

# Timber products use less energy

when comparing the kilowatt hours of energy consumption used to make a finished product, no other building material can compete with timber

1000 kw/h



timber

2500 kw/h



concrete

4500 kw/h



steel

20000 kw/h



aluminium

*Timber is the perfect, sustainable building material. It is strong, natural, renewable and has the lowest embodied energy of any major building material. It also stores atmospheric carbon. Buildings constructed from timber take less energy to make than similar brick, concrete or steel buildings.*

# timber is natural, renewable & sustainable

## Timber and Embodied Energy.



Embodied energy measures the total energy used to transform raw materials into ready to use building products. It is expressed in gigajoules per tonne (Gj/t) or megajoules per kilogram (MJ/kg).

Timber, either softwood or hardwood, requires the lowest production energy of any major building material.

While the amount of energy embodied in a building obviously varies with its design and location, the following examples provide a telling story;

- a steel beam requires more than 10 times the production energy of the equivalent timber beam;
- aluminium window frames use over 50 times the energy of equivalent timber frames;
- on a weight-for-weight basis, the manufacture of steel consumes 300% and aluminium 1500% more energy than its timber equivalent; and
- brick cladding for houses uses significantly more energy than timber cladding;
- much of the energy used for timber drying kilns is waste material from the harvesting process. In comparison, most of the energy used in the extraction and processing of substitute materials is non-renewable fossil fuels.

Material	Fossil fuel energy (MJ/kg)	Fossil fuel energy (MJ/m <sup>3</sup> )
Rough Sawn timber	1.5	750
Steel	35	266000
Concrete	2	4800
Aluminium	435	1100000

Timber also stores atmospheric carbon.

The environmental benefits of using timber as a greenhouse sink are considerable.

- timber stores up to 15 times the amount of carbon dioxide released during its manufacture, whereas steel and aluminium store negligible amounts.
- steel making, which requires energy and involves the burning of non-renewable fossil fuel, liberates about 2 tonnes of carbon dioxide for each tonne of steel produced; and
- a steel-framed house accounts for the release of 3.5 tonnes of carbon, but the equivalent house framed in timber can store 3.1 tonnes of carbon.

Material	Carbon released (kg/t)	Carbon released (kg/m <sup>3</sup> )	Carbon stored (kg/m <sup>3</sup> )
Rough Sawn timber	30	15	250
Steel	700	5320	0
Concrete	50	120	0
Aluminium	8700	22000	0

Source: Presented in Ferguson, I., La Fontaine, B., Vinden, P., Bren, L., Hateley, R. and Hermesec, B. 1996, 'Environmental Properties of Timber', Research Paper commissioned by the Forest & Wood Products Research & Development Corporation.

