Moving to performance based codes: Sustainable building programs in Upper Austria

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The State of Upper Austria - Oberösterreich

Capital: Linz
Population: 1.38 million (similar to NH)
Area: 4.600 mi² (similar to CT)
Economic activities: industry, services & tourism, 25% of the Austrian industrial exports
The Energy Agency of the State of Upper Austria

- **Founded** in 1991
- **Funded** by the state government
- **Energy efficiency & renewable energy**
- **Services** to households, public bodies & businesses
- **State funding programmes**
- **Support to the development of legislation and policies**
The Energy Agency of the State of Upper Austria

10,000 face-to-face energy advice sessions each year (homeowners, businesses, public bodies)
The Energy Agency of the State of Upper Austria

> 100,000 buildings rated and labelled since 1993
The Oekoenegie-Cluster
Upper Austria (OEC)

• Network of 170 renewable energy & energy efficiency companies in the state of Upper Austria
• Since 2000, managed by the energy agency
• www.oec-en.at

• Turnover: 3 billion US$
• Employees: 8,900
• Export share: > 50 %
Solar thermal, biomass heating, efficient buildings
Renewable energy in Upper Austria

- **32 % renewable energy** of total primary energy demand (15 % clean biomass, 11 % hydro, 6 % solar & other renewable)
- **50 % renewable heating**
- **68 % renewable electricity**
- **> 1-2 billion US $** per year avoided imports of fossil fuels
Renewable energy in Upper Austria

By 2030, all electricity and space heating will come from renewables!
Carrots, sticks and tambourines
Upper Austria's sustainable buildings strategy:

**STICKS**

**Regulations**
- Building rating & labelling/disclosure
- Performance standards for heating & cooling demand
- Regular inspection of boilers & AC systems
- Renewable heating mandates (new public build. + buildings > 1000 m²)

**Financial incentives**

**Information & training**

“sticks”

“carrots”

“tambourines”
Upper Austria's sustainable buildings strategy: CARROTS

Financial incentives

- Low interest loans for efficient construction & renovation (based on energy performance indicators)
- Grants for renewable heating & efficiency measures
- Pilot projects, R&D programme, ESCOs
Upper Austria's sustainable buildings strategy: TAMBOURINE

Information & training

- Energy advice
- Training & education programs
- Publications, campaigns & competitions
- Local energy action plans
- Green energy cluster

Regulations
Financial incentives
Information & training

"sticks"
"carrots"
"tambourines"
What is an "energy performance indicator"?

Miles per gallon
Heating/electricity/CO₂ etc. per m² & year
The "energy performance indicator" for the heat demand is influenced by:

- the orientation of the building + solar gains
- the insulation quality
- the ventilation losses
- heating system and the use of renewables
- the geometry of the buildings
Why is it so important?

Energy performance indicators:

- allow for comparison
- empower building owners
- motivate to use renewables
- give impulse for building improvements/renovation
- drive legislation
- allow for targeted funding programmes
Efficiency Requirements for Buildings in Upper Austria

- Since the 70s u-value based building codes
- 1993: energy performance indicator as a funding programme requirement
- Since 1999: building codes: both energy performance indicator (heat) and u-values for domestic buildings
- 2002: energy performance indicator required by EU law
- 2007: energy performance indicator requirements also for non-domestic buildings
- 2012: energy performance indicator must be stated in advertising
The Energy Performance Certificate

- Since 1993/1999

- required for:
  - for any new construction & renovation
    (housing & non-residential)
  - for any sales and renting

- Public buildings must display energy certificate
Energy performance indicators as the basis for building energy codes (ex.: single-family homes)

- Existing Building Stock: 150 kWh/m²,a
- Requirement in 1994: 110 kWh/m²,a
- Requirement in 1999: 90 kWh/m²,a
- Requirement in 2008: 68 kWh/m²,a
- Requirement in 2010: 57 kWh/m²,a
- Requirement in 2013: 54 kWh/m²,a
- Planned requirement 2020: 34 kWh/m²,a
The end of the oil-era?

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>1999</th>
<th>2012</th>
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<tbody>
<tr>
<td>Oil-heating</td>
<td>36 %</td>
<td>&lt; 0.01 %</td>
</tr>
<tr>
<td>Renewable Energy Techs</td>
<td>32 %</td>
<td>&gt; 85 %</td>
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</tbody>
</table>

The graph shows a decrease in the percentage of oil-heating from 36% in 1999 to less than 0.01% in 2012, while renewable energy technologies saw an increase from 32% in 1999 to over 85% in 2012. This suggests a shift away from oil towards renewable energy sources.
**Sustainable buildings:**
**biomass heating**

- Ultra-clean, fully automatic biomass heating systems
- Standard solution for homes, increasing number of non-domestic buildings
Lession learnt:

Performance based building programmes

- high level of energy efficiency ambition vs. high market activation
- continuously tightening the requirements
- avoiding "boom and bust" incentive programmes
- information, training and quality assurance are key
- no "one fits it all" - different instruments to mobilise different market segments (domest/non-domestic; low income/middle-class)
- the right combination of "sticks + carrots + tambourines"

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