Table 4. Farm and biofuel labor household energy use.

	Farm household members in biofuel production *	Non-farm labor household members in biofuel production †	Annual US non-biofuel per capita energy consumption (MJ) ‡	Total household energy use in biofuel production (MJ)	2005 US biofuel production (L)	Total household energy use per unit of biofuel production (MJ/L) §	Allocated household energy use on farm / off farm (MJ/L)
Corn grain ethanol	49,160	6,250	3.54×10^5	1.96×10^{10}	1.48×10^{10}	1.33	1.18 / 0.15
Soybean biodiesel	4,900	774	3.55×10^5	2.01×10^9	2.56×10^8	7.87	6.79 / 1.08

* In 2005, 4.71×10^6 ha were devoted to corn farming for ethanol (19) As the average farm size was 120 ha in the top nine corn producing states (20), the equivalent of 3.93×10^4 farms provided the corn for ethanol production. Approximately 2.56×10^8 L of biodiesel were produced in 2005 (21), 90% of which derived from soybean oil. With an average farm size of 120 ha in the top 15 soybean producing states (20), the equivalent of 3.91×10^3 farms were devoted to growing soybeans for biodiesel production. We assume an average of 2.5 people on each farm (22) and that 50% of farm household labor is devoted to farming (23).

† An average of 40 people work in an ethanol plant, which includes those involved in corn and ethanol transportation (24), and as of 2005 there were approximately 100 ethanol plants in the US (25). Off-farm soybean biodiesel production is done at both soybean crushing and soybean oil conversion facilities. With approximately 75 crushing facilities nationwide and 50 laborers at each facility (26), 3,750 workers were involved in crushing; however, only 1.65% of crushed soybeans were needed to produce the soybean oil used to make biodiesel. We assume 10 larger and 35 smaller soybean oil conversion facilities nationally each with 25 and 5 laborers, respectively (27). The total off-farm laborers in corn grain ethanol and soybean biodiesel production are, therefore, 4,000 and 487, respectively. Given the 2000-2005 annual average of employment/population ratio of 63% (28), we assume that each laborer supports 1.59 people.

‡ The US energy consumption in 2004 was 1.05×10^{14} MJ (29). Also, 1.48×10^{10} L of corn grain ethanol (19) and 2.56×10^8 L of soybean biodiesel (21) were produced in 2005 at 20.38 and 28.37 MJ/L, respectively. Therefore, the total national energy usage excluding that used in the entire ethanol production cycle was 1.05×10^{14} MJ, or 99.7% of national energy consumption. For biodiesel, the corresponding estimates are 1.05×10^{14} MJ and 100.0%. The average US population in 2004 was 2.96×10^8 people (30).

§ Average annual household energy use divided by average annual industry biofuel production.