2016 Republic of China

National Greenhouse Gas Inventory Report

Report Summary

December, 2016

Executive Summary

ES.1 Background Information on National Greenhouse Gas Inventory

The guidelines in Article 4 and Article 12 of the United Nations Framework Convention on Climate Change （UNFCCC） and Article 5 of the Kyoto Protocol state that each party shall submit information on its progress in response to climate change to the UNFCCC Convention of the Parties for review. In particular, the National Inventory Report （NIR） is a national report in which the UNFCCC [1] requires each Annex 1 country to report on its national greenhouse gas（GHG）inventory describing the procedures for GHG emission inventory preparation, information on emission trends, statistics by sectors, and a national report of re-calculation while submitting its inventory based on Common Reporting Format （CRF）. Although Taiwan is not a UNFCCC party, it has long been committed to fulfilling its responsibility as a member of the global community by endeavoring to take initiatives to help slow down global warming. The establishment of a national GHG inventory report and the estimation of GHG emission and absorption is the fundamental obligation of a country to UNFCCC as well as one of the essential steps in reducing global warming.

Since 1998, Taiwan has taken initiatives to prepare the national GHG inventory. According to Decision 24/CP.17 of the 17th Convention of the Parties （COP17）of the United Nations Framework Convention on Climate Change and the 7th Session of the Conference of the Parties （CMP7） to the Kyoto Protocol held in Durban, requesting developed countries to submit Annual National Inventory Report starting from 2015 in accordance with the 2006 Intergovernmental Panel on Climate Change Guidelines（2006 IPCC Guidelines） for National Greenhouse Gas Inventories proposed by the Intergovernmental Panel on Climate Change （IPCC） in 2006. This report also carried out the statistics and compilation in accordance with the 2006 IPCC Guidelines to actively demonstrate the efforts and resolution to abide by the convention. Today, Taiwan has established a greenhouse gas inventory database covering the period from 1990 to 2014. The database provides an overview on greenhouse gas inventory statistics to explain the GHG trends in Taiwan. It also aims to quantify future greenhouse gas emissions, introduce Taiwan's greenhouse gas statistics overview, thereby receiving comments from all fields for the continuous improvement on the quality of national greenhouse gas inventories.

ES.2 Summary of National Emission and Absorption Related Trends

Taiwan's total GHG emissions increased from 137,854 kilotons of carbon dioxide equivalents （excluding carbon dioxide removal） in 1990 to 283,489 kilotons of carbon dioxide equivalents （excluding carbon dioxide sequestration） in 2014, with emissions increased by 105.65% at an average annual growth rate of 3.05%. The total emissions in 2014 saw an increase of 0.33% from the previous year. The net greenhouse gas emission increased from 114,468 kilotons of carbon dioxide equivalents in 1990 to 262,012 kilotons of carbon dioxide equivalents in 2014, with emissions increased by 128.90%, at an average annual growth rate of 3.51%. The total emissions in 2014 were an increase of 0.39% from the previous year, as shown in Figure ES2.1. Further comparison of statistics on various greenhouse gas emissions shows that carbon dioxide accounts for the majority of greenhouse gas emissions in Taiwan in 2013, followed by methane, nitrous oxide and then fluorinated greenhouse gas. Between 1990 and 2014, carbon dioxide emissions grew by 116.41%, increasing at an average annual growth rate of 3.27%; methane emissions decreased by 48.21% with an average annual growth rate of -2.70%, a negative growth; nitrous oxide emissions increased by 55.54% with an annual growth rate of 1.86%, as shown in Table ES2.1.

The energy sector, industrial processes and product use sector, agriculture sector, and waste sector are the main emission sources of carbon dioxide in Taiwan, as shown in Table ES2.2. In 1990, Taiwan had carbon dioxide emissions of 124,077 kilotons of carbon dioxide equivalents. In 2014, the figure was 268,515 kilotons of carbon dioxide equivalents, with a 116.41% increase and an average annual growth rate

1 UNFCCC, FCCC/CP/2002/8, 2002.

of 3.27%. In 2014 alone, the energy sector accounted for 93.49%, the industrial processes and product use sector 6.46%, the agriculture sector 0.02%, and the waste sector 0.03%. The emissions in 2014 compared with 2013 increased by 0.31%, mainly because of the 0.77% emissions increase in the energy sector, the 6.38% decrease in the industrial processes and product use sector, the 12.04% decrease in the agriculture sector and 19.32% increase in the waste sector.

Methane emissions in Taiwan mainly come from the agriculture sector, waste sector, and energy sector, as shown in Table ES2 .3. In 1990, the total methane emission in Taiwan was 10,882 kilotons of carbon dioxide equivalents. In 2014, the total methane emission was 5,636 kilotons of carbon dioxide equivalents, down by 48.21% with an average growth rate of -2.71%. In particular, the waste sector is the largest source of methane emissions in 2014, responsible for 68.04%, followed by the agriculture sector（22.82%）, energy sector（8.48%）, and industrial processes and product use sector（0.66%）. Compared to 2013, the 2014 methane emission was down by 5.69%, with the waste sector down by 7.64%, the agriculture sector down by 1.39%, the energy sector down by 0.89%, and the industrial process and product use sector down by 0.43%.

Nitrous oxide emissions in Taiwan are mainly from the industrial processes and product use sector, agriculture sector, and energy sector with minor emissions from the waste sector, as shown in Table ES2.4. In 1990, the total nitrous oxide emission in Taiwan was 2,895 kilotons of carbon dioxide equivalents. In 2014, the total nitrous oxide emission was 4,503 kilotons of carbon dioxide equivalents, up by 55.54% with an average growth rate of 1.86%. In particular, the industrial processes and product use sector is the largest source for nitrous oxide in Taiwan in 2014, responsible for 33.62%, followed by the agriculture sector（31.69%）, the energy sector（27.17%）, and the waste sector（7.52%）. Compared to 2013, the 2014 nitrous oxide emission was down by 0.47%, with the industrial process and product use sector down by 1.63%, the agriculture sector dropped by 0.32%, the energy sector down by 0.31%, and only the waste sector was up by 3.81%.

In Taiwan, the majority of fluorinated greenhouse gases come from economically critical industries, including the semiconductor, optoelectronics, power facilities, and magnesium alloy industries, all of which are emission-heavy industries. The fluorinated greenhouse gas emissions are shown in Table ES2.5. In particular, the emission from Taiwan's Hydrofluorocarbons（HFCs）increased from

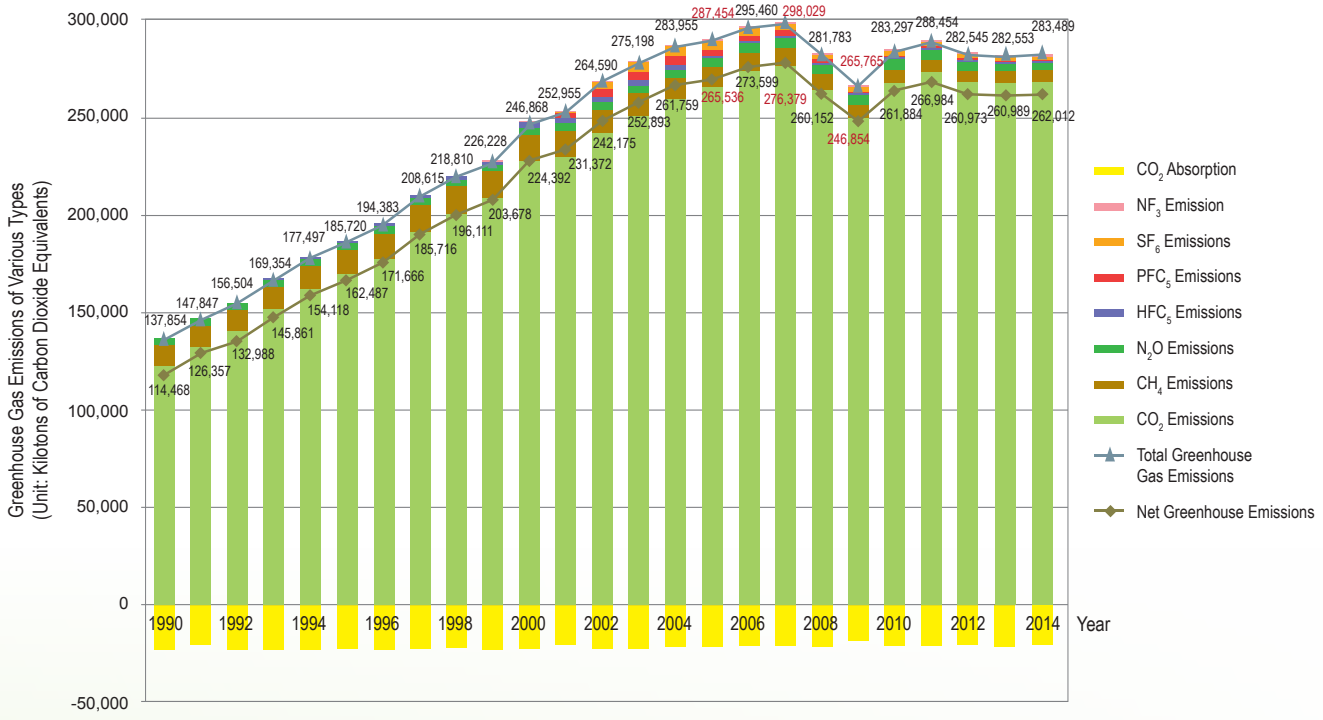

Figure ES2.1 1990-2014 Trends in Total Greenhouse Gas Emissions and Sequestration in Taiwan by Type

Table ES2.1 1990-2014 Greenhouse Gas Emissions and Sequestration in Taiwan by Type

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG	Global Warming Potential	1990	1991	1992	1993	1994	1995	1996	1997	1998
CO_2	1	124,077	133,543	142,155	153,784	161,024	168,487	176,292	190,297	199,924
CH_4	25	10,882	11,157	11,206	11,603	12,364	13,108	13,539	13,559	13,579
N_2O	298	2,895	3,148	3,142	3,212	3,254	3,323	3,246	3,282	3,225
HFCs	HFC-134a: 1,430	NE	NE	NE	755	855	801	1,305	1,477	2,083
PFCs	PFC-14:7,390	NE	NE	NE	NE	NE	NE	NE	NE	NE
SF_6	22,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
NF_3	17,200	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO_2 Sequestration	1	-23,386	-21,490	-23,516	-23,493	-23,379	-23,233	-22,717	-22,899	-22,699
Net GHG		114,468	126,357	132,988	145,861	154,118	162,487	171,666	185,716	196,111
Total GHG		137,854	147,847	156,504	169,354	177,497	185,720	194,383	208,615	218,810
GHG	Global Warming Potential	1999	2000	2001	2002	2003	2004	2005	2006	2007
CO_2	1	207,599	227,119	229,840	237,857	248,233	256,453	263,492	272,689	276,249
CH_4	25	13,705	13,490	12,646	12,029	11,489	10,756	10,253	9,588	9,062
N_2O	298	3,185	3,797	3,930	4,033	3,957	4,103	4,159	4,694	4,780
HFCs	HFC-134a: 1,430	1,609	2,319	2,619	2,216	2,397	2,451	1,070	987	1,093
PFCs	PFC-14:7,390	3	13	2,939	4,143	4,198	4,341	3,070	3,264	2,972
SF_6	22,800	116	120	746	3,914	4,385	5,193	4,683	3,590	3,114
NF_3	17,200	11	10	235	398	540	659	726	650	759
CO_2 Sequestration	1	-22,550	-22,476	-21,583	-22,415	-22,305	-22,196	-21,918	-21,861	-21,650
Net GHG		203,678	224,392	231,372	242,175	252,893	261,759	265,536	273,599	276,379
Total GHG		226,228	246,868	252,955	264,590	275,198	283,955	287,454	295,460	298,029
GHG	Global Warming Potential	2008	2009	2010	2011	2012	2013	2014		
CO_2	1	263,531	248,714	266,607	272,452	267,894	267,687	268,515		
CH_4	25	8,344	7,682	7,092	6,658	6,321	5,976	5,636		
N_2O	298	4,370	4,531	4,937	4,828	4,741	4,524	4,503		
HFCs	HFC-134a: 1,430	1,046	980	934	1,016	869	981	1,010		
PFCs	PFC-14:7,390	1,682	1,143	1,354	1,365	725	929	1,298		
SF_6	22,800	2,644	2,176	2,155	1,755	1,647	1,722	1,355		
NF_3	17,200	166	538	219	381	349	734	1,171		
CO_2 Sequestration	1	-21,631	-18,911	-21,413	-21,470	-21,572	-21,564	-21,477		
Net GHG		260,152	246,854	261,884	266,984	260,973	260,989	262,012		
Total GHG		281,783	265,765	283,297	288,454	282,545	282,553	283,489		

Remarks: 1. Global Warming Potential (hereinafter referred to as GWP) is cited from the IPCC Fourth Assessment Report.
2. NE (not estimated) refers to the exclusion of estimation on existing emissions and sequestration.

Table ES2.2 1990-2014 Carbon Dioxide Emissions and Sequestration in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Energy Sector	109,491	118,414	126,056	135,212	142,982	150,437	158,104	170,599	181,294	190,260	209,364	213,039	221,092	230,680
1.A.1. Energy Industry	49,118	55,403	58,795	66,180	70,862	76,800	81,519	92,436	100,959	107,029	122,157	126,437	130,556	140,966
1.A.2. Manufacturing Industry and Construction	30,154	31,656	33,121	33,405	34,380	34,996	36,051	37,818	38,551	39,854	43,064	42,158	44,936	43,564
1.A.3. Transportation	19,646	20,888	24,033	26,103	27,540	28,822	29,801	30,536	31,844	32,772	33,207	33,246	34,542	34,509
1.A.4. Other Sectors	10,572	10,466	10,107	9,523	10,200	9,820	10,733	9,809	9,940	10,605	10,937	11,198	11,058	11,641
1.A.4.a Service Industry	3,621	3,529	2,989	2,490	3,018	2,445	3,175	2,483	2,948	3,155	3,220	3,562	3,493	3,961
1.A.4.b Residential	4,005	4,238	4,446	4,359	4,461	4,597	4,754	4,851	4,952	5,410	5,354	5,181	5,107	4,869
1.A.4.c Agriculture, Forestry, Fishery, and Husbandry	2,946	2,700	2,672	2,675	2,721	2,777	2,805	2,475	2,041	2,040	2,362	2,455	2,459	2,811
2. Industrial Processes and Product Use Sector	14,424	14,975	15,895	18,378	17,797	17,501	17,651	19,460	18,386	17,156	17,365	16,168	16,059	17,053
2.A Mining Industry (Non-Metal Process)	10,584	10,698	11,854	13,879	13,259	12,766	12,645	13,394	11,564	10,746	10,486	9,974	10,648	10,270
2.B Chemical Industry	563	539	565	609	762	850	992	1,020	1,003	1,075	1,143	1,232	1,313	1,384
2.C Metal Process	3,275	3,735	3,474	3,888	3,774	3,884	4,013	5,045	5,817	5,333	5,734	4,960	4,096	5,397
2.H Others	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3. Agriculture Sector	142	146	139	131	135	151	151	134	127	118	131	94	93	82
4. Land Use and Forestry Sector	-23,386	-21,490	-23,516	-23,493	-23,379	-23,233	-22,717	-22,899	-22,699	-22,550	-22,476	-21,583	-22,415	-22,305
5. Waste Sector	20	8	65	63	110	398	387	105	117	65	259	540	612	417
Net Greenhouse Gas Emission	100,691	112,053	118,639	130,291	137,645	145,254	153,575	167,398	177,225	185,049	204,643	208,257	215,442	225,928
Total Greenhouse Gas Emission	124,077	133,543	142,155	153,784	161,024	168,487	176,292	190,297	199,924	207,599	227,119	229,840	237,857	248,233

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
1. Energy Sector	238,517	245,204	252,070	255,871	244,635	232,204	248,279	253,449	248,639	249,110	251,038			
1.A.1. Energy Industry	146,638	153,820	160,602	164,426	158,464	148,936	159,910	163,547	161,112	160,239	165,646			
1.A.2. Manufacturing Industry and Construction	43,978	42,660	43,947	45,868	42,391	39,558	43,663	44,898	43,256	44,564	40,361			
1.A.3. Transportation	35,859	36,844	36,769	35,415	33,394	33,711	34,824	35,293	34,502	34,472	34,930			
1.A.4. Other Sectors	12,041	11,880	10,752	10,162	10,387	9,999	9,881	9,712	9,769	9,835	10,101			
1.A.4.a Service Industry	4,118	4,230	4,248	4,192	4,201	4,226	4,203	3,961	3,958	4,177	4,411			
1.A.4.b Residential	4,947	5,023	4,857	4,879	4,820	4,775	4,737	4,814	4,770	4,649	4,616			
1.A.4.c Agriculture, Forestry, Fishery, and Husbandry	2,977	2,626	1,646	1,091	1,365	998	941	937	1,041	1,009	1,074			
2. Industrial Processes and Product Use Sector	17,340	17,877	20,089	19,758	18,396	16,300	18,067	18,835	19,139	18,528	17,346			
2.A Mining Industry (Non-Metal Process)	10,691	11,257	11,014	10,369	9,289	8,467	8,616	9,577	9,333	9,866	8,728			
2.B Chemical Industry	1,485	1,552	1,530	1,654	1,457	1,514	1,599	1,637	1,503	1,572	1,603			
2.C Metal Process	5,162	5,066	7,544	7,733	7,648	6,317	7,851	7,620	8,301	7,088	7,013			
2.H Others	2	2	2	2	2	2	2	2	2	2	2			
3. Agriculture Sector	84	62	59	57	57	55	54	53	55	45	40			
4. Land Use and Forestry Sector	-22,196	-21,918	-21,861	-21,650	-21,631	-18,911	-21,413	-21,470	-21,572	-21,564	-21,477			
5. Waste Sector	512	348	470	562	443	154	208	115	61	4	91			
Net Greenhouse Gas Emission	234,257	241,574	250,827	254,599	241,900	229,803	245,194	250,982	246,322	246,123	247,038			
Total Greenhouse Gas Emission	256,453	263,492	272,688	276,249	263,531	248,714	266,607	272,452	267,894	267,687	268,515			

Table ES2.3 1990-2014 Methane Emissions in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Energy Sector	254	270	293	310	328	344	359	370	390	409	430	435	447	465
2. Industrial Processes and Product Use Sector	5	7	6	7	8	10	11	12	10	12	14	23	24	22
3. Agriculture Sector	1,873	1,901	1,864	1,863	1,832	1,855	1,839	1,723	1,622	1,644	1,618	1,565	1,479	1,394
3.A Livestock Gastrointestinal Fermentation	670	731	738	775	789	822	822	732	674	694	692	660	636	626
3.B Livestock Waste Treatment	206	236	234	240	247	259	266	219	192	205	210	201	194	192
3.C Rice Culturing	960	908	845	825	775	767	745	765	751	738	702	689	637	567
3.F Agricultural Waste Burning (Crop Burning)	38	25	48	22	21	7	7	7	6	7	14	15	13	9
5. Waste Sector	8,750	8,980	9,044	9,423	10,196	10,899	11,329	11,454	11,556	11,640	11,429	10,624	10,079	9,607
5.A Garbage Landfill	5,832	5,917	5,928	6,323	7,061	7,719	8,080	8,212	8,372	8,596	8,512	7,732	7,214	6,675
5.B Garbage Biological Treatment	11	1	1	0	0	1	0	1	0	2	0	0	0	2
5.D Waste Water Treatment	2,907	3,062	3,115	3,100	3,135	3,179	3,249	3,241	3,184	3,042	2,916	2,891	2,864	2,930
Total	10,882	11,157	11,206	11,603	12,364	13,108	13,539	13,559	13,579	13,705	13,490	12,646	12,029	11,489

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
1. Energy Sector	482	488	488	491	473	462	478	485	478	482	478			
2. Industrial Processes and Product Use Sector	28	29	33	39	37	33	36	9	35	38	37			
3. Agriculture Sector	1,320	1,387	1,368	1,341	1,299	1,281	1,274	1,301	1,300	1,304	1,286			
3.A Livestock Gastrointestinal Fermentation	614	623	614	609	584	571	578	590	583	579	566			
3.B Livestock Waste Treatment	193	195	195	185	180	175	176	180	172	166	164			
3.C Rice Culturing	505	561	551	543	529	530	514	526	540	555	552			
3.F Agricultural Waste Burning (Crop Burning)	8	8	8	5	6	5	5	5	5	3	4			
5. Waste Sector	8,926	8,350	7,699	7,192	6,535	5,906	5,304	4,863	4,508	4,152	3,835			
5.A Garbage Landfill	6,101	5,525	4,930	4,379	3,814	3,246	2,749	2,352	1,997	1,688	1,428			
5.B Garbage Biological Treatment	7	10	11	14	16	18	21	26	24	23	20			
5.D Waste Water Treatment	2,818	2,815	2,757	2,798	2,705	2,642	2,535	2,485	2,486	2,441	2,387			
Total	10,756	10,253	9,588	9,062	8,344	7,682	7,092	6,658	6,321	5,976	5,636			

755 kilotons of carbon dioxide equivalents in 1993 to 1,010 kilotons of carbon dioxide equivalents in 2014. The emission from Perfluorocarbons （PFCs） increased from 3 kilotons of carbon dioxide equivalents in 1999 to 1,298 kilotons of carbon dioxide equivalents in 2014; while the emission from Sulfur Hexafluoride （SF6） increased from 116 kilotons of carbon dioxide equivalents in 1999 to 1,355 kilotons of carbon dioxide equivalents in 2014. The emission from Nitrogen Trifluoride （NF3） increased from 11 kilotons of carbon dioxide equivalents in 1999 to 1,171 kilotons of carbon dioxide equivalents in 2014. For total emission of fluorinated greenhouse gases, it increased from 1,738 kilotons of carbon dioxide equivalents in 1999（about 0.77% of total greenhouse gas emission for 1999） to 4,835 kilotons of carbon dioxide equivalents in 2014 （about 1.71% of total greenhouse gas emission for 2014）, with an emissions increase of 178.16%. Compared to 2013, the 2014 emission increased by 10.77%.

ES.3 Emission Estimation and Trends Overview for Emission Source and Sinks Classification

Of all the sectors, the energy sector has long been the one accounting for the largest total greenhouse gas emission in Taiwan over the years. The GHG emission for the energy

Table ES2.4 1990-2014 Nitrous Oxide Emissions in Taiwan

（Unit: Kilotons of Carbon Dioxide Equivalents）

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Energy Sector	537	578	652	703	739	772	816	861	912	961	1,047	1,070	1,124	1,175
1.A.1 Energy Industry	138	158	183	207	221	239	267	302	332	364	432	453	475	529
1.A.2 Manufacturing Industry and Construction	91	94	100	99	101	101	105	107	111	113	125	127	137	133
1.A.3 Transportation	291	309	353	382	402	418	428	438	456	469	475	475	496	495
1.A.4 Other Sectors	17	17	15	14	15	14	16	14	14	14	15	16	16	17
2. Industrial Processes and Product Use Sector	166	352	325	301	318	345	186	374	383	312	625	800	833	833
3. Agriculture Sector	1,897	1,933	1,867	1,897	1,883	1,872	1,907	1,710	1,609	1,583	1,794	1,720	1,729	1,597
3.B Livestock Waste Treatment	48	50	52	54	59	61	67	70	71	72	73	71	71	71
3.D Agricultural Soil	1,837	1,876	1,800	1,837	1,818	1,808	1,838	1,638	1,536	1,509	1,717	1,644	1,655	1,524
3.F Agricultural Waste Burning (Crop burning)	12	8	15	7	7	2	2	2	2	2	4	5	4	3
5. Waste Sector	296	285	298	311	313	334	337	337	321	329	331	340	348	353
Total	2,895	3,148	3,142	3,212	3,254	3,323	3,246	3,282	3,225	3,185	3,797	3,930	4,033	3,957

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
1. Energy Sector	1,215	1,251	1,283	1,294	1,238	1,200	1,238	1,253	1,232	1,227	1,224			
1.A.1 Energy Industry	549	576	604	624	604	574	581	583	578	569	568			
1.A.2 Manufacturing Industry and Construction	135	132	137	149	139	131	144	151	144	148	138			
1.A.3 Transportation	513	527	527	508	481	483	500	507	498	498	504			
1.A.4 Other Sectors	18	17	15	13	14	13	12	12	12	12	12			
2. Industrial Processes and Product Use Sector	834	960	1,432	1,531	1,290	1,457	1,834	1,762	1,674	1,539	1,514			
3. Agriculture Sector	1,710	1,598	1,629	1,595	1,514	1,547	1,528	1,469	1,497	1,432	1,427			
3.B Livestock Waste Treatment	69	71	72	71	72	71	71	71	71	71	73			
3.D Agricultural Soil	1,639	1,524	1,554	1,522	1,440	1,474	1,456	1,396	1,424	1,359	1,353			
3.F Agricultural Waste Burning (Crop burning)	2	2	3	1	2	2	2	2	2	1	1			
5. Waste Sector	343	350	351	360	328	327	337	344	339	326	339			
Total	4,103	4,159	4,694	4,780	4,370	4,531	4,937	4,828	4,741	4,524	4,503			

Table ES2.5 1990-2014 Fluoride-Containing Gas Emissions in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total HFCs Emissions	755	855	801	1,305	1,477	2,083	1,609	2,319	2,619	2,216	2,397	2,451
Total PFCs Emissions	NE	NE	NE	NE	NE	NE	3	13	2,939	4,143	4,198	4,341
Total SF_6 Emissions	NE	NE	NE	NE	NE	NE	116	120	746	3,914	4,385	5,193
Total Emissions NF_3	NE	NE	NE	NE	NE	NE	11	10	235	398	540	659
Total Emissions	755	855	801	1,305	1,477	2,083	1,738	2,462	6,538	10,671	11,520	12,643
GHG Emission Source and Sinks	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**		
Total HFCs Emissions	1,070	987	1,093	1,046	980	934	1,016	869	981	1,010		
Total PFCs Emissions	3,070	3,264	2,972	1,682	1,143	1,354	1,365	725	929	1,298		
Total SF_6 Emissions	4,683	3,590	3,114	2,644	2,176	2,155	1,755	1,647	1,722	1,355		
Total Emissions NF_3	726	650	759	166	538	219	381	349	734	1,171		
Total Emissions	9,549	8,490	7,900	5,538	4,838	4,661	4,516	3,589	4,365	4,835		

Remarks: NE (not estimated) refers to the exclusion of estimation on existing emissions and sequestration.

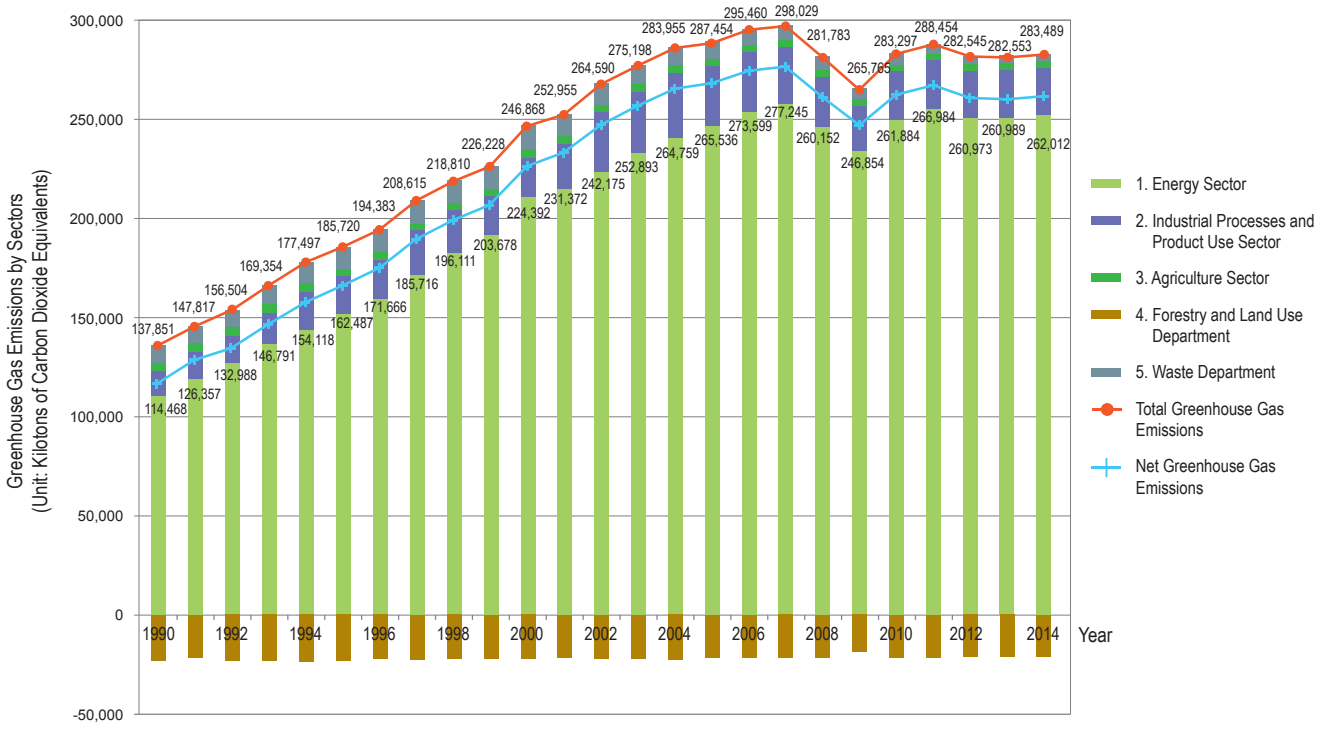

圖 ES2.2 臺灣 1990 至 2014 年各部門溫室氣體排放量趨勢

sector was responsible for approximately 89.15% of the total emissions in 2014 (excluding land use and forestry absorption), the industrial processes and product use sector 8.37%, the agriculture sector 0.97%, and the waste sector 1.50%. The GHG emission and trends for Taiwan from 1990 to 2014 by sector are shown in Figure ES3.1 and Table ES3.1. Between 1990 and 2014, the GHG emissions from the energy sector increased by 129.18% with an average annual growth rate of 3.52%, the industrial processes and product use sector increased by 62.61% with an average growth rate of 2.05%, the agriculture sector decreased by 29.61% with an average annual growth rate of -1.45%, a negative growth. The GHG emissions from the waste sector decreased by 52.97% with an average annual growth rate of -3.09%, while the GHG sequestration for land use and the forestry sector decreased by 8.16% with an average annual growth rate of -0.35%. The total greenhouse gas emission for Taiwan in 2014 increased by 0.33%, compared to that of 2013. In particular, the GHG emission from the energy sector was up by 0.77%, the industrial processes and product use sector up by 3.01%, the agriculture sector down by 1.01%, and the waste sector down by 4.87%. Additionally, the carbon dioxide sequestration of land use change and the forestry sector was down by 0.40%.

The total greenhouse gas emission from the energy sector in 1990 was 110,281 kilotons of carbon dioxide equivalents and increased to 252,739 kilotons of carbon dioxide equivalents in 2014 with a growth of 129.18% and an annual average growth of 3.52%, as shown in ES3.2. During this period, the greenhouse gas emission from the energy sector showed a downward trend in 2008 for the first time and declined again in 2009, followed by more reduction in 2012. The total greenhouse gas emission from the energy

Table ES3.1 1990-2014 Greenhouse Gas Emission in Taiwan by Sector

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Energy Sector	110,281	119,261	127,001	136,225	144,050	151,553	159,279	171,829	182,597	191,630	210,842	214,544	222,663	232,320
2. Industrial Processes and Product Use Sector	14,595	15,333	16,227	19,441	18,977	18,658	19,154	21,323	20,862	19,218	20,465	23,529	27,586	29,428
3. Agriculture Sector	3,911	3,980	3,869	3,890	3,850	3,878	3,897	3,567	3,359	3,345	3,543	3,379	3,301	3,074
4. Land Use and Forestry Sector	-23,386	-21,490	-23,516	-23,493	-23,379	-23,233	-22,717	-22,899	-22,699	-22,550	-22,476	-21,583	-22,415	-22,305
5. Waste Sector	9,066	9,273	9,407	9,798	10,619	11,631	12,053	11,896	11,993	12,035	12,018	11,504	11,039	10,377
Net Greenhouse Gas Emission	114,468	126,357	132,988	145,861	154,118	162,487	171,666	185,716	196,111	203,678	224,392	231,372	242,175	252,893
Total Greenhouse Gas Emission	137,854	147,847	156,504	169,354	177,497	185,720	194,383	208,615	218,810	226,228	246,868	252,955	264,590	275,198
GHG Emission Source and Sinks	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**			
1. Energy Sector	240,214	246,944	253,841	257,656	246,345	233,867	249,994	255,187	250,349	250,819	252,739			
2. Industrial Processes and Product Use Sector	30,846	28,416	30,044	29,266	25,261	22,628	24,597	25,122	24,437	24,469	23,733			
3. Agriculture Sector	3,114	3,047	3,056	2,993	2,870	2,884	2,856	2,823	2,851	2,781	2,753			
4. Land Use and Forestry Sector	-22,196	-21,918	-21,861	-21,650	-21,631	- 18,911	-21,413	-21,470	-21,572	-21,564	-21,477			
5. Waste Sector	9,781	9,047	8,519	8,114	7,306	6,387	5,849	5,322	4,908	4,483	4,264			
Net Greenhouse Gas Emission	261,759	265,536	273,599	276,379	260,152	246,854	261,884	266,984	260,973	260,989	262,012			
Total Greenhouse Gas Emission	283,955	287,454	295,460	298,029	281,783	265,765	283,297	288,454	282,545	282,553	283,489			

Table ES3.2 1990-2014 Greenhouse Gas Emissions Produced by Energy Sector in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Carbon Dioxide Emission	109,491	118,414	126,056	135,212	142,982	150,437	158,104	170,599	181,294	190,260	209,364	213,039	221,092	230,680
1.A.1. Energy Industry	49,118	55,403	58,795	66,180	70,862	76,800	81,519	92,436	100,959	107,029	122,157	126,437	130,556	140,966
1.A.2. Manufacturing Industry and Construction	30,154	31,656	33,121	33,405	34,380	34,996	36,051	37,818	38,551	39,854	43,064	42,158	44,936	43,564
1.A.3. Transportation	19,646	20,888	24,033	26,103	27,540	28,822	29,801	30,536	31,844	32,772	33,207	33,246	34,542	34,509
1.A.4. Others	10,572	10,466	10,107	9,523	10,200	9,820	10,733	9,809	9,940	10,605	10,937	11,198	11,058	11,641
Total CH_4 Emission	254	270	293	310	328	344	359	370	390	409	430	435	447	465
1.A.1. Energy Industry	26	29	28	31	33	38	37	44	50	57	66	67	68	78
1.A.2. Manufacturing Industry and Construction	46	48	51	51	52	52	53	54	57	57	64	66	71	70
1.A.3. Transportation	152	163	187	202	216	228	239	245	257	266	270	272	278	287
1.A.4. Others	30	29	28	26	28	27	29	26	27	28	29	30	30	32
Total N_2O Emission	537	578	652	703	739	772	816	861	912	961	1,047	1,070	1,124	1,175
1.A.1. Energy Industry	138	158	183	207	221	239	267	302	332	364	432	453	475	529
1.A.2. Manufacturing Industry and Construction	91	94	100	99	101	101	105	107	111	113	125	127	137	133
1.A.3. Transportation	291	309	353	382	402	418	428	438	456	469	475	475	496	495
1.A.4. Others	17	17	15	14	15	14	16	14	14	14	15	16	16	17
Total Emission from Energy Sector	110,281	119,261	127,001	136,225	144,050	151,553	159,279	171,829	182,597	191,630	210,842	214,544	222,663	232,320

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
Total Carbon Dioxide Emission	238,517	245,204	252,070	255,871	244,635	232,204	248,279	253,449	248,639	249,110	251,038			
1.A.1. Energy Industry	146,638	153,820	160,602	164,426	158,464	148,936	159,910	163,547	161,112	160,239	165,646			
1.A.2. Manufacturing Industry and Construction	43,978	42,660	43,947	45,868	42,391	39,558	43,663	44,898	43,256	44,564	40,361			
1.A.3. Transportation	35,859	36,844	36,769	35,415	33,394	33,711	34,824	35,293	34,502	34,472	34,930			
1.A.4. Others	12,041	11,880	10,752	10,162	10,387	9,999	9,881	9,712	9,769	9,835	10,101			
Total CH_4 Emission	482	488	488	491	473	462	478	485	478	482	478			
1.A.1. Energy Industry	83	84	89	95	95	85	89	89	90	91	89			
1.A.2. Manufacturing Industry and Construction	71	69	73	79	75	70	78	82	79	82	77			
1.A.3. Transportation	295	303	298	289	276	281	285	288	284	284	286			
1.A.4. Others	33	32	29	27	27	26	26	25	25	25	26			
Total N_2O Emission	1,215	1,251	1,283	1,294	1,238	1,200	1,237	1,253	1,232	1,227	1,224			
1.A.1. Energy Industry	549	576	604	624	604	574	581	583	578	569	568			
1.A.2. Manufacturing Industry and Construction	135	132	137	149	139	131	144	151	144	148	138			
1.A.3. Transportation	513	527	527	508	481	483	500	507	498	498	504			
1.A.4. Others	18	17	15	13	14	13	12	12	12	12	12			
Total Emission from Energy Sector	240,214	246,944	253,841	257,656	246,345	233,867	249,994	255,187	250,349	250,819	252,739			

Table ES3-3 1990-2014 Greenhouse Gas Emissions Produced by Industrial Process and Product Use Sector in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total CO_2 Emission	14,424	14,975	15,895	18,378	17,797	17,501	17,651	19,460	18,386	17,156	17,365	16,168	16,059	17,053
2.A Mining Industry (Non-Metal Process)	10,584	10,698	11,854	13,879	13,259	12,766	12,645	13,394	11,564	10,746	10,486	9,974	10,648	10,270
2.B Mining Industry (Non-Metal Process)	563	539	565	609	762	850	992	1,020	1,003	1,075	1,143	1,232	1,313	1,384
2.C Metal Process	3,275	3,735	3,474	3,888	3,774	3,884	4,013	5,045	5,817	5,333	5,734	4,960	4,096	5,397
2.H Others	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total CH_4 Emission	5	7	6	7	8	10	11	12	10	12	14	23	24	22
Total N_2O Emission	166	352	325	301	318	345	186	374	383	312	625	800	833	833
2.B Chemical Industry	166	352	325	301	318	345	186	374	383	312	625	714	743	831
2.C Metal Process	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	86	90	2
2.E Electronics	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total HFCs Emission	NE	NE	NE	755	855	801	1,305	1,477	2,083	1,609	2,319	2,619	2,216	2,397
2.B Chemical Industry	NE	NE	NE	755	855	801	1,305	1,477	2,083	1,609	2,319	2,567	2,157	1,937
2.E Electronics	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	51	59	59
2.F Alternatives to Ozone-Depleting Substances	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	401
Total PFCs Emission (2.E Electronics)	NE	NE	NE	NE	NE	NE	NE	NE	NE	3	13	2,939	4,143	4,198
Total SF_6 Emission	NE	NE	NE	NE	NE	NE	NE	NE	NE	116	120	746	3,914	4,385
2.C Metal Process	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	1,027	1,027
2.E Electronics	NE	NE	NE	NE	NE	NE	NE	NE	NE	116	120	746	944	1,415
2.G Manufacturing and Use of Other Products	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	1,943	1,943
Total NF_3 Emission (2.E Electronics)	NE	NE	NE	NE	NE	NE	NE	NE	NE	11	10	235	398	540
Total Emission from Industrial Processes and Product Use Sector	14,595	15,333	16,227	19,441	18,977	18,658	19,154	21,323	20,862	19,218	20,465	23,529	27,586	29,428

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
Total CO_2 Emission	17,340	17,877	20,089	19,758	18,396	16,300	18,067	18,835	19,139	18,528	17,346			
2.A Mining Industry (Non-Metal Process)	10,691	11,257	11,014	10,369	9,289	8,467	8,616	9,577	9,333	9,866	8,728			
2.B Mining Industry (Non-Metal Process)	1,485	1,552	1,530	1,654	1,457	1,514	1,599	1,637	1,503	1,572	1,603			
2.C Metal Process	5,162	5,066	7,544	7,733	7,648	6,317	7,851	7,620	8,301	7,088	7,013			
2.H Others	2	2	2	2	2	2	2	2	2	2	2			
Total CH_4 Emission	28	29	33	39	37	33	36	9	35	38	37			
Total N_2O Emission	834	960	1,432	1,531	1,290	1,457	1,834	1,762	1,674	1,539	1,514			
2.B Chemical Industry	834	960	969	996	784	1,006	1,170	1,195	1,016	780	728			
2.C Metal Process	NE	NE	94	95	90	76	119	NE	NE	NE	NE			
2.E Electronics	NE	NE	369	439	416	375	546	568	658	759	786			
Total HFCs Emission	2,451	1,070	987	1,093	1,046	980	934	1,016	869	981	1,010			
2.B Chemical Industry	1,710	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			
2.E Electronics	59	73	91	171	118	168	164	134	86	169	182			
2.F Alternatives to Ozone-Depleting Substances	682	996	896	922	928	812	770	881	783	812	828			
Total PFCs Emission (2.E Electronics)	4,341	3,070	3,264	2,972	1,682	1,143	1,354	1,365	725	929	1,298			
Total SF_6 Emission	5,193	4,683	3,590	3,114	2,644	2,176	2,155	1,755	1,647	1,722	1,355			
2.C Metal Process	1,357	1,063	770	440	144	235	212	134	109	55	56			
2.E Electronics	1,783	2,117	2,050	1,721	1,605	1,239	1,648	1,339	1,352	1,524	1,276			
2.G Manufacturing and Use of Other Products	2,053	1,503	770	953	895	703	295	282	186	142	24			
Total NF_3 Emission (2.E Electronics)	659	726	650	759	166	538	219	381	349	734	1,171			
Total Emission from Industrial Processes and Product Use Sector	30,846	28,416	30,044	29,266	25,262	22,628	24,597	25,122	24,437	24,469	23,733			

Remarks: NE (not yet estimated), excluding estimation on existing emission sources and sequestration.

sector in 2014 accounted for 89.15% of total greenhouse gas emissions in Taiwan. In particular, 1.A.1 "energy industry" was responsible for 166,304 kilotons of carbon dioxide equivalents, accounting for 65.80% of the total greenhouse gas emission from the energy sector. 1.A.2 "manufacturing industry and construction" was responsible for 40,576 kilotons of carbon dioxide equivalents （accounting for 16.05%）. 1.A.3 "transportation" was responsible for 35,721 kilotons of carbon dioxide equivalents （accounting for 14.13%）, and finally 1.A.4 "other sectors （including the service industry, residential, and agriculture/forestry/fishery）" was responsible for 10,139 kilotons of carbon dioxide equivalents（accounting for 4.01%）.

The greenhouse gas emission from the industrial processes and product use sector in 1990 was 14,595 kilotons of carbon dioxide equivalents and increased to 23,733 kilotons in 2014, a growth by 62.61% and an annual average growth of 2.05%, as shown in Table ES3.3. The total greenhouse gas emission in 2014 accounted approximately for 8.37% of the total greenhouse gas emissions in Taiwan. In particular, 2.A "mining industry （non-metal process）" was responsible for 8,728 kilotons of carbon dioxide equivalents, accounting for 36.78%（majority）of the greenhouse gas from the industrial process sector, followed by 2.C. "metal process" responsible for 7,069 kilotons of carbon dioxide equivalents （accounting for 29.79%）, 2.E. "electrical industry" responsible for 4,714 kilotons of carbon dioxide equivalents （accounting for

Table ES3.4 1990-2014 Greenhouse Gas Emissions Produced by Agriculture Sector in Taiwan

（Unit: Kilotons of Carbon Dioxide Equivalents）

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total CO_2 Emission	142	146	139	131	135	151	151	134	142	127	119	131	94	93
Total CH_4 Emission	1,873	1,901	1,864	1,863	1,832	1,855	1,839	1,723	1,873	1,622	1,644	1,618	1,565	1,479
3.A Livestock Gastrointestinal Fermentation	670	731	738	775	789	822	822	732	670	674	694	692	660	636
3.B Livestock Waste Treatment	206	236	234	240	247	259	266	219	206	192	205	210	201	194
3.C Rice Culturing	960	908	845	825	775	767	745	765	960	751	738	702	689	637
3.F Agricultural Waste Burning (Crop Burning)	38	25	48	22	21	7	7	7	38	6	7	14	15	13
Total N_2O Emission	1,897	1,933	1,866	1,897	1,883	1,872	1,907	1,710	1,897	1,609	1,583	1,794	1,720	1,729
3.B Livestock Waste Treatment	48	50	52	54	59	61	67	70	48	71	72	73	71	70
3.D Agricultural Soil	1,837	1,876	1,800	1,837	1,818	1,808	1,838	1,638	1,837	1,536	1,509	1,717	1,644	1,655
3.F Agricultural Waste Burning (Crop Burning)	12	8	15	7	7	2	2	2	12	2	2	4	5	4
Total Emission From Agriculture Sector	3,911	3,980	3,869	3,890	3,850	3,878	3,897	3,567	3,911	3,359	3,345	3,543	3,379	3,301

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
Total CO_2 Emission	83	84	62	60	57	56	54	53	55	45	40			
Total CH_4 Emission	1,394	1,320	1,387	1,368	1,299	1,281	1,274	1,301	1,300	1,304	1,286			
3.A Livestock Gastrointestinal Fermentation	626	614	623	614	584	571	578	590	583	579	566			
3.B Livestock Waste Treatment	192	193	195	195	180	175	176	180	172	166	164			
3.C Rice Culturing	567	505	561	551	529	530	514	526	540	555	552			
3.F Agricultural Waste Burning (Crop Burning)	9	8	8	8	6	5	5	5	5	3	4			
Total N_2O Emission	1,597	1,710	1,598	1,629	1,514	1,547	1,528	1,469	1,496	1,432	1,427			
3.B Livestock Waste Treatment	71	69	71	72	72	71	70	71	71	71	73			
3.D Agricultural Soil	1,524	1,639	1,524	1,554	1,440	1,474	1,456	1,396	1,424	1,359	1,353			
3.F Agricultural Waste Burning (Crop Burning)	3	2	2	3	2	2	2	2	2	1	1			
Total Emission From Agriculture Sector	3,074	3,114	3,047	3,056	2,870	2,884	2,856	2,823	2,851	2,781	2,753			

19.86%）, 2.B. "chemical industry" responsible for 2,369 kilotons of carbon dioxide equivalents （accounting for 9.98%）, 2.F. "alternatives to ozone-depleting substances" responsible for 828 kilotons of carbon dioxide equivalents （accounting for 3.49%）, 2.G. "manufacturing and use of other products" responsible for 24 kilotons of carbon dioxide equivalents （accounting for 0.1%）, and 2.H. "others" responsible for 1.67 kilotons of carbon dioxide equivalents （accounting for 0.01%）.

In 2014, the greenhouse gas emissions from the agriculture sector totaled 2,753 kilotons of carbon dioxide equivalents, accounting for 0.97% of total greenhouse gas emission in Taiwan, approximately down by 29.61% compared to 3,911 kilotons of carbon dioxide equivalents in 1990, with an average annual growth rate of -1.45%, as shown in Table ES3.4. The greenhouse gas emission from the agriculture sector in 2014 was down by 1.01%, compared to that of 2013. In particular, 3.D. nitrous dioxide emission from "agricultural soil" accounted for 49.15% （majority）, methane emission from 3.A. "livestock gastrointestinal fermentation" accounted for 20.57%, methane emission from 3.C. "rice culturing" accounted for 20.07%, methane emission from 3.B. "livestock waste treatment" accounted for 5.94%, nitrous dioxide emission from 3.B. "livestock waste treatment" accounted for 2.65%, carbon dioxide emission from 3.H "urea use" accounted for 1.45%, methane emission from 3.F. "crop waste burning" accounted for 0.13%, and nitrous dioxide emission from "crop waste burning" accounted for 0.04%.

The main source of greenhouse gas absorbed by land use and the forestry sector is carbon dioxide while the change in annual sequestration does not vary much with the exception of trends in minor fluctuations for the sequestration in the past. It is mainly because of the increased sequestration from the annual growth of forest resources while the sequestration reduced from the increased sequestration of forestation and the forest interference is less. The greenhouse gas emission from land use and the forestry sector for Taiwan from 1990 to 2014 （mainly consists of carbon dioxide sequestration by forestry resources） is shown in Table ES3.5. The 2014 sequestration was 21,477 kilotons of carbon dioxide equivalents, up by 87 kilotons of carbon dioxide equivalents compared to that of 2013 （0.40%）. The carbon dioxide sequestration between 1990 and 2014 was down 8.16%, with an average annual growth rate of -0.35%.

The greenhouse gas emission from the waste sector in 2013 was 4,908 kilotons of carbon dioxide equivalents, approximately accounting for 1.50% of total greenhouse gas emission in Taiwan （as shown in Table ES3.6）, down by 52.97% compared to that of 1990, with an average annual growth down by 3.09%. Among the waste sector' s emissions in 2014, methane emission from 5.D "wastewater treatment and discharge" accounting for 55.97%, followed by methane from 5.A "solid waste disposal" accounted for 33.48%, nitrous oxide from 5.D "wastewater treatment and discharge" accounted for 7.38%, and the rest carbon dioxide from 5.C " waste incineration and opening burning" accounted for 2.13%, methane from 5.B "waste biological disposal" accounted for 0.48%, nitrous oxide from 5.B "waste biological disposal" accounted for 0.43%, and nitrous oxide from 5.C "waste burning" accounted for 0.13%.

ES.4 Other Information

According to the Durban Accord, all countries listed under Annex 1 shall submit the National Inventory Report, Biennial Report, and National Communications, while countries not listed under Annex 1 shall submit the Biennial Update Report and National Communications. These national reports all relate to the content of National Greenhouse Gas Inventory. Taiwan is currently taking the initiative in establishing a national system that is feasible to conform to Taiwan’ s customs, division of labor in sectors, and the hierarchical management of database. In addition to formulating regulations governing national greenhouse gas inventory review, Taiwan also established a review committee, a review on greenhouse gas inventory, and a sound management system to comply with procedures of Measurement Reporting, Verification （MRV）. Moreover, to comply with the UNFCCC, Taiwan shall apply 2006 IPCC Guidelines for National Greenhouse Gas Inventories （hereinafter referred to as 2006 IPPC Guidelines） starting in 2015. Taiwan has started preparing a national greenhouse gas inventory with 2006 IPCC Guidelines-based statistical foundation and framework in addition to designing and establishing a registration platform for electronics national greenhouse gas inventory starting in 2013. At the same time, the relevant departments will test run this registration platform and submit the national greenhouse gas inventory statistics online. Taiwan has comprehensively adopted the 2006 IPCC Guidelines in step with the UNFCCC starting in 2015.

Table ES3.5 1990-2014 Changes in Annual Sequestration by Forestry Sector in Taiwan

(Unit: Kilotons of Carbon Dioxide Equivalents)

Year	Forests Maintaining Forests		Other Lands Turned to Forests	Changes in Overall Annual Sequestration
	Increase in Biomass Carbon Dioxide Storage (△ CO_{2G})	Loss in Biomass Annual Carbon Dioxide Storage (△二 CO_{2L})	Increase in Biomass Annual Carbon Dioxide Storage (△ CO_{2G})	
1990	-23,902	607	-91	-23,386
1991	-23,902	2,503	-91	-21,490
1992	-23,713	333	-136	-23,516
1993	-23,524	216	-185	-23,493
1994	-23,335	190	-233	-23,379
1995	-23,146	202	-288	-23,233
1996	-22,957	559	-319	-22,717
1997	-22,768	266	-397	-22,899
1998	-22,579	326	-446	-22,699
1999	-22,390	401	-561	-22,550
2000	-22,201	389	-665	-22,476
2001	-22,012	1,112	-683	-21,583
2002	-21,823	167	-759	-22,415
2003	-21,633	227	-899	-22,305
2004	-21,444	243	-995	-22,196
2005	-21,255	369	-1,031	-21,918
2006	-21,066	251	-1,046	-21,861
2007	-20,877	308	-1,080	-21,650
2008	-20,688	199	-1,142	-21,631
2009	-20,499	2,753	-1,166	-18,911
2010	-20,392	218	-1,240	-21,413
2011	-20,409	140	-1,202	-21,470
2012	-20,435	145	-1,283	-21,572
2013	-20,473	135	-1,226	-21,564
2014	-20,508	197	-1,166	-21,477

Table ES3.6 Greenhouse Gas Emission from Waste Sector for Taiwan from 1990 to 2013

(Unit: Kilotons of Carbon Dioxide Equivalents)

GHG Emission Source and Sinks	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total CO_2 emission	20	8	65	63	110	398	387	105	117	65	259	540	612	417
5.C Waste Burn	8,750	8,980	9,044	9,423	10,196	10,899	11,329	11,454	11,556	11,640	11,429	10,624	10,079	9,607
Total CH_4 Emission	5,832	5,917	5,928	6,323	7,061	7,719	8,080	8,212	8,372	8,596	8,512	7,732	7,214	6,675
5.A Solid Waste Disposal	11	1	1	0	0	1	0	1	0	2	0	0	0	2
5.B Solid Waste Biological Disposal	2,907	3,062	3,115	3,100	3,135	3,179	3,249	3,241	3,184	3,042	2,916	2,891	2,864	2,930
5.D Wasteater Treatment and Discharge	296	285	298	311	313	334	337	337	321	329	331	340	348	353
Total N_2O Emission	10	0	1	0	0	1	0	1	0	2	0	0	0	2
5.B Solid Waste Biological Disposal	1	0	4	3	6	18	19	4	6	3	8	30	26	24
5.C Waste Burn	285	284	294	307	307	316	318	332	315	324	322	310	321	327
5.D Wasteater Treatment and Discharge	9,066	9,273	9,407	9,798	10,619	11,631	12,053	11,896	1,993	12,035	12,018	11,504	11,039	10,377
Total Emission from Waste Sector	9,066	9,273	9,407	9,798	10,619	11,631	12,053	11,896	11,993	12,035	12,018	12,018	12,018	11,504

GHG Emission Source and Sinks	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			
Total CO_2 emission	512	348	470	562	443	154	208	115	61	4	91			
5.C Waste Burn	8,926	8,350	7,699	7,192	6,535	5,906	5,304	4,863	4,508	4,152	3,835			
Total CH_4 Emission	6,101	5,525	4,930	4,379	3,814	3,246	2,749	2,352	1,997	1,688	1,428			
5.A Solid Waste Disposal	7	10	11	14	16	18	21	26	24	23	20			
5.B Solid Waste Biological Disposal	2,818	2,815	2,757	2,798	2,705	2,642	2,535	2,485	2,486	2,441	2,387			
5.D Wasteater Treatment and Discharge	343	350	351	360	328	327	337	344	339	326	339			
Total N_2O Emission	6	9	10	13	15	16	19	23	22	20	18			
5.B Solid Waste Biological Disposal	23	27	30	30	21	9	11	7	4	0	5			
5.C Waste Burn	314	314	310	318	293	302	307	313	314	306	315			
5.D Wasteater Treatment and Discharge	9,781	9,047	8,519	8,114	7,306	6,387	5,849	5,322	4,908	4,483	4,264			
Total Emission from Waste Sector	11,039	10,377	9,781	9,047	8,519	8,114	7,306	6,387	5,849	5,322	4,908			

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Report Summary

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