First Meeting of the Joint Task Force on Energy Efficiency Standards in Buildings
UNECE - Geneve  30-31 October 2017

Session C:
Framework guidelines for energy efficiency standards in buildings

Dr. Burkhard Schulze Darup, Architect
Co-chair of the Joint Task Force, Germany
1. INTRODUCTION: mission for a generation
1. INTRODUCTION: ... not only winners ...
1. INTRODUCTION: ... but being curious and creative ...
1. INTRODUCTION: ... to find the win-win-strategies
1. Introduction: Development of energy efficiency in Germany & Europe

- EnEV 2014 – 2016
- EPBD 2020 – nearly Zero Energy Building - nZEB
- Passivehouse & renewables = Plus energy
2. GOAL: 95-percent reduction of greenhouse gas emissions until 2050

Balance between energy efficiency and renewables
2. GOAL: 95-percent reduction of greenhouse gas emissions until 2050

Requirements for the Efficiency of Buildings

<table>
<thead>
<tr>
<th></th>
<th>Heating/Cooling</th>
<th>Hot Water</th>
<th>Ventilation Heat recovery</th>
<th>Electric Power Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy demand</td>
<td>25 kWh/(m²a)</td>
<td></td>
<td></td>
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<tr>
<td>Primary energy demand</td>
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<tr>
<td>Primary energy demand</td>
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<td></td>
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<td>90 kWh/(m²a)</td>
</tr>
</tbody>
</table>

* „Over time with improvements in technology and materials and with enhanced connections to the built environment, these targets could be improved further."

2. GOAL: 95-percent reduction of greenhouse gas emissions until 2050

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<td>Primary energy demand</td>
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<td>Primary energy demand</td>
<td>90 kWh/(m²a)</td>
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</table>

3. PRINCIPALS
Urban & Regional identity
3. PRINCIPALS
Cultural & Social impacts

Source: Dorothee Dubrau, Baustadträtin a. D. Architektur und Stadtplanung
3. PRINCIPALS
Holistic & Integrated
3. PRINCIPALS
Science based & Integrated

Multy family building (1520 / 2010)

Pfeifergasse 9, Nürnberg

Source: Alexandra Fritsch, Fritsch & Knodt + Klug, Nuremberg
3. PRINCIPALS
Urban planning & Monument conservation

Multy family building (1876 / 2000)
Mathildenstraße, Fürth

Source: Schulze Darup
3. PRINCIPALS
Innovation & Highest efficiency

<table>
<thead>
<tr>
<th>kWh/(m²y)</th>
<th>before</th>
<th>concept</th>
<th>measured</th>
<th>q_p (EnEV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>285</td>
<td>29</td>
<td>27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One family building (1958 / 2011)

Source: Wimmer - Schulze Darup & Partners

Nuremberg
3. PRINCIPALS

Cost effective & Performance monitored

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<th>kWh/(m²y)</th>
<th>q_p (EnEV)</th>
<th>Hot water</th>
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</tr>
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<tbody>
<tr>
<td>207</td>
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<tr>
<td>26</td>
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<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

before  concept measured q_p (EnEV)

Multy family building (1964 / 2006)

Bernadottestraße 42 - 48, Nuremberg

Source: Schulze Darup / wbg Nuremberg
3. PRINCIPALS
Energy efficiency &
Plus energy balance

Junior high school Feuchtwangen

Source: Schulze Darup (energy concept)
3. PRINCIPALS
Energy efficiency &
Plus energy balance

Townhall Herzogenaurach

Source: Schulze Darup & Partner
Architectural- & Energy Concept
3. PRINCIPALS
High sustainability & Life Cycle Optimising

Monastery Plankstetten

![Graph showing energy consumption in kWh/(m²y) with categories: Renewables, Prime Energy, Electricity, IT-Systems, Cooling, Lighting, Warm Water, Heating. The graph includes data before and after renovation.]

Source: Schulze Darup (energy concept)
3. PRINCIPALS
Top runner Efficiency & Highly renewable

Renewable Heating
Photovoltaics
Smart Grid
Roof
U = 0,11 W/(m²K)

Windows
Uw = 0,85 W/(m²K)

Outer Wall
U = 0,14 W/(m²K)

Ground
U = 0,10 W/(m²K)

Source: Schankula / Schulze Darup & B&O Bad Aibling

Multy family building „WOOD5“ (B & O)
3. PRINCIPALS
Plus energy quarters

One family houses Erlangen-Büchenbach

Source: Benjamin Wimmer, schulze darup & partners
3. PRINCIPALS
Plus energy quarters

Source: Stadt Erlangen / energy concept: Schulze Darup
3. PRINCIPALS
Affordable & Validated

Parkwohnanlage Nuremberg - Heritage-ensemble
1030 apartments – 1960ies

- Photovoltaics
- Electricity
- Hot Water
- Heating

kWh/(m²y)
Prime Energy

Source: Schulze Darup / wbg Nürnberg
3. PRINCIPALS
Sustainable management & High urban performance

Strubergasse Salzburg (1949 bis 1958)
Modernisation of 500 apartments

Quelle: Google Maps
3. PRINCIPALS
Sustainable management & High urban performance

Strubergasse Salzburg (1949 bis 1958)
Modernisation of 500 apartments

Öffentliches Grün
Spielplatz
Treffpunkte

Mieter-
Gärten
Balkons

Photovoltaics
Eletricity
Hot Water
Heating

before
after
PV

Prime Energy

kWh/(m²y)
3. PRINCIPALS
Sustainable management &
High urban performance

Strubergasse Salzburg (1949 bis 1958)
Modernisation of 500 apartments 2011 - 2017
3. PRINCIPALS
Sustainable management &
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Strubergasse Salzburg (1949 bis 1958)
Modernisation of 500 apartments 2011 - 2017
3. PRINCIPALS
New old urban heart

DomRömer Frankfurt
Reconstruction of the old historic core
3. PRINCIPALS
New old urban heart

DomRömer Frankfurt
Reconstruction of the old historic core
3. PRINCIPALS

New old urban heart
- With Passivehouse Technique
3. PRINCIPALS
New old urban heart
- With Passivehouse Technique
4. Implementation
- Dissemination

Framework of national, regional and municipal leaders in the public, private, research and education sectors
4. Implementation
- Education &
- Training programme

Information, guidance, instruction & ongoing knowledge-dialogue must be provided to policy, market, and knowledge stakeholders to foster local development.
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- Education &
- Training programme

Information, guidance, instruction & ongoing knowledge-dialogue must be provided to policy, market, and knowledge stakeholders to foster local development.
4. Implementation - Research
Collaborations in science and technology, focused on the frontier challenges in such areas as:

1. efficiency components and materials
2. building design, construction and monitoring
3. energy generation and distribution
4. integrated urban systems and life cycle management
5. strategies for each country and climate zone to be carbon-free in 2050/2060
4. Implementation

- Consultation

- Formal and informal channels with local policy, market and knowledge stakeholders
- Dialogue on impact strategy
- Addressing discovered or unanticipated challenges
- Cultivating global consensus in support of the Framework
4. Implementation
- Participation & Passion

Networks of support and engagement among leading corporations, foundations, universities, professions, civil society and others with the array of resources – intellectual, experiential, financial, and relational – that will be required to make transformation a grassroots or deep market movement.

Source: Theodor Mommsen – „Ohne Leidenschaft gibt es keine Genialität“
4. Implementation
- Participation & Passion

Networks of support and engagement among leading corporations, foundations, universities, professions, civil society and others with the array of resources – intellectual, experiential, financial, and relational – that will be required to make transformation a grassroots or deep market movement.
Finally – optimised design and balance of Efficiency and Renewable Energies! ... with high awareness for the individual situation of the involved countries.
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