



Embodied Energy

Photo: Günther Hartmann

The reduction of our energy consumption is a climate and political necessity and now a subject on which there is political agreement. In Germany, the Energy Saving Ordinance (Energieeinsparverordnung, EnEV) was introduced for a range of different building types. The aim is to limit the energy demand for heating. It does not, however, take the so-called embodied energy into consideration: the energy required for the construction, maintenance and disposal of a building. The production of building materials tends to account for the largest proportion of embodied energy. Mineral and metal building materials, in particular, require high

temperatures for their production, and thus a lot of energy.

In many buildings, the energy consumption for the development of the building is comparable to the heating energy demand over several decades. The fact is, the smaller the proportion of heating energy, the larger the proportion of energy for the production of building materials within the total energy balance. If, however, the development of the building requires more energy than the heating for the next 100 years, the priorities of our energy saving endeavours are no longer viable. Then the time has come to question current strategies and establish new priorities.

The energy once invested in the construction of the building and then “stored” in the building stock is lost and becomes irrecoverable once the building is demolished.

The good news is that there is still considerable potential for energy savings in the field of building. One solution is to modernise, con-

“Instead of trying to achieve dwindling savings in heating energy, we should tap the savings potential in the embodied energy.”

vert and extend the existing building stock, instead of randomly demolishing older structures and rebuilding them. The other solution is to use building materials from renewable natural resources. Wood, a renewable natural resource, requires a comparatively small amount of energy for its extraction and processing. Timber is extremely efficient, which is proven by spectacular large-scale projects, such as the 84-metre-tall timber building “HoHo” that is currently under construction in Vienna.

The performance of wood is also based on a high energy input. It occurs during the growing process before the trees are harvested. The energy comes entirely from the sun and is used to construct complex molecular and cell structures by means of photosynthesis in a highly efficient way. So, whereas the “natural production” of wood and other renewable natural resources takes place without the generation of CO₂ emissions, the artificial production of mineral and metal building materials is achieved by burning fossil fuels and producing high CO₂ emissions.

If energy transition and climate protection are to be taken seriously, we have to overcome today’s tunnel vi-

“The energy consumption for the development of a building often compares with the heating energy demand of several decades.”

sion, which only concentrates on the heating energy demand. In order to obtain large energy savings, the energy for the production of building materials must be incorporated in our strategies, regulations and guidelines. What is more important for climate protection is the fact that energy savings are made immediately and not over an extended period of several decades as is the case when reducing the heating energy demand. Climate protection is based on limiting the temperature rise of the Earth's atmosphere as quickly and effectively as possible. If the ecosystems of our planet have too little time to adapt to the climate change, they will fail—with unforeseeable consequences.

We need a paradigm change in the building industry. The energy for the production of building materials can no longer be ignored and must be

embedded in the regulations and subsidy programmes for energy-efficient buildings and refurbishments. Instead of trying to obtain dwindling savings in heating through ever greater effort, the focus should be on tapping the savings potential offered by the embodied energy. The effort/benefit ratio is much better in this case. The necessary data has already been recorded and is available on two central online databases. The time has come to utilise this know-how.

“The right selection of building materials can save large amounts of energy immediately rather than spread over an extended period of several decades.”