Transformation of the Heating Sector
Cleaner fossils as a bridge for renewables?

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German Renewable Energy Federation

Umbrella organization of the German renewable energy sector. Members are 52 associations and enterprises with 30,000 individuals and 5,000 companies. BEE is a founding member of the European Renewable Energies Federation (EREF). Our objective: 100 percent Renewable Energy
Debunking a myth:

Final energy and CO₂ savings made by replacing aging boilers with condensing boilers

- A detailed study of potential savings, subject to initial conditions

Conducted by ECONSULT for BEE
The Sample: private and commercial buildings

- Built 1970s and 1980s
- Existing gas boilers 20 years old
- Boilers from 1998: constant temp., low temp. and condensing boilers
- Boilers also supply hot water
- Typical peripherals

<table>
<thead>
<tr>
<th>Building code</th>
<th>Use</th>
<th>living space/net floor space [m²]</th>
<th>nominal thermal capacity [kW]</th>
<th>primary energy demand – low-temp. boilers [kW/m²a]</th>
<th>transmission heat loss specs [W/m²K]</th>
<th>specific features</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFH_120</td>
<td>semi-detached single family house</td>
<td>120</td>
<td>19</td>
<td>346.0</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>MFH_216</td>
<td>detached three-family house</td>
<td>216</td>
<td>30</td>
<td>139.8</td>
<td>0.42</td>
<td>partial renovation, shell at EH115 level, heated b</td>
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<tr>
<td>MFH_880</td>
<td>detached apartment building</td>
<td>880</td>
<td>80</td>
<td>168.7</td>
<td>1.08</td>
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<td>MFH_1970</td>
<td>detached apartment building</td>
<td>1,970</td>
<td>186</td>
<td>205.1</td>
<td>1.21</td>
<td>one-pipe heating system</td>
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<tr>
<td>Office</td>
<td>office building, partially air-conditioned</td>
<td>875</td>
<td>188</td>
<td>348.8</td>
<td>1.27</td>
<td></td>
</tr>
<tr>
<td>Discount store</td>
<td>supermarket, air-conditioned</td>
<td>1,525</td>
<td>208</td>
<td>280.5</td>
<td>0.40</td>
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</tr>
</tbody>
</table>
Fuel savings related to total final energy demand

- The worse the replaced system, the better the achieved savings
- Significantly higher savings from peripheral improvements
- Maximum 15% savings from new boilers
CO₂ savings related to entire emissions in %

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Summary of findings

• Average savings by new condensing gas boiler:
  • 10-15%, if replacing constant temperature boiler
  • 5-10%, if replacing low temperature boiler
  • 2-3%, if replacing an aging condensing boiler

• Switch from oil to gas results in around 20% related CO₂ savings

• Additional savings of 5-12% from peripheral improvements

• Savings from peripheral improvement not necessarily linked to boiler replacement
Conclusions of the presented study

- **Main savings** achieved through peripheral adjustments

- Weighted (10% CT, 80% LT, 10% CD) **savings are around 10%** (assuming optimum operation)

- **Maximum savings from boiler replacement 15%** (if aging constant temperature boiler is replaced by modern condensing boiler)

- **Switching to Renewable Energy and CHP can deliver savings of up to 90% and more**
The way forward: Fast track instead of deviations and bridges

- **Remove remaining barriers** for Renewables, such as
  - continued support for oil and gas heating
  - lack of internalisation of societal costs of fossil fuel use
  - lack of awareness, lack of professional capacity

- **Create favourable frameworks** for Renewables deployment
  - support programmes for Renewable heat installations
  - for hybrid systems: limit support to the Renewables part
  - offer choice between direct investment support and loan credits
  - support efficiency improvements only with at least partial inclusion of Renewables
  - create incentives for retailers and support capacity building for installers

- **Use building obligations** for new buildings / major refurbishment

- Aim at net zero and **plus energy buildings** well before 2050

- **Integrated energy markets and systems: sector coupling**
Thanks for your Attention!

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We deliver clean energy. 100 percent.