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Inventory of national strategies for reducing the impact on air quality from residential wood combustion

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Summary of report

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Reduction of air pollution is a major societal goal, and great efforts are currently undertaken. Over the last 30 years, significant progress has been made, but wood combustion remains a significant source of air pollution in the member countries of IEA Bioenergy, particularly for carbon monoxide (CO) and particulate matter (PM)-emissions.

Wood combustion emissions originating from the private households where problems are most difficult to solve. Here, there is a large number of factors; the applied conversion technology is numerous, and type of wood fuels are many and there exist variability in wood fuel quality. Additionally, user practise and operational skills play an enormous role in affecting emission levels. For these reasons, pollutant emissions are highest in the residential sector. Consequently, small scale biomass appliances form the main focus in this report. In this field, policy makers or institutions responsible for air quality control must coordinate an unmanageable number of options for remedial actions. For such a challenging task, it can be helpful to draw inspiration from success stories from other regions.

Therefore, this report compiles national approaches concerning emission reduction strategies in the field of residential wood combustion in selected IEA-member countries. The information presented in the report was gathered in a structured manner through a detailed questionnaire. Where possible, the report also provides direct access to the original sources of information via active weblinks. Decision makers are thus enabled to strengthen their own strategy.

Nine countries contributed the compilation of information: Austria, Canada, Switzerland, Germany, Denmark, Italy, The Netherlands, Norway and Sweden. The report is structured into three major parts. Part 1 briefly shows some simple statistics on the current status of wood combustion in selected countries, Part 2 forms the main part of the report, here extensive information of relevant measures is compiled for each of the selected countries, this is done

in 16 sub-chapters, e. g. on stove replacement strategies, regional restrictions for furnaces, tightening of emission limits, inspections of stoves or boilers, quality labels, teaching and informing, etc. Finally in Part 3, the effectiveness of measures for reducing wood-based pollutant emissions is evaluated and prioritized by each involved expert.

SOME SELECTED HIGHLIGHTS

- National replacement schemes for old stoves were implemented in Germany and in Denmark. But there were many regional and temporal replacement schemes, sometimes also on municipal level.
- To ban wood fuel use is a widely used approach. Such restrictions are applied in all involved countries, either by temporary or as permanent bans. They are mostly implemented regionally. Sometimes a wood fuel ban is depending on actual immission conditions. Or the ban is communicated as a temporary suggestion which is based on critical weather conditions, such as the ‘Stookalert’ (heating alarm) in The Netherlands.
- Tightening of emission limits have a long history in several countries which typically get stricter over time. For example, in the last years, Austria and Germany have introduced more stringent emission limits three times. The European limits (Ecodesign-directive) have finally forced other European countries to implement them, even Non-EU countries like Switzerland and Norway have followed.
- Public incentives for investment for new appliances have been quite common over the past years. For stoves it seems crucial, that any scrappage bonus is designed in a way where any further use of the old stove is effectively disabled (e.g. in Canada or Denmark). For boilers, subsidies are mostly not conditional, except in Germany, where a long-term subsidy program has paved the way for an advanced state of technology by introducing strict ambitious emission classes or obligatory technical features.
- Regular on-site inspections are common in most of the involved countries for both wood stoves and wood boilers. In most cases the chimney sweeps are involved, but mostly they only visit the site to ensure operational safety. But in Austria, Germany, Switzerland, and Denmark the stove is also regularly checked for functioning and damages. In Germany, the authorized district chimney sweeper is obliged to instruct the stove owner every 3 to 4 years on the proper stove use, to test the fuel moisture, and for boilers do performance tests with recurring CO- and PM emission measurements.
- Advanced stove/boiler labels are numerous and are mostly based on results from type testing by certified bodies. Only the German “Blue Angel” is based on a dedicated real-life test protocol.
- Public information campaigns are manifold covering a range of interesting approaches. Apart from brochures and websites there are online-courses for stove users (Canada), citizen-science trailers which invite stove users to practically experience the correct operation (Austria), teaching videos about stove operation are available (Switzerland, Germany), or scientists lead discussion forums about wood stove technology and use (Norway). In Sweden all small-scale wood burning appliances are mapped to assess large emission reduction potentials.