

Supplementary Materials

Table S1. The emission factor effect of extended LMDI decomposition by industry (rolling base year). Unit:10⁴ tons(the same as following tables).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	23	29	3	15	12	82	7	11	5	43	66	32	9	37	9
1996–1997	-5	-6	-1	-3	-3	-19	-1	-3	-1	-10	-15	-8	-2	-9	-2
1997–1998	-31	-34	-11	-20	-17	-103	-7	-19	-9	-59	-89	-50	-13	-57	-15
1998–1999	-17	-18	-5	-11	-10	-53	-4	-12	-5	-33	-49	-29	-8	-31	-9
1999–2000	-64	-77	-8	-49	-42	-208	-16	-40	-28	-134	-200	-123	-33	-121	-39
2000–2001	-41	-53	-6	-35	-30	-135	-11	-23	-26	-90	-132	-82	-24	-83	-25
2001–2002	13	18	2	11	10	44	3	7	8	29	43	27	9	28	8
2002–2003	36	56	5	36	31	138	10	19	25	88	137	87	29	90	22
2003–2004	-67	-131	-13	-79	-66	-308	-23	-38	-60	-198	-328	-206	-70	-212	-41
2004–2005	-101	-207	-24	-113	-83	-456	-33	-53	-104	-301	-528	-313	-108	-318	-57
2005–2006	75	157	21	77	49	331	23	35	81	224	404	239	81	226	42
2006–2007	-134	-287	-38	-127	-87	-592	-38	-59	-140	-401	-759	-477	-146	-414	-67
2007–2008	-274	-558	-81	-242	-175	-1164	-74	-114	-284	-801	-1546	-1031	-295	-879	-131
2008–2009	321	620	101	279	207	1306	86	123	334	941	1777	1172	339	1057	155
2009–2010	-188	-360	-61	-162	-130	-758	-51	-71	-201	-572	-1080	-713	-212	-670	-92
2010–2011	49	93	16	42	35	197	14	18	52	158	290	195	57	187	25
2011–2012	-388	-730	-126	-319	-256	-1589	-106	-139	-408	-1251	-2232	-1559	-425	-1431	-195
2012–2013	-98	-184	-31	-76	-63	-412	-27	-34	-106	-303	-543	-395	-112	-346	-46
2013–2014	-335	-613	-108	-257	-225	-1443	-94	-113	-365	-1042	-1851	-1370	-405	-1186	-150
2014–2015	-32	-57	-10	-24	-22	-138	-9	-11	-35	-95	-164	-145	-38	-113	-14
1995–2015	-1258	-2343	-375	-1057	-867	-5282	-351	-515	-1264	-3808	-6798	-4748	-1368	-4245	-625

Table S2. The energy structure effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	-517	-154	72	-76	3107	-1249	-146	561	-81	-189	6	-44	61	101	195
1996–1997	256	544	42	220	-5040	2275	188	-763	108	425	474	276	116	541	53
1997–1998	313	-270	506	13	111	-264	-2	192	11	174	617	17	8	457	93
1998–1999	34	293	-546	242	196	349	-14	47	29	273	716	249	93	19	175
1999–2000	-77	77	-9	-74	243	191	-12	-123	-15	351	-2444	-25	52	226	6
2000–2001	47	82	24	88	141	277	53	78	69	-78	-573	160	67	197	90
2001–2002	114	155	-21	-27	112	19	-39	-42	58	179	245	-58	127	179	10
2002–2003	-165	173	33	206	-402	-169	68	426	57	-431	1322	400	253	549	81
2003–2004	-541	-143	-43	-203	-23	-672	-41	146	-129	-807	669	-249	138	197	430
2004–2005	108	113	119	-76	-549	630	17	-78	327	202	-295	13	78	-172	135
2005–2006	218	679	57	105	212	129	-49	66	-71	1051	282	3	-121	-157	-54
2006–2007	151	315	76	-2	106	389	6	97	177	209	-1012	975	53	723	13
2007–2008	-32	43	35	-80	-10	718	-28	15	39	-339	2875	-108	-59	62	-20
2008–2009	283	373	49	63	-15	262	110	117	236	893	-671	333	217	643	105
2009–2010	808	556	138	466	352	-1832	90	152	309	198	8198	1271	475	1301	4
2010–2011	309	180	29	203	-485	-132	-20	-35	132	255	-638	399	77	576	41
2011–2012	342	670	114	146	-269	1349	-5	-14	361	225	466	317	-311	1399	94
2012–2013	192	539	98	206	-56	593	77	69	219	700	-588	447	208	509	-4
2013–2014	27	618	59	223	234	-380	84	72	232	564	-409	154	318	656	1
2014–2015	34	-58	65	22	-95	818	18	-6	6	-212	-1005	1313	-57	647	-108
1995–2015	1903	4783	897	1666	-2130	3300	354	976	2073	3643	8234	5842	1794	8656	1343

Table S3. The energy intensity effect of extended LMDI decomposition by industry (rolling base year).

FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
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1995–1996	89	-2320	-539	-867	-2711	3153	-1239	-1160	-184	-1275	414	-266	-429	-968	-827
1996–1997	-3426	-2443	-436	-1824	5446	-16339	-1072	-261	-351	-7271	-4096	-895	-666	-3704	-252
1997–1998	-1074	-1130	390	-571	-2186	-6870	-334	-386	-333	-5203	-5920	-789	-205	-2845	-826
1998–1999	-1186	-1061	-794	-531	-96	-5732	-39	-1700	-218	-3198	-6172	-1117	-211	-1672	-53
1999–2000	335	582	118	956	1373	-757	234	-536	1768	-475	8852	313	162	17	281
2000–2001	-341	-364	-56	-514	-504	-2953	-291	827	-249	2927	-4043	-1597	-44	-1221	-195
2001–2002	-636	-321	2	-143	-1175	579	-272	-345	-491	-312	-6659	763	-4	-1375	-87
2002–2003	-1884	-715	42	-937	1119	-2121	-206	-1541	-73	3142	-13264	-1566	-159	-3525	-213
2003–2004	2417	1029	-56	70	2884	3259	-65	-625	386	7109	-17741	-1321	-417	-1633	-1929
2004–2005	-353	-1018	-31	-687	169	-1762	-160	-288	249	-2080	2143	-585	-195	-1666	-111
2005–2006	-1862	-1748	-263	-1330	2002	-5983	-268	-957	-364	-12824	-14418	-1670	46	-1459	-277
2006–2007	-1587	-2844	-696	-2200	-3435	-13157	-704	-1040	-1465	-11004	-5412	-1017	-965	-3742	-578
2007–2008	197	-2795	-221	-284	-1282	-10906	-251	-652	-529	-3356	15740	-6476	-362	-2192	-177
2008–2009	-2969	-2124	-227	-584	2306	-20878	-1045	-635	-14	-17114	-22172	-1573	-733	-3741	-620
2009–2010	-5088	-1018	-401	-2295	-2316	2118	-218	115	-734	-8554	-5124	3707	527	-1971	27
2010–2011	-1155	273	-239	-870	1822	6714	-179	255	-575	6665	19178	2831	-1062	-1853	-56
2011–2012	-1889	-2081	-378	-1915	-1754	-11376	-372	-384	-552	-12763	-31200	-5093	505	-7763	-312
2012–2013	-1089	-2139	-611	-1816	-1214	-11314	-561	-186	-997	-15808	-24041	-5841	-124	-3671	-730
2013–2014	-1515	-3220	-104	-1336	-1932	-150	-676	-666	-752	-8167	-12671	-2258	-1141	-3539	-24
2014–2015	-1356	-517	-538	-704	240	-4758	-243	-292	-544	-10245	-23682	1550	-886	-2819	-2
1995–2015	-24374	-25975	-5036	-18381	-1243	-99231	-7958	-10458	-6022	-99807	-150286	-22901	-6362	-51340	-6959

Table S4. The R&D efficiency effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	331	2518	-403	878	-2709	10196	246	-1003	356	4053	-14738	-506	1082	-327	-233
1996–1997	2078	1427	395	-871	1557	551	41	792	224	-4156	-15381	2199	-641	469	775
1997–1998	109	2158	689	-879	4573	2025	82	582	-67	9958	8882	2933	935	1055	-630
1998–1999	-1508	-1496	-560	-2	-255	-677	145	1241	224	3213	-599	-1962	589	68	-663
1999–2000	-3220	-542	312	-64	-11002	-6502	-942	-1040	-74	-6308	-8274	-5299	-14	-2078	1831
2000–2001	300	-596	-1097	-442	7776	239	-32	-3232	-347	-7392	-4188	131	-673	-1801	-1187
2001–2002	-501	-2573	230	-999	553	-4607	-548	1737	-144	436	-11500	371	-241	-987	-36
2002–2003	-567	171	-33	520	2697	396	86	-319	312	2018	5225	1439	-783	1555	-1979
2003–2004	-3184	-1736	-1283	-1920	-18277	-16055	-1260	-26	-2973	-11760	4228	-3423	-2205	-1535	-1868
2004–2005	-1223	3919	938	1906	1981	14200	1764	907	2154	14402	8572	109	1221	4578	1099
2005–2006	1590	-1180	-234	-2590	-151	-1467	-310	-670	-1176	1954	-1918	-5427	-232	-1492	-1214
2006–2007	-2838	-2349	-380	-299	-705	-6041	-139	-713	-1247	-1504	-26502	-1528	-1607	-1353	497
2007–2008	-6582	-2474	-1288	-2288	-3123	-19361	-1284	42	-1385	-44278	-49471	-397	-2626	-4152	-183
2008–2009	14938	12203	3423	8310	16017	79289	2733	2479	5021	78196	142176	19136	5988	14881	2203
2009–2010	-1987	-2516	679	-157	-7646	-14131	-468	-1044	-1822	-13367	-41742	-7395	-2061	-1460	-844
2010–2011	-4198	-5877	-2167	-2825	-4982	-39078	-1125	-521	-1289	-24683	-13711	-10016	-2860	-2684	-1116
2011–2012	-5537	-4615	-1415	-5571	-10914	-12099	-1386	-391	-2393	-14588	-21721	-9734	-4918	-5207	-31
2012–2013	-3272	-4416	-1547	-2671	-5013	-13894	-1017	-515	-1371	-25097	8758	-754	-2034	-5291	433
2013–2014	-814	-960	-420	-941	-3123	-4709	-70	-99	-596	-5286	12339	525	27	-751	-745
2014–2015	-547	-3298	-825	-1238	2168	-2036	-447	86	-528	-8871	28726	-2066	-1043	-2682	-990
1995–2015	-16630	-12234	-4986	-12144	-30578	-33761	-3929	-1706	-7122	-53060	9160	-21663	-12095	-9192	-4881

Table S5. The R&D intensity effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	1893	960	626	-2332	1994	3025	513	1334	-1495	-490	11405	3408	-2217	73	705
1996–1997	-1205	-1587	323	178	-3137	20990	-317	-1017	148	16635	33692	1124	2386	98	-1498
1997–1998	172	-5741	-984	-3471	-5732	-4522	-627	-1425	-162	-8584	-13618	-3052	-1788	-6956	-473
1998–1999	-3593	-1244	250	-135	2368	-10068	-1334	4181	-636	-8024	18715	-2086	-2047	-2367	-1383
1999–2000	3123	-1842	-376	2866	23012	12877	813	2094	-434	3610	24522	3547	915	2003	-2512
2000–2001	-664	-2740	854	-56	-20036	1944	-349	-1539	-901	5778	-7043	-888	-971	155	251
2001–2002	-2274	465	-1036	1962	-1855	3864	-418	-1507	360	-16749	-38	-2515	-1421	451	-1003
2002–2003	-3170	-6015	-508	-4348	766	-26422	-796	935	-2044	-24322	-44060	-9577	-901	-138	1243
2003–2004	400	-1049	1039	-1553	-3652	16135	573	-2163	1704	-6736	-38320	4348	992	-2337	3804
2004–2005	-2320	-6596	-1634	-3086	-6693	-23157	-1683	-275	-2948	-18916	-7350	-1652	-3157	-8002	-1696
2005–2006	-4120	162	-160	2194	-3667	2635	737	917	-644	-7053	32616	6871	-711	-325	614
2006–2007	1454	2571	24	154	-2826	2847	765	703	1644	-9607	37047	215	976	-643	-620
2007–2008	5503	4991	1325	2042	-679	13097	1131	409	1616	28525	15939	224	1759	2799	235
2008–2009	-18876	-14476	-4047	-10178	-15353	-78805	-3572	-1902	-7683	-90741	-104710	-21985	-7591	-19953	-2552
2009–2010	109	-369	-1148	440	6499	11344	-166	-305	1276	10074	42739	-1948	700	-1164	314
2010–2011	1214	-1994	1548	623	4675	26209	612	-1637	-949	10521	-4970	4231	1350	-2380	524
2011–2012	2765	4209	884	2933	9905	3628	587	315	2165	12374	19138	10066	4563	3034	-788
2012–2013	711	1687	1143	1747	176	13003	421	-243	637	24178	26932	455	1240	3680	-673
2013–2014	-319	-461	-1	165	4571	3979	-65	345	190	696	18133	2122	-994	233	323
2014–2015	367	1185	340	136	7436	6268	189	256	-86	7687	1309	7707	497	782	188
1995–2015	-18829	-27884	-1538	-9718	-2227	-1130	-2983	-525	-8242	-71145	62077	617	-6420	-30959	-4998

Table S6. The investment intensity effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	-2224	-3478	-222	1454	716	-13221	-759	-330	1139	-3563	3333	-2901	1136	253	-472
1996–1997	-873	160	-718	693	1580	-21541	276	226	-372	-12478	-18310	-3323	-1745	-567	724
1997–1998	-281	3583	295	4350	1159	2497	545	842	229	-1374	4736	119	852	5901	1103
1998–1999	5100	2740	310	136	-2113	10745	1189	-5422	412	4811	-18116	4048	1458	2299	2046
1999–2000	97	2385	64	-2802	-12010	-6375	129	-1054	508	2698	-16248	1752	-901	75	681
2000–2001	364	3336	243	498	12259	-2182	381	4770	1248	1613	11231	757	1644	1646	936
2001–2002	2774	2108	806	-963	1302	743	966	-230	-216	16313	11538	2144	1662	537	1039
2002–2003	3737	5845	541	3828	-3464	26027	710	-616	1732	22304	38836	8138	1685	-1417	736
2003–2004	2785	2785	244	3473	21929	-81	686	2189	1269	18496	34093	-925	1213	3872	-1936
2004–2005	3543	2677	696	1180	4712	8957	-82	-631	794	4514	-1222	1543	1935	3424	597
2005–2006	2530	1018	394	396	3818	-1167	-427	-247	1821	5099	-30698	-1445	942	1817	599
2006–2007	1384	-221	356	145	3532	3194	-627	10	-397	11111	-10545	1313	631	1996	123
2007–2008	1078	-2516	-37	246	3801	6264	152	-451	-231	15753	33532	172	867	1353	-51
2008–2009	3938	2273	624	1868	-664	-484	838	-576	2662	12545	-37466	2849	1603	5071	349
2009–2010	1878	2885	469	-283	1147	2786	634	1349	547	3294	-997	9343	1361	2624	530
2010–2011	2984	7871	618	2202	308	12869	512	2158	2238	14163	18681	5785	1510	5064	592
2011–2012	2771	406	531	2638	1009	8471	799	75	228	2214	2583	-332	355	2173	819
2012–2013	2561	2729	404	924	4837	890	596	759	735	919	-35689	298	794	1611	240
2013–2014	1133	1421	421	776	-1448	730	135	-246	406	4591	-30472	-2646	967	518	422
2014–2015	179	2114	484	1103	-9603	-4232	258	-342	614	1184	-30035	-5642	546	1900	802
1995–2015	35459	40119	6524	21862	32805	34891	6913	2231	15364	124205	-71237	21046	18516	40150	9879

Table S7. The industrial structure effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	819	204	363	213	-1352	1253	402	45	256	-1884	-8110	-142	273	-533	192
1996–1997	204	-239	131	18	-933	-2408	219	331	72	-1637	-1481	-123	-59	662	-302
1997–1998	-139	-362	50	-84	1677	-669	-29	177	7	-310	-2234	213	-73	223	-28
1998–1999	-328	48	-95	-433	-848	775	20	1110	-10	-834	2127	849	-28	242	-109
1999–2000	48	80	3	109	-1990	773	6	-377	77	-741	-2437	302	1	344	-107
2000–2001	-380	-4	5	198	-957	517	138	-1366	70	-2835	3812	813	40	431	-237
2001–2002	-207	-170	-134	52	-510	-794	30	-6	35	-2703	1565	-781	-72	775	-303
2002–2003	-777	-545	-91	-399	-2736	44	-102	-458	-336	-1103	13853	939	-536	1277	-571
2003–2004	-628	-85	136	-65	-3038	-947	-246	-187	-20	-2592	10993	484	-132	430	-33
2004–2005	-307	140	24	-98	-3922	-2425	-49	-67	-265	-1937	6987	-10	-135	512	-43
2005–2006	-521	-389	-6	-430	-5220	-1659	-77	25	-76	-248	3899	1834	101	621	-78
2006–2007	-1004	-450	168	-265	961	3279	24	220	-15	906	-4421	-55	170	380	32
2007–2008	-1137	215	175	-228	-2349	673	4	-197	191	-1747	-31945	4477	35	1359	75
2008–2009	-290	-1426	-176	-756	-2471	10491	15	-84	-1364	6648	21300	-2164	-532	6	203
2009–2010	-312	-884	-105	9	-2799	-4114	-31	-538	189	3845	-13354	-4629	-516	1998	-35
2010–2011	-160	-1274	170	109	-1913	-4504	223	-101	-244	735	-17367	-2978	51	1564	55
2011–2012	-377	-291	-84	-251	-1974	3625	101	-63	-120	548	17364	2918	-118	-458	-74
2012–2013	-632	-898	-55	-35	-2161	3486	37	-311	-20	500	9135	2902	-12	-40	116
2013–2014	-30	-463	-39	-93	60	-704	91	36	-120	-525	-2518	825	57	300	-139
2014–2015	386	-219	-31	-278	-712	2361	86	181	-145	-225	-3165	1865	-65	-197	96
1995–2015	-5771	-7010	409	-2704	-33188	9054	864	-1631	-1840	-6136	4000	7538	-1548	9894	-1289

Table S8. The industrial activity effect of extended LMDI decomposition by industry (rolling base year).

	FT	TL	WP	PP	PC	CM	PM	CF	RP	NM	FR	NR	MP	ME	OM
1995–1996	1603	1557	201	979	1214	6826	427	670	218	5583	7263	1118	412	2054	491
1996–1997	1188	1031	146	676	933	4891	259	484	176	3946	5298	864	302	1480	353
1997–1998	1087	909	189	616	1650	4006	225	568	169	3549	5114	883	283	1372	325
1998–1999	640	517	104	362	1065	2228	137	357	95	2047	3028	569	174	787	189
1999–2000	627	541	75	387	1075	2174	150	318	146	1962	3177	612	183	791	205
2000–2001	1005	907	127	675	1671	3446	252	439	347	3185	5388	992	313	1288	325
2001–2002	1612	1508	203	1132	2636	5730	402	684	555	5259	8820	1646	548	2131	498
2002–2003	2293	2383	322	1766	4012	9400	615	850	848	8670	14480	2751	883	3356	713
2003–2004	2695	2991	414	2081	4833	11864	705	859	1063	11726	18027	3346	1017	3941	611
2004–2005	2724	2898	415	1914	4266	11369	631	735	1077	11462	17698	3059	912	3560	446
2005–2006	3396	3680	553	2317	4953	14202	791	851	1440	13799	23986	4088	1204	4558	558
2006–2007	3787	4164	627	2468	5722	16094	883	894	1621	15017	28052	5187	1449	5373	599
2007–2008	2320	2414	387	1452	3478	9581	530	495	969	9117	17328	3289	880	3338	351
2008–2009	2639	2632	463	1696	4089	10656	582	523	1118	10401	20717	3749	1009	3937	412
2009–2010	2153	2352	417	1499	3766	9690	514	466	1034	9435	19896	3557	973	3819	393
2010–2011	1636	1969	348	1210	3080	8526	447	401	866	8518	17182	3166	837	3446	348
2011–2012	2035	2496	446	1477	3914	11312	590	521	1099	11335	22612	4144	1065	4232	450
2012–2013	2024	2465	430	1397	3880	11623	604	515	1124	10892	23220	4223	1160	3998	431
2013–2014	1591	1837	336	1062	3107	9583	474	393	885	8313	18556	3403	949	3123	327
2014–2015	1179	1326	246	772	2422	7569	356	290	654	6018	13384	2798	689	2302	252
1995–2015	38234	40575	6449	25939	61768	170772	9571	11311	15506	160235	293225	53444	15241	58884	8278