

Supplemental Information

The supplemental information file provides all the additional figures and tables to the main text. The list of SI tables and figures is shown as follows:

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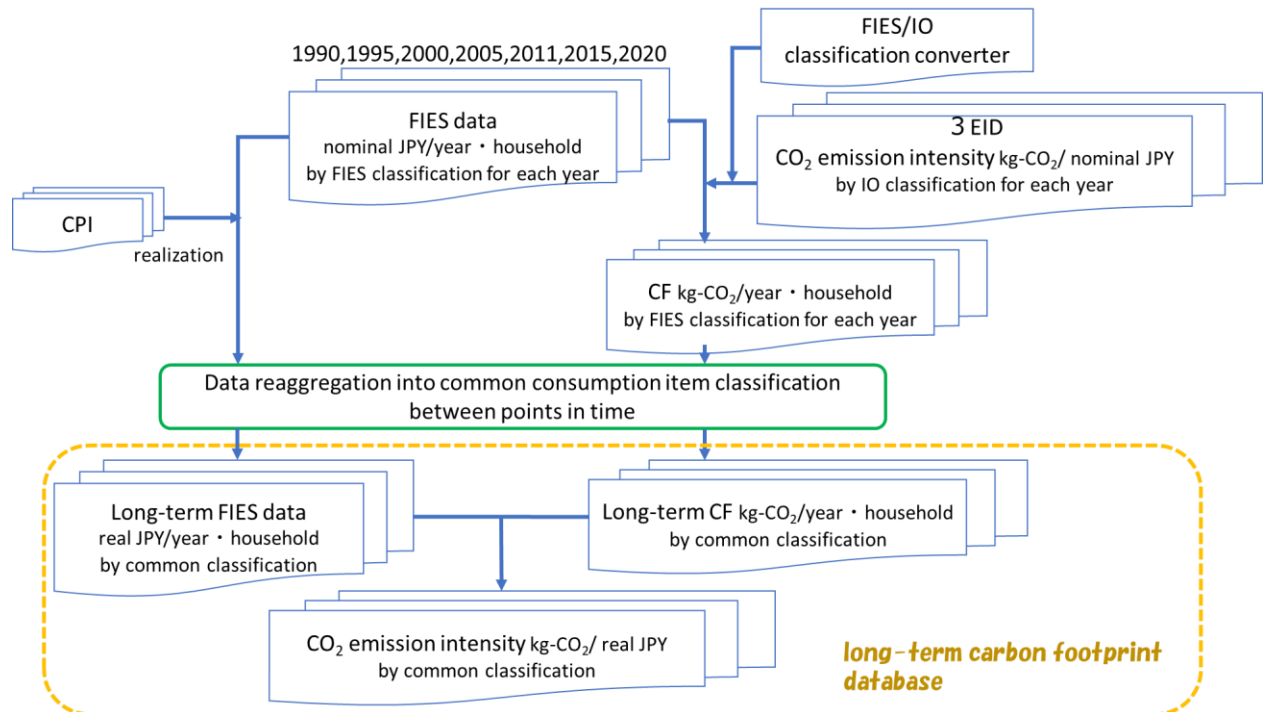


Figure S1. Flowchart for creating a long-term household carbon footprint database.

Table S1. Integrated classification for long-term time series analysis

Level 1	Level 2	Level 3	
0			Total consumption expenditure
1			Food
	1	1	Cereals
	2		Seafood
		2	Fresh fish
		3	Shellfish
		4	Salted and dried seafood
		5	Fish paste product
		6	Other seafood products
	3		Meat
		7	Fresh meat
		8	Processed meat
	4		Dairy eggs
		9	Milk
		10	Dairy products
		11	Egg
	5		Vegetables and seaweed
		12	Fresh vegetables
		13	Dried food, seaweed
		14	Processed soybean products
		15	Other vegetables and seaweed processed products
	6	16	Fruits
	7		Fats and oils/seasonings
		17	Fats and oils
		18	Seasonings
	8	19	Confectionery
	9	20	Cooking food
	10	21	Beverage
	11	22	Liquor
	12	23	Eating out
2			Residence
	13	24	Rent
	14	25	Equipment material
	15	26	Construction and other services
3			Utility and water bills
	16	27	Electric bill
	17	28	Gas fee
	18	29	Other fuel costs
	19	30	Water and sewage charges
4			Furniture and household goods
	20	31	Household durables
	21	32	Air conditioning equipment
	22	33	General furniture
	23	34	Interior equipment/decoration
	24	35	Bedding
	25	36	Household goods
	26	37	Household consumables
	27	38	Housework service
5	28	39	Clothing and footwear
6			Healthcare
	29	40	Health services
	30	41	Other healthcare
7	31	42	Transportation expenses

8			Automobile related expenses
	32	43	Purchase of automobiles, etc.
	33	44	Bike purchase
	34	45	Gasoline
	35	46	Parking fee
	36	47	Other maintenance of automobiles, etc.
9	37	48	Communication
10	38	49	Education
11			Educational entertainment
	39	50	Recreational durable goods
	40	51	Educational entertainment supplies
	41	52	Books and other printed matter
	42	53	Educational entertainment service
12	43	54	Other consumption expenditure

Table S2. GHG emission intensity (energy-derived intensity) Methane gas-derived intensity is shown in parentheses.

(g-CO₂-eq per JPY)

Level 1 category Level 2 category Level 3 category	1990	1995	2000	2005		2011		2015		2020	
Total consumption expenditure	3.1710	3.6832	3.5179	3.3599	(0.1071)	3.6207	(0.1569)	3.3466	(0.1477)	3.2816	(0.1536)
Food	1.578	1.604	1.594	1.817	(0.283)	1.944	(0.441)	1.837	(0.422)	1.937	(0.436)
Cereals	1.190	1.266	1.206	1.880	(0.641)	2.113	(1.814)	1.939	(1.621)	2.058	(1.692)
Seafood	2.582	2.272	2.044	2.274	(0.006)	2.031	(0.009)	2.088	(0.011)	2.323	(0.013)
Fresh fish	2.997	2.471	2.284	2.525	(0.004)	2.227	(0.007)	2.292	(0.008)	2.538	(0.009)
Shellfish	3.659	3.115	2.464	3.111	(0.004)	2.573	(0.009)	2.655	(0.010)	2.924	(0.011)
Salted and dried seafood	2.233	1.949	1.564	1.852	(0.004)	1.755	(0.007)	1.825	(0.008)	2.173	(0.009)
Fish paste product	1.693	1.840	1.649	1.703	(0.025)	1.454	(0.022)	1.624	(0.030)	1.684	(0.031)
Other seafood products	1.812	1.745	1.672	1.710	(0.004)	1.784	(0.010)	1.765	(0.013)	1.991	(0.014)
Meat	1.045	1.115	1.148	1.305	(1.303)	1.695	(1.209)	1.662	(1.107)	1.750	(1.176)
Fresh meat	0.997	1.094	1.119	1.291	(1.528)	1.706	(1.455)	1.707	(1.301)	1.856	(1.414)
Processed meat	1.279	1.206	1.263	1.362	(0.405)	1.651	(0.266)	1.488	(0.358)	1.372	(0.330)
Dairy eggs	1.780	1.701	1.716	1.849	(1.027)	1.836	(1.259)	1.604	(1.657)	1.676	(1.130)
Milk	1.817	1.774	1.783	1.948	(1.267)	1.818	(1.571)	1.587	(1.326)	1.644	(1.374)
Dairy products	2.104	1.974	1.939	2.044	(1.329)	1.874	(1.620)	1.587	(1.326)	1.696	(1.417)
Egg	1.436	1.276	1.276	1.355	(0.075)	1.804	(0.127)	1.670	(0.130)	1.680	(0.131)
Vegetables and seaweed	1.548	1.728	1.769	2.308	(0.027)	2.947	(0.061)	2.713	(0.048)	2.857	(0.053)
Fresh vegetables	1.492	1.649	1.732	3.059	(0.022)	4.108	(0.054)	3.879	(0.039)	3.985	(0.046)
Dried food, seaweed	1.741	1.870	1.585	1.811	(0.017)	2.139	(0.050)	1.929	(0.041)	2.279	(0.045)
Processed soybean products	1.766	2.130	2.219	2.251	(0.074)	2.182	(0.142)	1.825	(0.117)	1.860	(0.120)
Other vegetables and seaweed processed products	1.473	1.689	1.717	1.710	(0.019)	1.931	(0.033)	1.631	(0.030)	1.808	(0.031)
Fruits	1.236	1.333	1.299	1.574	(0.021)	2.180	(0.042)	1.999	(0.038)	2.328	(0.044)
Fats and oils/seasonings	2.430	2.493	2.235	2.121	(0.034)	1.801	(0.059)	1.585	(0.073)	1.582	(0.075)
Fats and oils	2.447	2.624	2.381	2.384	(0.063)	1.882	(0.098)	1.566	(0.089)	1.451	(0.082)
Seasonings	2.428	2.478	2.217	2.089	(0.030)	1.792	(0.055)	1.587	(0.071)	1.599	(0.074)
Confectionery	1.423	1.449	1.497	1.661	(0.148)	1.650	(0.207)	1.582	(0.221)	1.697	(0.250)
Cooking food	1.419	1.408	1.637	1.683	(0.158)	1.821	(0.299)	1.704	(0.248)	1.773	(0.254)
Beverage	2.170	1.874	2.069	1.962	(0.168)	1.995	(0.228)	1.704	(0.200)	1.713	(0.214)
Liquor	1.408	1.427	1.399	1.530	(0.065)	1.437	(0.069)	1.213	(0.062)	1.242	(0.064)
Eating out	1.304	1.492	1.463	1.592	(0.138)	1.626	(0.224)	1.694	(0.189)	1.790	(0.202)
Residence	0.260	0.323	0.351	0.323	(0.001)	0.365	(0.002)	0.248	(0.001)	0.260	(0.001)
Rent	0.255	0.223	0.334	0.321	(0.001)	0.355	(0.002)	0.215	(0.001)	0.213	(0.001)
Equipment material	0.312	0.229	0.338	0.287	(0.001)	0.349	(0.002)	0.213	(0.001)	0.216	(0.001)
Construction and other services	0.257	0.497	0.381	0.342	(0.002)	0.393	(0.003)	0.307	(0.002)	0.353	(0.002)
Utility and water bills	19.138	21.761	18.095	15.969	(0.113)	20.219	(0.144)	19.793	(0.136)	19.522	(0.142)
Electric bill	21.198	20.049	19.271	20.849	(0.014)	27.523	(0.040)	28.686	(0.033)	28.285	(0.032)
Gas fee	23.562	30.573	21.310	14.370	(0.014)	14.443	(0.029)	15.335	(0.029)	14.488	(0.027)
Other fuel costs	32.340	41.749	33.568	23.384	(0.019)	46.263	(0.033)	34.558	(0.028)	35.417	(0.033)
Water and sewage charges	3.143	3.082	4.620	4.497	(0.496)	2.618	(0.537)	2.233	(0.498)	2.300	(0.513)
Furniture and household goods	3.038	3.040	3.030	2.814	(0.085)	2.415	(0.085)	2.128	(0.057)	2.195	(0.055)
Household durables	14.507	11.336	8.607	5.257	(0.016)	2.778	(0.010)	1.621	(0.005)	1.502	(0.005)
Air conditioning equipment	6.643	5.142	4.156	3.097	(0.009)	2.218	(0.008)	1.746	(0.006)	1.866	(0.006)

General furniture	1.548	1.614	1.596	1.612	(0.006)	1.631	(0.008)	1.549	(0.007)	1.619	(0.007)
Interior equipment/decoration	2.404	2.439	2.276	2.331	(0.027)	2.015	(0.030)	1.693	(0.024)	1.627	(0.025)
Bedding	2.125	1.950	1.622	1.643	(0.055)	1.554	(0.040)	1.410	(0.041)	1.500	(0.042)
Household goods	2.235	2.411	2.436	2.371	(0.009)	3.039	(0.021)	2.792	(0.014)	3.125	(0.016)
Household consumables	3.705	3.215	2.995	2.778	(0.010)	2.475	(0.015)	2.642	(0.011)	2.665	(0.013)
Housework service	2.946	3.744	4.713	4.577	(0.696)	1.953	(0.759)	1.868	(0.580)	1.962	(0.619)
Clothing and footwear	1.617	1.611	1.718	1.914	(0.009)	1.894	(0.011)	1.781	(0.008)	1.829	(0.008)
Healthcare	1.471	1.457	1.596	1.611	(0.017)	1.508	(0.017)	1.275	(0.014)	1.438	(0.015)
Health services	1.027	1.013	1.217	1.192	(0.016)	0.802	(0.010)	0.671	(0.008)	0.788	(0.010)
Other healthcare	3.007	2.451	2.279	2.283	(0.019)	2.429	(0.027)	2.029	(0.021)	2.107	(0.020)
Transportation expenses	2.145	2.391	2.650	2.755	(0.012)	1.890	(0.012)	2.115	(0.014)	2.074	(0.014)
Automobile related expenses	5.879	6.535	5.506	5.235	(0.008)	5.180	(0.012)	4.052	(0.009)	3.598	(0.008)
Purchase of automobiles, etc.	1.620	1.647	1.910	2.075	(0.006)	2.411	(0.008)	2.125	(0.006)	2.174	(0.006)
Bike purchase	1.575	1.430	1.355	2.017	(0.006)	2.388	(0.008)	2.152	(0.007)	2.384	(0.008)
Gasoline	18.030	19.422	16.780	15.294	(0.013)	14.629	(0.025)	12.658	(0.020)	12.645	(0.020)
Parking fee	0.492	0.699	0.895	0.940	(0.004)	0.458	(0.003)	0.339	(0.003)	0.334	(0.003)
Other maintenance of automobiles, etc.	1.541	1.325	1.196	1.173	(0.006)	1.181	(0.006)	1.041	(0.005)	1.127	(0.005)
Communication	1.157	1.151	1.132	0.906	(0.009)	0.949	(0.010)	0.732	(0.009)	0.655	(0.009)
Education	0.654	0.768	0.854	1.118	(0.008)	0.913	(0.009)	1.063	(0.007)	0.991	(0.007)
Educational entertainment	2.500	2.705	2.926	2.570	(0.021)	1.790	(0.027)	1.656	(0.014)	1.524	(0.018)
Recreational durable goods	24.980	18.368	13.125	6.628	(0.023)	1.696	(0.007)	1.260	(0.005)	1.228	(0.005)
Educational entertainment supplies	2.153	2.191	2.309	2.307	(0.016)	2.031	(0.031)	1.805	(0.022)	1.882	(0.024)
Books and other printed matter	1.336	1.598	1.686	2.132	(0.007)	2.121	(0.010)	1.793	(0.008)	1.898	(0.008)
Educational entertainment service	2.724	3.011	3.290	2.609	(0.026)	1.629	(0.032)	1.608	(0.013)	1.286	(0.019)
Other consumption expenditure	1.106	1.110	1.097	1.137	(0.015)	1.367	(0.022)	1.266	(0.012)	1.244	(0.011)

Notes: The average GHG intensity for a given subcategory s can be calculated by $\bar{e}_{st} = \frac{\sum_{i \in s} e_{it} \cdot \lambda_{it}}{\sum_{i \in s} \lambda_{it}}$.

Table S3. Results of Factor Decomposition Analysis of Total CF Changes (2005-2020)

(g-CO₂-eq)

Level 1 category Level 2 category Level 3 category	2005-2011						2011-2015						2015-2020					
	Total GHG Changes	Due to					Total GHG Changes	Due to					Total GHG Changes	Due to				
		CC	TC	Ele	Elm	EIo		CC	TC	EIe	Elm	EIo		CC	TC	Ele	Elm	EIo
Total consumption expenditure	809,756	-195,460	-457,489	996,277	162,783	303,645	-1,111,889	-145,477	-138,989	-705,761	-32,590	-89,071	-548,221	-70,793	-389,040	-130,498	14,855	27,254
Food	149,138	-60,201	-91,939	118,984	147,826	34,468	-155,756	35,177	-28,732	-100,692	-17,444	-44,064	84,368	16,422	-81,783	91,691	13,007	45,031
Cereals	116,595	4,485	-9,166	18,571	93,643	9,062	-42,603	-9,841	-3,734	-13,299	-14,793	-937	19,075	13,604	-10,747	9,178	5,476	1,563
Seafood	-65,777	-39,955	-9,069	-23,307	310	6,244	-20,139	-20,942	-2,043	4,816	173	-2,143	-9,506	-21,662	-5,528	17,066	99	519
Fresh fish	-49,975	-30,726	-5,562	-15,835	187	1,961	-12,101	-14,168	-1,200	3,018	42	207	-6,799	-13,470	-3,277	9,660	36	251
Shellfish	-6,737	-3,855	-597	-2,492	20	187	-1,874	-2,094	-113	313	4	18	-680	-1,260	-311	865	3	22
Salted and dried seafood	-5,282	-2,830	-1,352	-1,694	52	542	-3,603	-4,358	-306	1,042	13	6	-2,068	-5,487	-774	4,066	18	109
Fish paste product	-2,041	-2,101	-658	-2,250	-23	2,990	-1,112	214	-189	1,535	68	-2,740	-740	-765	-506	498	9	23
Other seafood products	-1,742	-2,386	-824	850	66	552	-1,450	-1,071	-228	-202	29	22	781	-924	-653	2,259	16	83
Meat	8,403	10,058	-12,863	33,816	-8,203	-14,405	-7,091	13,140	-3,766	-2,886	-9,076	-4,502	36,665	29,298	-11,809	8,218	6,459	4,498
Fresh meat	6,362	6,620	-11,273	28,592	-5,084	-12,492	-7,434	12,025	-3,320	98	-10,900	-5,337	35,043	20,141	-10,160	10,925	8,326	5,811
Processed meat	2,041	2,366	-1,548	5,185	-2,505	-1,457	342	1,335	-449	-2,990	1,693	754	1,622	6,643	-1,563	-2,408	-579	-471
Dairy eggs	-3,854	-6,637	-6,049	-555	9,654	-267	-13,535	10,222	-1,856	-10,143	17,391	-29,148	18,964	17,325	-5,448	3,394	-24,986	28,678
Milk	-11,271	-13,813	-2,465	-2,145	5,013	2,139	-12,376	-3,395	-688	-3,574	-3,787	-932	1,573	1,534	-1,846	876	732	275
Dairy products	8,547	7,129	-2,442	-2,632	4,529	1,964	2,048	15,561	-880	-5,514	-5,632	-1,487	14,715	12,192	-2,642	2,403	2,008	755
Egg	-1,131	160	-1,147	4,261	495	-4,900	-3,207	-716	-302	-1,224	28	-993	2,676	3,469	-955	101	8	54
Vegetables and seaweed	43,802	-22,046	-12,462	69,176	3,724	5,410	-34,464	1,597	-4,277	-25,130	-1,452	-5,201	18,272	12,243	-12,248	15,487	608	2,184
Fresh vegetables	56,713	-14,703	-11,400	75,200	2,304	5,312	-22,710	4,714	-4,074	-16,465	-1,062	-5,823	17,090	19,881	-12,181	7,821	500	1,069
Dried food, seaweed	-2,219	-5,248	-776	3,065	310	429	-3,069	-473	-248	-1,904	-82	-362	547	-1,825	-606	2,778	30	171
Processed soybean products	-3,149	-1,526	-1,316	-897	884	-294	-4,283	1,307	-369	-4,750	-332	-140	1,188	1,646	-991	472	30	31
Other vegetables and seaweed processed products	708	-1,588	-1,090	3,158	204	24	-6,162	-1,719	-315	-4,001	-38	-90	921	-701	-786	2,219	17	172
Fruits	12,260	-9,504	-3,207	24,645	887	-560	-12,831	-3,350	-1,113	-7,058	-187	-1,123	3,258	-7,023	-2,835	11,424	233	1,460
Fats and oils/seasonings	-6,662	7,225	-3,808	-13,140	1,030	2,031	-6,154	3,718	-964	-9,189	583	-302	8,820	12,195	-3,021	-132	85	-306
Fats and oils	-2,508	-393	-427	-1,983	138	157	417	2,403	-124	-1,580	-47	-236	239	1,335	-356	-633	-36	-70
Seasonings	-4,155	7,410	-3,373	-11,016	908	1,917	-6,571	1,509	-842	-7,690	590	-138	8,581	10,858	-2,665	499	122	-234
Confectionery	914	-889	-6,546	-878	4,846	4,381	-4,181	2,257	-1,897	-5,728	1,200	-14	6,178	-986	-5,538	9,202	2,242	1,258
Cooking food	26,024	1,565	-8,933	15,199	15,555	2,638	-14,854	7,867	-2,887	-13,109	-5,720	-1,005	41,186	40,381	-9,418	8,765	769	688
Beverage	14,447	17,289	-4,896	1,599	2,887	-2,432	-10,504	8,445	-1,447	-14,863	-1,413	-1,225	19,589	23,145	-4,562	552	820	-366
Liquor	-6,795	-2,034	-2,764	-3,851	138	1,715	-9,428	1,233	-742	-9,253	-264	-401	6,063	6,869	-2,137	1,327	68	-64
Eating out	9,781	-12,890	-12,447	5,502	13,947	15,668	20,027	19,163	-3,987	11,518	-5,804	-863	-84,196	-89,895	-9,141	11,711	1,515	1,614
Residence	15,316	1,639	-3,097	9,587	105	7,082	-39,982	-4,376	-980	-25,348	-156	-9,123	-1,407	-1,369	-1,731	2,500	16	-822
Rent	7,177	822	-1,680	4,240	60	3,736	-24,446	-6,935	-469	-14,923	-86	-2,032	-1,900	-890	-805	-197	-1	-7
Equipment material	4,964	2,028	-433	2,247	20	1,101	-6,679	-1,603	-137	-4,305	-25	-608	1,270	1,431	-295	124	0	9
Construction and other services	3,175	-1,570	-969	3,427	31	2,256	-8,858	4,798	-381	-6,665	-58	-6,553	-777	-2,120	-624	3,120	22	-1,175
Utility and water bills	988,007	-129,768	-197,747	1,257,094	9,103	49,326	-489,999	-296,139	-65,098	-118,525	-2,176	-8,060	-338,641	-81,965	-189,368	-71,723	1,564	2,851
Electric bill	970,598	124,717	-120,773	934,534	3,657	28,462	-58,765	-161,921	-41,791	154,355	-969	-8,439	-135,282	50,270	-132,826	-52,156	-59	-510
Gas fee	-172,229	-139,654	-42,636	5,283	1,063	3,715	-927	-49,587	-11,143	60,568	-19	-746	-171,551	-87,656	-32,693	-50,928	-118	-156
Other fuel costs	299,740	-137,098	-19,097	454,284	287	1,364	-398,225	-213,519	-7,893	-176,537	-80	-196	-33,227	-28,337	-16,842	11,827	72	53
Water and sewage charges	-110,102	9,225	-14,727	-119,939	2,607	12,732	-32,083	-1,881	-2,813	-24,142	-2,415	-832	1,420	2,563	-7,647	4,101	915	1,488
Furniture and household goods	44,560	59,036	-15,261	-49,523	49	50,258	-17,486	18,357	-4,360	-36,851	-3,647	9,016	85,931	71,374	-14,522	9,958	-263	19,384
Household durables	6,304	47,168	-3,494	-38,524	-92	1,246	-9,155	17,073	-723	-24,153	-105	-1,247	11,425	17,062	-1,895	-3,437	-11	-294
Air conditioning equipment	6,064	19,330	-1,877	-12,085	-12	707	-5,782	828	-392	-6,567	-30	379	7,514	6,412	-1,190	1,987	6	299
General furniture	-2,508	-2,556	-431	122	16	341	-535	182	-124	-524	-7	-62	2,020	1,903	-420	513	2	23
Interior equipment/decoration	-4,911	-1,547	-902	-2,880	23	395	-1,792	1,943	-239	-3,194	-59	-243	-3,442	-2,363	-523	-547	13	-22

Bedding	-1,504	61	-723	-894	-142	195	-1,697	-25	-187	-1,416	9	-79	1,351	938	-545	909	8	43
Household goods	24,937	2,588	-2,836	18,953	348	5,883	-15,052	-6,352	-981	-6,466	-195	-1,058	9,601	3,004	-2,800	8,761	50	587
Household consumables	7,053	16,349	-3,471	-8,971	146	3,000	29,368	6,245	-948	5,296	-128	18,902	51,648	38,734	-5,001	939	78	16,898
Housework service	9,126	3,564	-2,550	-29,541	713	36,940	-12,840	-7,572	-699	-846	-1,787	-1,937	5,812	4,238	-2,099	966	405	2,301
Clothing and footwear	-44,603	-37,692	-12,196	-3,006	253	8,038	-31,985	-10,122	-3,260	-16,300	-397	-1,906	-66,995	-65,379	-6,980	5,096	19	248
Healthcare	-7,085	8,985	-10,690	-15,910	-70	10,600	-38,507	724	-2,852	-35,637	-472	-270	37,509	24,247	-8,199	26,804	145	-5,488
Health services	-39,829	-5,876	-4,502	-34,054	-575	5,177	-11,081	-1,407	-879	-11,174	-139	2,517	3,262	1,131	-2,392	9,769	157	-5,403
Other healthcare	32,744	23,808	-6,541	9,793	479	5,206	-27,425	5,145	-2,007	-27,331	-363	-2,869	34,248	34,054	-6,179	6,379	-117	110
Transportation expenses	-100,579	-40,715	-7,649	-57,328	-1	5,114	20,020	5,009	-1,551	15,247	113	1,202	-72,394	-68,261	-2,923	-1,492	24	257
Automobile related expenses	-134,261	-85,884	-51,997	-13,032	937	15,715	-195,735	139,991	-15,729	-297,516	-765	-21,716	-74,546	89,883	-39,650	-125,320	-134	675
Purchase of automobiles, etc.	-14,501	-32,725	-4,827	18,529	95	4,427	28,458	53,757	-2,168	-21,574	-135	-1,422	29,006	31,355	-6,827	4,240	13	225
Bike purchase	1,974	838	-285	1,257	8	156	-842	81	-94	-800	-3	-27	1,546	952	-288	855	3	25
Gasoline	-114,301	-32,034	-42,385	-44,779	843	4,054	-199,278	-65,403	-10,341	-122,641	-302	-592	-128,835	-104,726	-23,445	-660	-1	-4
Parking fee	-14,262	-2,220	-937	-11,491	-19	405	-4,089	-1,489	-114	-2,452	-7	-28	-1,249	-893	-229	-88	-3	-36
Other maintenance of automobiles, etc.	6,828	3,722	-4,488	723	-7	6,878	-19,983	16,579	-1,489	-14,185	-135	-20,753	24,985	17,358	-3,893	9,927	41	1,552
Communication	32,123	20,945	-5,489	6,272	273	10,122	-23,124	12,502	-1,817	-33,346	-189	-275	8,842	29,287	-5,331	-13,983	-118	-1,013
Education	11,769	9,009	-5,571	-29,839	85	38,085	-22,436	-12,016	-1,472	19,773	-195	-28,525	-9,104	6,483	-4,362	-9,613	-84	-1,529
Educational entertainment	-224,951	61,902	-41,036	-293,361	2,144	45,401	-28,697	-28,359	-8,090	-48,025	-4,523	60,300	-179,069	-114,873	-20,775	-38,330	1,062	-6,153
Recreational durable goods	1,362	192,565	-10,201	-174,845	-551	-5,606	-38,729	-28,012	-439	-8,918	-45	-1,315	11,455	13,890	-1,449	-949	-4	-33
Educational entertainment supplies	-11,903	12,122	-8,248	-22,863	1,255	5,830	35,224	-1,625	-2,047	-18,378	-755	58,028	7,549	6,354	-7,721	6,219	186	2,511
Books and other printed matter	-14,110	-12,150	-4,499	-573	183	2,929	-28,546	-11,731	-1,120	-14,685	-110	-901	-9,622	-11,271	-2,462	3,932	17	162
Educational entertainment service	-200,300	-9,621	-22,862	-203,166	1,178	34,171	3,355	12,376	-4,477	-4,461	-4,015	3,932	-188,451	-116,793	-9,383	-46,197	846	-16,923
Other consumption expenditure	80,321	-2,715	-14,818	66,338	2,081	29,435	-88,202	-6,223	-5,048	-28,541	-2,739	-45,651	-22,715	23,356	-13,417	-6,084	-383	-26,187

CC: consumption composition

TC: total consumption

Ele: GHG emission intensity (energy-derived)

Elm: GHG emission intensity (methane-derived)

Elo: GHG emission intensity (other sources)

Table S4. Results of Factor Decomposition Analysis on energy-derived CF Changes (1990-2020)

(g-CO₂)

Level 1 category Level 2 category Level 3 category	1990-1995				1995-2000				2000-2005				2005-2011				2011-2015				2015-2020			
	Total CO ₂ Changes	Due to			Total CO ₂ Changes	Due to			Total CO ₂ Changes	Due to			Total CO ₂ Changes	Due to			Total CO ₂ Changes	Due to			Total CO ₂ Changes	Due to		
		CC	TC	Ele		CC	TC	Ele		CC	TC	Ele		CC	TC	Ele		CC	TC	Ele		CC	TC	Ele
Total consumption expenditure	1,721,489	666,831	-57,836	1,112,494	-1,033,751	759,554	-510,707	-1,282,599	-711,523	97,897	-194,649	-614,770	387,398	-181,035	-427,843	996,277	-981,828	-150,390	-125,676	-705,761	-551,188	-67,593	-353,098	-130,498
Food	-85,056	-105,432	-8,860	29,236	-112,435	-34,517	-67,215	-10,703	119,850	-77,507	-26,732	224,089	2,988	-45,899	-70,097	118,984	-96,060	25,286	-20,654	-100,692	44,271	11,915	-59,334	91,691
Cereals	-6,251	-13,092	-577	7,418	-17,631	-7,992	-4,366	-5,274	47,116	-6,120	-1,643	54,880	15,424	3,015	-6,161	18,571	-19,943	-4,816	-1,827	-13,299	10,585	6,699	-5,292	9,178
Seafood	-80,124	-29,660	-2,003	-48,461	-82,812	-40,502	-11,883	-30,427	-5,875	-28,883	-4,007	27,015	-71,752	-39,483	-8,962	-23,307	-17,138	-20,002	-1,952	4,816	-9,214	-20,936	-5,343	17,066
Fresh fish	-44,612	3,301	-1,317	-46,596	-44,598	-22,894	-7,398	-14,306	-4,083	-17,771	-2,574	16,263	-51,807	-30,458	-5,514	-15,835	-11,931	-13,781	-1,168	3,018	-6,604	-13,082	-3,182	9,660
Shellfish	-2,311	2,264	-148	-4,427	-7,747	-2,218	-873	-4,655	1,221	-2,444	-249	3,915	-6,909	-3,825	-592	-2,492	-1,837	-2,039	-110	313	-663	-1,226	-302	865
Salted and dried seafood	-18,337	-10,060	-311	-7,967	-18,269	-7,557	-1,777	-8,936	298	-4,876	-518	5,692	-5,827	-2,797	-1,336	-1,694	-3,480	-4,224	-297	1,042	-2,005	-5,321	-751	4,066
Fish paste product	-5,582	-7,388	-110	1,916	-5,360	-2,366	-820	-2,174	-738	-1,026	-291	579	-4,896	-2,015	-631	-2,250	1,555	168	-148	1,535	-695	-718	-475	498
Other seafood products	-9,283	-7,863	-167	-1,253	-6,837	-4,686	-1,044	-1,107	-2,574	-2,707	-375	508	-2,313	-2,351	-812	850	-1,446	-1,026	-219	-202	754	-883	-623	2,259
Meat	-5,179	-12,466	-588	7,874	-11,617	-10,561	-4,369	3,313	-310	-12,419	-1,682	13,791	32,800	3,641	-4,656	33,816	1,366	5,962	-1,709	-2,886	16,406	13,716	-5,528	8,218
Fresh meat	-3,245	-11,696	-456	8,907	-11,172	-9,781	-3,435	2,043	844	-9,870	-1,311	12,026	27,084	2,145	-3,653	28,592	3,682	4,951	-1,367	98	15,276	8,780	-4,429	10,925
Processed meat	-1,934	-252	-134	-1,548	-444	-642	-939	1,137	-1,155	-2,528	-371	1,744	5,717	1,536	-1,005	5,185	-2,315	1,017	-342	-2,990	1,129	4,626	-1,089	-2,408
Dairy eggs	-3,294	1,123	-443	-3,975	-544	2,006	-3,294	745	-1,346	-6,080	-1,294	6,027	-7,168	-3,460	-3,153	-555	-6,059	4,991	-906	-10,143	9,239	8,526	-2,681	3,394
Milk	-2,819	-1,485	-234	-1,100	-3,347	-1,892	-1,670	215	-1,998	-4,834	-624	3,460	-10,848	-7,385	-1,318	-2,145	-5,454	-1,563	-317	-3,574	731	714	-859	876
Dairy products	1,994	3,672	-125	-1,553	4,347	5,970	-1,116	-507	1,349	308	-464	1,505	-126	3,811	-1,306	-2,632	1,247	7,166	-405	-5,514	6,845	5,671	-1,229	2,403
Egg	-2,469	-426	-87	-1,956	-1,543	-993	-550	-0	-696	-1,265	-210	778	3,806	74	-528	4,261	-1,851	-441	-186	-1,224	1,663	2,156	-594	101
Vegetables and seaweed	4,295	-19,557	-1,065	24,917	-6,259	-2,743	-8,941	5,425	44,892	-16,454	-3,567	64,914	40,761	-18,153	-10,261	69,176	-27,370	1,335	-3,575	-25,130	15,482	10,282	-10,287	15,487
Fresh vegetables	7,093	-6,297	-663	14,053	2,466	898	-5,610	7,178	89,701	-12,085	-2,271	104,057	54,580	-11,615	-9,006	75,200	-15,941	3,852	-3,329	-16,465	14,172	16,399	-10,048	7,821
Dried food, seaweed	-5,334	-7,080	-125	1,871	-6,780	-2,179	-942	-3,659	1,965	-500	-327	2,792	-2,334	-4,704	-695	3,065	-2,540	-417	-218	-1,904	615	-1,624	-539	2,778
Processed soybean products	2,725	-2,392	-126	5,243	1,478	1,398	-1,211	1,291	-503	-436	-522	454	-3,478	-1,386	-1,195	-897	-3,916	1,162	-328	-4,750	1,051	1,456	-877	472
Other vegetables and seaweed processed products	-189	-4,404	-147	4,362	-3,423	-2,742	-1,182	501	-3,680	-3,111	-453	-117	687	-1,465	-1,006	3,158	-5,880	-1,588	-291	-4,001	857	-642	-720	2,219
Fruits	-5,463	-10,496	-339	5,373	-4,531	81	-2,786	-1,827	5,248	-6,736	-1,027	13,011	14,222	-7,793	-2,630	24,645	-10,897	-2,882	-957	-7,058	2,926	-6,054	-2,444	11,424
Fats and oils/seasonings	2,272	414	-448	2,305	-5,609	8,224	-3,802	-10,031	-2,900	3,101	-1,480	-4,521	-9,926	6,797	-3,582	-13,140	-6,720	3,333	-864	-9,189	7,948	10,741	-2,661	-132
Fats and oils	-119	-739	-45	666	12	1,444	-426	-1,006	322	480	-170	12	-2,727	-356	-387	-1,983	369	2,055	-106	-1,580	205	1,143	-305	-633
Seasonings	2,391	1,147	-402	1,646	-5,621	6,812	-3,378	-9,056	-3,222	2,630	-1,311	-4,542	-7,199	7,007	-3,189	-11,016	-7,089	1,360	-759	-7,690	7,743	9,600	-2,356	499
Confectionery	-8,627	-10,398	-672	2,443	-6,232	-5,481	-5,002	4,251	12,261	185	-2,170	14,247	-7,298	-768	-5,652	-878	-5,434	1,840	-1,546	-5,728	3,964	-792	-4,446	9,202
Cooking food	4,773	6,589	-733	-1,083	34,636	15,434	-6,118	25,320	10,879	8,700	-3,125	5,303	8,903	1,338	-7,634	15,199	-9,118	6,305	-2,314	-13,109	33,945	32,838	-7,658	8,765
Beverage	-11,851	-602	-395	-10,854	10,118	5,489	-2,802	7,431	6,065	12,189	-1,497	-4,627	11,452	13,746	-3,892	1,599	-9,301	6,712	-1,150	-14,863	15,161	18,195	-3,586	552
Liquor	-3,214	-3,798	-344	929	-5,452	-1,543	-2,598	-1,311	2,290	-2,477	-1,027	5,794	-8,323	-1,896	-2,577	-3,851	-8,811	1,112	-669	-9,253	5,568	6,157	-1,916	1,327
Eating out	27,606	-8,394	-1,279	37,280	-16,501	168	-11,144	-5,526	1,531	-16,857	-4,304	22,693	-16,109	-10,994	-10,617	5,502	23,365	14,960	-3,113	11,518	-67,740	-72,118	-7,334	11,711
Residence	30,452	13,903	-341	16,890	538	-3,199	-3,110	6,847	-10,799	-2,919	-1,368	-6,512	8,158	1,607	-3,035	9,587	-30,200	-3,964	-887	-25,348	-666	-1,398	-1,768	2,500
Rent	2,876	7,982	-194	-4,912	11,000	-2,808	-1,184	14,992	-4,142	-1,820	-713	-1,610	3,397	807	-1,651	4,240	-21,643	-6,294	-426	-14,923	-1,773	-827	-748	-197
Equipment material	-792	475	-23	-1,244	3,600	1,522	-187	2,265	1,757	3,483	-173	-1,553	3,814	1,991	-425	2,247	-5,881	-1,452	-124	-4,305	1,179	1,329	-274	124
Construction	28,369	5,343	-123	23,149	-14,062	-1,967	-1,737	-10,358	-8,414	-5,020	-475	-2,919	948	-1,533	-946	3,427	-2,676	4,333	-344	-6,665	-73	-2,466	-726	3,120

