepts, energy management and user behaviour** in Berlin, Germany and beyond
- internationally a leading advisor on energy service models and energy-efficient technologies

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International Activities – EPC Market Development (selection)

Monaco Preparation and successful tender of **EPC pilot project** for public buildings

PRINCIPAUTÉ DE MONACO
DIRECTION DE L'ENVIRONNEMENT

Romania Support to **EPC pilot projects in municipalities** for public buildings and street lighting

European Bank for Reconstruction and Development

Saudi Arabia **Development of a national ESCO programme** and support to the establishment of a Super-ESCO structure

البرنامج الوطني لإدارة وترشيد الطاقة
National Energy Efficiency Program

Indonesia Development of an **ESCO business model for industrial areas**

Mongolia Project development for **EPC in a public building**

IFC International Finance Corporation World Bank Group

Russia Support in developing guidelines on **energy service models for multi-storey dwellings**

South Africa Facilitation for **ESCO Market Development & Co-/Trigeneration**

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Definition

Energy Services

*"The physical benefit, utility or good derived from a **combination of energy with energy efficient technology and/or with action**, which may include the operations, maintenance and control necessary to deliver the service, which is **delivered on the basis of a contract** and in normal circumstances has **proven to lead to verifiable and measurable** or estimable energy efficiency improvement and/or primary **energy savings**"*

Source: Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC, Official Journal L 114, 27.04.06. p.68.

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Energy Services – Types and Definitions

Energy operation Contracting / Energy Warden	Equipment Installation	Energy Supply Contracting	Energy Performance Contracting
Energy efficient operation of existing equip-ment/appliances (no investment)	Delivery & installation of equipment/parts of equipment	➢ Planning, financing, implementation ➢ Operation	➢ System analysis, planning, financing, implementation & operation ➢ System responsibility for equipment & users' behaviour
Invoicing of operation cost	Invoicing of installation	Invoicing of energy delivered	Invoicing of reduced energy consumption

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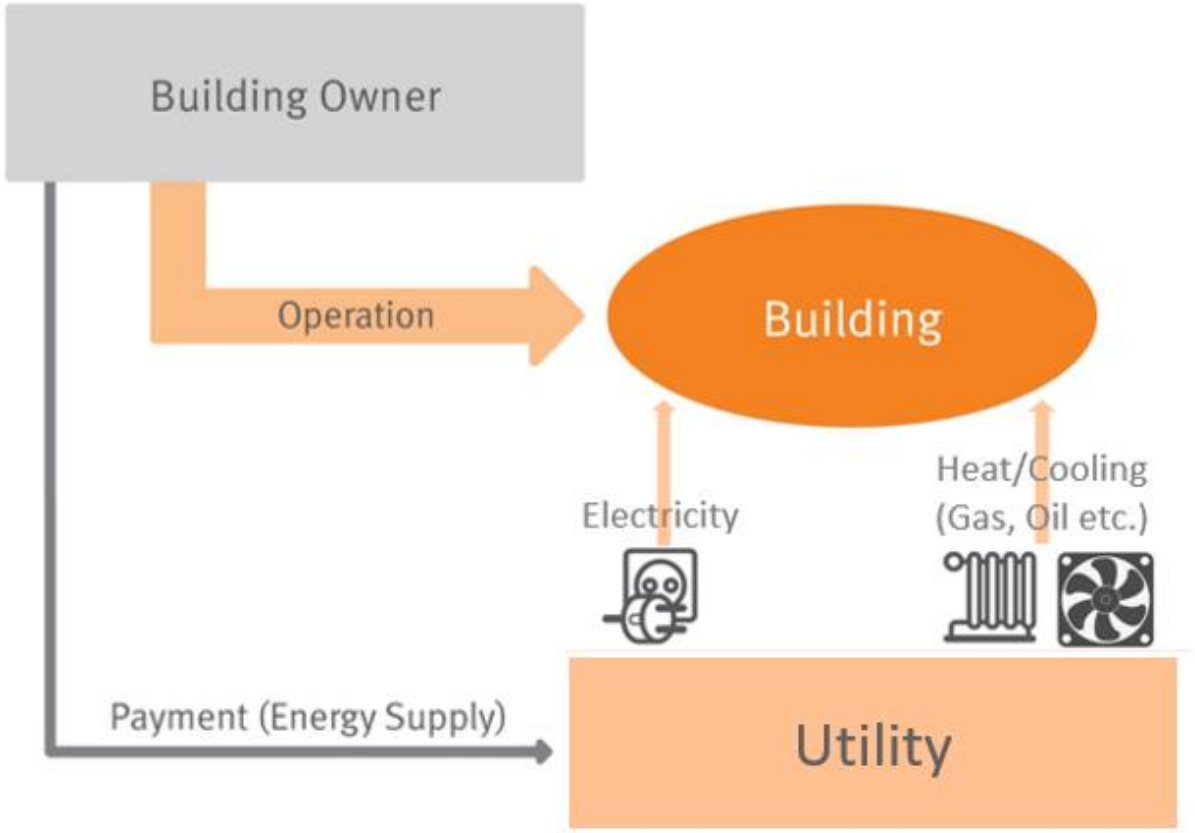
Typical Energy Supply Situation without Energy Services



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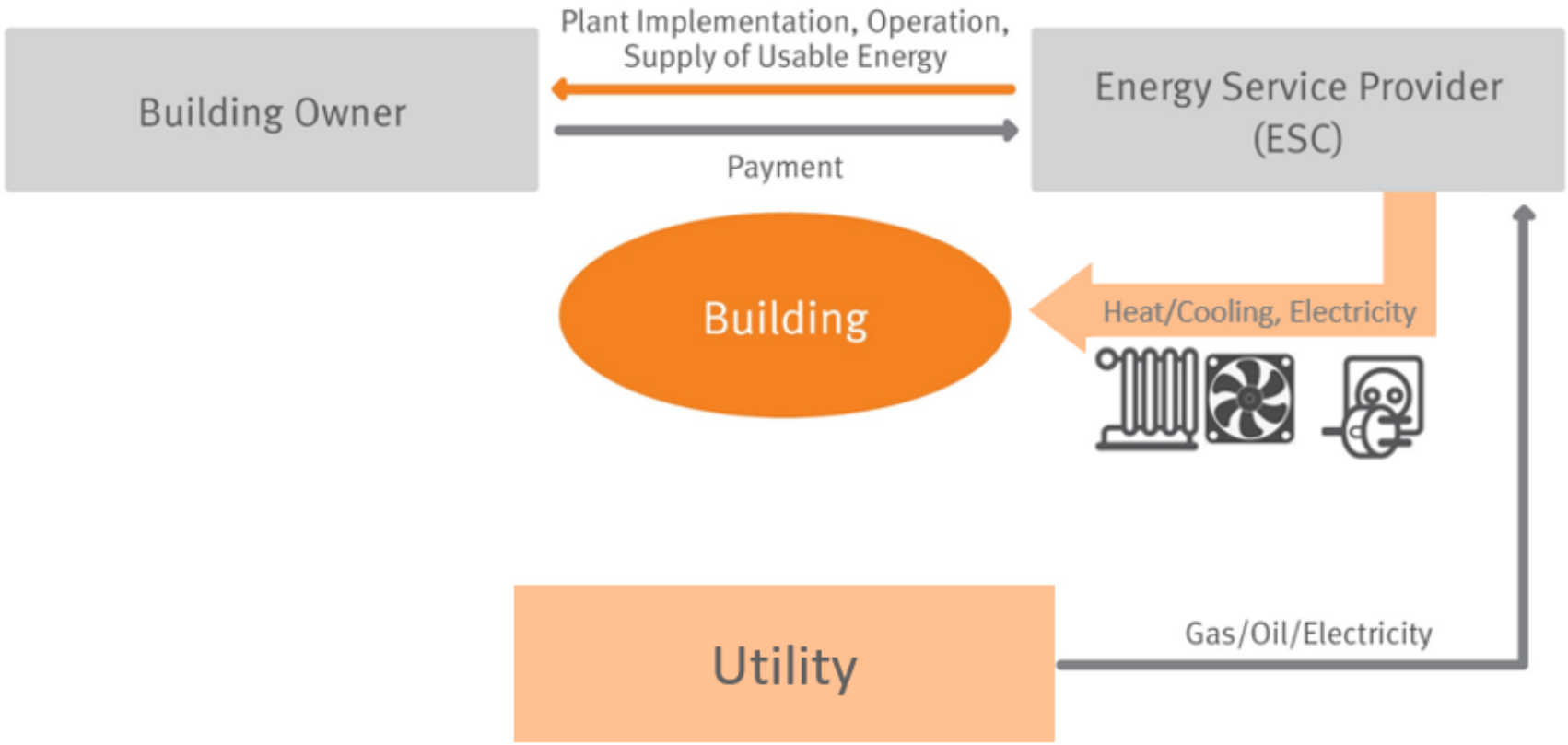
Energy Supply Contracting – General Project Scheme



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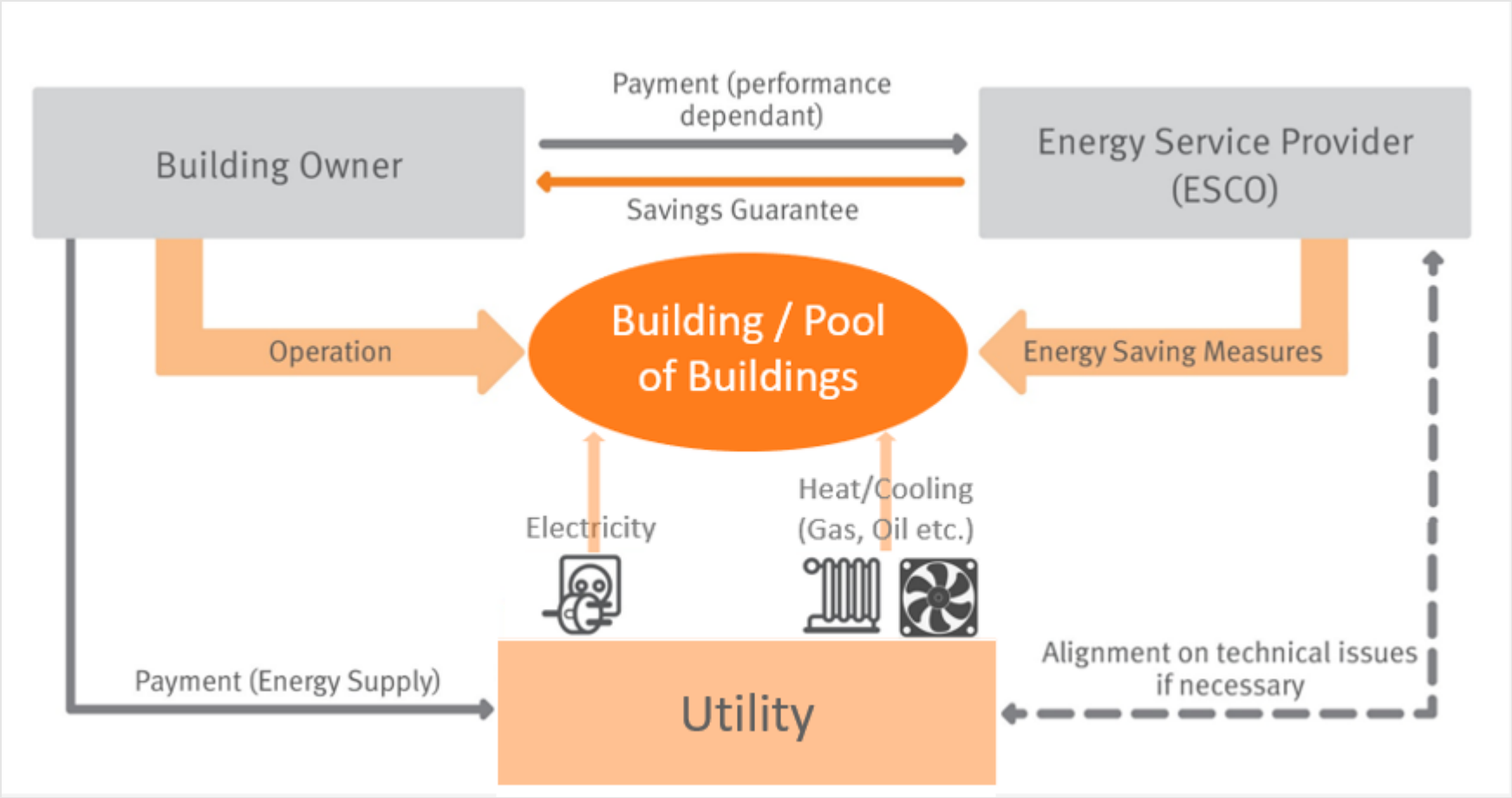
Energy Performance Contracting (EPC) – General Project Scheme



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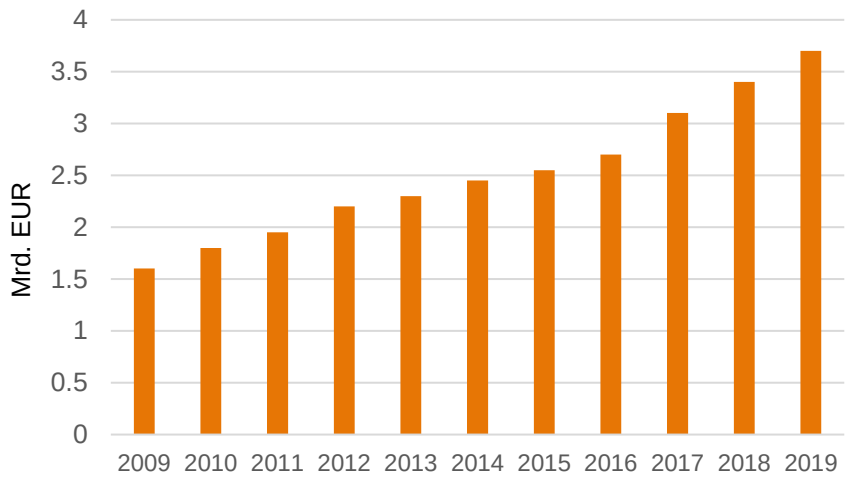
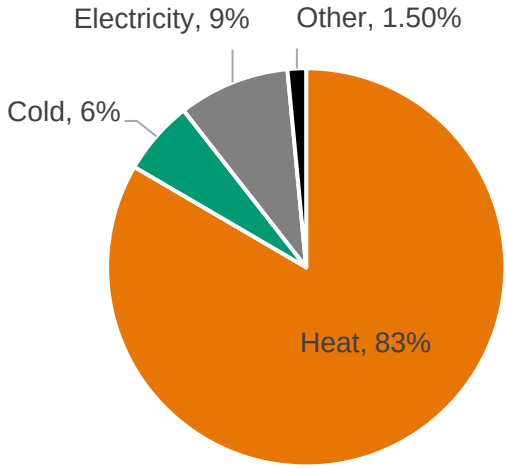
Energy Services – German Market

Energy Contracting is an important instrument for the success of the energy transition. In Germany, it is particularly relevant as a mechanism for increasing energy efficiency in the building sector.

Development of the market revenue in Germany (2009 – 2019)



Energy forms supplied in Contracting in Germany in 2019



Source: Verbands für Energiedienstleistungen, Effizienz und Contracting (vedec)

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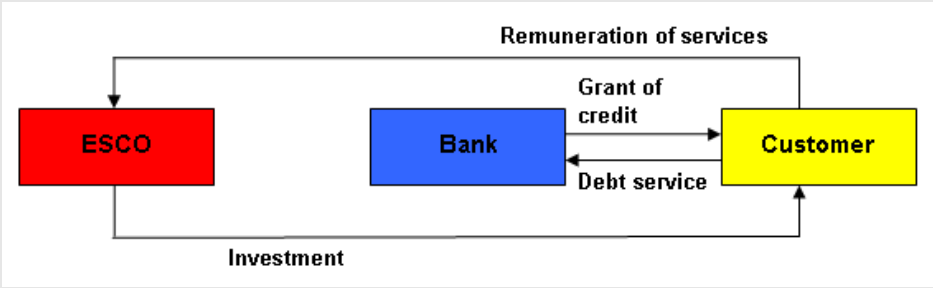
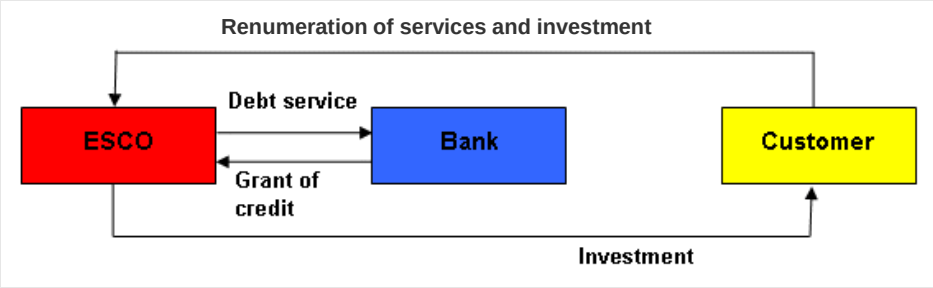
General financing options for energy services

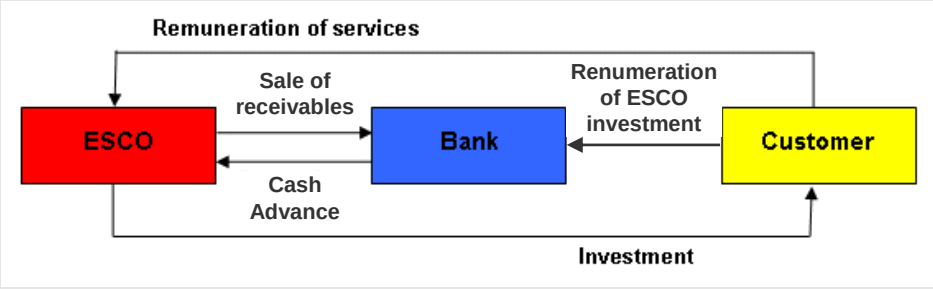
Financing through client



Financing through ESCO (credit)



Financing through ESCO (forfaiting)



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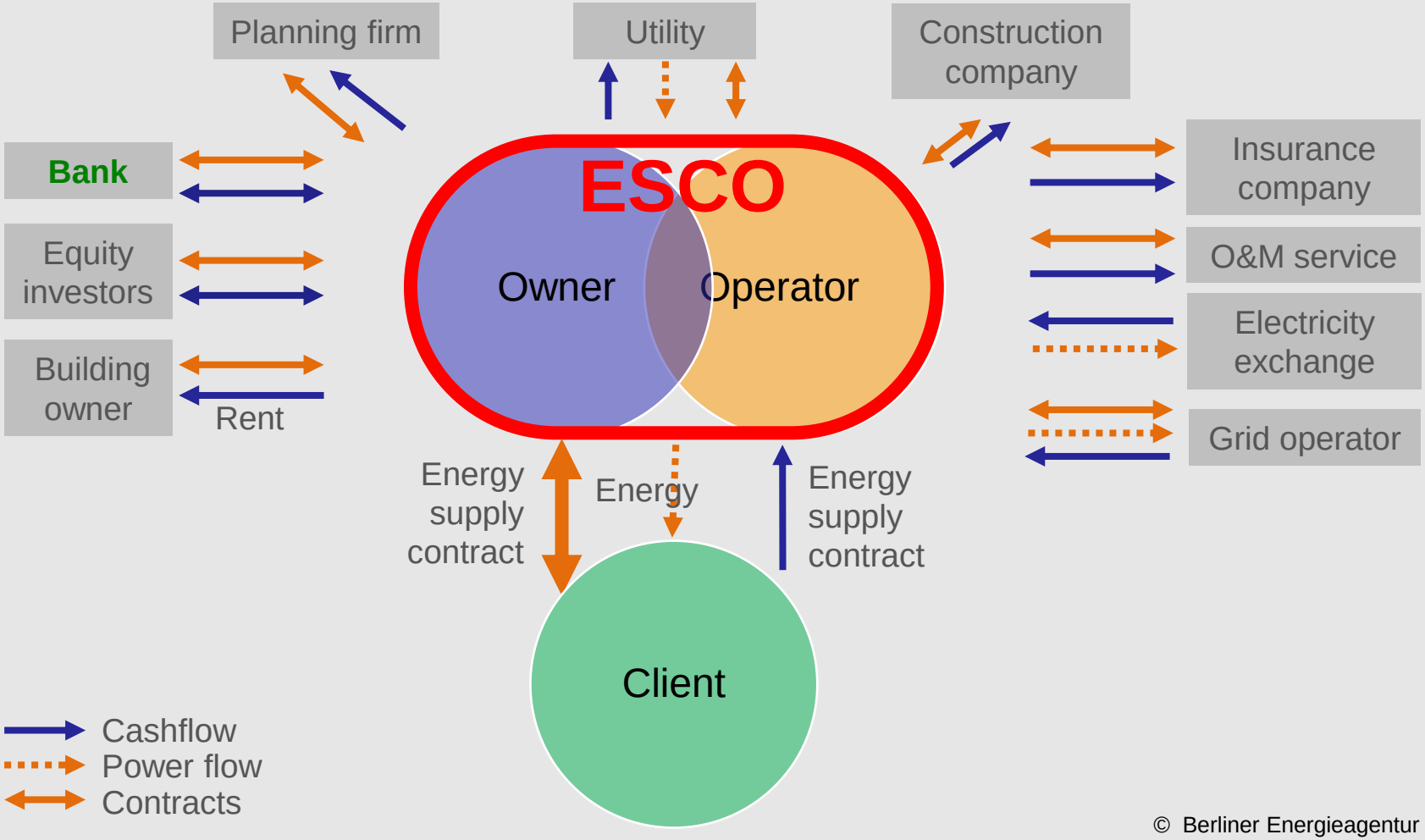
Energy Supply Contracting – Loan Financing (General Scheme)



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Best Practice I: Energy Supply Contracting – Photovoltaics

Berliner Großmarkt (Berlin Wholesale Market)

Berlin Wholesale Market

- one of the largest wholesale markets in Germany:
  - 330,000 m^2
  - 300 retailers
  - revenues of retailers: € 1 billion per year

PV system:

- PV modules: approx. 5,500 at 280/290 Wp each
- Installed capacity: 1,600 kWp
- Electricity generation: approx. 1,400 MWh/a
- covers approx. 80% of general electricity consumption (lighting, part of cooling, etc.)
- Start of supply: 2012

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Best Practice II: Trigeneration – Service complex „Königstadt-Terrassen“

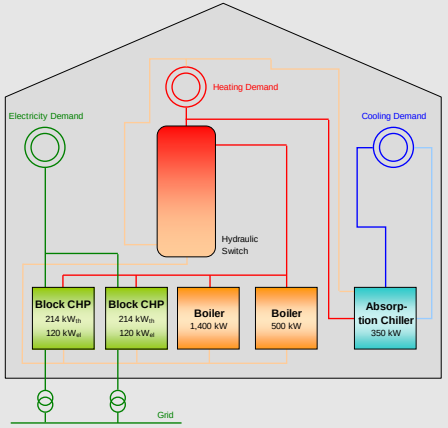
Services Building Complex „Königstadt-Terrassen”

- Tenants: Shops, medical practices and offices (25 units)
- Size: ca. 42,000 m² heated floor space
- Heating demand: 2,800 MWh/a
- Cooling Demand: 175 MWh/a
- Commissioning of trigeneration system: 1996
- Renewal of CHP systems 2015

Königstadt-Terrassen Schönhauser Allee, Berlin-Prenzlauer Berg

Technologies used

- Natural gas boiler running at low temperature: 1,900 kW
- 2 natural gas operated CHP units: each 120 kW_{el},214 kW_{th}
- Absorption chiller unit: 350 kW



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Best Practice III: Energy Performance Contracting – Wenckebach Hospital Berlin

- Building: public-owned hospital with 438 beds
- Baseline: 808,359 €/a
- Guaranteed savings: 39.6 % = 320,000 €/a
- Invest: 2.44 m €
- CO_2 reduction: 1,789 t/a
- Duration of contract: 12 years (start in 2011)
- Measures: modernisation of heat distribution, cooling and ventilation system, installation of CHP unit, web-based energy management system, user trainings
- Special feature: insulation of top storey ceilings

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Energy Services – Criteria and Conditions of Success

- Driving force:
  - Decision makers who take on the responsibility
- Reliable legal framework:
  - Clear information that Energy Services are allowed, tender procedure confirmed
- Standardized procedures and contracts:
  - Time and cost effectiveness for implementation, reliability
  - Competition and transparency
- Neutral process management:
  - Trustworthiness, both technical and economic know-how
  - Potential mediator in conflict situation

Outlook

Energy Services

- ✓ offer new business
- ✓ reduce energy demands and costs
- ✓ guarantee security of supply
- ✓ reduce CO2-emissions

Win-Win-Win

- Building Owner/User
- Energy Service Company (ESCO)
- Environment

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