

## Examples of construction of new energy efficient buildings

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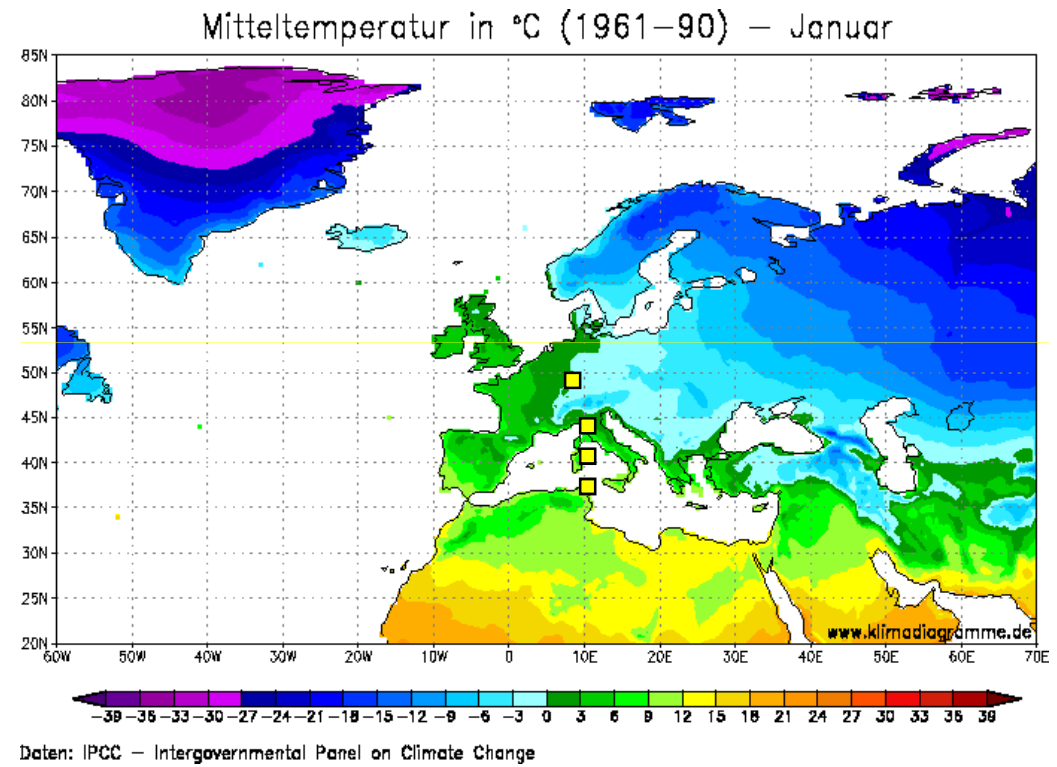
## Examples of construction of new energy efficient buildings

Eight examples of new energy efficient buildings

- fulfilling the demands of environmental, technical social and health aspects
  - well accepted by inhabitants
  - presenting additional aspects of holistic planning
1. Criteria of selection
  2. Systematic of presentation
  3. Presentation of additional aspects of holistic planning

## Criteria of selection

Criteria climate Winter design temperature	C°
Hamburg, Telemannstraße	- 12
Hamburg, Pinnasberg	- 12
Hamburg, Kornweg	- 12
Hannover, Stickfeld	- 14
Eschenz, Switzerland	- 12
Skien, Norway	- 20



# Criteria of selection

Selection of types of houses:

Background:

Task to rise the average

living space from 25 sqm to 35 sqm

*Demand of new flats in big multi storey houses*

*With up to 70 units*


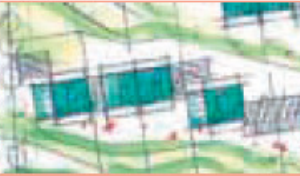
*Demand of single houses in the green belts round the cities*

Therefore:

3 single and row house projects in green belts

3 multi storey house projects in densely built up area are selected

# Systematics of presentation comparable parameters

<p>type of site</p> <p>km to next buissness center</p> <p>km to public transport</p> 	<p>type of house</p> <p>compactness</p> <p>orientation</p> 	<p>energy standard</p> <p>energy losses by transmission:</p> <p>final energy consumption:</p>	<p>primary energy demand:</p> <p>energy demand by traffic:</p>	<p>Costs:</p> <p>building costs</p> <p>E/sm</p> <p>living space</p> <p>cost for technical equipment</p> <p>E/sm</p> <p>living space</p> <p>total costs</p>
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## Type of site

Former agricultural site  
Former gap site  
Recycled area  
Km to public transport

## type of house

compactness  
detached house  
row house  
multistorey house  
orientation to the sun

## energy figures:

Energy standard  
Energy losses by transmission  
Final energy consumption  
Primary energy consumption  
Energy consumption by traffic

see further details

## Costs

building costs  
costs für technical equipment

comparable project with average energy standard

## Systematics of presentation primary energy calculation

heat requirement:  $Q_H = Q_T + Q_V - \eta(Q_I + Q_S)$

primary energy balance:  $Q_P = (Q_H + Q_{TW}) \times e_p$

### legende

$Q_p$  = primary energy demand

$Q_h$  = end energy demand for heating

$Q_i$  = internal gains

$Q_s$  = solar gains

$Q_w$  = end energy demand for warm water supply

$e_p$  = primar energy consumption number  
see next slide

$H_T$  = heat losses by transmission

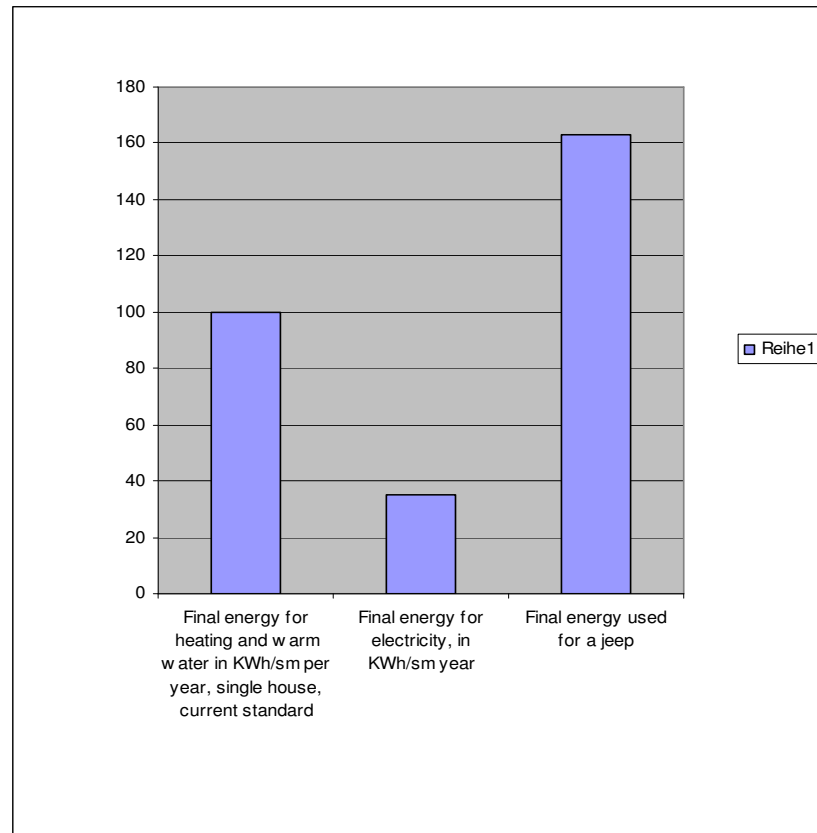
$H_v$  = heat losses by ventilation

## Systematics of presentation primary energy calculation

Primary energy factor,  
defined for german conditions

- Heating oil 1,1
- Natural gas 1,1
- Black coal 1,1
- Brown coal 1,2
- Wood pellets 0,2
- Fossil fuel /cogeneration 0,7
- Renewable fuel/cogeneration 0,0
- Fossil fuel /district heating 1,3
- Renewable fuel/district heating 0,1
- Electricity 3,0

## Systematics of presentation calculation of energy demand by traffic



One possible formula to calculate the energy demand caused by traffic:

240 days to use the car x 2(kilometers to CBD) x 0,075l for an efficient car  
or like the example, 0,20 l for the jeep  
converted to kWh/smj

## Presentation of additional aspects of holistic planning

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### **Life cycles of materials**

- „Renewable“ materials
- Recycling
- Composting

*Two examples  
with use of renewable materials:  
Wood fibre, straw*

### **Energy efficiency is no luxury**

- Realisation with specialised bank loans

*• various examples,  
realised with  
loans for CO<sup>2</sup> saving  
and climate protection*

## Presentation of additional aspects of holistic planning

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### **Design with the sun**

- Various floor plan solutions p.E for singles, families or changing situations

### **Participation of inhabitants**

- Projects of joint planning
- Growing responsibility for flat and building and surroundings

*Individual living even in a nine storey house*

## Presentation of additional aspects of holistic planning

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### **Holistic sustainable district planning**

- Close links between living - and working places

*Example of Expo district  
Kronsberg,  
Hannover*

### **Energy demand of traffic**

- Projects of car free living
- Common garden and yards instead of parking places