Abatement measures for Small Combustion Installations – German Legislation

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Foto: Prof. Dr. Günther Baumbach, TU Stuttgart
Renewable energy and Air Quality

EU - Objective:
• Achieving 20% renewable energy in the EU by 2020
• Currently 2/3 of EU final renewable energy consumption is from biomass

▶ The use of wood for domestic heating is promoted for climate protection reasons (e.g. Renewable Energy Incentive Program of the German government)

▶ Increasing use of wood in small combustion installations may cause problems for air quality
Emissions from SCI in Germany 2010

- Coal
- Wood
- Heating oil
- Natural gas

- Energy input (%)
- PM2.5 (%)
- NMVOC (%)
Situation of wood combustion in Germany

- Small combustion installations in Germany: about 14 million stoves and about 0.7 million boilers for solid fuels

Problems:

1. Combustion technology
2. Maintenance of the appliances
3. Consumer behaviour
4. Quality of wood (e.g. humidity, use of treated wood)

Ordinance on small combustion installations amended in 2010
Legal framework in Germany

Federal Immission Control Act

Regulation for Combustion Plants

- not subject to licensing
- subject to licensing

Ordinance on small combustion plants
- Thermal Input <1 MW (wood, coal) and < 0.1 MW (straw)

Technical Instructions air
- Thermal Input 1 – 50 MW (wood, coal) and 0.1-50 MW (straw)

Ordinance on large combustion plants
- Thermal Input ≥ 50 MW
1. Combustion technology

**Roomheaters:**
- limit values for CO, dust and efficiency at type tests
- 2 Tiers: 2010 and 2015

**Boilers:**
- Limit values for CO and dust at operation
- 2 Tiers: 2010 and 2015
- Buffer tank required
### Emission limit values (type tests) – room heaters, 13 % O₂

<table>
<thead>
<tr>
<th>Tier 1: Put into operation after entry into force of the Ordinance</th>
<th>Tier 2: Put into operation after 31. December 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO [g/m³]</td>
<td>CO [g/m³]</td>
</tr>
<tr>
<td>0.4 (pellet stoves) to 3.5 (cookers)</td>
<td>0.25 (pellet stoves) to 1.5 (cookers)</td>
</tr>
</tbody>
</table>
# Emission limit values (regular controls) for boilers, 13 % O₂

<table>
<thead>
<tr>
<th>Tier 1: Installations put into operation from 3/2010 – wood, coal</th>
<th>Rated thermal output [kW]</th>
<th>Dust [g/m³]</th>
<th>CO [g/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 4</td>
<td>0.1</td>
<td>0.3 – 1.0</td>
<td></td>
</tr>
<tr>
<td>Wood pellets</td>
<td>≥</td>
<td>0.06</td>
<td>0.5 – 0.8</td>
</tr>
<tr>
<td>Tier 2: Installations put into operation after 31 January 2014</td>
<td>≥ 4</td>
<td>0.02</td>
<td>0.3 – 0.4</td>
</tr>
</tbody>
</table>
2. Maintenance

- Technical inspection every 3-4 years for roomheaters;
- Measurement of dust and CO at every boiler once in 2 years;
- Information on maintenance in brochures etc.
3. Consumer behaviour

- Personal consultation for every operator by the chimney sweeper for every new installation and after every change of an operator

4. Fuel Quality

- List of admissible fuels, standardised quality requirements where possible (wood pellets, wood briquettes, light heating oil…)
- Requirements for wood quality: untreated wood, humidity < 25 %
- Other biomass: straw, grain and similar fuels with additional requirements;
- Regular Inspection of fuel storages
Existing installations

- After a transition period of 5 to 15 years (depending on the age of the installation) new provisions also apply to existing boilers;
- Stoves: retrofitting (installation of a filter) or exchange of old appliances after a transition period depending on the date of type testing; For existing stoves less stringent limit values apply than for new ones.
Experiences

• Roomheaters: Limit values of the second tier have been reached more quickly than expected, but results in real life operation may differ.

• Boilers: Tier 2 Limit values are still challenging

• Tackling real life stays important

Outlook

• 2 Ecodesign regulations in preparation for roomheaters and boilers

• Requirements for putting appliances on the market
Prognosis of PM$_{2.5}$ emissions 2009
PM$_{2.5}$ Emissions until 2011
Prognosis of PM$_{2.5}$ emissions 2012

- Trend 2009
- Amendment 1.BImSchV 2009
- Prognosis "Energiewende" 2012
- Emissions until 2011
Thank you for your attention

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