

Summary

This study focuses on policy measures that can improve fire safety in homes in the Netherlands. As a first step an inventory of possible policy measures was made: a *long list*. Four measures were selected from this list. These measures were then further specified and an estimate was made of the social costs and benefits involved in introducing the selected policy measures. The results presented here can be helpful in making policy decisions.

The selected policy measures

Two types of policy measures were selected with two variants each, i.e. four policy measures in total. The first type is an obligation to install home fire sprinklers, the second type concerns fire safety requirements for upholstered furniture such as sofas.

With regard to mandatory home fire sprinklers, two variants were explored: an obligation for new build homes (variant A) and an obligation for existing homes (variant B). For new build homes the obligation applies if at least six apartments can be connected to a single sprinkler system, for existing homes it must be possible to connect a minimum of twelve apartments to one sprinkler system. The thought behind this is that the fixed costs of a sprinkler system can be shared between multiple apartments and that installing fire sprinklers in existing homes is more expensive. The sprinklers must meet the current Dutch standards for home fire sprinklers.

With regard to fire safety requirements for upholstered furniture and mattresses/beds, two variants were explored as well. Variant A is based on the current fire safety requirements that apply in the United Kingdom. This means that the furniture in question must be able to withstand certain fire tests. Chemical flame retardants are not mandatory in order to pass the tests. However, in practice they are often used. Variant B, on the other hand, explicitly prohibits the use of chemical flame retardants, which means that fire safety has to be achieved through other methods (via upholstery, padding or filling material). The underlying reason is that various groups of chemical flame retardants may carry risks for man and the environment. Variant B only sets fire safety requirements for upholstered furniture, not for mattresses, because the possibilities of making mattresses fire safe without using chemical flame retardants at reasonable costs seem to be quite limited for now.

The results of the analyses

The social costs of both variants of the policy measure ‘mandatory home fire sprinklers’ (new build and existing homes) are higher than their benefits to society. The balance of monetized social benefits minus costs of variant A (‘new build homes’) is in the order of minus € 260 million; for variant B (‘existing homes’) it is in the order of minus € 1.2 billion. For existing homes the difference between costs and benefits is greatest: the additional costs compared to investments in new build homes are not sufficiently compensated for by the greater benefits due to a faster achievement of increased fire safety for a larger part of the available homes. Both

variants offer social benefits in terms of prevented damage, deaths and injuries and prevented deployment of firefighters, but these are not sufficiently high to make up for the investment costs of home fire sprinklers.

The social benefits of home fire sprinklers could be greater than their social costs if the investment costs of home fire sprinklers would be substantially lower without compromising their effectiveness. In this regard we should point out the existence of the so-called mains fed sprinkler. This is a type of home fire sprinkler that is fed by the mains water supply and does not require a separate pump. However, in this study mains fed sprinklers were only investigated marginally in the analyses of mandatory home fire sprinklers. Statements regarding their actual social costs and benefits would require additional research.

Analyses regarding the policy measure ‘fire safety requirements for upholstered furniture and mattresses/beds’ do not have an unambiguously positive or negative outcome. As it turns out, whether or not the balance of monetized social benefits minus costs is positive or negative depends upon specific assumptions made in the calculations. Both variants (with or without a ban on the use of chemical flame retardants) have social benefits in terms of prevented damage, deaths and injuries and prevented deployment of firefighters. A complication with the variant that does not include a ban on the use of chemical flame retardants is that it proved impossible in the current analyses to attach a value to the possible risks of using chemical flame retardants in order to meet fire safety requirements. Various groups of chemical flame retardants carry risks for health and the environment. It was not possible in this study to ascertain to what degree furniture producers would use chemical flame retardants in order to meet fire safety requirements and if and to what extent the applied chemical flame retardants would give rise to increased risks.

Policy implications

The outcomes with regard to mandatory home fire sprinklers clearly indicate that imposing a requirement to install sprinklers in existing homes in the Netherlands has greater costs than benefits. For new build homes the costs are also greater than the benefits, but the difference is smaller. There may be specific situations where the social benefits *do* outweigh the social costs of home fire sprinklers. To determine if this is the case more detailed information is necessary regarding, for instance, the costs and effectiveness of the aforementioned mains fed sprinkler or the degree to which the fixed costs of home fire sprinkler systems can be shared amongst even more apartments. A follow-up study could shed light on these issues.

The results with regard to fire safety requirements for furniture do not unequivocally show if the costs exceed the benefits, or vice versa. This is valuable information in itself. It means that a fast introduction of such fire safety requirements, without any conscious choices regarding their design and timing, will bear the risk that requirements are introduced for which it is uncertain whether or not their benefits will actually exceed their costs. However, it also means that definitively rejecting such fire safety requirements would be jumping to conclusions. Further research and market developments could indicate if a set-up exists in which the benefits exceed the costs in a robust manner. As mentioned earlier, there is a lack of information regarding the possible risks that occur when using furniture where chemical flame retardants are applied.

Other policy measures

Although the four investigated policy measures were chosen consciously, it was primarily a practical decision to study only four options from the long list, in order to achieve a timely publication of the study results and because of the available research budget. Moreover, investigating a limited number of measures gives the study a certain focus. The selection of the four policy measures does not imply that other policy measures are undesirable or that it is impossible to investigate their social costs and benefits.

Recommendations

If advice could be given on the basis of this study, the most important recommendations would be:

- to conduct further research into the possibilities of achieving substantial cost savings with home fire sprinklers, for instance for the mains fed sprinklers mentioned earlier, in which case also their effectiveness must be determined and their relation to Dutch standards for home fire sprinklers should be assessed; and
- to expand discussions regarding fire safety requirements for upholstered furniture so as to include both the possible risks of chemical flame retardants and the extent to which alternative technologies to chemical flame retardants are or will be ready for large-scale applications.