1.6.8 Embodied Energy of Column and Beam Assemblies in the U.S.

Assumes Non-Load-Bearing Exterior Wall:

Column Type	Beam Type	Embodied Energy (MMBtu SF) (1)	CO2 Equivalent Emissions (lbs/SF)
Concrete	Concrete	0.101	17.57
Concrete	Steel I-beam	0.091	11.24
Hollow structural steel	Glulam	0.022	2.07
Hollow structural steel	Laminated veneer lumber	0.019	1.81
Glulam	Glulam	0.019	1.68
Glulam	Laminated veneer lumber	0.016	1.39
Steel I-beam	Steel I-beam	0.054	5.51
Steel I-beam	Laminated veneer lumber	0.018	1.61
Built-up softwood	Glulam	0.019	0.62
Built-up softwood	Laminated veneer lumber	0.016	0.49

Assumes Load-Bearing Exterior Wall:

Column Type	Beam Type		
Concrete	Concrete	0.076	13.49
Concrete	Steel I-beam	0.069	8.31
Hollow structural steel	Glulam	0.017	1.63
Hollow structural steel	Laminated veneer lumber	0.015	1.41
Glulam	Glulam	0.015	1.34
Glulam	Laminated veneer lumber	0.013	1.15
Steel I-beam	Steel I-beam	0.044	4.48
Steel I-beam	Laminated veneer lumber	0.014	1.28
Built-up softwood	Glulam	0.015	1.34
Built-up softwood	Laminated veneer lumber	0.013	1.12

Note(s): Assumptions: Values are general estimations for the U.S. Low rise building. 60 year building lifetime. Bay size: 30 by 30 feet. Column Height: 10 feet. 1) Embodied Energy: Energy use includes extraction, processing, transportation, construction, and disposal of each material.

Source(s): Athena Institute. Athena EcoCalculator for Assemblies v.3.5.2. 2010. Available at www.athenasmi.org/tools/ecoCalculator/index.html