The story of zero:e park Hanover

Int. Workshop
Sofia (BG)
30 September 2014

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Region and City of Hanover

21 municipalities
157,500 family houses
48,000 apartment buildings
49,800 companies
1.2 million inhabitants (ca. 514,000 City of Hanover)
- zero:e-park
- political discussion and decisions
- technical feasibility
- role of proKlima
- success story
- success factors
south district of Hanover

Foto: Karl Johaentges
Single family houses, semi-detached houses, row houses, supermarket

total development area: 260,000 m²
(incl. green / public area, infrastructure)

net building plot: 130,000 m²
zero:e-park – design plan

fig.: design plan (City of Hannover)
zero:e-park – 2013

PH-supermarket
row-houses
single-houses

1.stage
2.stage
3.stage
political discussion – road to zero-e

as of 2000: local housing corporation meravis (formerly Reichsbund Wohnungsbau) look for developable plots and permissions to build

City of Hanover council decision 2002: high ecological standards → new neighbourhood in Hanover-Wettbergen has to follow zero-emission-targets (CO2-neutral)

2002 – 2005: discussion what is “zero-e” and how to reach it
development partner

meravis Wohnungsbau- und Immobilien GmbH

Niedersächsische Landgesellschaft mbH

City of Hanover
framework – climate protection plan

Climate-Alliance 2020 Hanover (2008):
40 % CO2-reduction until 2020 on level 1990

City of Hanover council decision 2007: “ecological standards”
- Energy (solar-) optimized urban development
- Passive House / High energy standard resolution to buildings in municipal influence (Urban development and sale contracts)
technical feasibility

- 2005 local development started
- 2005 energy concept studies by proKlima and climate protection unit city of Hanover
- 2005 - 2006 urban development competition
  1st prize AG Baufrösche / foundation 5+
- 2007 – 2009 detailed studies and work on the development plan and regulations
- 2010 1st construction side started

Fig. AG baufrösche und foundation 5+
energy studies:
starting point: Passive Houses with minimum energy demand →
gas-supply/ gas-grid is not economic
district heating is not economic because of high level of heat losses

Need of variable heating solutions with renewables (thermal solarplants and PV)
energy concept

- heat
- electricity
- local RES
- PH & quality assurance
- electricity saving consulting
- compensation: renewable production of electricity

100% CO2 reduction

regulation standard

kWh/(m² yr)
CO2 balancing

compensation per housing unit:

\[
\begin{align*}
1,600 \text{ kWh/yr} & \quad \text{heat demand} \\
& \quad (\text{DHW + heating system + vent. system}) \\
+ 2,400 \text{ kWh/yr} & \quad \text{electric demand} \\
4,000 \text{ kWh/yr} & \quad \text{total demand}
\end{align*}
\]

x 330 housing units = 1,320 MWh/yr → by local hydro power
development plan
The envelope curve determines distances between buildings and heights for the homes that will be built. Within these limits, building owners still have plenty of room for various building and roof shapes so that they can implement individual, high-quality architectural designs.
PH-Standard, Primary-energy demand for DHW, heating, cooling and aux-energy < 40 kWh/m² yr (m² = Net floor area def. by nation. regulation ENEV); > 60 % Solarheat application or 1,5 kWpeak PV
role of proKlima

financial incentives:
owners

information and training:
owners / construction workers

organisation of quality assurance process

push
inform
pull

+ expert knowledge → involved in energy studies
proKlima fund – established 1998

Foto: proKlima Partners - extension of the contract, 2004
proKlima – financing model

- **City of Hanover**: (3.25 %, max. 1 M €)
- **Sofia (BG)**: 30 Sep. 2014 // matthias.wohlfahrt@enercity.de
- **Suburb-cities**: concession levy for grid usage (2.5%)
- **enercity Stadtwerke Hannover AG profit sharing**: (3.25 %, max. 2 M €)
- **proKlima Der enercity-Fonds**: 4.4 M €/year*
- **enercity Stadtwerke Hannover AG gas price component**: (0.05 ct/kWh)

* in 2013

*In 2013*
1 EUR support generates 13 EUR local investments.

Quelle: Pestel-Institut Hannover, 2011
proKlima supports new Passive House residential buildings

<table>
<thead>
<tr>
<th>Type of Building</th>
<th>Subsidy per House or Dwelling</th>
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<tbody>
<tr>
<td>single house</td>
<td>5,000 EUR/ house</td>
</tr>
<tr>
<td>semi-detached house</td>
<td></td>
</tr>
<tr>
<td>row house</td>
<td></td>
</tr>
<tr>
<td>apartment house</td>
<td>3,000 EUR/ dwelling</td>
</tr>
</tbody>
</table>

conditions:
Passive House Standard + Quality Assurance
maximal support: 50,000 EUR per house
success story zero:e-park

Start of construction 2010

Foto: pr-motion/ City of Hanover
success story zero:e-park

Start / end of sale
1. stage: 2010/2012  (Plan End 2013)
2. stage: 2012/2013  (Plan End 2017)
3. stage: 2013/...  (Plan End 2021)
success story zero:e-park

End of Summer 2014: sold out of all single plots

www.zero-e-park.de
success story zero:e-park

voluntary monitoring programme

Fig.: voluntary monitoring programme for zero:e park- building owners (source proKlima)
success story – exemplary zero:e house

monitoring example

consumption wooden pellets per month

Consumption of wooden pellets: 1,011 kg
= 136 kg CO2-Equivalent
success story – exemplary zero:e house

consumption of domestic electricity per year

Ihr Haushaltsstromverbrauch im Vergleich

<table>
<thead>
<tr>
<th>Personen</th>
<th>Ihr Verbrauch</th>
<th>kWh/a</th>
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<tbody>
<tr>
<td>5</td>
<td>2240</td>
<td>5440</td>
</tr>
<tr>
<td>4</td>
<td>1960</td>
<td>4760</td>
</tr>
<tr>
<td>3</td>
<td>1610</td>
<td>3910</td>
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<tr>
<td>2</td>
<td>1190</td>
<td>2890</td>
</tr>
<tr>
<td>1</td>
<td>700</td>
<td>1700</td>
</tr>
</tbody>
</table>

electr. consumption: 2,920 kWh = 2,745 kg CO2-Equivalent
success story – exemplary zero:e house

PV-earnings per month

Die Ernte Ihrer PV-Anlage im Vergleich zu anderen Anlagen in monatlicher Übersicht


production of electricity (PV-panels): 5,582 kWh
success story – exemplary zero:e house

consumpt. of wooden pellets:
1,011 kg = 136 kg CO2-Equivalent

corresponds roughly to
145 kWh electricity

+ 

domestic electricity consumpt.:
2,920 kWh = 2,745 kg CO2-Equivalent

= 

Electricity-Equivalent: 3,065 kWh

production of electricity (PV): 5,582 kWh
success story – PH supermarket

REWESupermarket, zero:e-park, Hanover (2012)
→ Developing the Standard and monitoring by PHI

PassREg Study Tour Hanover, May 2012
success story – PH supermarket

**REWE supermarket**, zero:e-park, Hanover (2012)
→ Developing the Standard and monitoring by PHI

Fotos: proKlima/Olaf Mahlstedt

Architects: Spengler-Wiescholek, Hamburg
barriers and success factors

first barriers:

- refusal by planners and real estate developers → generate excessive prizes for PH buildings?

turnaround / success factors

- free building design is possible (limited market of free building plots in Hanover)
- first „projects“ (beacon effect)
- (early) consulting is required (owners)
- contract to built was connected with mandatory use of quality assurance and compliance with PH Standard → penalty clause
zero:e-park
experience between the lines

We plan to buy a plot of land, how could we fulfill the conditions?

We bought a plot of land, what should we do next?

“passive house is a research project”

“passive house is normal, because my neighbour doesn’t fail.”
Thank you for your attention!

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