



# NATIONAL REPORT BY SPAIN – SEPTEMBER 2015

Enhanced Black Carbon and Methane Emissions  
Reductions– an Arctic Council Framework for Action



# **REPORT OF SPAIN ON ITS CURRENT GREENHOUSE EMISSIONS AND FORECASTS**

## **1- SPAIN BLACK CARBON EMISSIONS AND ITS FORECAST**

Black Carbon is mainly quantified in Spain jointly with PM2.5 particles.

According to AEMET (Spanish State Meteorological Agency) particles emitted from the Spanish territory, are deposited aground before reaching Arctic regions.

### **1.1 BLACK CARBON (BC) EMISSIONS**

Spain quantifies PM2.5 following its national regulations, in accordance with the Geneva Convention.

The EMEP (European Monitoring and Evaluation Programme) defines black carbon (BC) as particles mainly originated in combustion processes.

At present, a separate evaluation of BC emissions in Spain is a voluntary decision.

BC emissions shall be separately reported in the Spanish National Emission Inventory from 2016 on.

In consequence BC emissions are computed now by means of a direct estimate included in the PM2.5 emissions.

PM2.5 emissions have significantly decreased in Spain since year 2000, thanks to an improved Spanish traffic control and an increased efficiency in Carbon powered electrical plants.

In consequence, the emission estimate for year 2013 amounts to 66.78 kt, a 32% less than in year 2000.

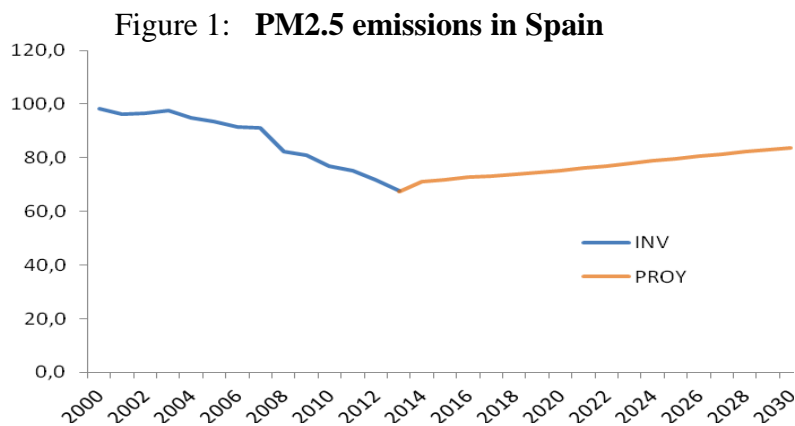
Detailed additional information about Spain’s emissions inventory can be found in the report submitted by Spain, on March 2015, to the Secretariat of the Geneva Convention and EMEP programme (1990-2013):

[http://webdab.umweltbundesamt.at/download/submissions2015/ES\\_IIR2015.zip?cgiproxy\\_skip=1](http://webdab.umweltbundesamt.at/download/submissions2015/ES_IIR2015.zip?cgiproxy_skip=1).

## 1.2 FORECASTS.

In what concerns forecasts, the graphic in figure 1, made by the CDGAE (Spanish Delegate Committee for Economic Affairs), shows the evolution of PM2.5 emissions, including the trend.

Due to difficulties to adequately meet all PAMs (Policies and Measures), the tendency of future increases of PM2.5 emissions will have to be corrected in accordance with the new Spanish PAMs.



### FORECAST ANALYSIS PM 2.5

**Table 1: emissions**

*Particle emissions have their main source on Residential, Institutional and Commercial (RCI) activities.*

*The comparison of emissions in 2030 with those in 2000 and 2005 shows only a low decrease of about 85 and 90%.*

*Spain is therefore planning to reduce emissions with new regulating measures.*

	PM2.5 (kT)	% vs2000	% vs2005
2000	98	100%	
2005	93	95%	100%
2010	76	78%	82%
2015	71	73%	77%
2020	75	77%	80%
2025	79	81%	85%
2030	83	85%	90%

**Figure 2: Spain's greenhouse gas emissions distribution by main sectors (2013/2030)**

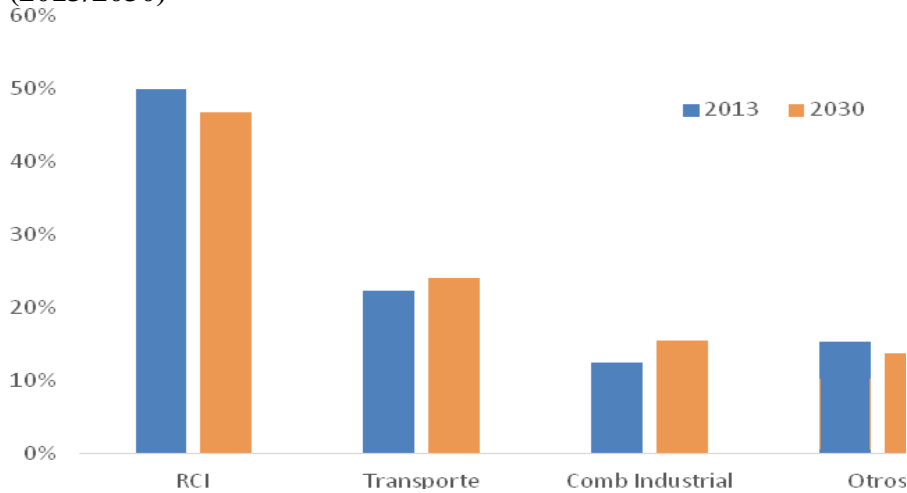
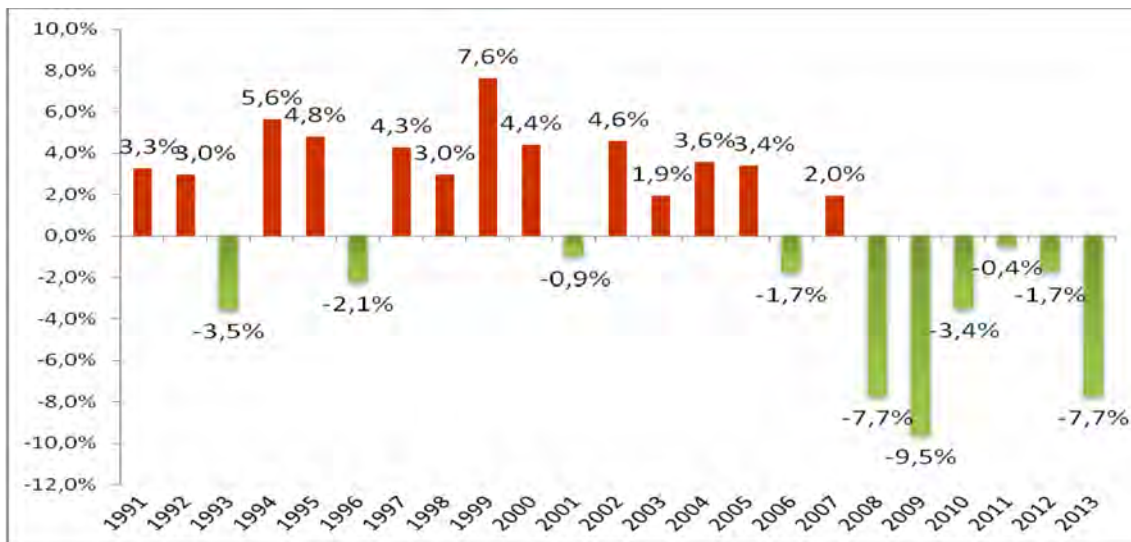


Figure 3 shows annual percentage evolution of greenhouse gases emissions in Spain from 1990 to 2013



**Figure 3: Percentage greenhouse emissions evolution in Spain**

## 2. SUMMARY OF CURRENT METHANE EMISSIONS TO UNFCCC AND FUTURE FORECASTS

### 2.1 EMISSIONS: INVENTORY OF GREENHOUSE EMISSIONS IN SPAIN

- 1990-2012.: The following table contains detailed information on Spain's different greenhouse gas emissions by sectors, which are summarised in table 2:

<https://webmerlin.uca.es/webmerlin/redireccionarEmail.do>

**Table 2: Spain's different greenhouse emissions evolution between 1990 and 2012 (numbers in Gg CO<sub>2</sub> eq.)**

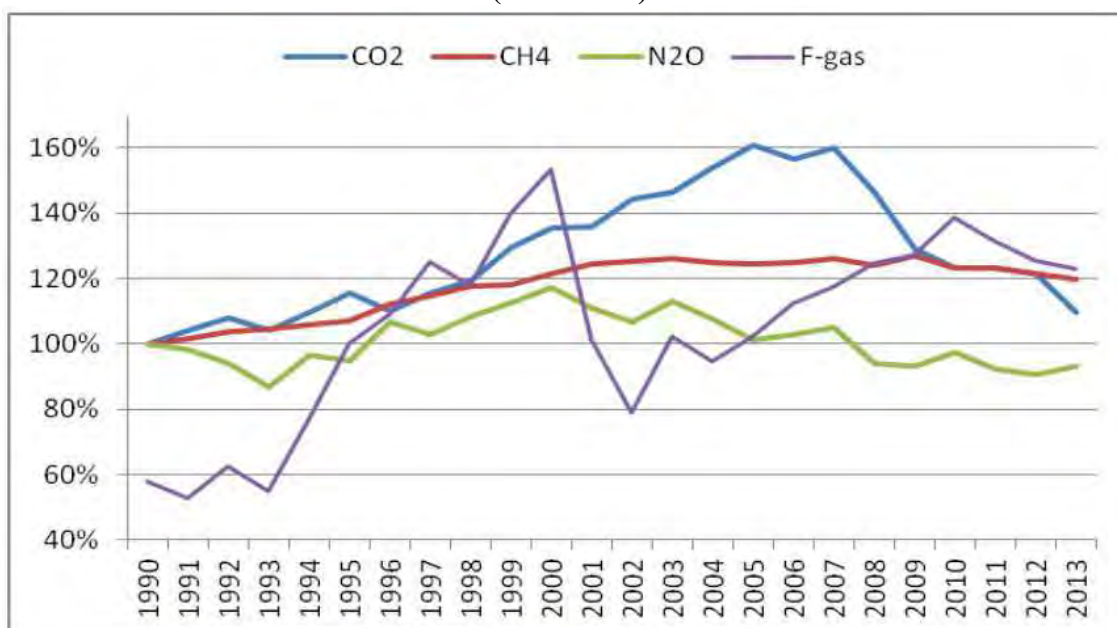
Cifras en Gg CO <sub>2</sub> -eq									
GAS	1990	1995	2000	2005	2008	2009	2010	2011	2012
CO <sub>2</sub>	227.508,03	262.860,03	308.026,42	365.478,37	333.181,72	293.732,28	290.377,63	280.922,73	276.636,64
CH <sub>4</sub>	26.218,13	28.129,54	31.840,87	32.667,05	32.486,04	33.284,40	32.337,27	32.305,90	32.318,02
N <sub>2</sub> O	26.832,07	25.297,61	31.118,95	26.918,93	25.084,13	24.796,66	25.949,05	24.556,82	24.018,78
HFC	2.441,16	4.880,33	8.448,19	5.958,54	7.327,35	7.519,76	8.203,19	7.790,09	7.574,17
PFC	882,92	832,34	371,44	145,01	120,66	84,17	72,71	64,78	41,17
SF <sub>6</sub>	68,92	108,34	198,35	224,75	264,25	241,88	241,15	246,82	219,81
<b>TOTAL GASES</b>	<b>283.749,22</b>	<b>322.108,19</b>	<b>380.004,18</b>	<b>431.392,66</b>	<b>398.444,15</b>	<b>359.659,15</b>	<b>347.181,00</b>	<b>345.887,15</b>	<b>340.808,59</b>
Porcentaje sobre el total de CO <sub>2</sub> -eq del inventario									
GAS	1990	1995	2000	2005	2008	2009	2010	2011	2012
CO <sub>2</sub>	80,18	81,61	81,06	84,72	83,82	81,67	80,76	81,22	81,17
CH <sub>4</sub>	9,24	8,73	8,38	7,57	8,15	9,25	9,31	9,34	9,48
N <sub>2</sub> O	9,39	7,85	8,19	6,24	6,29	6,89	7,47	7,10	7,05
HFC	0,86	1,52	2,22	1,38	1,84	2,09	2,36	2,25	2,22
PFC	0,31	0,26	0,10	0,03	0,03	0,02	0,02	0,02	0,01
SF <sub>6</sub>	0,02	0,03	0,05	0,05	0,07	0,07	0,07	0,07	0,06
<b>TOTAL GASES</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>	<b>100,00</b>
Índice de evolución anual (año 1990 = 100; 1995 = 100 para los gases fluorados)									
GAS	1990	1995	2000	2005	2008	2009	2010	2011	2012
CO <sub>2</sub>	100,0	115,5	135,4	160,6	146,4	129,1	123,2	123,5	121,6
CH <sub>4</sub>	100,0	107,3	121,4	124,6	123,9	127,0	123,3	123,2	123,3
N <sub>2</sub> O	100,0	95,0	116,8	101,1	94,1	93,1	97,4	92,2	90,2
HFC	50,0	100,0	173,1	122,1	150,1	154,1	168,1	159,6	155,2
PFC	106,1	100,0	44,6	17,4	14,5	10,1	8,7	7,8	4,9
SF <sub>6</sub>	81,8	100,0	183,1	207,5	243,9	223,3	222,6	227,8	202,9

A detailed account of Spain's greenhouse gas emissions in 2013 can be found in the following web page.

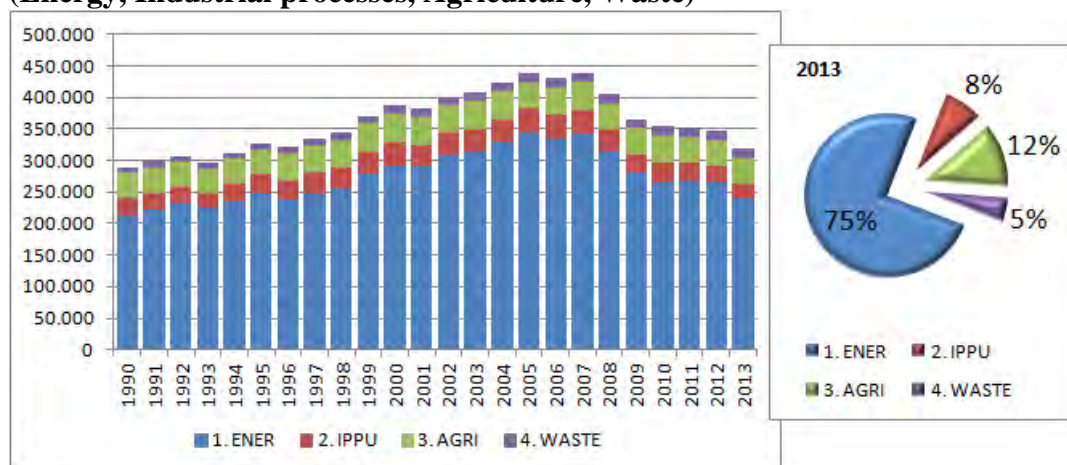
[http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/sistema-espanol-de-inventario-sei-/2\\_Sumario\\_inventario\\_GEI\\_Espa%C3B1a\\_-\\_Serie\\_1990-2013\\_Def\\_tcm7-362874.pdf](http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/sistema-espanol-de-inventario-sei-/2_Sumario_inventario_GEI_Espa%C3B1a_-_Serie_1990-2013_Def_tcm7-362874.pdf)

Its trend is graphically displayed in figure 4a, b and c

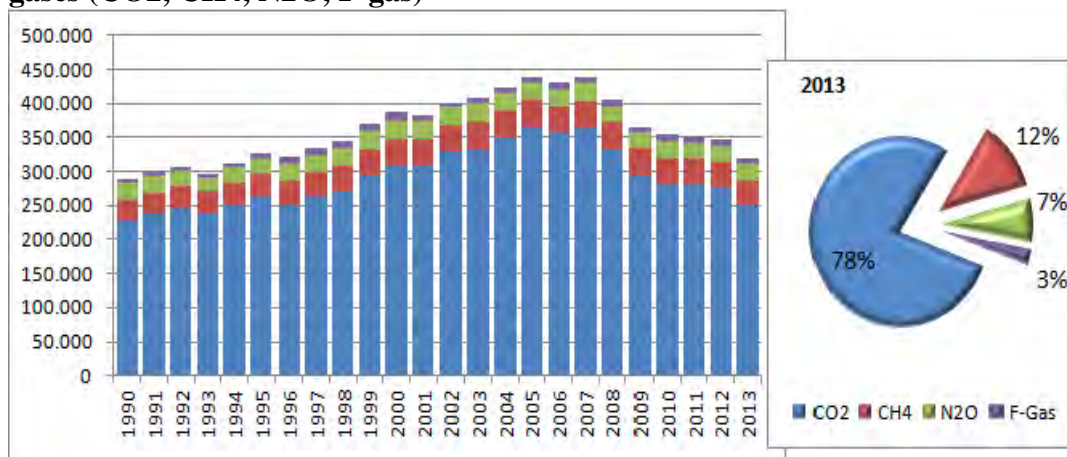
**Figure 4a: Spain's greenhouse gas emissions trend (1990/2013)**



**Figure 4b: Annual distribution of Spain greenhouse emissions by sectors (Energy, Industrial processes, Agriculture, Waste)**



**Figure 4c: Annual distribution of Spain greenhouse emissions by greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, F-gas)**



## 2.2 FORECASTS.

The following web reference contains a detailed forecast of the different greenhouse gas emissions in Spain from years 2015 to 2030. (Spanish official submission on forecasts according to MMR article 14)

[http://cdr.eionet.europa.eu/es/eu/mmr/art04-13-14\\_lcds\\_pams\\_projections/envvt17a/](http://cdr.eionet.europa.eu/es/eu/mmr/art04-13-14_lcds_pams_projections/envvt17a/)

The forecasts analyses the expected evolution according to the trend and assuming the scenario that additional regulating measure are taken.

*Table 3: Spain's methane emissions (CH<sub>4</sub>) projection in KT (2015/2030) in a tendency scenario*

<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
1536	1534	1530	1526	1532	1517	1512	1508
<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
1502	1487	1491	1486	1482	1481	1479	1477



### **3. SUMMARY OF NATIONAL ACTIONS, NATIONAL ACTION PLANS, OR MITIGATION STRATEGIES BY SECTORS.**

#### **3.1 METHANE:**

The following WEB sites include the general Spanish emissions plan for diffuse sectors, in a timeframe up to year 2020, including measures aimed directly at allowing Spain to comply with its diffuse sectors emissions objective:

[http://www.magrama.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/Hoja\\_de\\_Ruta\\_2020\\_tcm7-351528.pdf](http://www.magrama.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/Hoja_de_Ruta_2020_tcm7-351528.pdf)

[http://www.magrama.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/HojaRuta2020\\_Fichas\\_tcm7-358623.pdf](http://www.magrama.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/HojaRuta2020_Fichas_tcm7-358623.pdf)

Some measures on waste and agriculture sectors are closely related with reductions on methane emissions:

#### **Agriculture and cattle farming sector**

Anaerobic digestion of cattle dejections with nitrification / desnitrification treatment

Anaerobic digestion of cattle dejections

Introduction of vegetables in synthetically fertilized meadows

Direct sowing

Training for a better fertilization efficiency

Improve tractor driving techniques

Use of woody prune waste to avoid incineration

Incorporate woody prune waste to soils

Introduction of vegetables in irrigated woody cultivations

#### **Waste sector**

Domestic and community waste for compost

Separate bio waste collection for compost

Separate bio waste collection for bio methane

Reduction of alimentary waste

Separate collection of paper waste in towns

#### **3.2 BLACK CARBON**

To reduce BC emissions, it is necessary to take into account that usual measures that reduce PM emissions also reduce BC.



Spain is implementing at present several measures to reduce particle emissions included on the National Program for Air quality and Atmosphere Protection (Air Program 2013/2016) described in detail in the WEB.

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[http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/atmosfera-y-calidad-del-aire/calidad-del-aire/Plan\\_Aire.aspx](http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/atmosfera-y-calidad-del-aire/calidad-del-aire/Plan_Aire.aspx)

Some measures include actions related with the transport sector, industry, construction, agriculture and sector RCI that jointly produce most of the particles emitted.

### **Transport Sector**

- Mobility development and teleworking in the public administration.
- Regulate and control vehicle speed at national level.
- Support bicycles as an alternative transport media.
- Improve the transport sector to reduce fuel consumption.
- Reduce ship and other emissions on harbour traffic and other activities.

### **Industrial sector**

- Regulate the reduction of particle emissions in the industrial sector improving energy, processes and machinery efficiency.

### **Construction sector**

- Introduce measures for construction, demolition and civil works.

### **Agriculture and livestock sector**

- Reduce emissions in agriculture work
- Reduce emissions on livestock activities
- Reduce emission in biomass incineration in open air

### **RCI Sector**

- Regulate energy use in residential, commercial and institutional facilities.
- Measures to improve building isolation.
- Improve education on best energy domestic uses