ENERGY RENOVATION OF LANGKÆRPARKEN

Karsten Winckler Rasmussen
Company presentation

● Besides the traditional engineering disciplines, Is Esbensnes key competence and methodology integrated energy design.

● We have the competence and willingness to engage in dialogue at the earliest stages of a project and contribute to our creative sparring partners, so the objectives of an energy-efficient construction is achieved by simple and integrated solutions.
The potential for public housing in Denmark

- 40 % of the total energy consumption in Denmark constitutes from buildings
- 20 % of the total housing is public housing (a total of 500,000 apartments)
- As you see there is an opportunity for saving energy due to the big heat loss.
History of Langkærparken

- Built in 1969-1971
- 35 blocks
- 860 apartments in 3 storages
- Renovated in 1990
- No empty apartments
- AL2Bolig
- Energy renovation is part of a masterplan
About the selected block

<table>
<thead>
<tr>
<th>Division</th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
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</thead>
<tbody>
<tr>
<td>1 room (30 m²)</td>
<td>3</td>
<td>1</td>
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<tr>
<td>3 room (92 m²)</td>
<td>3</td>
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<td>4 room (108 m²)</td>
<td>3</td>
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<td>5 room (122 m²)</td>
<td>2</td>
<td>3</td>
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<tr>
<td><strong>Sum:</strong></td>
<td>9</td>
<td>7</td>
<td>6</td>
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<td><strong>Total sum:</strong></td>
<td>22 apartments</td>
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<td><strong>Total sum:</strong></td>
<td>2070 m²</td>
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Overall plan for the energy renovation project

a. 4 projekts according to 4 energy classes
b. All 4 cases are priced by a main contractor.
c. AL2 Bolig will select 1 of the 4 projekts will be selected the ambition is LEK 0.
d. After renovation. There will be measurements on both the selected project and the reference building.
e. Evaluation, reports is a part of the projekt.
Energy classes

![Energy class bar chart](image)

- Existing energy consumption
  - BR08: >140 kWh/m²/year
  - LEK2: 70 kWh/m²/year
  - LEK1: 45 kWh/m²/year
  - LEKO: 20 kWh/m²/year
Corresponding CO2 emissions

- Existing building: 50 tons/år
- BR08: 20 tons/år
- LEK2: 10 tons/år
- LEK1: 5 tons/år
- I FKD: 0 tons/år
# Time plan for the climate project

<table>
<thead>
<tr>
<th>Activities/ Quarter</th>
<th>1/09</th>
<th>2/09</th>
<th>3/09</th>
<th>4/09</th>
<th>1/10</th>
<th>2/10</th>
<th>3/10</th>
<th>4/10</th>
<th>1/11</th>
<th>2/11</th>
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<tbody>
<tr>
<td>Phase</td>
<td>Phase 1</td>
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<td>Phase 2</td>
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<td>Prequalification. Workshop 1</td>
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<td>Workshop 2 + 3</td>
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<td>Project proposal. Retail project. Supply. Workshop 5. Decision of which case to continue with.</td>
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<td>Evaluation. Workshop 6</td>
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<td>Workshop 7. Dissemination.</td>
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AL2Boligs proposal to the tenants.

- Same expenses as before as:
  - Smaller bill of energy consumption
  - Larger bill of rent
- We help you moving out and back again, and we will pay for it!
- If you don’t want to stay in the new apartment it is possible
- You can choose the indoor designs – either one of the new proposals or just the old one
Working methodology of the project

- Integrated process:
  - Organisation supplied by external advisors
  - Integrated energy design
  - Workshops
  - Tenants and AL2Bolig has focused a lot on the communication:
    - Making special newspapers about the climate project
    - Information meetings
    - Knocking doors
General conditions for all 4 cases

- “Coating principal”
- Optimizing the climate screen in all cases:
  - Insulation thicknesses
  - Elimination of cold bridges
  - Focus on airtightness
Case 1 – Standard (BR08)

- Appr. 70 kWh/m² year
- Extra insulation in walls, ceiling and floor
- Upgrading all windows.
- New mechanical ventilation aggregate with heat recovery.
Case 2 – Low energy class 2

- Appr. 50 kWh/m² year
- As Standard 08 only more of everything.
- Implementation of solar heating (appr. 1 m² pr. apartment)
- Disconnection of district heating will be investigated
Case 3 – Low energy class 1

- Appr. 30 kWh/m² year
- As LEK 2 only more of everything.
- Implementation of solar heating (appr. 3 m² pr. appartment)
- Implementation of solar cells (appr. 4 m² pr. appartment)
- Disconnection of district heating will be investigated
Case 4 – Low energy class “0”

- Appr. 18 kWh/m² year.
- As LEK 1 only more of everything.
- Implementation of solar heating (appr. 3 m² pr. apartment)
- Implementation of solar cells (appr. 12 m² pr. apartment)
- Disconnection of district heating will be investigated
Energy principles

- Conversion of solar energy and solar heat via solar cells and solar panels
- Roof
- Solar panel area
- Interior
- Roof terrace
- Elevator tower
- Green facade
- New facade cladding
- Extra insulation
- New super insulating windows
- Extra insulation of facade
- Ventilation zone
- New super insulating doors and windows
- Vest side
- New boiler room
New facades

Facade towards East

Facade towards West
South gable
Primary energy source – district heating

- Langkærparken is within an area of district heating of Affald Varme Århus (AVÅ)
- According to BR08 only new buildings can be disconnected to the district heating grid when fulfilling Low Energy Class 2 or 1
- It is a challenge for energy renovation projects if they are placed in an area with district heating as the cost of district heating is divided into 2 parts:
  - Variable costs (proportional to the energy consumption)
  - Non-variable costs (fixed cost is to cover all expenses according to maintenance of the grid)
Primary energy source – district heating

- AVÅ have future plans with low temperature district heating
- AVÅ has shown interest in the climate project and are open to a dialogue in order to find a suitable price system
- Three principals have been discussed:
  1. District heating with $T = (60/40)^\circ C$ and reduced costs
  2. Connection to the return pipes with $T= (30-35)^\circ C$ and reduced costs
  3. Complete disconnection from district heating
Conclusions

- To have a successful renovation in almene boliger, it is utterly important that
  - The residents gains something more than just energy reductions (for example better interior designs)
  - Communication has a high priority in order to have success with the voting
  - Energy solutions proposed also are valid in the future
Contact information

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More information about the project
http://www.al2bolig.dk