Scenario Analysis in LCA on the Zero Emission Neighbourhood Ydalir

A Norwegian case study

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Ydalir

- Elverum
- 1000 residential units
- 2,5 residents/unit
- School and kindergarten
- Passive house standard

Credits to Elverum Vekst and Hornkvern Film & Foto
Illustrated by Asplan Viak
Ydalir

- District heating
- CHP machines
- PV panels
- Vehicle restrictions

Illustrated by Tegn_3
LCA Model

- Dimensions
- Emission intensity

$$E_{tot} = E_{b,mat} + E_{b,oper} + E_{m,mat} + E_{m,oper} + E_{o,mat} + E_{o,oper}$$
## Method - Scenarios

<table>
<thead>
<tr>
<th></th>
<th>Ydalir</th>
<th>Ydalir + car-sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trend path</strong></td>
<td>Scenario A</td>
<td>Scenario C</td>
</tr>
<tr>
<td><strong>Ultra low emission path</strong></td>
<td>Scenario B</td>
<td>Scenario D</td>
</tr>
</tbody>
</table>
Overall Results

Scenario A
- Buildings
- Infrastructure
- Mobility
- On-site Energy, DH
- On-site Energy, PV

Scenario C
- Buildings
- Infrastructure
- Mobility
- On-site Energy, DH
- On-site Energy, PV

Scenario B
- Buildings
- Infrastructure
- Mobility
- On-site Energy, DH
- On-site Energy, PV

Scenario D
- Buildings
- Infrastructure
- Mobility
- On-site Energy, DH
- On-site Energy, PV

4 bars for each scenario, representing different categories with color codes for each category.

Product stage (A1-A3) - Construction (A5) - Replacements (B4) - Energy use in operation (B6) - Benefits (D)
Sensitivity Analysis

- Base case
- Ydalir + Car Sharing
- Elverum
- Mobility energy use in operation +25%
- Areas of PV panels +25%
- Energy load (thermal and electrical) +25%
- Emissions embodied in building materials +25%
- Emissions associated with vehicle production +25%
- Travel distance/inhabitant/year +25%
- Emission intensity district heat +25%
- Emission intensity electricity +25%
- Emission intensity electricity as Scenario 2
- Mobility ultra low emission path

$t\ CO_2$-eq over lifetime
Discussion

- Mobility
- Emission intensity
- Dynamic parameters
- Impact categories
- 0-ambition goal
Conclusion

- Ydalir
- Future work
- ZEN definition
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