



Effects of a very Low Energy Building Scenario in Europe on Health

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ABSTRACT

The share of energy that is used for domestic heating and cooling is substantial. Accordingly building insulation has significant impact on air pollution. We investigated the effects of a very low energy building scenario with an annual retrofit rate of 2% in 25 European states on air pollution and resulting benefits to health and economy.

Energy savings from 2005 to 2020 due to insulation were calculated by comparing a business as usual with the insulation scenario based on existing building data on thermal conductivity. The resulting changes in emissions were entered in a Comprehensive Air-Quality Model with extensions, using meteorology for 2009 from which annual changes in the main air pollutants were derived for each country. Data on populations and on impacts of pollutants came from WHO/EU reports and databases.

Effects on the mean annual change in fine particles varied greatly from $-0.008 \mu\text{g}/\text{m}^3$ (Finland) to $-0.538 \mu\text{g}/\text{m}^3$ (Belgium). The annual number of life-years (LY) gained per 100,000 adults varied from 0.9 LY in Finland to 54.5 LY in Belgium - the mean being 24.3 LY. The total number of LY gained annually varied from 31 in Finland to 22,524 in Germany, totalling 78,678 LY in Europe. A total of 7,173 cases of persistent chronic bronchitis were avoided annually. Several other health outcomes improved similarly. The saved societal costs totalled 6.64 billion € annually.

In conclusion, in addition to carbon emission reductions not assessed in this study, a very low energy building scenario in Europe would have substantial benefits on health through improvements in air pollution. Health effects and resulting societal cost savings may significantly counterbalance investment costs and should be taken into account when evaluating strategies for mitigation of global warming