# THE METHODOLOGICAL DOCUMENT RELATED TO MAIN REVISION ON GREENHOUSE GAS EMISSIONS INVENTORY

## Introduction

Turkey, ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 2004, and as a Party is obliged to prepare its National Greenhouse Gas Emissions Inventory according to the Intergovernmental Panel on Climate Change (IPCC) Guidelines and submit to the UNFCCC Secreteriat. Within this scope, as an Annex I Party, Turkey annually compiles its National Greenhouse Gas Inventory and submits UNFCCC Secretariat to fulfill commitments under the Convention. National Greenhouse Gas Inventory consists of National Inventory Report (NIR), common reporting format (CRF) tables, key source and uncertainty analysis.

Greenhouse gas emissions inventory is prepared by "Greenhouse Gas Emissions Inventory Working Group" which is set up by decision of the Coordination Board on Climate Change and Air Management (CBCCAM). TurkStat is the responsible organization for the coordination of working group. The Emission Inventory includes direct GHGs as carbondioxide ($CO_2$), methane ($CH_4$), nitrousoxide ($N_2O$), hydro fluorocarbons (HFCs), per fluorocarbons (PFCs), sulphur hexafluoride ($SF_6$), and indirect GHG as nitrogen oxides ($NO_x$), non-methane volatile organic compounds (NMVOC), carbonmonoxide (CO), and sulphurdioxide ($SO_2$) emissions.

Up to 2015, Greenhouse Gas Emissions Inventory was prepared in accordance with the methodologies defined in Revised 1996 IPCC Guidelines and 2000 Good Practice Guidance. In 2015, emissions for the period 1990-2013 will be reported in the line with 2006 IPCC Guidelines. Revised tables based on the methodological changes in 2006 IPCC Guidelines, is given in 2013 Greenhouse Gas Emissions press release.

In this context, emissions from

- Energy
- Industrial Processes and Product Use
- Agriculture, Forestry and Other Land Use
- Waste

sectors are revised.

## Reasons for the Main Revision

Details of revision on Greenhouse Gas Emissions Inventory under the "Changes in methodology, implementation and questionnaire structure" heading in the directive "Instruction on Methods and

Principles Regarding Revisions on Statistical Data Produced by Turkish Statistical Institute" is shown below.

Subsidiary Body for Scientific and Technological Advice (SBSTA) of UNFCCC, in its 13th session, assessed the use of 2006 IPCC Guidelines and ask Annex I countries of the Convention to use 2006 IPCC guidelines in accordance with development of production and energy technologies and reporting format requirements.

Within this scope, changes related to the 2006 IPCC Guidelines are indicated with the main titles below;

- Recalculation and time series consistency with 2006 IPCC Guidelines
- Mandatory and non-mandatory reporting requirements
- Coverage of gases to be reported by Parties
- Sectors and source/sink categories
- Revision of the common reporting format (CRF) tables
- Linkages between inventory reporting and a national inventory system
- Outline and elements of national inventory reports

The changes in the calculation of emissions can be briefly summarized as follows: in energy sector; changes in the emission factors and oxidation rates used in the emission calculations, addition of the carbon dioxide transport, injection and geological storage as a new category; in industrial processes and product use sectors; shifting emissions from iron and steel production to this sector which is previously considered under energy sector; the inclusion of the product use emissions to the related product use category, in agriculture; in addition to changes in emission factors, including emissions from urea application and full coverage of sectors in the calculation of indirect $N_2O$ emissions and excluding N-fixing crops; in waste sector; using IPCC FOD (First Order Decay) method for waste disposal emissions in line with the suggestions of guidelines and adding composting category.

## Length of the Main Revision

The revision process is made for the 1990-2012 period data.

## Depth of the Main Revision

The revision process is carried out in the all sectors and sub-categories. The emissions from Energy, Industrial Processes and Product Use, Agriculture, Forestry and Other Land Use Change and Waste sectors are revised.

Table 1. Greenhouse Gas Emissions by Sectors (Million Tonnes CO2 equivalent), 1990 - 2012

| | Previous Series | | | | | Current Series | | | | | Absolute Revision (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Energy | Industrial processes and product use | Agriculture | Waste | Total | Energy | Industrial processes and product use | Agriculture | Waste | Total | Energy | Industrial processes and product use | Agriculture | Waste | Total |
| 1990 | 132.9 | 15.5 | 30.4 | 9.7 | **188.5** | 131.6 | 31.1 | 41.6 | 13.9 | **218.2** | 1.00 | 50.15 | 26.95 | 30.17 | **13.61** |
| 1991 | 138.8 | 17.8 | 31.0 | 13.1 | **200.7** | 135.6 | 32.5 | 42.3 | 14.5 | **224.9** | 2.36 | 45.27 | 26.77 | 9.47 | **10.76** |
| 1992 | 145.1 | 19.0 | 30.9 | 16.7 | **211.8** | 141.3 | 31.9 | 42.5 | 15.1 | **230.8** | 2.71 | 40.54 | 27.25 | 11.07 | **8.25** |
| 1993 | 151.6 | 21.0 | 31.1 | 19.5 | **223.1** | 149.1 | 32.3 | 43.4 | 15.7 | **240.5** | 1.68 | 35.19 | 28.40 | 24.43 | **7.23** |
| 1994 | 149.4 | 19.3 | 29.8 | 20.1 | **218.6** | 145.6 | 32.0 | 40.7 | 16.3 | **234.6** | 2.63 | 39.63 | 26.91 | 23.39 | **6.81** |
| 1995 | 161.5 | 24.3 | 29.2 | 23.9 | **238.9** | 158.8 | 33.7 | 40.2 | 16.9 | **249.5** | 1.70 | 28.01 | 27.22 | 41.65 | **4.27** |
| 1996 | 179.7 | 24.4 | 29.7 | 26.3 | **260.0** | 173.9 | 35.4 | 41.2 | 17.5 | **268.0** | 3.32 | 31.24 | 28.06 | 50.60 | **3.00** |
| 1997 | 192.1 | 24.2 | 28.2 | 28.7 | **273.2** | 187.0 | 37.3 | 39.5 | 18.3 | **282.1** | 2.74 | 35.14 | 28.69 | 57.05 | **3.14** |
| 1998 | 191.3 | 24.8 | 28.9 | 30.2 | **275.2** | 186.6 | 37.1 | 41.3 | 18.9 | **283.8** | 2.55 | 33.12 | 30.07 | 60.15 | **3.02** |
| 1999 | 191.3 | 24.0 | 29.1 | 31.6 | **276.0** | 186.3 | 35.8 | 41.7 | 19.8 | **283.7** | 2.68 | 33.00 | 30.22 | 59.00 | **2.72** |
| 2000 | 213.2 | 24.4 | 27.8 | 32.6 | **298.1** | 213.8 | 36.2 | 40.1 | 20.7 | **310.8** | 0.25 | 32.63 | 30.55 | 57.97 | **4.07** |
| 2001 | 196.6 | 23.4 | 26.4 | 32.7 | **279.1** | 197.2 | 36.6 | 37.4 | 21.5 | **292.7** | 0.28 | 36.08 | 29.33 | 51.92 | **4.63** |
| 2002 | 204.6 | 25.6 | 24.9 | 32.0 | **287.1** | 205.2 | 37.8 | 36.2 | 22.2 | **301.3** | 0.29 | 32.21 | 31.00 | 44.19 | **4.70** |
| 2003 | 218.6 | 26.3 | 25.8 | 32.8 | **303.6** | 218.2 | 41.0 | 37.6 | 22.8 | **319.7** | 0.16 | 35.80 | 31.39 | 43.94 | **5.04** |
| 2004 | 228.0 | 28.6 | 25.4 | 31.1 | **313.1** | 228.5 | 43.4 | 37.5 | 23.7 | **333.1** | 0.22 | 34.15 | 32.12 | 31.16 | **6.00** |
| 2005 | 242.4 | 28.8 | 26.3 | 33.3 | **330.7** | 251.8 | 46.9 | 38.5 | 24.6 | **361.7** | 3.74 | 38.59 | 31.67 | 35.37 | **8.57** |
| 2006 | 259.2 | 31.0 | 27.0 | 33.7 | **350.9** | 275.1 | 48.4 | 39.5 | 25.6 | **388.6** | 5.78 | 35.85 | 31.77 | 31.58 | **9.71** |
| 2007 | 289.4 | 31.0 | 26.8 | 35.3 | **382.4** | 306.4 | 50.2 | 39.0 | 26.2 | **421.8** | 5.56 | 38.31 | 31.38 | 34.59 | **9.35** |
| 2008 | 278.4 | 31.7 | 25.5 | 33.2 | **368.7** | 294.2 | 52.6 | 36.9 | 26.6 | **410.4** | 5.37 | 39.82 | 31.02 | 24.71 | **10.14** |
| 2009 | 279.0 | 33.2 | 26.1 | 32.9 | **371.1** | 280.5 | 54.9 | 38.5 | 26.9 | **400.7** | 0.54 | 39.56 | 32.11 | 22.36 | **7.38** |
| 2010 | 285.1 | 55.7 | 27.1 | 35.6 | **403.5** | 284.8 | 60.0 | 39.8 | 27.2 | **411.7** | 0.12 | 7.17 | 31.84 | 30.83 | **2.00** |
| 2011 | 301.3 | 58.6 | 28.8 | 35.3 | **424.1** | 297.6 | 65.6 | 41.6 | 27.7 | **432.5** | 1.25 | 10.64 | 30.68 | 27.52 | **1.94** |
| 2012 | 308.6 | 62.8 | 32.3 | 36.2 | **439.9** | 320.8 | 69.6 | 46.3 | 27.6 | **464.2** | 3.78 | 9.77 | 30.34 | 31.44 | **5.24** |

**Figure 1. Impacts of Main Revision on Total Greenhouse Gas Emissions**