	Production	Specific Combustion Energy	Total Combustion Energy	Carbon Content		Hydrogen Content		CO_2 emissions (combustion)
	MT/yr	MJ/kg	EJ/yr	MT/yr	EJ/yr	MT/yr	EJ/yr	MT/yr
Oil	4,200	44	185	3,600	119	600	85	12,200
Gas	2,500	55	138	1,900	63	600	85	6,800
Coal	7,500	20	150	4,800	158	100	14	16,300
Total			473	10,300	340	1,300	184	35,300

Table 1: Yearly production of carbon, hydrogen, and energy via oil, gas, and coal (from IEA World Energy Outlook). For natural gas, most of the energy is contained in the hydrogen. The energies of combustion of carbon and hydrogen are ~33 MJ/kg and ~142 MJ/kg, respectively. Most fossil coal is lignite, which has low carbon content (~60%) and 3 to 5% hydrogen. The total combustion energy of oil, gas, and coal (column 4) is not the same as the combustion energy of their carbon (column 6) and hydrogen (column 8) components; the difference is the standard energy of formation of their constituent hydrocarbons (e.g., 4.7 MJ/kg for methane).

	Density	Cost	Embodied Energy		CO_2 footprint		Yearly Production	Yearly energy consumption	Yearly CO_2 emissions
	kg/m^3	USD/kg	MJ/kg	GJ/m^3	kg CO_2/kg	T CO_2/m^3	MT/yr	EJ/yr	MT/yr
Steel	7,800	0.8	30	6.2	1.8	14	1,600	48	2,900
Aluminum	2,700	2	210	567	12	24	60	12.6	720
Copper	9,000	6	60	54	3.7	33	20	1.2	74
C-Fibers	1,800	30-200	370	666	25	45	0.1	0.037	2.5
Concrete	2,500	0.05	1.2	3	0.12	0.3	16,000	19.2	1,900

Table 2: Properties, embodied energies and CO_2 footprints, and yearly production of main industrial materials (adapted from Ref. 4 and the United States Geological Survey). Within the same class of materials (e.g., steel), there are subclasses with major markets and significantly higher economic value and energy and CO_2 footprints. For example, stainless steel is produced at 50 MT/yr of and sold at 3 to 8 USD/kg; its energy and CO_2 intensity are about three times higher than low carbon steel. CO_2 footprints are given on a by weight and by volume basis, because materials are traded on a mass basis but used on the basis of function, that tracks more closely with volumetric properties. Because of this accounting, heavier materials appear to be cheaper and less environmentally impactful. Most of the concrete emissions are due to cement production; however, cement alone is not used as a structural material.