

## Section 7. Consumption adjustments for calculating expenditures

The State Energy Data System (SEDS) calculates expenditures as the product of the SEDS price estimates and consumption estimates. The prices estimated by SEDS are end-use prices for the final products purchased by end users and the cost of fuels consumed by the electric power sectors. For the SEDS expenditure calculations, SEDS adjusts its consumption estimates to remove process fuel, intermediate products, and other consumption that has no direct fuel costs to the end-use customer, including: hydroelectric, geothermal, solar, and wind energy sources, and some wood and waste. SEDS also excludes electricity exports to Canada and Mexico from the expenditure calculations.

Almost all aspects of energy production, processing, and distribution consume energy as an inherent part of those activities. SEDS industrial and transportation sector consumption estimates include energy consumed in the process of providing energy to end users, called “process fuel.” Common examples include: energy used to drill for oil and gas, to transport petroleum and natural gas by pipeline, and to generate and deliver electricity to end users. Energy products that are later used in another energy product for end-use consumption are called “intermediate products.” A common example is intermediate motor gasoline blending components that are later consumed as part of finished motor gasoline sold at gas stations.

Process fuel and intermediate products are not directly purchased by the end user and, therefore, SEDS does not estimate these prices. Although the end user does not consume either process fuel or intermediate products directly, the cost is passed on to the end user in the final end-use product price. If SEDS did not remove the process fuel and intermediate products consumption, there would be double counting, first as paid by the “processor” (producer, processor, or transporter) and again in the final price to the end user.

Some renewable energy sources are not purchased directly. The consumption of hydroelectric, geothermal, wind, solar photovoltaic, and solar thermal energy, which SEDS measures as kilowatthours of electricity produced, are not included in the SEDS expenditure estimates because there are no “fuel costs” involved. These all-electric sources are inherently included in the end-use electricity price to ultimate customers, and therefore are part of the SEDS electricity expenditures. Wood and

waste can be purchased or obtained at no cost. SEDS adjusts wood consumption estimates in the residential sector, and wood and waste in the commercial and industrial sectors to remove estimated quantities that were obtained at no cost. For 2021 forward, SEDS adjusts biofuels in two ways. First, SEDS adjusts distillate fuel oil consumption in the transportation sector to include biodiesel product supplied and renewable diesel product supplied, because those fuels are sold together at diesel stations. Second, SEDS removes the relatively small amount of U.S.-level other biofuels product supplied consumption from other petroleum products consumed in the transportation sector, because no individual fuel consumption or price data information are available for any of the other biofuels category.

### *Process fuel consumption adjustments include:*

1. Fuel (petroleum, natural gas, steam coal) and electricity consumed at refineries
2. Crude oil lease, plant, and pipeline fuel
3. Natural gas lease and plant fuel
4. Natural gas pipeline and distribution fuel
5. Electrical system energy losses (energy consumed in the generation, transmission, and distribution of electricity)
6. Energy losses and co-products from the production of biodiesel and fuel ethanol

### *Intermediate product consumption adjustments include:*

1. Aviation gasoline blending components
2. Motor gasoline blending components
3. Natural gasoline (1970 through 1983)
4. Natural gasoline, formerly pentanes plus (1984 through 2009)
5. Plant condensate (1970 through 1983)
6. Unfinished oils
7. Unfractionated streams (1970 through 1983)

For 1984 forward, the U.S. Energy Information Administration (EIA) reports historical natural gasoline (including isopentane) and plant

condensate together as pentanes plus. In the 2016 SEDS cycle, EIA renamed the product natural gasoline and EIA now includes it as part of a group of products called hydrocarbon gas liquids (HGL). For 2010 forward, SEDS includes the price of natural gasoline consumed by the petrochemical industry in the aggregate price for HGL. Before 2010, SEDS assumes natural gasoline to be an intermediate product with no end-use price or expenditures.

*Renewable energy consumption adjustments include:*

1. Solar energy in the residential, commercial, industrial, and electric power sectors
2. Geothermal energy in the residential, commercial, industrial, and electric power sectors
3. Electricity generated from hydropower in the commercial, industrial, and electric power sectors
4. Electricity generated from wind energy in the commercial, industrial, and electric power sectors
5. Estimated portions of wood consumed in the residential sector, and wood and waste in the commercial and industrial sectors that were obtained at no cost
6. Biodiesel product supplied and renewable diesel product supplied added to distillate fuel oil consumption in the transportation sector (2021 forward)
7. Other biofuels product supplied (U.S.-level only) removed from other petroleum products in the transportation sector

In addition, while SEDS does remove the consumption of supplemental gaseous fuels (SGF) from SEDS total consumption estimates to prevent double-counting in both natural gas and the fossil fuels from which they are derived, prices and expenditures of SGF cannot be separately identified and therefore SEDS does not adjust those products in its expenditure calculations.

Table TN7.1 shows the quantities of energy, by state, added or subtracted from SEDS consumption to calculate expenditures for the most recent year. Table TN7.2 shows the adjustments made to SEDS U.S. consumption estimates to derive the net consumption data used to calculate expenditures for 1970 forward.

State adjustment estimates from 1970 forward are available in the SEDS Internet data file, [https://www.eia.gov/state/seds/sep\\_update/pr\\_adjust\\_consum\\_update.csv](https://www.eia.gov/state/seds/sep_update/pr_adjust_consum_update.csv).

### *Adjustment procedures*

**Hydroelectricity, geothermal, solar, and wind energy.** Electricity generated from hydropower and geothermal, solar, and wind energy has no fuel cost. Operation and maintenance costs associated with these energy sources are included indirectly in the prices of the electricity sold by power producers. Therefore, SEDS removes consumption of these renewable sources for electricity generation from its expenditure calculations. Direct use of geothermal and solar thermal energy also have no fuel costs and SEDS omits them from its energy expenditure calculations.

**Residential wood.** Some residential wood is purchased and some is acquired at no cost. For 1970 through 1989, based on responses to the Form EIA-457, “1980 Residential Energy Consumption Survey,” SEDS developed Census division-level ratios of wood purchased and applied to residential wood consumption in each state in the divisions. For 1990 forward, SEDS uses the Census region ratios from Form EIA-457, “1993 Residential Energy Consumption Survey.” Table TN7.3 shows the percentage of purchased wood for each Census division or region.

**Commercial wood and waste.** Some commercial wood and waste are purchased and some are acquired at no cost. SEDS estimates the ratios of conventional commercial wood purchased using the same percentages used for the residential sector (see Table TN7.3). For 1989 through 2011, SEDS estimates the ratios of wood and waste acquired at no cost by commercial combined heat-and-power facilities using the U.S. annual average percentages of wood and waste acquired at no cost by the electric power sector. For 2012 forward, because of lack of information, SEDS no longer estimates these ratios and assumes that all commercial wood and waste to be purchased.

**Industrial wood and waste.** The cost of industrial wood and waste products used for energy vary widely from more expensive woods to free waste products. SEDS estimates industrial wood and waste consumption for two categories—manufacturing industries and combined heat and power (CHP) facilities—to estimate the amount of wood and waste used at no cost.

For 1994 forward, SEDS adjusts manufacturing wood and waste consumption using data from Form EIA-846, “1994 Manufacturing Energy Survey (MECS).” For 1980 through 1993, SEDS uses Form EIA-846, “1991 Manufacturing Energy Survey.” For 1970 through 1979, SEDS uses the 1980 average ratios for each state. The 1991 and 1994 MECS report the quantities consumed and quantities purchased of five types of wood and waste in each of four (MECS 1991) or five (MECS

Table TN7.1. Energy consumption adjustments for calculating expenditures by state, 2022 (billion Btu)

State	Refinery fuel and intermediate products								Total <sup>c</sup>
	Distillate fuel oil	Residual fuel oil	Hydrocarbon gas liquids <sup>a</sup>	Petroleum coke	Other petroleum <sup>b, c</sup>	Natural gas <sup>d</sup>	Coal	Electricity <sup>e</sup>	
AK .....	473	—	—	—	-14,025	-2,814	—	-256	-16,621
AL .....	1,964	—	-19	—	-12,020	-10,817	—	-1,276	-22,169
AR .....	1,487	—	-12	-1,232	-7,710	-6,841	—	-819	-15,126
AZ .....	1,306	—	—	—	—	—	—	—	1,306
CA .....	213,951	—	-2,562	-53,597	-147,135	-162,208	—	-6,514	-158,063
CO .....	367	—	—	-2,376	-8,775	-5,398	—	-1,338	-17,519
CT .....	454	—	—	—	—	—	—	—	454
DC .....	16	—	—	—	—	—	—	—	16
DE .....	70	—	—	-8,984	-14,567	-12,607	—	-1,273	-37,361
FL .....	1,445	—	—	—	—	—	—	—	1,445
GA .....	974	—	—	—	—	—	—	—	974
HI .....	417	—	—	—	-7,965	—	—	-143	-7,692
IA .....	5,027	—	—	—	—	—	—	—	5,027
ID .....	175	—	—	—	—	—	—	—	175
IL .....	12,200	-57	-1,248	-31,454	-88,603	-40,220	—	-11,393	-160,774
IN .....	2,874	-25	-100	-14,234	-39,809	-20,521	—	-4,978	-76,792
KS .....	1,737	-25	-85	-7,331	-34,434	-23,935	—	-4,002	-68,074
KY .....	1,995	-19	-61	-7,959	-24,790	-12,793	—	-3,102	-46,729
LA .....	2,072	—	-384	-70,773	-248,082	-130,849	—	-30,241	-478,257
MA .....	668	—	—	—	—	—	—	—	668
MD .....	407	—	—	—	—	—	—	—	407
ME .....	292	—	—	—	—	—	—	—	292
MI .....	2,112	-6	-31	-3,370	-11,927	-6,193	—	-1,491	-20,905
MN .....	9,290	-25	-92	-9,908	-37,398	-19,296	—	-4,678	-62,108
MO .....	2,272	—	—	—	—	—	—	—	2,272
MS .....	1,494	—	-54	-5,168	-33,560	-30,258	—	-3,562	-71,108
MT .....	-1	—	—	-6,419	-17,514	-9,940	—	-3,334	-37,207
NC .....	847	—	—	—	—	—	—	—	847
ND .....	1,218	—	-15	-2,420	-6,048	-3,143	—	-757	-11,167
NE .....	1,475	—	—	—	—	—	—	—	1,475
NH .....	195	—	—	—	—	—	—	—	195
NJ .....	681	—	—	-15,152	-32,244	-28,106	—	-2,818	-77,639
NM .....	1,027	—	-15	-1,760	-9,371	-8,447	—	-996	-19,564
NV .....	624	—	-4	—	-170	-37	—	-3	410
NY .....	6,139	—	—	—	—	—	—	—	6,139
OH .....	3,617	-31	-119	-13,165	-48,124	-22,631	—	-6,118	-86,572
OK .....	2,301	-31	-111	-11,625	-44,339	-28,258	—	-5,684	-87,748
OR .....	12,754	—	—	—	—	—	—	—	12,754
PA .....	3,870	-31	—	-8,255	-22,660	-11,391	—	-1,979	-40,447
RI .....	123	—	—	—	—	—	—	—	123
SC .....	574	—	—	—	—	—	—	—	574
SD .....	604	—	—	—	—	—	—	—	604
TN .....	2,356	-13	-35	-5,357	-14,482	-7,395	—	-1,812	-26,737
TX .....	13,308	-6	-784	-153,114	-505,747	-411,724	—	-39,774	-1,097,841
UT .....	224	—	—	-5,168	-17,610	-7,207	—	-1,668	-31,429
VA .....	842	—	—	—	—	—	—	—	842
VT .....	107	—	—	—	—	—	—	—	107
WA .....	1,548	—	-960	-13,460	-55,059	-44,663	—	-5,691	-118,286
WI .....	2,026	—	—	-868	—	—	—	—	1,158
WV .....	376	—	—	—	-1,900	-1,731	—	-167	-3,421
WY .....	186	—	—	-3,150	-10,721	-6,671	—	-1,634	-21,990
US .....	322,561	-270	-6,691	-456,298	-1,529,039	-1,076,095	—	-147,501	-2,893,332

See footnotes at end of table.

Table TN7.1. Energy consumption adjustments for calculating expenditures by state, 2022 (billion Btu) (continued)

State	Residential		Commercial		Industrial					Transportation		Electrical system energy losses	Total <sup>c</sup>
	Non-combustible renewable energy <sup>f</sup>	Wood	Non-combustible renewable energy <sup>f</sup>	Wood and waste	Crude oil lease, plant, and pipeline fuel	Natural gas lease and plant fuel	Non-combustible renewable energy <sup>f</sup>	Wood and waste	Biofuels production losses <sup>g</sup>	Biofuels product supplied <sup>c</sup>	Natural gas pipeline fuel		
AK .....	-139	-3,461	-728	-645	—	-318,178	-1	-38	—	508	-453	-28,003	-368,268
AL .....	-189	-986	-54	-184	—	-10,983	-46	-26,324	-22	1,981	-30,565	-482,972	-574,493
AR .....	-1,285	-2,910	-317	-542	—	-2,800	-137	-12,334	-84	1,499	-5,731	-280,583	-321,849
AZ .....	-14,082	-2,458	-3,021	-458	—	-14	-358	-928	—	1,306	-16,450	-453,873	-490,336
CA .....	-72,838	-11,926	-19,554	-2,223	—	-34,903	-11,722	-9,316	-4,410	214,308	-21,431	-940,423	-1,286,808
CO .....	-3,994	-6,776	-1,471	-1,263	—	-74,874	-350	-242	-7,971	373	-8,900	-259,900	-383,259
CT .....	-3,144	-1,844	-1,304	-344	—	—	-167	-2,987	-39	454	-6,081	-148,208	-163,665
DC .....	-391	—	-232	—	—	—	—	—	—	16	-1,570	-55,441	-57,618
DE .....	-860	-311	-132	-58	—	—	-41	-6	—	70	-899	-61,533	-101,201
FL .....	-43,170	-142	-2,904	-26	—	-223	-69	-6,477	—	1,445	-17,590	-1,215,364	-1,284,518
GA .....	-1,008	-1,361	-227	-254	—	—	-775	-21,378	-6	974	-11,394	-805,526	-840,955
HI .....	-4,863	-10	-1,687	-2	—	—	-222	-37	-10	434	—	-50,040	-64,563
IA .....	-995	-3,320	-1,348	-619	—	—	-42	-6,447	-211,032	5,027	-8,614	-136,158	-363,547
ID .....	-629	-7,479	-652	-1,394	—	—	-864	-1,027	-3,416	175	-7,661	-84,509	-107,456
IL .....	-4,990	-3,537	-2,573	-659	—	-6,171	-14	-3,398	-78,541	12,246	-19,728	-858,165	-1,138,550
IN .....	-4,358	-6,765	-1,392	-1,261	—	-242	-25	-8,403	-63,618	2,897	-9,982	-646,057	-818,893
KS .....	-531	-2,104	-818	-392	—	-9,366	-49	-73	-30,176	1,755	-14,399	-174,867	-300,850
KY .....	-2,155	-4,458	-976	-831	—	-5,661	-5	-7,346	-1,978	2,007	-27,228	-493,094	-590,462
LA .....	-1,905	-328	-917	-61	—	-155,194	-42	-18,033	—	2,377	-286,060	-467,230	-1,408,026
MA .....	-4,916	-3,054	-7,579	-569	—	—	-484	-2,152	-1	668	-8,615	-251,221	-277,923
MD .....	-3,887	-2,728	-1,143	-509	—	—	-98	-291	—	407	-30,134	-339,310	-377,692
ME .....	-507	-6,697	-864	-1,248	—	—	-270	-7,430	-1	292	-1,966	-33,229	-51,920
MI .....	-5,329	-18,214	-1,192	-3,395	—	-4,862	-50	-13,415	-17,427	2,118	-29,289	-625,618	-739,697
MN .....	-1,799	-10,355	-331	-1,930	—	—	-328	-4,722	-69,033	9,313	-17,170	-319,869	-487,645
MO .....	-1,521	-10,415	-626	-1,941	—	—	-42	-1,963	-16,257	2,272	-4,675	-524,095	-559,262
MS .....	-226	-669	-778	-125	—	-1,718	-44	-1,670	-31	1,534	-39,206	-252,363	-367,937
MT .....	-266	-6,915	-192	-1,289	—	-3,339	-70	-638	—	5	-2,635	-62,294	-114,846
NC .....	-2,654	-4,170	-999	-777	—	—	-56	-8,263	-2	847	-6,073	-786,723	-808,869
ND .....	-540	-474	-447	-88	—	-72,470	—	-742	-27,616	1,224	-36,927	-113,244	-263,715
NE .....	-602	-1,138	-751	-212	—	-56	-12	-362	-106,497	1,475	-5,021	-171,903	-285,080
NH .....	-559	-3,872	-324	-722	—	—	-39	-1,654	-9	195	-106	-65,915	-73,003
NJ .....	-7,554	-909	-5,336	-169	—	—	-731	-201	—	681	-7,638	-441,298	-541,474
NM .....	-1,789	-5,991	-543	-1,117	—	-116,965	-245	-57	—	1,038	-11,859	-104,932	-263,061
NV .....	-5,536	-1,115	-1,379	-208	—	-4	-622	-56	—	624	-3,653	-135,747	-147,912
NY .....	-7,013	-10,290	-7,362	-1,918	—	-161	-239	-10,860	-2,999	6,139	-41,011	-602,034	-677,747
OH .....	-3,377	-12,192	-1,351	-2,273	—	-19,005	-476	-4,161	-34,479	3,645	-56,282	-842,722	-1,062,889
OK .....	-300	-2,098	-41	-391	—	-110,614	-3	-10,903	-59	2,324	-43,485	-226,072	-481,715
OR .....	-2,670	-10,666	-1,099	-1,988	—	-1	-232	-13,883	-1,365	12,754	-9,456	-87,133	-115,739
PA .....	-3,804	-10,666	-1,630	-1,988	—	-279,784	-289	-23,914	-6,254	3,870	-56,834	-804,707	-1,230,318
RI .....	-544	-463	-1,366	-86	—	—	-11	2	-1	123	-3,053	-33,458	-38,858
SC .....	-1,984	-770	-339	-144	—	—	-158	-18,572	—	574	-2,589	-568,286	-592,267
SD .....	-661	-1,270	-969	-237	—	-10	-251	-324	-69,252	604	-6,676	-19,425	-98,471
TN .....	-326	-3,558	-185	-663	—	-303	-21	-6,409	-8,569	2,362	-17,827	-625,734	-690,332
TX .....	-10,970	-1,326	-2,497	-247	—	-484,945	-30	-8,097	-18,807	13,654	-218,732	-2,179,021	-4,022,513
UT .....	-2,339	-1,516	-885	-283	—	-18,374	-397	-69	—	230	-12,352	-187,319	-254,963
VA .....	-2,381	-6,133	-1,179	-1,143	—	-5,361	-18	-8,914	-2	842	-14,704	-733,443	-772,437
VT .....	-567	-4,969	-270	-926	—	—	-7	-94	—	107	-2	-1,958	-8,686
WA .....	-1,615	-13,377	-988	-2,493	—	—	-3	-10,589	-144	1,680	-18,681	-136,368	-302,543
WI .....	-1,200	-15,831	-418	-2,951	—	—	-447	-26,686	-28,120	2,026	-4,185	-417,586	-496,266
WV .....	-162	-4,934	-33	-920	—	-137,507	-1,797	-527	—	376	-35,985	-224,460	-409,746
WY .....	-138	-2,547	-538	-475	—	-59,564	-68	-49	—	192	-13,239	-97,674	-196,281
US .....	-239,259	-239,498	-83,945	-44,641	—	-1,933,650	-22,465	-312,457	-808,229	311,798	-1,254,794	-19,657,106	-27,489,375

<sup>a</sup> Mainly propane consumed as refinery fuel.<sup>b</sup> In this table, "other petroleum" consists of: still gas consumed as refinery fuel; and aviation gasoline blending components and motor gasoline blending components used as intermediate products.<sup>c</sup> U.S. data include other biofuels product supplied not allocated to the states.<sup>d</sup> Natural gas including supplemental gaseous fuels.<sup>e</sup> Electricity is converted at the rate of 3,412 Btu per kilowatthour.<sup>f</sup> Hydroelectric power, geothermal, solar, and wind energy. Solar thermal energy consumed as heat by the commercial and industrial sectors that cannot be separately identified are included in residential consumption.<sup>g</sup> Energy losses and co-products from the production of biodiesel and fuel ethanol.

— = No consumption. NA = Not available.

Data source: U.S. Energy Information Administration, State Energy Data System. See technical notes. <https://www.eia.gov/state/seds/>

Table TN7.2. U.S. energy consumption adjustments for calculating expenditures, selected years, 1970 through 2022 (trillion Btu)

Year	Total (gross) consumption <sup>a</sup>	Adjustments														Consumption used in expenditure calculations <sup>a,d</sup>
		Residential		Commercial		Industrial						Transportation			Total <sup>a</sup>	
		Non-combustible renewable energy <sup>b</sup>	Wood	Non-combustible renewable energy <sup>b</sup>	Wood and waste	Refinery fuel and intermediate products	Crude oil lease, plant, and pipeline fuel	Natural gas lease and plant fuel	Non-combustible renewable energy <sup>b</sup>	Wood and waste	Biofuels production losses <sup>c</sup>	Biofuels product supplied <sup>a</sup>	Natural gas pipeline fuel	Electrical system energy losses		
1970	R 65,939	—	-298	—	-6	-2,714	—	-1,442	R -11	-789	—	—	-740	R -9,739	-15,739	50,200
1975	R 69,810	—	-316	—	-6	-2,881	—	-1,434	R -11	-824	—	—	-595	R -12,183	-18,249	51,561
1980	R 76,065	—	-627	—	-16	-3,051	—	-1,058	R -11	-1,283	—	—	-650	R -15,217	-21,913	54,303
1981	R 74,196	—	-651	—	-16	-2,203	—	-959	R -11	-1,354	-6	—	-660	R -15,285	-21,144	53,225
1982	R 70,772	—	-724	—	-16	-2,087	—	-1,144	R -11	-1,310	-16	—	-614	R -14,623	-20,545	50,371
1983	R 70,453	—	-722	—	-16	-2,120	-140	-1,010	R -11	-1,480	-29	—	-505	R -14,858	-20,892	49,692
1984	R 74,177	—	-733	—	-16	-2,254	-135	-1,113	R -11	-1,510	-35	—	-545	R -15,479	-21,831	52,456
1985	R 74,341	—	-755	—	-18	-2,045	-128	-1,001	R -11	-1,503	-42	—	-521	R -16,121	-22,145	52,321
1986	R 74,451	—	-688	—	-20	-2,285	-103	-954	R -11	-1,478	-48	—	-501	R -16,017	-22,106	52,458
1987	R 77,113	—	-634	—	-22	-2,485	-72	-1,194	R -11	-1,472	-55	—	-538	R -16,733	-23,216	53,996
1988	R 81,077	—	-676	—	-24	-2,695	-85	-1,134	R -11	-1,531	-55	—	-633	R -17,866	-24,711	56,464
1989	R 82,703	-57	-684	R -3	-73	-2,710	-59	-1,103	R -11	-684	-56	—	-650	R -18,842	-24,929	57,879
1990	R 82,278	-60	-337	R -3	-59	-2,802	-51	-1,269	R -12	-716	-49	—	-682	R -19,100	-25,141	57,255
1991	R 82,213	-62	-353	R -3	-60	-2,668	-39	-1,164	R -12	-685	-56	—	-621	R -19,299	-25,023	57,296
1992	R 83,843	-65	-371	R -4	-66	-2,954	-27	-1,208	R -12	-689	-64	—	-608	R -19,442	-25,510	58,446
1993	R 85,220	-67	-308	R -4	-68	-2,877	-21	-1,199	R -12	-642	-74	—	-643	R -20,043	-25,959	59,375
1994	R 87,080	-68	-292	-5	-66	-2,991	-19	-1,153	R -23	-662	-82	—	-706	R -20,512	-26,580	60,606
1995	R 88,732	-69	-292	R -5	-66	-2,915	-15	-1,253	R -21	-445	-86	—	-723	R -20,989	-26,878	61,959
1996	R 91,474	-70	-303	R -6	-77	-3,204	-14	-1,280	R -23	-495	-61	—	-734	R -21,427	-27,695	63,884
1997	R 92,106	-70	-233	R -6	-80	-3,197	-5	-1,251	R -23	-493	-80	—	-781	R -21,656	-27,875	64,330
1998	R 92,615	-69	-207	R -8	-71	-3,043	—	-1,212	R -21	-493	-86	—	-657	R -22,822	-28,689	64,022
1999	R 94,213	-69	-213	R -8	-66	-3,051	—	-1,103	R -21	-495	-90	—	-663	R -23,410	-29,187	65,119
2000	R 96,686	-66	-229	R -8	-67	-2,951	—	-1,181	R -19	-459	-99	—	-661	R -24,426	-30,165	66,606
2001	R 94,391	R -64	-210	R -9	-46	-3,152	—	-1,139	R -16	-437	-108	—	-641	R -24,039	-29,859	64,611
2002	R 95,582	-63	-213	R -9	-43	-3,028	—	-1,135	R -18	-312	-130	—	-683	R -24,277	-29,911	65,733
2003	R 95,807	R -64	-225	R -12	-46	-3,141	—	-1,147	R -18	-316	-168	—	-609	R -24,113	-29,859	66,012
2004	R 98,045	-65	-230	R -13	-46	-3,123	—	-1,123	R -15	-537	-201	—	-582	R -24,656	-30,589	67,510
2005	R 98,109	R -65	-249	R -14	-49	-3,130	—	-1,138	R -15	-336	-227	—	-601	R -25,167	-30,994	67,162
2006	R 97,231	R -70	-221	R -15	-46	-3,211	—	-1,171	R -14	-278	-280	—	-602	R -24,768	-30,676	66,584
2007	R 98,988	R -75	-244	R -16	-46	-3,180	—	-1,257	R -10	-293	-369	—	-640	R -25,623	-31,754	67,261
2008	R 96,658	R -82	-273	R -17	-47	-2,983	—	-1,250	R -11	-282	-519	—	-667	R -25,151	-31,283	65,420
2009	R 91,632	R -89	-292	R -19	-48	-2,922	—	-1,304	R -11	-457	-603	—	-689	R -23,515	-29,950	61,791
2010	R 95,130	R -96	-313	R -23	-45	-2,972	—	-1,316	R -11	-392	-727	—	-692	R -24,481	-31,067	64,164
2011	R 93,972	R -102	-304	R -27	-45	-3,052	—	-1,355	R -12	-370	-756	—	-705	R -23,650	-30,378	63,672
2012	R 91,667	R -106	-254	R -31	-34	-3,105	—	-1,433	R -15	-357	-711	—	-751	R -22,894	-29,690	62,055
2013	R 94,237	R -111	-332	R -35	-40	-3,175	—	-1,522	R -19	-361	-714	—	-857	R -22,862	-30,027	64,254
2014	R 95,328	R -119	-336	R -39	-42	-3,070	—	-1,562	R -13	-370	-766	—	-726	R -22,920	-29,962	65,413
2015	R 94,473	R -126	-288	R -41	-42	-3,057	—	-1,633	R -14	-369	-791	—	-707	R -22,249	-29,318	65,193
2016	R 94,087	R -139	-252	R -44	-45	-3,242	—	-1,599	R -16	-366	-821	—	-715	R -21,737	-28,975	65,137
2017	R 93,906	R -152	-243	R -49	-44	-3,290	—	-1,632	R -17	-366	-847	—	-751	R -20,947	-28,339	65,592
2018	R 97,404	R -163	-298	R -56	-45	-3,293	—	-1,743	R -18	-324	-855	—	-910	R -21,366	-29,071	68,355
2019	R 96,576	R -176	-309	R -60	-45	-3,321	—	-1,879	R -19	-320	-835	—	-1,058	R -20,359	-28,382	68,162
2020	R 88,871	R -191	R -196	R -67	-45	-3,195	—	R -1,907	R -20	-318	-735	—	R -1,059	R -19,058	-26,791	R 62,039
2021	R 93,350	R -208	R -194	R -75	-44	-3,153	—	R -1,903	R -21	-315	-789	262	R -1,173	R -19,597	-27,211	R 65,924
2022	94,774	-239	-239	-84	-45	-3,217	—	-1,934	-22	-312	-808	312	-1,255	-19,657	-27,489	67,010

<sup>a</sup> U.S. data include other biofuels not allocated to the states.<sup>b</sup> Hydroelectric power, geothermal, solar, and wind energy. Solar thermal energy consumed as heat by the commercial and industrial sectors that cannot be separately identified are included in residential consumption.<sup>c</sup> Energy losses and co-products from the production of biodiesel and fuel ethanol.<sup>d</sup> Includes adjustments of supplemental gaseous fuels and processed fuels not shown on this table.

Where shown, R = Revised data and — = No consumption.

NA = Not available.

Note: · Totals may not equal sum of components due to independent rounding. · All data are available via the full-precision data file (CSV) at <https://www.eia.gov/state/seds/seds-data-fuel.php?sid=US>.Data source: U.S. Energy Information Administration, State Energy Data System. See technical notes. <https://www.eia.gov/state/seds/>



**Table TN7.3. Percentage of purchased wood in residential wood consumption**

1960–1989		1990 forward	
Census division	Percent	Census region	Percent
New England	40%	Northeast	61%
Middle Atlantic	29%	Midwest	32%
East North Central	18%	South	39%
West North Central	17%	West	42%
South Atlantic	30%		
East South Central	18%		
West South Central	38%		
Mountain	12%		
Pacific	31%		

1994) SIC categories of industries. SEDS uses the two quantity series to calculate SIC category average ratios of wood and waste obtained at no cost. SEDS applies these SIC ratios to the estimated consumption for each category in each state to estimate the state's manufacturing wood and waste consumption at no cost.

For 1989 through 2011, SEDS estimates the amount of wood and waste consumed at no cost by industrial CHP facilities using the U.S. annual average percentages of wood and waste used at no cost by the electric power sector. For 2012 forward, because of lack of information, SEDS no longer estimates these ratios and assumes all industrial CHP wood and waste consumption to be purchased.

Each state's industrial wood and waste consumption quantities acquired at no cost are the sum of the estimated manufacturing and CHP facilities' quantities for each year.

**Biodiesel and renewable diesel product supplied.** For 2021 forward, SEDS adds biodiesel product supplied and renewable diesel product supplied to distillate fuel oil consumption in the transportation sector, because those fuels are sold as a mixture at diesel stations. SEDS allocates state-level biodiesel and renewable diesel product supplied proportionally to SEDS estimates of biodiesel and renewable diesel consumption. See explanations of methods and data sources in the petroleum and renewable energy sections of the SEDS consumption technical notes.

**Other biofuels product supplied.** For 2021 forward, SEDS removes the relatively small amount of other biofuels product supplied consumption from other petroleum products consumption in the transportation

sector because no prices are available and the individual fuels cannot be separately identified to adjust the consumption of their respective petroleum products. Other biofuels include small volumes of product supplied for renewable jet fuel, renewable naphtha, renewable propane, and other biofuels that are not biodiesel, fuel ethanol, or renewable diesel. Other biofuels data are for the U.S.-level only.

**Refinery fuel.** SEDS estimates petroleum refinery consumption of distillate fuel, residual fuel, hydrocarbon gas liquids (mainly propane), petroleum coke, still gas, natural gas, steam coal, and electricity for each state and subtracts it from the state's industrial sector total of each energy source.

The SEDS estimation method for petroleum coke consumption by refineries is described in Section 4 of the SEDS consumption technical notes at <https://www.eia.gov/state/seds/seds-technical-notes-complete.php>.

For 1970 through 1985, SEDS subtracts refinery consumption of still gas, excluding still gas consumed as petrochemical feedstocks, from the SEDS industrial sector total. For 1986 forward, EIA no longer reports refinery fuel and feedstock use separately, and SEDS removes all industrial still gas consumption for the expenditure calculations. The SEDS estimation method for still gas consumption is described in Section 4 of the SEDS consumption technical notes at <https://www.eia.gov/state/seds/seds-technical-notes-complete.php>.

Refinery consumption of each of the other fuels is available in the data sources by state or group of states (1970 through 1980) and by Petroleum Administration for Defense (PAD) district (1981 forward). For 2013 forward, SEDS uses unpublished state-level refinery fuel consumption data that would not result in a disclosure of identifiable data reported by respondents of the EIA survey forms. The number of states with usable data varies by fuel, from zero for coal and residual fuel oil to over 10 for electricity.

For each fuel, SEDS subtracts consumption for all the usable states within each PAD district from the district's fuel consumption. SEDS allocates the remainder to the other states in the district proportionally to their operable refining capacities. To reduce the possibility of over-allocating refinery fuel use to states that do not consume much of the fuel, SEDS does not include states where industrial sector consumption of a specific fuel is less than 0.05% (for natural gas, electricity, distillate fuel oil, and propane) or 0.1% (for coal and residual fuel oil) of the U.S. industrial sector total consumption in the allocation.

**Table TN7.4. Reallocations of excess refinery fuel consumption, 1970 through 2005**

Year	Fuel	Thousand barrels	Excess in:	Reallocated to:
1971	Residual fuel oil	294	Kansas	Oklahoma
1973	Residual fuel oil	45	Group 4: Kentucky, Tennessee	Illinois
1979	HGL (propane)	173	Montana	Wyoming
1985	Residual fuel oil	212	PAD District 4	PAD District 5
1986	Residual fuel oil	403	PAD District 4	PAD District 5
1987	Residual fuel oil	497	PAD District 4	PAD District 5
1988	Residual fuel oil	305	PAD District 4	PAD District 5
1989	Residual fuel oil	381	PAD District 4	PAD District 5
1990	Residual fuel oil	336	PAD District 4	PAD District 5
1991	Residual fuel oil	378	PAD District 4	PAD District 5
1992	Residual fuel oil	361	PAD District 4	PAD District 5
1996	Residual fuel oil	184	PAD District 4	PAD District 5
1997	Residual fuel oil	100	PAD District 4	PAD District 5
1998	Residual fuel oil	82	PAD District 4	PAD District 5
1999	Residual fuel oil	142	PAD District 4	PAD District 5
2000	Residual fuel oil	224	PAD District 4	PAD District 5
2001	Residual fuel oil	149	PAD District 4	PAD District 2
2001	Residual fuel oil	95	PAD District 5	PAD District 2
2001	Residual fuel oil	281	PAD District 5	PAD District 1
2002	Residual fuel oil	33	PAD District 5	PAD District 3
2002	Residual fuel oil	67	PAD District 5	PAD District 4
2003	Residual fuel oil	228	PAD District 5	PAD District 3
2004	Residual fuel oil	296	PAD District 5	PAD District 3
2005	HGL (propane)	198	PAD District 5	PAD District 4

Data source: EIA calculations based on data from the State Energy Data System and the *Petroleum Supply Annual*.

Before 2013, except for a few states with data in the earlier years, refinery fuel consumption is available at the regional level. SEDS estimates state-level refinery consumption of each of the other fuels by allocating the regional data (for state groups before 1981 and PAD district for 1981 through 2012) to the states with operating refineries proportionally to their shares of the region's industrial sector consumption of the fuel.

In some cases, the estimated state refinery fuel consumption of residual fuel or hydrocarbon gas liquids exceeds the estimate of the state's total industrial sector consumption of that fuel. For 1970 through 2006, SEDS reduces the refinery fuel consumption for the PAD district, group of states, or individual state until each state has positive industrial consumption.

Then, SEDS reallocates the excess refinery fuel to a different PAD district, group of states, or individual state as shown in Table TN7.4. When this adjustment involves a PAD district or group value, SEDS recalculates the refineries' consumption estimates for all states within the PAD district or group using these new values. For 2007 forward, SEDS no longer makes this adjustment.

The data source withholds refinery consumption of coal for 1999 and 2000, and SEDS uses unpublished estimates developed by the data source office for 1999 and 2000. For 2001 and 2002, the data source publishes U.S. values for refinery consumption of coal, but withholds the PAD district values. SEDS estimates the PAD district values for 2001 and 2002 by applying the PAD districts' shares of the U.S. total in 2000 to the U.S. totals for 2001 and 2002.

Because crude oil consumption is not an individual fuel in SEDS for 1970 through 1980, SEDS allocates the small amounts of crude oil used at refineries during those years to residual and distillate fuels consumed at refineries. SEDS allocates the crude oil refinery use to residual and distillate fuels refinery use proportionally to each fuel's share of the total crude oil used directly (including losses) as residual and distillate fuels in EIA's *Petroleum Supply Annual*, Volume 1, Table 2.

**Intermediate products.** Aviation gasoline blending components, motor gasoline blending components, natural gasoline (1970 through 1983), plant condensate (1970 through 1983), unfinished oils, and unfractionated streams (1970 through 1983) are used at refineries and blending plants to make end-use petroleum products, such as finished motor gasoline. SEDS removes the consumption of these products for the expenditure calculations. Through 2009, SEDS assumes natural gasoline (formerly pentanes plus) to be an intermediate product and removes its consumption for the expenditures calculations.

**Crude oil lease, plant, and pipeline fuel.** SEDS assumes all industrial crude oil to be used as lease, plant, and pipeline fuel. Because these are process fuel uses, SEDS removes crude oil consumption for the expenditures calculations.

**Natural gas lease and plant fuel.** Natural gas consumed as lease and plant fuel is process fuel and SEDS removes it for the expenditures calculations.

**Natural gas for pipeline and distribution use.** Most of the natural gas consumed in the transportation sector is used to power pipelines. As such, it is a process fuel and SEDS removes it for the expenditures calculations.

**Electricity exports.** SEDS excludes electricity exported to Canada and Mexico from its calculations of U.S. domestic energy expenditures and U.S. average energy prices.

**Electrical system energy losses.** The amount of energy lost during generation, transmission, and distribution of electricity (including plant use and unaccounted for electrical energy) is process fuel and SEDS removes it from the sector energy consumption estimates used in the price and expenditure tables. The energy losses are “paid for” when residential, commercial, industrial, and transportation sector consumers buy the electricity produced by the electric power sector.

**Energy losses and co-products from the production of biofuels.** Fuel ethanol and biodiesel are produced from corn, vegetable oils, animal fats, and other biomass inputs that are not included elsewhere as energy sources. The difference in heat content of the feedstock and biofuels is considered process fuel and SEDS removes it from sector energy consumption estimates used in the price and expenditure tables.

#### *Data sources*

**Biofuels (excluding fuel ethanol) product supplied.** 2021 forward: EIA, *Petroleum Supply Annual*, available here for biodiesel product supplied [https://www.eia.gov/dnav/pet/pet\\_cons\\_psup\\_a\\_EPOORDB\\_VPP\\_mbbi\\_a.htm](https://www.eia.gov/dnav/pet/pet_cons_psup_a_EPOORDB_VPP_mbbi_a.htm), renewable diesel product supplied [https://www.eia.gov/dnav/pet/pet\\_cons\\_psup\\_a\\_EPOORDO\\_VPP\\_mbbi\\_a.htm](https://www.eia.gov/dnav/pet/pet_cons_psup_a_EPOORDO_VPP_mbbi_a.htm), and other biofuels product supplied [https://www.eia.gov/dnav/pet/pet\\_cons\\_psup\\_a\\_EPOORO\\_VPP\\_mbbi\\_a.htm](https://www.eia.gov/dnav/pet/pet_cons_psup_a_EPOORO_VPP_mbbi_a.htm). Converted to British thermal units (Btu) and allocated to states, when available, using data from SEDS Consumption data estimates. See SEDS consumption technical notes.

**Capacity of petroleum refineries.** 1982 forward: EIA, *Refinery Capacity Report*, <https://www.eia.gov/petroleum/refinerycapacity/> or *Petroleum Supply Annual, Volume 1*, <https://www.eia.gov/petroleum/supply/annual/volume1/> tables titled “Number and Capacity of Operable Petroleum Refineries,” columns titled, “Crude Capacity, Barrels per Calendar Day, Operating” (1982-1985), “Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Operating” (1986-2012), and “Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Total” (2013 forward), adjusted with information on “New, Shutdown and Activated Refineries” (2011 forward).

1979 through 1981: EIA, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*, table titled “Number and Capacity of Petroleum Refineries,” column heading, “Crude Capacity, Barrels per

Calendar Day, Operating.”

1978: EIA, Energy Data Reports, *Petroleum Refineries in the United States and Puerto Rico*, table titled “Number and Capacity of Petroleum Refineries,” column heading, “Crude Capacity, Barrels per Calendar Day, Operating.”

1970 through 1977: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Petroleum Refineries in the United States and Puerto Rico*, table titled “Number and Capacity of Petroleum Refineries,” column heading, “Crude Capacity, Barrels per Calendar Day, Operating.”

**Fuel consumed at refineries.** 2013 forward: EIA unpublished data on fuels consumed at refineries for selected states.

1981 through 1994, 1996, and 1998 forward: EIA, *Petroleum Supply Annual, Volume 1*, <https://www.eia.gov/petroleum/supply/annual/volume1/> table titled “Fuels Consumed at Refineries by PAD District.” Data for 1991 are from a separately published EIA *Errata* dated November 10, 1992, GPO Stock No. 061-003-00758-9.

1995, 1997: EIA, *Petroleum Supply Annual, Volume 1*, table titled “Fuels Consumed at Refineries by PAD District.” Data for coal, electricity, and natural gas are not published, and values for the previous year are repeated.

1976 through 1980: EIA, Energy Data Reports, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled “Fuels Consumed for All Purposes at Refineries in the United States, by States.”

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled “Fuels Consumed for All Purposes at Refineries in the United States, by States.”

**Intermediate products.** 1970 forward: EIA, State Energy Data System, industrial sector consumption estimates for aviation gasoline blending components, crude oil, motor gasoline blending components, natural gasoline (1970-1983), natural gasoline (formerly pentanes plus) (1984 through 2009), petroleum coke, plant condensate (1970-1983), still gas (excluding still gas consumed as petrochemical feedstocks, 1970-1985), unfinished oils, and unfractionated streams (1970-1983).

**Natural gas lease, plant, and pipeline fuel use.** 1997 forward: EIA, *Natural Gas Annual*, Tables 26 through 76. Also available at [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_dcu\\_nus\\_a.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm).

1993 through 1996: EIA *Historical Natural Gas Annual 1930 Through*



2000, [https://www.eia.gov/oil\\_gas/natural\\_gas/data\\_publications/historical\\_natural\\_gas\\_annual/hnga.html](https://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html) Table 15.

1970 through 1992: EIA *Natural Gas Annual 1994, Volume II*, Table 14.

**Residential wood.** 1990 forward: EIA, unpublished data from the “1993 *Residential Energy Consumption Survey*,” Form EIA-457 <https://www.eia.gov/consumption/residential/index.php>.

1970 through 1989: EIA, unpublished data from the “1980 *Residential Energy Consumption Survey*,” Form EIA-457.

**Commercial wood and waste.** 1990 forward: EIA, unpublished data from the “1993 *Residential Energy Consumption Survey*,” Form EIA-457 <https://www.eia.gov/consumption/residential/index.php>.

1989 through 2011: EIA, SEDS, U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. See data sources for estimating wood and waste prices for the electric power sector in Section 5.

1970 through 1989: EIA, unpublished data from the “1980 *Residential Energy Consumption Survey*,” Form EIA-457.

**Industrial wood and waste.** 1994 forward: EIA, unpublished data from the “1994 *Manufacturing Energy Consumption Survey*” (Form EIA-846) <https://www.eia.gov/consumption/manufacturing/>.

1989 through 2011: EIA, SEDS, U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. See data sources for estimating wood and waste prices for the electric power sector in Section 5.

1970 through 1993: EIA, unpublished data from the “1991 *Manufacturing Energy Consumption Survey*” (Form EIA-846).