

„Climate Policy Activities – Berlin’s Pioneering Role“



Photo: Louis Back

Hella Dunger-Löper

Permanent Secretary for Building and Housing
Senate Department for Urban Development, Berlin

Outline

- **Fundamentals**
- **Climate Policy Working Programme**
- **Ecological Construction**
- **Implementation Strategies at the Federal State Level**
- **EU Project BEEN / Urb.Energy**
- **Where Do We Stand?**

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Fundamentals - International and National Context

Following [Kyoto](#) and in preparation for the [Bali](#) conference, the EU under the German Presidency, amongst other things, formulated a range of climate protection targets.

What had been achieved so far and the formulation of further goals were discussed at a follow-up conference in the fall in [Copenhagen](#).

In Meseberg in 2007 the Federal Government adopted a comprehensive package of legislative initiatives and support measures in the form of the [Integrated Energy and Climate Program \(IEKP\)](#).

The individual resolutions display a [complex interrelationship](#) and through their combined action can make a considerable contribution to reducing the developing effects of climate change.

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Focus on Energy Efficiency

- Intergovernmental Panel on Climate Change
- UN Climate Change Conferences
- EU Climate Summits
- Key Targets of the Energy and Climate Protection Programme of the German Government
 - Lowering greenhouse gases by approx. 36 % by 2020
 - Reducing CO₂ emissions by 40 % by 2020
 - Increasing proportion of renewable energies by 25 to 30 % by 2030
 - Increasing electricity production through combined power and heat by 25 % by 2020
 - CO₂ emissions reducing buildings rehabilitation programme

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Demands Placed on Climate Protection in Berlin up to 2020

Target: Reduction of Berlin's CO₂ emissions by 40 % compared to 1990

25 % reduction (from approx. 29 to approx. 22m t) achieved by 2005
necessary reduction of approx. 4.3 m t CO₂ to approx. 17.6 m t

Residential housing and private household sector must make a decisive contribution

CO₂ emissions of the housing and private household sector 2005:

approx. 5.0 m t from heating,
approx. 0.7 m t from warm water generation,
approx. 2.5 m t from electricity consumption,

approx. 8.2 m t CO₂ = approx. 37 % of Berlin's CO₂ emissions

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Starting points for CO₂ reduction in the housing stock

Reduce the energy consumption of the residential building fabric

Housing inventory 2007 approx. 1.84 m apartments
approx. 129 m m² **living space** (70 m²/housing unit)
equivalent to annual **CO₂**: 64 kg/m²; 4.5 t/housing unit
equivalent to **energy consumption**: approx. 15,000 kWh/housing unit,
or 205 kWh/m² annually, of which 160 kWh for heating, 20 kWh for
warm water and 25 kWh for electricity

Further develop reduced CO₂ energy supply forms

Reduced CO₂ energy carriers
Combined heat and power generation
Renewable energy sources

Promote Energy Saving Behaviour

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Berlin Regulations and Resolutions

- The Land Berlin Energy Programme 2006-2010
- Berlin Climate Protection Act
- The Coalition Agreement 2006 u. a.
 - 25 % reduction in CO₂ emissions for the period 1990 bis 2010
 - Thermal insulation of public buildings by 2011
 - Greater use of contracting agreements for public buildings
 - Issuing of energy efficiency certificates for all public buildings
 - Electricity contracts excluding use of nuclear power / 50 % of electricity from combined heat and power, 20 % from renewable energies
 - Use of roof space on public buildings for solar energy systems
- Prolongation of the Land Berlin Energy Programme for 2010-2020
- Implementation of current federal government resolutions

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Federal State of Berlin / Senate Climate Protection Activities

The Federal Government recommends the Federal States to take on a pioneering role in climate protection, especially in the private sector. Berlin intends to take on this challenge.

Climate protection is being tackled on a cross-departmental basis in Berlin. This primarily involves the **Environment, Economics and Urban Development** departments, however Education and Science are also affected.

The basis of the work in all departments is, amongst other things, the **Senate's Climate Policy Working Program** from July 2009. According to the Senate resolution, the technical coordination is in the hands of the Environment Department and that of communication in the hands of the State Chancellery.

In the Urban Development Department, the areas **nature, planning, building, housing and transport** are involved.

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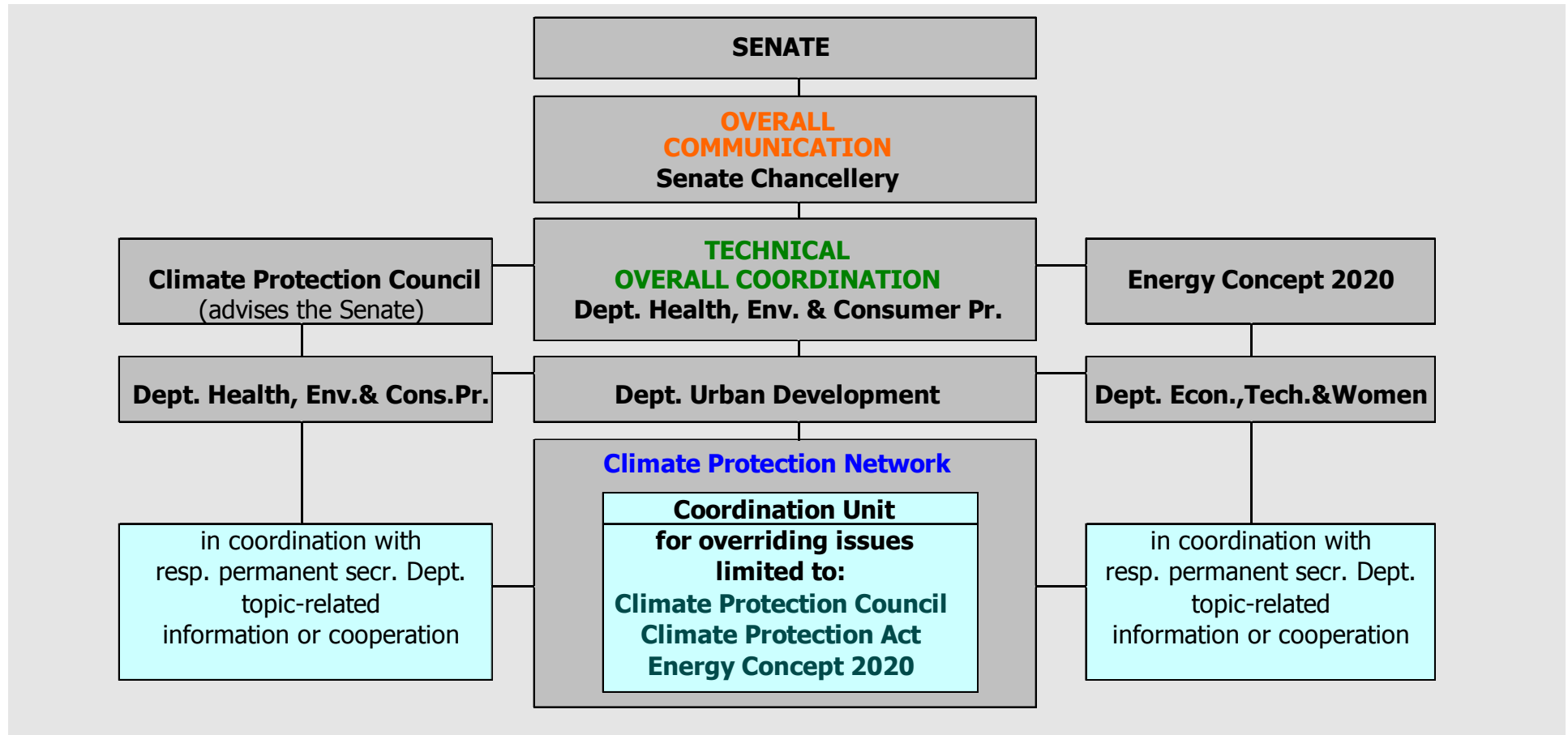
The Senate's Climate Policy Working Programme

- Target: **Focusing the climate protection activities**
- **Areas of responsibility** for our department from the Climate Policy Working Programme
 - The compiling of a catalogue of measures for the Senate's Urban Development portfolio
 - Development of a Berlin energy standard for public buildings
 - Amendment of the Berlin Energy Savings Act – Climate Protection Act
 - Climate protection agreements with public undertakings
 - Climate-adapted transport
 - Energy Concept 2020
 - Landscape Programme Update
 - Adaptation Climate Impact Assessment
 - Study on the cultural landscape of Berlin

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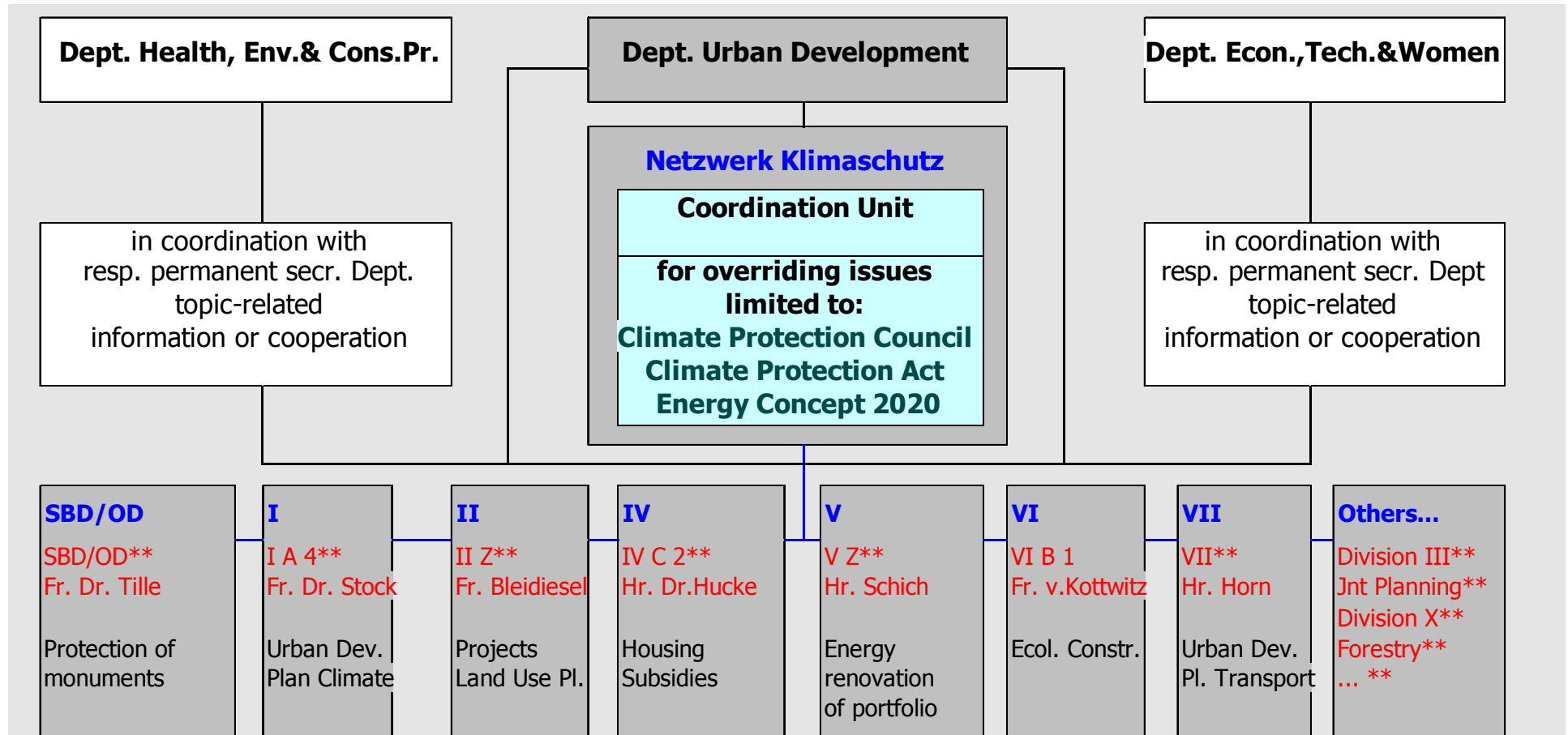
Focusing the climate protection activities



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Climate Protection Network



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Ecological Construction

Strategies for sustainability implementation in the building sector

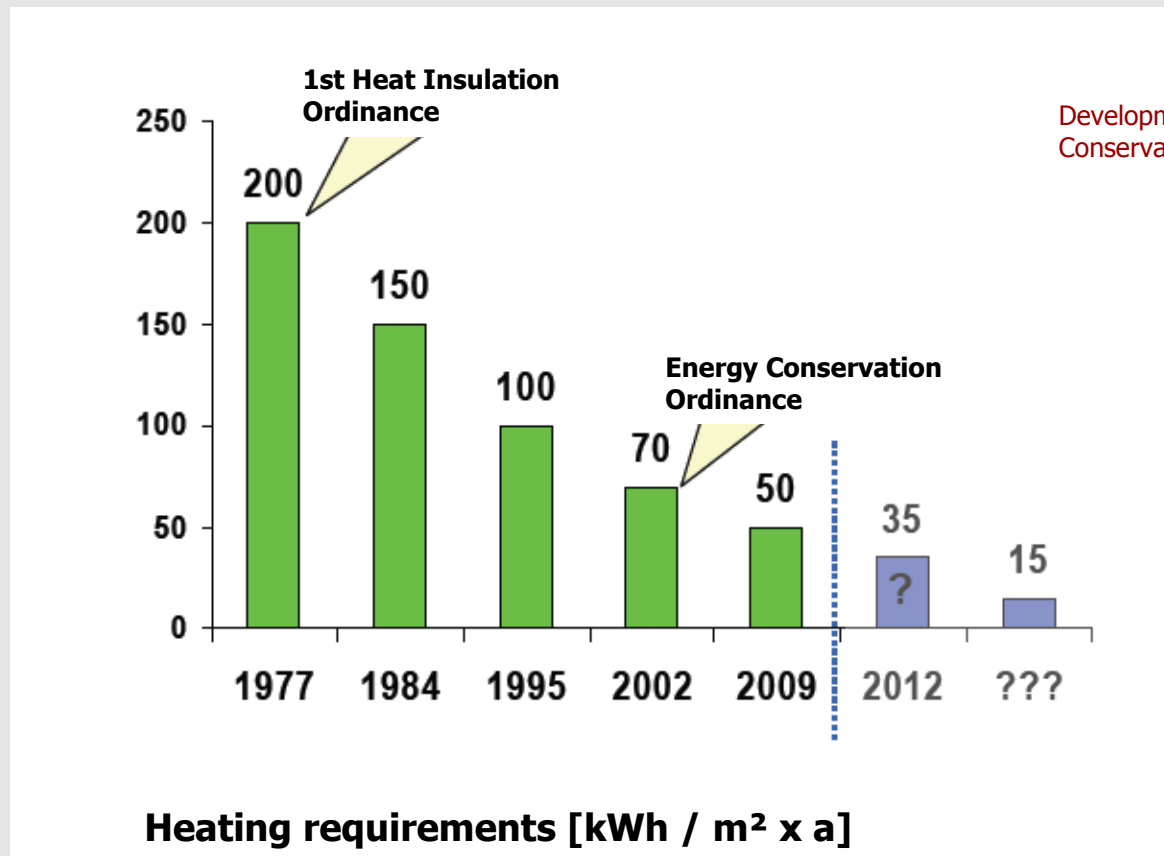
Given the policy objectives, the challenge of reducing CO₂ emissions becomes clear in many different sectors in Berlin.

The **building sector** plays an important role in this context, as its potential for energy savings is estimated at **40% (basis 1990) despite the successes that have been achieved so far.**

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Development of heat insulation standards (Energy Conservation Ordinance)

Source: Development of the heating requirements of new buildings
Diagram: Wolfgang Ornth, BMVBS

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Considerable savings of climate-damaging gases have been obtained already, therefore **it will be increasingly difficult to develop the additional potentials for savings** that have been identified.

In addition to an **extensive financial effort**, this requires targeted information and the **promotion of awareness** for the implementation of climate protection measures.

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An [information brochure](#) has recently been published to support interested builders/developers, planners and private citizens by [providing extensive information on the long-standing tradition of ecological construction in Berlin](#), including current examples of implementations and comprehensive additional links to specialised literature, funding programmes and legal provisions.

[These have to be oriented also towards decision-makers in the industrial, trade and service sectors.](#)

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The **energy requirements** for buildings established by the German federal legislation (Energy Conservation Ordinance, 2009) **will again be considerably strengthened.**

Public building projects will need to play an **exemplary role** in this context.

In Berlin this **will also be linked to a pioneering role** regarding energy targets for new buildings, and to the comprehensive renovation of the building stock (prepared Berlin Energy Standard for public buildings).

The aim is to reach a **lowest-energy or Passive House Standard** and to promote the increased use of renewable energy.

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Model Urban Ecological Projects

Berlin can draw on **longstanding experience and a high level of competence in sustainable housing construction and urban planning.**

Since 1989, the Land Berlin Programme „**Model Urban Ecological Projects**“ has helped to secure and evaluate the sustainable construction targets through their application in concrete construction projects.

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Model Urban Ecological Projects - The Heinrich Böll Estate



Photo: GSW / W. Brenne - J. Eble

Berlin Pankow-Niederschönhausen
216 apartments
Landscaping of outdoor space
Eco house

- Majority of buildings **facing south** (for passive use of solar energy)
- **Photovoltaic systems** on 3 buildings
- **Thermal insulation** of timber post wall, insulated limestone walls, Liapor (lightweight concrete) masonry
- **Heat insulation glazing**
- Eco house with massive wooden walls, interior earth plastering, wall radiation heating
- **Rainwater retention** system, cisterns for watering outside green spaces

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Model Urban Ecological Projects - Heinrich Roller Primary School



Berlin-Prenzlauer Berg
Rehabilitation of a primary school
Listed period building

- Thermal insulation of roofs, ceilings, gable walls and passageways
- Heat insulation glazing
- Room-to room temperature control
- Energy contracting
- Use of industrial water for flushing toilets
- Drinking water saving installations
- Use of environmentally friendly construction materials
- Removal of hard surfaces covering the ground
- Greening of building and roof
- Waste separation, compost bins
- A hybrid model facility that serves as a showcase

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Model Urban Ecological Projects – Department of Physics



Photos: Marco Schmidt

Berlin-Adlershof Department of the Humboldt University

Key points

- Decentralised **rainwater management system** used mainly to water the facade greenery
- **Passive building cooling** through extensive greening of roof
- **Greening of facades**
- **Adiabate cooling** of discharge air with rainwater

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Based on the evaluated pilot projects, the city of [Berlin imposes ecological construction guidelines](#). These guidelines need to be adhered to by builders/developers and planners who work for public authorities awarding contracts.

Additional conditions include:

- [Ecological Criteria for planning competitions](#) (architecture)
- [Ban on use of harmful building materials](#)
- [Guidelines for Profitability Analyses](#)

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In all decision-making processes,

ecological targets and **socio-cultural criteria** such as the built environment and the protection of monuments **need to be considered as equally important as purely monetary, economic aspects.**

The implementation of ecological principles must be taken into due account also in the restoration of architectural monuments.

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Photos: Louis Back (3), Mattbuck/Wikicommons

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The **integral planning principle** is the most important principle in all planning activities.

All those involved in planning have to consider all the ecological construction requirements from the early project stage and must produce an **interdisciplinary coordinated result**.

The building blocks of ecological construction such as **Energy**, **Water**, **Building Materials**, **Greenery** and **Waste** need to be taken into account for that purpose.

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Key Laws and Regulations

Energy

- EU:** Directive on the energy performance of buildings (COM (2002) 91)
Directive on combined heat and power (COM (2004) 8)
- Federal:** Energy Savings Act (EnEG)
Renewable Energy Sources Act (EEG)
Comined Heat and Power Generation Act (KWKG)
Ordinance on Conservation of Energy (EnEV)
- Berlin:** DVO EnEV Berlin
Land Berlin Energy Programme (LEP)

Water

- EU:** Water Framework Directive (WRRL)
- Federal:** Federal Water Act (WHG)
Waste Water Ordinance (AbwV)
- Berlin:** Berlin Water Act (BWG)
Ordinance on the Implementation of the Water Framework Directive (WRRLUmV)
Principles for the Use of the Water Supply

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Key Laws and Regulations

Building Materials

- EU: Construction Products Directive
Directive for setting ecodesign requirements for energy-using products (COM (2005) 32)
- Federal: Construction Products Act (BauPG)
Building Regulation Lists A, B, C
- Berlin: Berlin Building Code (BauO Bln)
Berlin Highway Act (BerlStrG)
Ordinance on the regulation of construction products and types of building (BauPAVO) ...

Greenery

- Federal: Nature Conservation and Landscape Management Act (BNatschG)
- Berlin: Urban Green Space Act (GrünanlG)
Berlin Nature Conservation and Landscape Management Act (NatschGBln)

Waste

- Federal: Act for Promotion Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal Act (KRW/AbfG)
Federal Ground Protection Act (BBodSchG)
- Berlin: Berlin Act for Promotion Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (KRW/AbfG Bln)
Ordinance on Disposal of Special Waste (SoAbfEV) ...

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It is important to prepare and implement all the construction projects in a way that

- preserves both the environment and the natural resources,
- supports action to enhance climate conditions,
- is most socially acceptable and compatible with the environment,
- ensures and establishes sound living and working conditions on a sustained basis

in the phases of construction, operation and its final disposal.

Special attention must be attached to the energy efficiency of the buildings (mitigation).

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Life Cycle Principle

The life cycle costs of a building, based on the type of use, can be divided into

approx. 20-25 % during the planning and construction phases (overall construction cost I-planning) and approx. 75-80 % during the phase of use and operation.

An early consideration of use and follow-up costs is indispensable for all planning decisions.



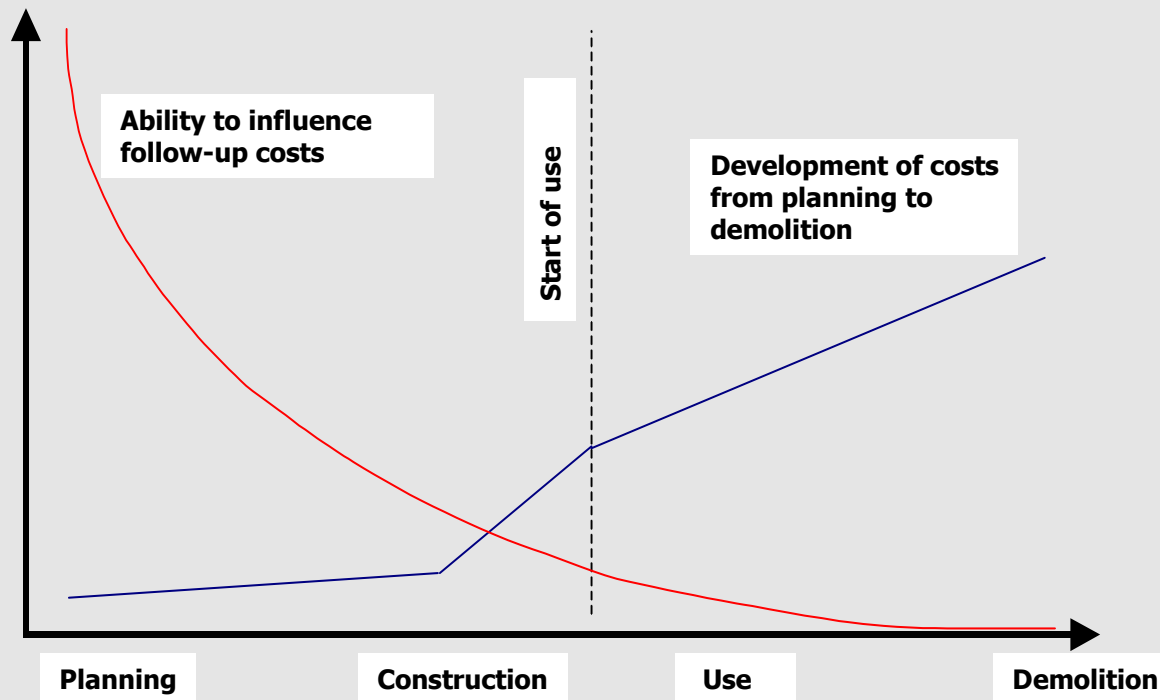
Photos: Przykuta/Wikicommons; Pavel Losevsky/fotolia; Luke Roberts/wikicommons; Endostock/fotolia; Bausparkasse Schwäbisch Hall AG/F. Thomas; Wolfgang Jargstorff/fotolia; Lekcets/fotolia

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All the decisions concerning the economic efficiency in particular need to be based on the life cycle cost principle of a building.



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Approach

- Scrutinise and minimise users' space requirements.
- Design the building services equipment based on the users' needs.
- Sensitise users' behaviour.
- Optimise the building shell, prevent energy losses to the greatest possible extent.

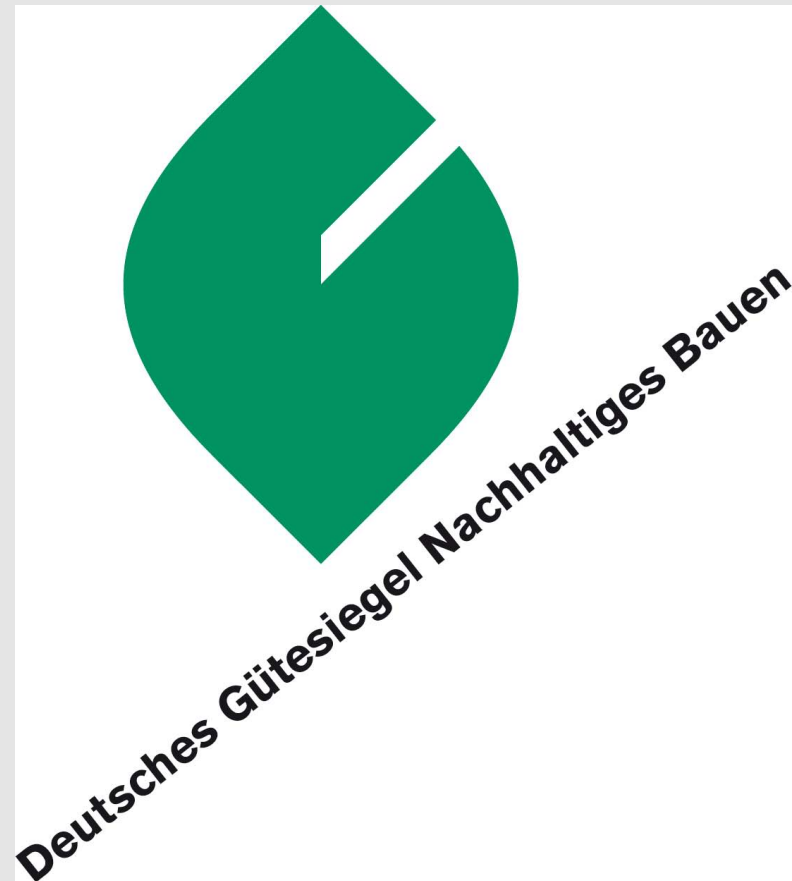
Principle

Early discussion and definition of common goals with binding agreements for all those involved. **Orientation on high level of German certification parameters.**

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Quelle: BMVBS

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Berlin claims to be a highly livable metropolis.

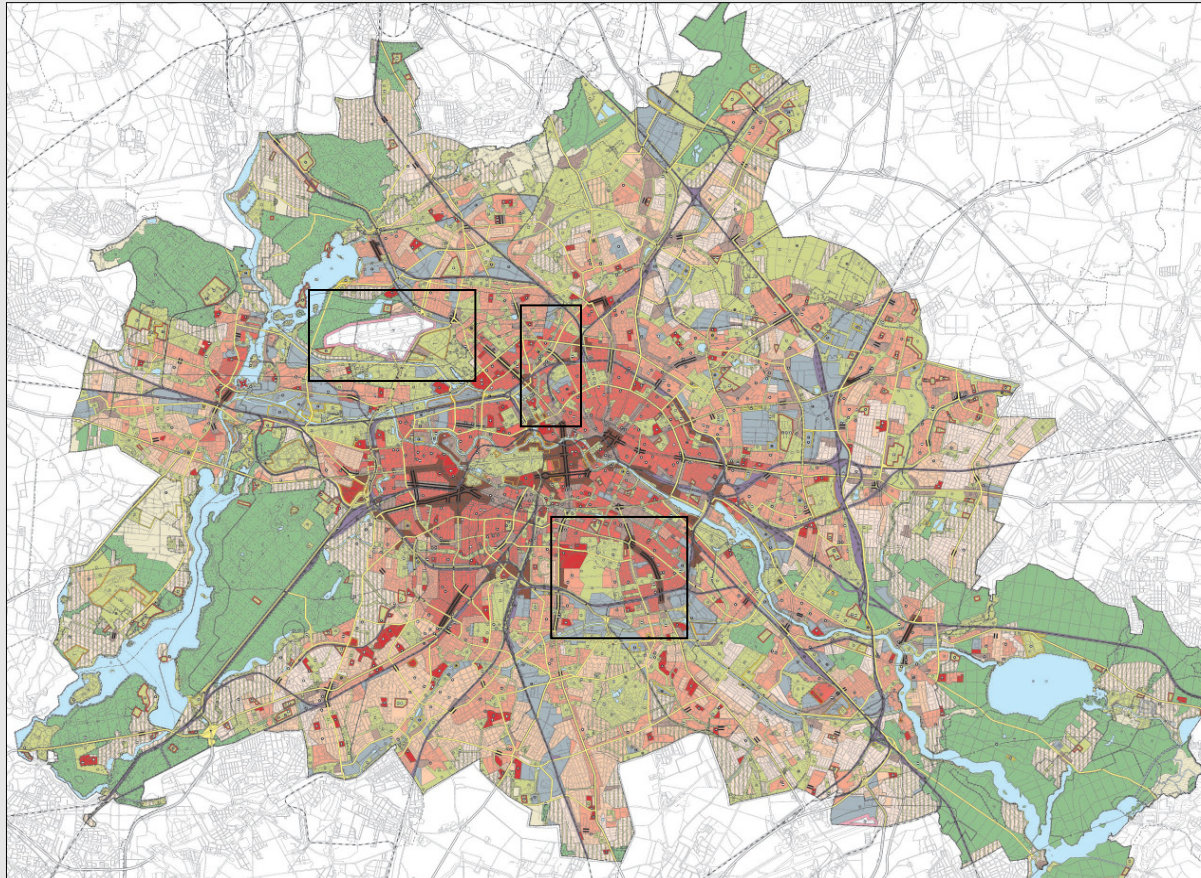
To ensure this quality on a longterm basis for future generations in the context of the unforeseeable consequences of climate change, the ecologically planned building must be located in a [sustainable cityscape](#) that is adapted to the changes.

Urban planning in Berlin focuses on sustainable, excellent solutions on a cross-departmental basis, in the context of the [German adaptation strategy](#).

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**City climate
model areas**

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Implementation strategies at Federal State level

- » Investment pact
- » Economic stimulus package
- » Climate protection agreements
- » Pilot projects of municipal public housing enterprises
- » Funding programmes
- » „Think locally – act globally“

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Investment pact

Programme objectives

- Energy renovation of public amenities (schools, day-care centres, sports halls, multi-purpose halls) built before 1990
- Investment grants for municipalities in particularly difficult budgetary situations

Programme conditions

Federal Government share 33,3 %

Programme volume (Federal Government/State) 2008: 22,76 m €; 2009: 40,68 m €

Prerequisite:

Municipal building with longterm public use in a disadvantageous state in terms of energy consumption (exceeding the reference index by 30%)

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Investment pact

Objects eligible for funding

- Needs registered by the Senate Department for Education, Science and Research, the Senate Department for the Interior and Sport, and the districts:

255 properties:	120	schools and sports halls
	84	day-care centres
	51	sports facilities

Decision

- Continuation in 2009, programme volume increased to 40,68 m €

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Economic stimulus package – implementation in Berlin

Volume and distribution of the economic stimulus package II

The economic stimulus package that was adopted by the Senate on 20 January 2009 for an amount of 632 m € (2009: 278 m €/ 2010: 354 m €) has been distributed as follows:

Federal Government rate

75 % Federal funds = 474 m €

25 % State funds = 158 m €

Rate for construction projects (total)

95 % Construction projects

5 % Procurement (IT, vehicles)

Rate for Education

65 % Education = 411 m €

35 % Rest = 221 m €

Rate for construction projects (by building agencies)

30 % Districts (without day-care centres)

10 % BIM

21 % Universities

9 % Senate Department for Urban Development

30 % Other (private bodies, Charité, etc.)



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Economic stimulus package

- In the framework of the Economic stimulus package II, the German Federal Government finances 75 % of the (mainly) energy renovation measures in educational institutions and public infrastructure amenities.
- Federal State rate: 25 %; the programme volume for Berlin amounts thus to 411 m € (funds must be effectively spent by the end of 2010; in 2011 only settlement of accounts and/or retention payments)
- The programme is managed by the Senate Department for Education, Science and Research in the following priority areas:

All-day schools (mainly secondary schools)	153 m €
Vocational and centrally administered schools (OSZ)	33 m €
Privately funded schools	10 m €
Day-care centres	84 m €
Universities (with focus on excellence initiative)	131 m €

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Climate protection agreements

„More and more companies are ready to make their own contribution to climate protection through improved energy efficiency, the use of modern technologies and other additional energy saving programmes.

The Berlin Climate Alliance is based on this entrepreneurial sense of responsibility. The Alliance aims at supporting the Berlin Senate in reaching its climate protection goals.“



Source: Zeitung Berliner Umschau, Photo Müller-Mertens

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Climate protection agreements

„The pioneering role of municipal housing companies:
The municipal housing companies are indispensable for climate protection in Berlin.“

„As a pioneer of energetic management in buildings, BIM will explicitly support Berlin in reaching its ambitious climate protection goals. We are committed to further reducing the carbon emissions linked to the use of energy for supplying electricity, heating and cooling.“

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Pilot projects of municipal housing companies

GESOBAU ‚Märkisches Viertel‘



More than 13,000 flats have undergone energy renovation since 2008

→ **Estimate: reduction of carbon emissions by 20,000 t per year, renovation at almost no cost for tenants**

- The largest redevelopment project in the German housing sector
- Low-interest financing through the KfW housing renovation and CO₂ building programme
- Since the beginning of 2009, part of the Redevelopment Programme for West Berlin (until 2013: 13.5 m € of funding: public spaces and social infrastructure development)
- The Märkisches Viertel residential area is connected to a district-heating network.

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Pilot projects of municipal housing companies

HOWOGE Low Energy Building



Germany's largest low energy building
296 apartments in pilot promotion

→ **Reduces annual energy consumption by 30-50 % !**

- Facades: composite thermal insulation system
- Window: 3 layers of insulation glazing
- Ventilation: central intake / output duct system with rotary regenerator
- Power: energy-saving bulbs; lights in corridor controlled by movement sensors
- Heating: state of the art control systems for connection to district heating
- Combined heating & power station: lights the corridors, supplies domestic installations, prepares hot water (in summer)
- Water-saving taps

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Pilot projects of municipal housing companies

degewo Biomass Gropiusstadt

12,000 **degewo** tenants have been supplied with environmentally friendly energy from the **wood-fired cogeneration plant** located in **Berlin-Gropiusstadt** since May 2003. In accordance with the Renewable Energies Act (EEG), the plant only uses wood, partly waste wood from building constructions or packagings.

The fuel energy is converted into electricity and heat in a single process which is based on the cogeneration principle.

Using wood as a fuel source conforms to the idea of an ecological circle, as wood is a renewable energy source that grows again, as opposed to fossil fuels such as coal. Burning wood also produces carbon dioxide, but this will be bound by the renewable plants. This ecological cycle does not harm the atmosphere.

The wood-fired cogeneration plant translated into numbers

- 360,000 MWh thermal energy for 20,000 housing units and 50,000 inhabitants.
- 100 MW fuel power
- 20 MW electrical output
- 60 MW thermal output
- 130 MW peak load and reserve boilers
- approx. 200,000 t/year wood fuel quantity
- 235,000 t/year CO₂ reduction
- Reduction of Berlin CO₂ emissions by 0.5 %

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Funding Opportunities

**Especially in the energy sector which boasts some 900 funding opportunities!
Some key funding by the EU, the Federal government, Länder, local authorities**

EU: LIFE +

Fed. Gov.: Rehabilitation Programme to reduce CO₂ Emissions in Buildings
Fed. Gov.-Länder-Local Authorities Investment Pact
Application of the Low Energy House to schools
Ecological building
Producing solar energy - photovoltaics
Environmental Programme of the Reconstruction Loan Corporation (KfW)

Land Berlin: Environmental Relief Programme (UEP)
Fed. Gov.-Länder-Local Authorities Investment Pact
Rehabilitation Programme to reduce CO₂ Emissions in Buildings

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Funding opportunities

Environmental Relief Programme for Berlin (UEP II)

- Projects that are in the interest of the Federal State of Berlin and which are implemented in Berlin
 - Eligible projects: non-profit and public institutions, private and public research institutions, and small and medium-sized enterprises.
 - Grants are made available.
 - Only those projects are eligible that have not started at the time of the approval.
- **e. g. the complete renovation of the large Tropical Greenhouse**



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„Think locally – act globally“ - Networks

- » C40 city network / Clinton Climate Initiative (CCI)
- » Climate Alliance of European cities
- » METROPOLIS
- » EUROCITIES
- » METREX
- » IMPACTS
- » POLIS

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„Think locally – act globally“ – EU projects

- » BEEN
- » TELLUS
- » SPICYCLES
- » YOUTH
- » OBIS
- » EUCO2 – 80/50

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EU Project BEEN / Urb.Energy

Urb.Energy builds upon **BEEN**



Project part-financed by ERDF

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Where do we stand?

- Creation of a cross-departmental climate protection network in the urban development administration
- Preparation of a Senate proposal for a Berlin Energy Standard for public and publicly funded buildings
- Development of an urban development plan on climate focusing on the priority of „Sustainable urban development“
- Preparation of a Climate Protection Act
- Evaluation and updating of the Federal State energy programme
- Backing of the activities of the Climate Protection Council
- Leading the working group „for the energetic documentation and assessment of the public housing stock in the Federal State of Berlin“

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Where do we stand?

- **Sustainable climate management**
 - Establishment of a climate impact assessment for the Federal State of Berlin
 - Cooperation with the Federal State of Brandenburg on the „climate check“ of laws and administrative acts
 - Further promotion of activities in the field of town twinning, metropolis networks, C40 initiative on climate protection

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Thank you for your attention!

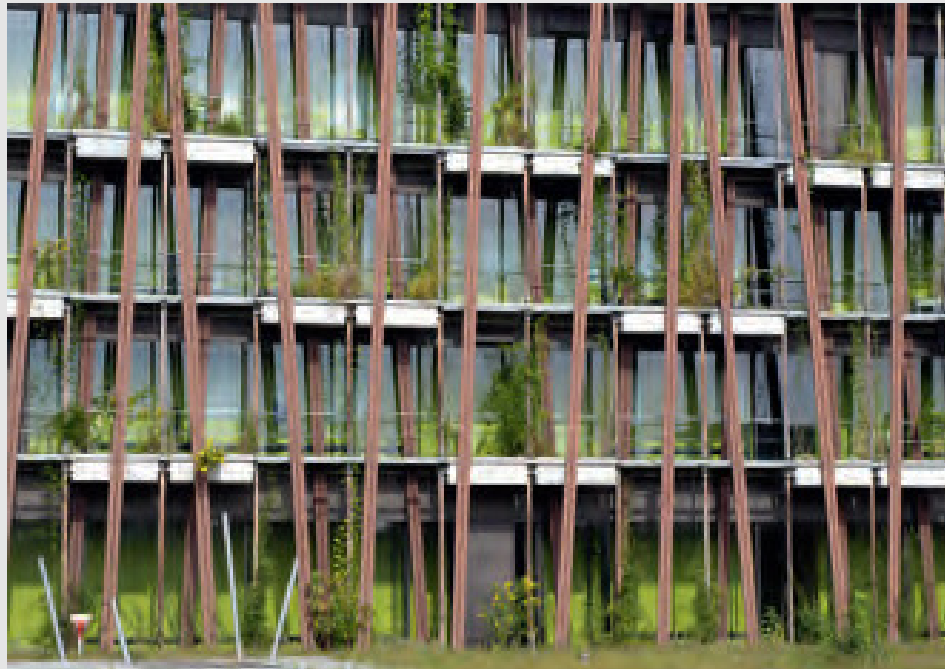


Photo: Louis Back

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"Climate Policy Activities - Berlin's Pioneering Role"

Hella Dunger-Löper, Permanent Secretary for Building and Housing
Senate Department for Urban Development, Berlin