

# Safer storage of biofuels and waste

## Fire and the Environment

### Fires in solid biomass and waste results in significant costs

***Solid biofuels, biomass and various waste fractions are handled and stored in large amounts at many different industries around the country which could result in significant fire risks. Within the Brandforsk project 701-12, we have compiled statistics on the frequency and extent of fires at these kinds of facilities, but also information on the most frequent material fractions and how these are generally stored. The results of the study indicate that e.g. the total annual cost for the fire incidents in average amounts to SEK 150-350 million.***

#### Summary of the project

According to the answers from a questionnaire directed towards the biomass and waste industry, outdoor storage in non-compacted stacks or piles is the dominant form of storage and applied by about 85 % of all respondents in our survey. The materials that are handled and stored in largest quantities outdoors are commercial waste and recycled wood. When it comes to solid biofuels: sawdust, bark and wood chips from logging residues account for the largest quantities. Indoor storage is required for some biofuels and different waste fractions for recycling, where the material must be protected against moisture. In these cases the use of flat storage buildings is most common, but for some materials, storages in silos is also used. Wood pellets are the individual material that is stored in the largest quantities indoors. Statistics from the MSB (Swedish Civil Contingencies Agency) database on fire incidents shows that in average 580 fires are reported per year for the period 2005-2013, which somehow relate to biomass or waste. The highest number of fires occurred in 2008 (676); then the statistics show a slightly decreasing trend. For fires classified as "Fire in building" the trend is stable, while the number of fires classified as "Fire not in building" (outdoor) varies considerably from year to year.

Many fires were not relevant to our project, i.e. industrial handling and storage of solid biofuels, biomass and waste, as the statistics also included fires

in trash piles, grass fires, fires due to spontaneous combustion in compost piles, etc., or reports that were very incomplete. To get an idea of the proportion of incidents that really were relevant for the project, a deeper analysis of the individual fire incident reports was therefore made for 2012. This showed that only about 30 % of the reported incidents were considered relevant and assuming that 2012 is representative of the entire period, 2005-2013, this means that there are about 190 fires in industrial storage facilities per year. About 40 of these fires are classified as "Fire in building" and 150 fires are classified as "Fire not in building". The most common type of objects for fires in buildings was CHP plants and for outdoor fires, it was fires in stacks and piles of stored material. The most common cause of the fire was in both cases reported as "Spontaneous ignition".

Based on an annual fire frequency of about 200 fires, the data on fire losses from the questionnaire to the industry indicates that the annual cost for fire damage in Sweden is in the order of SEK 150-350 million and that the annual quantity of burnt and damaged material amounts to about 6500-7500 tons. However, if one or several more extensive fire occur during a specific year, both the total costs and the quantities of burnt/damaged material might increase several times compared to the average figures.



*Fires as a result of spontaneous ignition in piles and stacks is the most common type of fire incident at facilities for industrial handling and storage of solid biofuels, biomass and waste.*

## Report

The project results are presented in the form of two reports. SP Report 2014: 55 is the project's main report and gives a detailed presentation of the various parts of the project while SP Report 2014: 67 is a short summary of the main report for those who primarily want to get an overview of the results and conclusions. Both reports can be downloaded from SP's website, [www.sp.se](http://www.sp.se) and from Brandforsks website, [www.brandforsk.se](http://www.brandforsk.se)

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