

ReNew: Renovating buildings with wood waste

The ReNew project will make new materials for energy renovation out of wood waste that is otherwise burned for energy. When wood is made by living trees, these take up CO₂ and uses the carbon (C) to make wood biomass. Therefore, making wood into construction materials helps storing carbon from CO₂ in our buildings. However, most of the wood biomass harvested in European forests is burned for energy, because the biomass does not meet industrial standards. This includes all parts of the tree that are too small, bent, or crooked. It also includes outer parts of the tree that are cut away when sawing the stem into structural wood or boards. When wood is burned the stored carbon is released back into the atmosphere as CO₂.

We need to save energy in existing buildings

Heating and cooling buildings require a lot of energy and emits a lot of CO₂. This is particularly true for older buildings that we desperately need to make more energy-efficient. However, many conventional building materials like mineral wool, concrete, and steel require a lot of energy to produce and emits substantial amounts of CO₂. Renovating existing buildings to save energy therefore makes most sense when we use materials with low energy consumption and CO₂ emissions from their production, such as wood or other biobased materials.

Upcycling wood waste has triple benefits

The ReNew project will make materials for energy renovation out of wood waste which is otherwise burned for energy. Hereby, the project will provide a triple benefit for society by

- 1) keeping the stored carbon in the wood locked-up in long-lived materials,
- 2) saving energy in existing buildings and hereby reducing CO₂ emissions from these, and
- 3) replacing conventional materials that takes more energy and emits more CO₂ to produce.

Heat, moisture and fire are central properties

The project focuses on wood from sawmill off-cuts, small-diameter stems, and branches. The basic assumption is that by analysing the chemistry and microstructure of the wood waste, it is possible to split it into fractions that are more homogeneous and therefore easier to use for material production. These materials will be characterised for their suitability in energy renovation, specifically their properties related to heat transfer, moisture, and fire. The project runs 2025-2026 and is headed by Associate Professor Emil Thybring from the research group “Bioresource Chemistry and Technology”, University of Copenhagen.