Ireland's

Report to facilitate the calculation of the assigned amount for the second commitment period pursuant to Article 3, paragraphs 7bis, 8 and 8bis of the Kyoto Protocol

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Introduction

This report is the submission of Ireland to the United Nations Framework Convention on Climate Change (UNFCCC) to facilitate the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol, in accordance with Decision 2/CMP.8[1]. The Conference of Parties serving as the meeting of Parties to the Kyoto Protocol amended the Kyoto Protocol pursant to its Article 3, paragrapgh 9 (the Doha Amendment) at COP18/CMP8 in Doha in 2012, Decision 1/CMP.8.

In accordance with paragragh 2 of Decision 2/CMP.8, each Party with a quantified emission limitation and reduction commitment (QELRC) inscribed in the third column of Annex B to the Kyoto Protocol, as contained in annex I to decision 1/CMP.8, shall submit to the secretariat, by 15 April 2015, a report to facilitate the calculation of its assigned amount pursuant to Article 3, paragraphs 7bis, 8 and 8bis, of the Kyoto Protocol for the second commitment period and to demonstrate its capacity to account for its emissions and assigned amount (hereinafter referred to as the report to facilitate the calculation of the assigned amount).

Ireland has a QELRC for the second commitment period, 2013-2020, inscribed in Annex B of the Doha Amendment to the Kyoto Protocol. The QELRCs for the European Union and its member States for a second commitment period under the Kyoto Protocol are based on the understanding that these will be fulfilled jointly with the European Union and its member States, in accordance with Article 4 of the Kyoto Protocol.

The information provided in this report fulfils the requirements of the report to facilitate the calculation of the assigned amount of Ireland in accordance with Annex I of decision 2/CMP.8. This report also fulfils the obligation under Article 19 of Commission implementing Regulation (EU) No. 749/2014[2], pursuant to Regulation (EU) No. 525/2013[3], reporting on the determination of the assigned amount.

The following specific information is provided in this report as set out in Annex I to decision 2/CMP.8:

a) Complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) not controlled by the Montreal Protocol;
b) The identification of its selected base year for nitrogen trifluoride in accordance with Article 3, paragraph 8bis, of the Kyoto Protocol, for all Parties included in Annex I with a quantified emission limitation and reduction target for the second commitment period;
c) The agreement under Article 4 of the Kyoto Protocol for the second commitment period, where the Party has reached such an agreement to fulfil its commitments under Article 3 of the Kyoto Protocol jointly with other Parties;

[1] Decisions 1 and 2/CMP.8; http://unfccc.int/resource/docs/2012/cmp8/eng/13a01.pdf
[2] COMMISSION IMPLEMENTING REGULATION (EU) No 749/2014 of 30 June 2014; http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0749&from=EN
[3] REGULATION (EU) No 525/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 80/2004/EC; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:165:0013:0040:en:PDF

d) The calculation of its assigned amount pursuant to Article 3, paragraphs 7bis, 8 and 8bis, of the Kyoto Protocol, on the basis of its inventory referred to in paragraph 1(a) above, which is due by 15 April 2015;
e) The calculation of its commitment period reserve in accordance with decision 11/CMP.1 or any subsequent revision thereof related to the calculation of the commitment period reserve;
f) The identification of its selection of single minimum values for tree crown cover, land area and tree height for use in accounting for its activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;
g) The identification of its election of activities under Article 3, paragraph 4, of the Kyoto Protocol for inclusion in its accounting for the second commitment period;
h) The identification of whether, for each activity under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, it intends to account annually or for the entire commitment period;
i) The forest management reference level as inscribed in the appendix to the annex to decision 2/CMP.7, any technical corrections as contained in the inventory report for the first year of the second commitment period and references to those sections in the national inventory report where such information is reported consistent with the requirements of decision 2/CMP.7, annex, paragraph 14;
j) Information on how emissions from harvested wood products originating from forests prior to the start of the second commitment period have been calculated in the reference level in accordance with decision 2/CMP.7, annex, paragraph 16;
k) An indication of whether it intends to apply the provisions to exclude emissions from natural disturbances for the accounting for afforestation and reforestation under Article 3, paragraph 3, of the Kyoto Protocol and/or forest management under Article 3, paragraph 4, of the Kyoto Protocol during the second commitment period;
l) A description of its national system in accordance with Article 5, paragraph 1, of the Kyoto Protocol;
m) A description of its national registry, reported in accordance with the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”.

a) Complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) not controlled by the Montreal Protocol

The complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) not controlled by the Montreal Protocol, recalculated in accordance with decision 4/CMP.7 for all years from 1990, or another approved base year or period under Article 3, paragraph 5, of the Kyoto Protocol, to the most recent year available, and prepared in accordance with Article 5, paragraph 2, of the Kyoto Protocol, and any relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) and the Conference of the Parties (COP) will be submitted along with Ireland's final version of this report.

Ireland's total emissions and removals of Greenhouse Gases for 1990-2014 are provided in Annex I to this report.

b) The identification of its selected base year for nitrogen trifluoride in accordance with Article 3, paragraph 8bis, of the Kyoto Protocol, for all Parties included in Annex I with a quantified emission limitation and reduction target for the second commitment period

In accordance with paragraph 1 (b), of Annex I of Decision 2/CMP.8, Ireland had a quantified emission limitation and reduction target in the first commitment period and selected a base year of **1995** for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Ireland also has a QELRC in the second commitment period and also selects **1995** as a base year for nitrogen trifluoride (NF_3) in accordance with Article 3, paragraph 8bis, of the Kyoto Protocol.

c) The agreement under Article 4 of the Kyoto Protocol for the second commitment period, where the Party has reached such an agreement to fulfil its commitments under Article 3 of the Kyoto Protocol jointly with other Parties

The agreement under, Article 4 of the Kyoto Protocol, for the second commitment period is attached in Annex II to this report. Council Decision (EU) 2015/1339 sets out the terms of the joint fulfilment agreement as well as the respective emission levels of each Party to that agreement.

The Agreement between the European Union, its Member States and Iceland, concerning Iceland's participation in the joint fulfilment of commitments by the European Union, its Member States and Iceland for the second commitment period of the Kyoto Protocol sets out the terms governing Iceland's participation. (Council Decision (EU) 2015/146 on the signing, on behalf of the European Union, of the agreement between the European Union and its Member States, of the one part, and

Iceland, of the other part, concerning Iceland's participation in the joint fulfilment of commitments of the European Union, its Member States and Iceland for the second commitment period of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, (OJ L 26/1, 31.1.2015, p.1)).

d) The calculation of its assigned amount pursuant to Article 3, paragraphs 7bis, 8 and 8bis, of the Kyoto Protocol, on the basis of its inventory referred to in paragraph 1(a) above, which is due by 15 April 2015

Emissions levels of the European Union member States and Iceland, before applying Article 3 paragraph 7bis, of the Kyoto Protocol in tonnes of CO_2 equivalent for the second commitment period of the Kyoto Protocol are presented in Table 1 below.

Table1. Emissions levels of the member States and Iceland

Belgium	584 228 513
Bulgaria	222 945 983
Czech Republic	520 515 203
Denmark	269 321 526
Germany	3 592 699 888
Estonia	51 056 976
Ireland	**343 467 221**
Greece	480 791 166
Spain	1 766 877 232
France	3 014 714 832
Croatia	162 271 086
Italy	2 410 291 421
Cyprus	47 450 128
Latvia	76 633 439
Lithuania	113 600 821
Luxembourg	70 736 832
Hungary	434 486 280
Malta	9 299 769
Netherlands	919 963 374
Austria	405 712 317
Poland	1 583 938 824
Portugal	402 210 711
Romania	656 059 490
Slovenia	99 425 782
Slovakia	202 268 939
Finland	240 544 599
Sweden	315 554 578
United Kingdom	2 743 362 625
Iceland	15 327 217

Ireland's assigned amount for the second commitment period, ***before applying Article 3 paragraph 7bis***, to be fulfilled jointly with the European Union and its member States and Iceland, is **343,467,221** tonnes of CO_2 equivalent as outlined in Annex II to Commission Decision 2013/162/EU[4] and adjusted pursuant to Annex II of Commission Decision 2013/634/EU[5] and presented in Table 2 below.

Table 2. Ireland's Annual Emission Allocations (AEAs) 2013-2020

Country	Annual Emission Allocation (tonnes of carbon dioxide equivalent)								
	2013	2014	2015	2016	2017	2018	2019	2020	**2013-2020**
Ireland	46,891,934	45,760,925	44,629,916	43,498,907	42,367,898	41,236,889	40,105,881	38,974,871	**343,467,221**

In accordance with Article 3 paragraph 7bis, Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base year or period the aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount.

Land-use change and forestry constituted a net source for Ireland in 1990 with final emissions estimated to be 6,222.43 kt of CO_2 equivalent as outlined in Annex I of this report.

Ireland's assigned amount, ***after applying Article 3 paragraph 7bis***, can be calculated using the formula;

$$AA = AEAs_{2013\text{-}2020} + (Deforestation_{1990} * 0.8 * 8)$$

$$AA = 343{,}467{,}221 + (8{,}339.54 * 0.8 * 8)$$

$$AA = 343{,}520{,}594$$

e) The calculation of its commitment period reserve in accordance with decision 11/CMP.1 or any subsequent revision thereof related to the calculation of the commitment period reserve

In accordance with decisions 11/CMP.1 and 1/CMP.8, each Party included in Annex I shall maintain, in its national registry, a commitment period reserve which should not drop below 90 per cent of the

[4] Commission Decision, 2013/162/EU, on determining Member States' annual emission allocations for the period 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council

[5] Commission Implementing, Decision 2013/634/EU, on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council

Party's assigned amount calculated pursuant to Article 3, paragraphs 7bis, 8 and 8bis, of the Kyoto protocol, or 100 per cent of eight times its most recently reviewed inventory, whichever is lowest.

Ireland's commitment period reserve (CPR), estimated on the basis of 90 per cent of the assigned amount described above, is 309,168,535 tonnes of CO_2 equivalent.

Ireland's commitment period reserve, estimated on the basis of 8 times the most recently reviewed inventory, is 468,249,904 tonnes of CO_2 equivalent as shown in Table 3.

Ireland's commitment period reserve is 309,168,535 tonnes of CO_2 equivalent, the lower of the two amounts described above.

Table 3. Calculation of the Commitment Period Reserve (CPR)

	tonnes of carbon dioxide equivalent
Ireland's Assigned Amount 2013-2020	343,520,594
90% of Assigned amount **(a)**	309,168,535
Ireland's most recently reviewed inventory (2012)	58,531,238
8 times of 100% of 2012 inventory **(b)**	468,249,904
Commitment Period Reserve, lower of **(a)** or **(b)**	309,168,535

f) The identification of its selection of single minimum values for tree crown cover, land area and tree height for use in accounting for its activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

In accordance with paragraph 1 (f), of Annex I to Decision 2/CMP.8, if the Party included in Annex I selected its forest definition for the first commitment period, the definition for the second commitment period shall be the same. Ireland selected its forest definition for the first commitment period and is provided here.

Forest is a minimum land area of 0.1 hectares, with a minimum width of 20 metres, with a tree crown cover (or equivalent stocking level) of 20 per cent or more, with trees having a potential to reach a minimum height of 5 metres at maturity in situ. Young natural stands and all plantations that have yet to reach a crown density of 20 per cent or a tree height of 5 metres are included under forest. Areas normally forming part of the forest area that are temporarily un-stocked as a result of human intervention, such as harvesting or natural causes such as wind-throw, but which are expected to revert to forest are also included. This forest definition is the same as given in the submission made by Ireland to the FAO Forest Resource Assessment 2005 (FRA 2005, www.fao.org).

- Minimum area of land: 0.1 hectare
- Minimum tree crown cover: 20 per cent
- Minimum tree height: 5 metres in situ

g) The identification of its election of activities under Article 3, paragraph 4, of the Kyoto Protocol for inclusion in its accounting for the second commitment period

In accordance with paragraph 7, of Annex to Decision 2/CMP.7, all Parties included in Annex I shall account for anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from the following: any activity under Article 3, paragraph 4, elected in the first commitment period, and forest management. Ireland did not elect any activities under Article 3, paragraph 4, in the first commitment period but will account for forest management in the second commitment period.

In accordance with paragraph 1 (g), Annex I to Decision 2/CMP.8, Ireland will elect the following additional activities under Article 3, paragraph 4, of the Kyoto Protocol for the second commitment period; Cropland Management and Grazing Land Management.

Information on how its national system under Article 5, paragraph 1, of the Kyoto Protocol will identify land areas associated with all additional elected activities

Ireland uses a combination of approaches 2 and 3 defined in Chapter 2, section 2.3.2 of the IPPC good practice guidance for Land Use, Land-Use Change and Forestry for the representation of land areas for Article 3, paragraphs 3 and 4 activities. This is in accordance with requirements under paragraph 6 of the annex to the decision 15/CMP.1 and 2/CMP.8. Un-harvested and harvested afforestation and deforestation areas are reported within the entire territory of Ireland, with further sub division into species strata within internal national boundaries. Afforestation areas are tracked on a spatially explicit basis (IPCC Approach 3) while deforestation areas are identifiable but not spatially explicit (IPCC Approach 2). FM areas are tracked using National forest inventory data since 2006 and FIPS data to 1995. Cropland and Grazing land management areas are tracked using the spatially explicit Land Parcel Information System (LPIS) for all years from 2000-2014 and CORINE land cover data for 1990, 2000, 2006 and 2012. All approaches adopted can detect a land use change at a resolution consistent with the forest definition area of 0.1 ha. This is facilitated using a statistical scaling approach when the resolution of representative sample plot data is less than the forest definition (see below).

Reforestation activities do not occur in Ireland and the relevant activities under Article 3, paragraph 3 are limited to afforestation and deforestation. All afforested areas are the result of planting and establishment of forest areas. Under guidelines of the Forest Service Afforestation Grant and Premium Scheme 2014-2020 a proposed conifer plantation or plot not adjoining other forests must not be less than 1 hectare in total. Where a proposed conifer plantation adjoins existing forests of 0.75ha or greater, then a minimum conifer plantation size of 0.25 hectare applies. A conifer plot within a plantation must not be less than 0.25 hectare and a broadleaf plantation must not be less than 0.1 hectare. An Agro-forestry plot must be not less than 0.5 ha (Forest Service, 2015). All of these forest areas are consistent with the forest definition. The scheme is 100 percent exchequer funded under the following legal framework; European Union guidelines for State aid in the agriculture and forestry sector and in rural areas 2014 – 2020. Commission Regulation (EU) No 1407/2013 on the application of article 107 and 108 of the Treaty on the functioning of the European

Union to *de minimis* aid (Official Journal reference number L:2013:352). Participation in the scheme is voluntary however, in accordance with European Communities (Forest Consent and Assessment) Regulations 2010 (S.I. No. 558 of 2010), as amended (by S.I. No. 442 of 2012), all afforestation projects (whether availing of grant aid or not) must obtain prior written approval from the Department of Agriculture, Food and the Marine. Afforestation areas recorded by the Forest Service are verified using a strict control and referrals process, following a post-establishment site visit by a forestry inspector (Forest Service, 2003). All deforestation areas are derived from legally-binding licence applications under the Forestry Act. These provisions fulfil the requirement to demonstrate that afforestation (i.e. planting of non-forest land with trees for development of the forest sector) and deforestation began on or after 1 January 1990 and are directly human-induced, which is necessary for the accounting of emissions and removals for activities under Article 3, paragraph 3. These datasets were primarily digitised using the 1:12560 and 1:2500 Ordnance Survey Ireland (OSI) raster maps.

Ireland provides information on how lands subject to harvest or disturbance followed by re-establishment is distinguished from deforestation as required under paragraph 8 of the annex to the decision 15/CMP.1. A forest area is classified as deforested when there is clear indication of a specific land use change for that area or if clearfelled areas have not been replanted within a period of 5 years. Whilst different methodologies have been used to detect deforestation over time (see below), this definition of deforestation will be applied consistently to develop a consistent time-series.

Areas under FM and AR

iFORIS

The iFORIS database is used to derive the total area of forests established before 1990 and afforestation areas of lands converted to forests since 1990. Ireland adopts combined approaches 2 and 3 as set out by the IPCC GPG (2003). Spatially explicit GIS polygons, representing all forest areas in 1995, were derived from the available FIPS 95 spatial layer. Digitised maps of afforested areas since 1990 using the Grants and Premiums Administration System (GPAS), archived in the iFORIS database (Figure 1). After attributing the species information with the unique ID from the Species Data table, the spatial and attribute data were joined in the Premiums layer, representing all afforested land since 1990. The data was quality controlled and the reasons for records not meeting the data validation criteria were recorded by the Forest Service. There were four separate stages in the data validation process, which occurred in successive iterations. The validated data were appended together and then reformatted and quality controlled. The FIPS95 afforested areas was then erased from the resulting Premiums table to produce the Forestry07 layer. These data sources are being updated for the new grant aided afforestation scheme areas. For example, the Forestry08 layer is derived from the GPAS08 data and the Forestry07 layer (Figure 1). Finally, the total forest areas and afforestation area is derived directly from the GPAS and IFORIS database after removal of areas identified as deforested (see deforestation data).

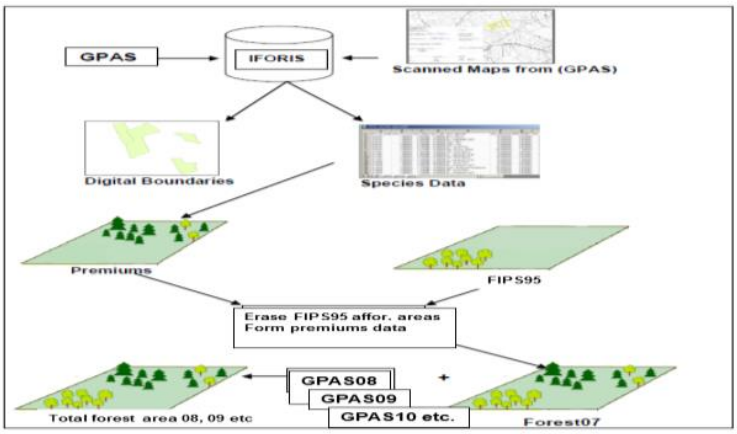

Figure 1. The process involved in deriving the total forest area and afforestation areas since 1990 using the IFORIS database

The National Forest Inventory

Ireland's first National Forest Inventory was completed in 2006 using a sampling approach, based on a randomised systematic grid sample design. The second inventory was completed in 2012. This system is also designed to track land use change trends. A pilot study in Co. Wexford showed that a grid resolution of 2 km x 2 km was required to provide the density of plots needed to achieve a national estimate of timber volume with a precision of 95 per cent at the 95 per cent confidence level. This grid resolution equates to 17,423 points nationally, each representing approximately 400 ha.

There are three stages of land-use classification undertaken in the NFI, primarily to identify forest areas according to the forest definition (see above). These stages are land-use type, land-use category and land-use class (Figure 2). They form the basis of the NFI, as the classification process dictates whether the sample points are included in the NFI or not, and also the range of attributes to be collected at the individual sample points.

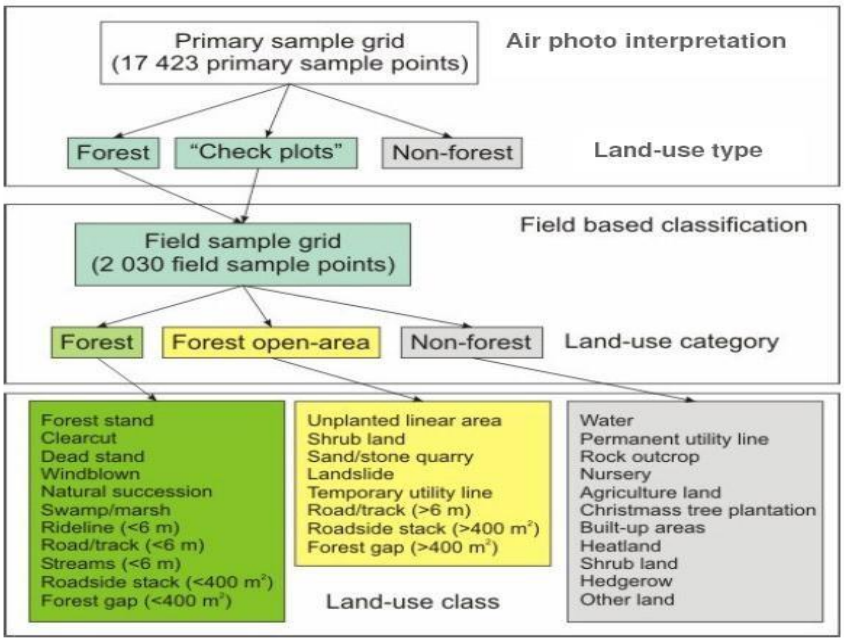

Figure 2. Overview of the NFI classification system (taken from NFI, 2007a)

The 2 km x 2 km grid is overlaid on the total land base map of the Republic of Ireland to facilitate land-use type (LUT) interpretation using colour air photographs (OSI, 2005, 2011/12). The primary focus of the interpretation is to identify forest land transitions. In tandem with this, other land-use types are identified for LULUCF reporting under the Convention. The grid is permanent and this allows for the re-assessment of primary sample points at future dates to monitor forest and other land-use change (i.e. afforestation and deforestation) when the OSI produces the next range of ortho-rectified aerial photos (NFI, 2007).

Once a forest plot has been identified, field measurements are undertaken in established permanent plots. The exact location of the centre of ground survey plots is identified in the field by navigating to a six digit Irish national grid co-ordinate using both GPS and electronic compass/laser technology. The total area of the circular sample plot is 500 m^2 (i.e. 25.24 m in diameter).

The area of a particular AR or FM category is calculated as the sum of the areas scaled up using representative area of (permanent sample plot) PSP within respective categories. For the NFI, a PSP represents 400 ha based on a 2 x 2 km grid sample. Since the NFI only detects forest areas at a 400 ha resolution the adjustment is done using the spatial iFORIS data. So for example, if the area of organic soils under forest land remaining forest land is estimated to be 4.8 kha based NFI PSP (i.e. 12 plots out of 650 (representing a total of 260 kha) plots for the afforestation categories) and the total IFORIS area is 260.47 kha, then the area is readjusted as follows:

New sub-category area (4.809 kha) $= (\frac{12}{650}) \times 260.47$

Harvests and Deforestation

Harvest

Harvest before 2006

EUROSTAT information is compiled by a contractor on behalf of the DAFM. The EUROSTAT harvest is obtained from timber mills and information from the industry (e.g. Coillte and the private sector). Harvest data from 1961 to 2013 were compiled using data national data submitted to the FAO and EUROSTAT.

Harvests from NFI data

The 2006 and 2012 NFIs were used to derive harvest data for the periods after 2005. The NFI records individual trees within PSP that are harvested and the indicative date of harvest based on:

I. The previous DBH and height of the tree in the 2006/12 inventories

II. The estimate year of harvest. This is based on assessment of condition of stumps and deadwood on site.

III. The volume at year of harvest is then estimated using the DBH and height in 2006 and 2012 and growth is interpolated between inventory years and extrapolated after the last available inventory 2012 using the CARBWARE model. Models are validated when a new inventory cycle is completed.

IV. The simulated harvest was validated against the official FAO/EUROSTAT data.

Harvests in years after NFI cycle assessments

To derive harvest for years when NFI has not been done (i.e. since the last inventory year) for Coillte (State owned) forests, the NFI sample plot co-ordinates and Coillte sub-compartment polygons were intersected to produce a layer representing NFI-Coillte plots with harvest management statistics (Figure 3). Harvested volume and basal area removed during harvest was assigned to individual NFI plots, representing 400 ha, based on Coillte Forecast plans. The total volume removed in a given year was validated against independently derived FAO/Eurostat data and Coillte sales invoice information. An EventsTable table for use in the CARBWARE database was created for input into the stand modification functions within the CARBWARE model to simulate the harvesting of trees. A final validation was performed on the individual tree tables to ensure adequate timber was removed during a thinning simulation. It will be possible in the future to re-evaluate the activity data 'ground truthed data' from repeat NFI inventories of harvested plots, where adjustment can be made to the harvest volumes based on new PSP information.

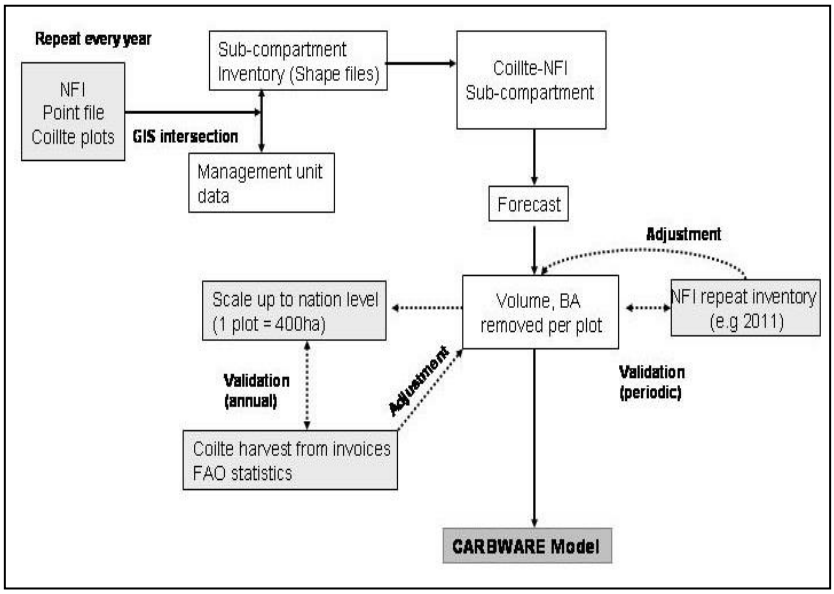

Figure 3. Methodology used to derive harvest information for post-1990 State Forests

To derive harvests from private forests, a GIS layer was created by intersection of Town land boundaries and names (OSI) and the GPAS layer compartments (see Figure 4) that contain NFI plots. This layer contains attributes which identifies permanent sample plots which may be subjected to harvesting activities as supplied on felling licence application forms (Figure 4). Once this layer is updated every year the Forest Service carries out the following checks:

i. Forest inspectors open the GIS attribute table to check if the Town land in question (as specified on felling licence application) contains a sample compartment.

ii. If there is a sample compartment in the Town land, then an aerial photo layer is used to locate the compartment as indicated in the OS map in the hardcopy of the felling licence application.

iii. Once the compartment is located, a shaded area within or covering the entire area should be identified once the GIS layer is switched on. The shaded area will contain a unique number which is used as a reference (name - FID number).

iv. The inspector can then contact the contractor or owner to obtain information on area, species, volume and basal area removed due to harvest.

Deforestation

Clearfelled areas, which were not restocked within 5 years or if there was clear indication of land use change, were deemed to be deforested. The following approaches are used to determine deforestation areas:

1) Sampling approach: NFI grid points and aerial photography

This is a modification of IPCC GPG approach 3, where the grids or centroids are sampled using a systematic sampling procedure adopted in the NFI. Assessment of ca.18000 NFI point intersects with aerial photographs form 2000 and 2006 provides the opportunity to report deforestation for this period. This method identified 15 NFI PSP grid samples, which were deemed to be deforested between 2000 and 2006. The current land uses of these previously deforested lands were determined from photo interpretation using the 2006 images.

Assessments of deforestation from 1995 to 2000 were based on a GIS intersection of the 18,000 NFI plots with the FIPS 95 forest parcel polygon layer. This exercise produced 105 forest parcels, which were classified as forest in the FIPS 1995 dataset, but then re- classified as non-forest land in the NFI aerial photography 2000 interpretation. These 105 polygons were cross-checked with 1995 black and white aerial photographs to verify that they were forests in 1995. However, most of the sampled forest polygons were deemed to not be deforested or were originally other land uses in 1995. This was due to original FIPS 95 interpretation inconsistencies of photographs and mapping errors in the FIPS95 layer. Only 5 NFI sample points were identified to be deforested between 1995 and 2000. Although it is recognised that a grid based sample introduces a high level of uncertainty due to the poor resolution of detecting highly fragmented deforestation, this is the only available data set for this time series. Importantly these uncertainties should not introduce bias, because deforestation could be both over and under estimated using this approach.

The final deforestation-land use change-soils matrices for 1995-2000 and 2000-2006 were obtained by intersecting identified deforested sample points with the national soils map database.

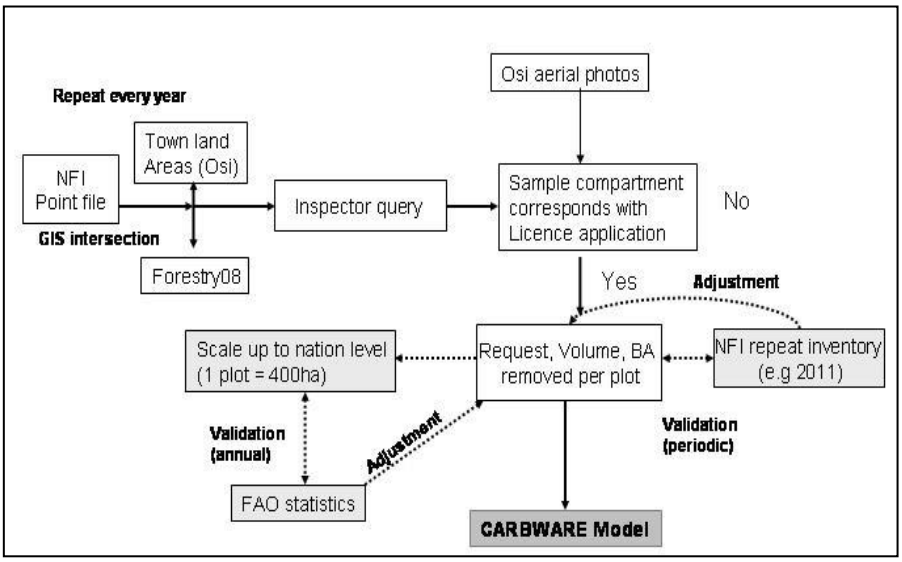

Figure 4. Procedure used to derive harvest activity data for private forested areas

2) Tracking deforestation using CORINE Land cover (CLC) data sets

Although the reporting of LUC matrices uses CORINE, classification and resolution problems have been highlighted comparative studies across Europe (Black et al., 2009; Hazeu and de Wit 2004, Cruickshank and Tomlinson 1996). Despite the abovementioned inappropriateness of CLC for reporting areas under LULUCF in a representative and accurate manner, this is the only data currently available to track historic deforestation prior to FIPS 95 (see method 1 above).

For this exercise we extracted CLC codes 311 (conifers), 312 (broadleaves) and 313 (mixed woodlands) to represent forest land area that were present in 1990. The transitional land cover classes were re-classified into the LULUCF land use categories to identify land uses following deforestation. The resulting polygons were then intersected with a national soils map using ARCGIS to derive a land use change and soil type matrix to the periods 1990 to 1995.

3) Modification to deforestation records from 2006-2012 using the NFI

The new NFI 2012 and previous NFI 2006 are now used to derive deforestation data for the period 2006 to 2012. This method replaced the previously used activity data from felling licence applications. The national forest inventory programme will continue to monitor whether clear felled forest land is replanted. The NFI performs land use transition analysis based on a 2 x 2 km grid using aerial photography every 5 years. The first NFI was completed in 2006 with a follow up completed at the end of 2012. A unit of land is defined as deforested land if there is a clear indication of land use change, either from limited felling licences or aerial photography and a permanent sample point, which was recorded as unplanted previously clearfelled land in the previous inventory, is still unplanted at the time of the subsequent inventory.

4) Deforestation records after inventory years

The Forestry Act legally requires a formal application to the Forest Service to fell trees under either a limited or a general felling license. General felling licences cover forestry activities associated with silvicultural management, such as thinnings or clearfell and replanting. Limited felling licences capture areas and volumes felled and land use transitions for all forest land converted to other land uses. All limited felling licence applications for 2013 were considered as deforestation and record provide the basis for estimating emissions for all biomass pools at the time of harvest.

Felling stands younger than 10 years old are not subject to the forestry act felling licence application. However, records were kept because these areas were previously subject to premium payments under the afforestation scheme. Owners in receipt of these payments are obliged to notify the Forest service if these areas are taken out (‘lands taken out’) of the premiums payment due to deforestation. A data base of these records has been compiled to capture the land use change and soil categories. The biomass, litter and DOM losses associated with deforestation are based on the NFI, PSP average of all 10 year old forest areas.

The national forest inventory programme will continue to monitor whether clear felled forest land under general licences are replanted. The NFI performs land use transition analysis based on a 2 x 2 km grid using aerial photography every 5 years.

Areas under CM and GM

Cropland Management includes those lands which fall under the 2006 IPCC guidelines for Cropland category: *"Cropland includes all annual and perennial crops as well as temporary fallow land (i.e., land set at rest for one or several years before being cultivated again)."*

Grazing land Management includes all grasslands utilised for livestock management not included in the CM activities.

The Land Parcel Information System (LPIS) provides spatially explicit GIS polygons for all parcels with attribute data which includes a description of current activity within these parcels of land. The data consists of all lands covered under various agricultural and rural environmental administrative schemes, in Ireland, since 2000. This effectively covers all agricultural lands in Ireland, including both cropland and grassland. The data is subject to systematic audit, and provides robust and detail information on croplands and grazing land. The parcels are mapped to an accuracy of at least 0.1 ha, consistent with the minimum unit under the forest definition.

Post-processing and analysis of the annual LPIS data enables tracking of land use over time, at the resolution of individual parcels, with a high degree of inter-annual consistency.

All parcels identified as under crop, at any time in the LPIS archive, are defined as CM. This includes temporary grasslands. LPIS only includes managed lands and therefore allows CM and GM to be differentiated from natural, unmanaged lands.

The 1990, CM and GM base year areas includes all LPIS parcels, and is adjusted to allow for those areas identified in the IFORIS data as converted from cropland and grassland to forest and for area converted to Settlement since 1990.

Analysis of the conversion of CM and GM to Settlement has not been undertaken to the same level of spatial detail. The demand for settlement on CM and GM is currently based on estimates of activities in the construction sector which is disaggregated based on proportion of national land cover. It is assumed; these lands will be excluded automatically from the LPIS statistics, or assigned an appropriate attribute: e.g. farm building, dwelling, etc. Preliminary exploration of the LPIS data, postal service geodirectory data and contemporary aerial and satellite imagery confirms this assumption.

How the Party ensures that land that was accounted for under activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the first commitment period continues to be accounted for in subsequent commitment periods, in accordance with decisions 16/CMP.1 and 2/CMP.7

Ireland uses the same methodological approach to report land areas subject to afforestation, reforestation and deforestation since 2006 and this will be applied consistently over both commitment periods. The basis for capturing land use transitions into and out of forestry is the national forest inventory (NFI). The third NFI is due for completion in 2017/18.

Additional legal frameworks provide the basis for tracking and verifying Afforestation and Reforestation lands remain forested unless they are allowed to be taken out of the premiums and

grant scheme or granted the right for deforestation based on a limited felling license application as enforced through the Forestry Act (see above).

h) The identification of whether, for each activity under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, it intends to account annually or for the entire commitment period

Ireland intends to account for each activity under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, for the entire commitment period.

i) The forest management reference level as inscribed in the appendix to the annex to decision 2/CMP.7, any technical corrections as contained in the inventory report for the first year of the second commitment period and references to those sections in the national inventory report where such information is reported consistent with the requirements of decision 2/CMP.7, annex, paragraph 14

Ireland's forest management reference level (FMRL) as inscribed in the appendix to the annex to decision 2/CMP.7 is -142.07 kt CO_2 equivalent, see table 5 below.

Ireland has performed recalculations for the historic time series, 2013 and 2014, and will apply a technical correction when accounting for the second commitment period. The requirement to apply a recalculation is based on conditions as outlined in the IPCC 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (IPCC 2013 GPG KP-LULUCF):

- Use of new models to derive the reported carbon stock (CSC) changes in the inventory 2013. The same model has been applied to the activity data used for the forest management reference level (FMRL) inscribed in the annex to 2/CMP.7. The new version of CARBWARE v5 is now used for the basis for CSC changes in biomass, litter and deadwood pools. The FMRL used CARBWARE version 4.5.
- There have been a range of methodological changes for estimation CO_2, N_2O and CH_4 emissions from organic and mineral soils as outlined in the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (IPCC Wetland supplement 2013). These include off-site DOC emissions of C, N_20 and CH_4 emissions due to drainage of organic soils.
- In accordance with Decision 2/CMP.6, Ireland's FMRL submission included a description of the domestic policies adopted and implemented no later than December 2009 and explain how these polices have been considered in the construction of the FMRL. Ireland confirms that the construction of the FMRL does not include assumptions about changes to domestic

policies adopted and implemented after December 2009. However, Ireland has obtained new historical data for:

- FM areas due to new deforestation data based on the repeat NFI in 2012 (See Table 4 below).
- New harvest rates from FM areas based on new national forest inventory (NFI) data (Table 4).

These data have been used to recalculate the historical and projected time series and a technical correction will be applied **when accounting** for FM activities.

- New historical activity data (prior to 2009) and new methods for HWP estimations have been applied. Therefore, HWP pools emission reductions have been recalculated for the whole time series. The new methods include differentiation of domestic harvests from deforestation and those originating from FM lands remaining as FM land (IPCC 2013 GPG KP-LULUCF).

Table 4. A comparison of previous activity data for 1990-2009 used for the FMRL submission and the new data used in the 2014 inventory

	Area (Kha)		Harvests (M m^3)	
Year	FM 2014 inventory	FMRL submission	FM 2014 inventory	FMRL submission
1990	465.26	**481.35**	1.676	**1.787**
1991	465.24	**479.91**	1.767	**1.837**
1992	465.22	**476.96**	2.082	**2.156**
1993	465.20	**479.40**	2.097	**2.003**
1994	465.18	**480.70**	2.283	**2.220**
1995	464.84	**474.14**	2.377	**2.424**
1996	464.51	**463.20**	2.461	**2.520**
1997	464.18	**461.33**	2.313	**2.398**
1998	463.84	**463.32**	2.632	**2.493**
1999	463.51	**466.75**	2.765	**2.842**
2000	462.65	**462.14**	3.002	**2.940**
2001	461.79	**456.02**	2.822	**2.700**
2002	460.94	**450.85**	2.899	**2.911**
2003	460.08	**458.81**	2.986	**2.951**
2004	459.22	**456.45**	2.829	**2.818**
2005	458.37	**454.35**	2.925	**2.775**
2006	456.37	**477.21**	2.947	**2.803**
2007	454.77	**444.52**	2.864	**2.160**
2008	452.77	**446.94**	2.209	**2.056**
2009	451.97	**447.29**	2.682	**2.392**
2010	451.17		3.036	1.833
2011	449.57		2.729	2.061
2012	449.57		2.735	2.314
2013	449.53		2.827	2.390
2014	499.40		2.215	2.104

Major reasons for the difference in the FMRLcorr and FMRL include:

- The new version of the CARBWARE model (v5) is a dynamic model which provides more accurate estimates of biomass, litter and deadwood CSC over time. The older version 4.5 of the model assumed that younger age classes (i.e. those less than 7 years old) exhibited a zero CSC.

- Higher CO_2 and non-CO_2 emissions from soils due to the new Wetland supplement methodology.
- Larger removals from the HWP pool in the FMRLcorr due to new methods applied and the higher historical harvest up to 2009, based on the new data. The allocation of HWP feedstock to FMRLcorr was also higher than the FMRL submission due to a change in methodology used.

Table 5. Summary of the FMRL recalculated (FMRLcorr) values for different pools in 2014, compared to the FMRL and reported FM (reported FM) emission/removal for 2013. Note that the FMRL shown is the value for 2014 not the annual average over the period 2013-2020 as indicated in the annex to 2/CMP.7

	FMRLcorr 2014	2/CMP.7 submission 2014	Reported FM in 2014
Biomass (kt C)	-46.01	146.65	-121.23
Litter	194.28	48.24	213.25
Deadwood	21.50	33.76	41.84
Soils	-128.21	-95.22	-127.43
Sub-total CO_2	**-152.39**	**-489.24**	**-23.55**
Fires CO_2 eq	**12.00**	**12.00**	**56.94**
N_2O and CH_4 drainage CO_2eq	**128.44**	**10.94**	**128.32**
HWP CO_2 eq	**-369.18**	**-35.98**	**-418.31**
Total CO_2 eq	**-381.13**	**-502.28**	**-256.60**
FMRL 2013-2020		**-142.07**	

Indicative accountable amount for 2014 under FM (kt CO_2eq)	**10.00**

Reasons for the differences between the FMRLcorr and reported FM emission/removal are due to:

- Slightly higher losses of biomass stock for the reported FM areas for 2014 due to a higher harvest than what was used in the projected FMRLcorr, based on policies implemented up to the end of 2009.
- The slightly higher HWP removal for the reported FM for 2014, compared to the FMRLcorr, is due to the higher reported harvest of 2.215 Mm^3, compared to a projected 2.104 Mm^3 in the FMRL submission (Table 4).

It should be noted that the recalculations and the technical correction shown in Table 5 are indicative and need only to be applied when Ireland accounts at the end of the second commitment period in accordance with paragraph 14, of annex to decision 2/CMP.7.

j) Information on how emissions from harvested wood products originating from forests prior to the start of the second commitment period have been calculated in the reference level in accordance with decision 2/CMP.7, annex, paragraph 16

The primary activity data used for estimating HWP CSC for the reference level is the EUROSTAT and FAO data form 1961 to 2009. The harvest data from 2009 to 2012 was based on the Irish national roundwood harvest forecast 2013-2028, shown in Table 4 above. The method used to derive domestically produced HWP is outlined in the following steps below:

- Derive sawnwood (SW), wood based panel (WBP), paper and paper board (PPB) HWP feed stock from FAO/EUROSTAT data using Eq 2.8.1 and 2.8.2 of the GPG KP-LULUCF 2013. This uses the data produced in CRF 4.Gs2 and f_{irw} and f_{pulp} ratios to derive the volume of SW, WBP and PPB (see Table 6).
- Volumes of the SW and WBP HWP from domestic harvest are converted to tC using default conversion factors. The aggregate value of 0.458 and 0.595 Mg/m^3 is used for SW and WBP, respectively (Table 2.8.1 IPCC 2013 GPG KP-LULUCF). A carbon fraction of 0.5 is used for SW and a C fraction of 0.454 for WBP (Table 2.8.1 of the IPCC 2013 GPG KP-LULUCF). The final inflows of different domestically produced HWP are shown in Table 6.
- Harvest product data was further extrapolated back to 1900 using regression equations using a exponential function for each wood product (WP_j):

$$WPj = e^{0.015(year-1961)\times tC1961j} \quad (1)$$

where *year* is the specific year before 1961 and $tC1961_j$ is the tC feedstock for the wood product j in 1961. Historic consumption rates from 1900-1960, using a growth rate of 1.15% y^{-1}, were used to estimate emissions from products entering the system prior to 1961, as outlined in 2006 IPCC Guidelines Volume 4, Agriculture, Forestry and Other Land Use (2006 IPCC AFOLU).

- The tier 2 first order decay model Forestry production and trade data from 1990-2012 from FAO and historical growth for timber utilisation (see Tables 4 and 6) were used to estimate harvested wood product (HWP) emissions/removals in Ireland for 1900-2012 using a model based on 2006 IPCC AFOLU; i.e. the Pingoud and Wagner 2006 model:

$$C_{i+1} = e^{-k} \times C_i + \left[\frac{(1-e^{-k})}{k}\right] \times Inflow_i \quad (2)$$

$$\Delta C_i = C_{i+1} - C_i \quad (3)$$

Where:

i = year

C_i = the carbon stock in the particular HWP category from a particular forest activity at the beginning of year *i*, kt C

k = decay constant of first-order decay for HWP category given in units yr^{-1} (k = ln(2)/HL, where HL is half-life of the HWP pool in years (see below).

$Inflow_i$ = the inflow to the particular HWP category (HWP_j) during year i, kt C yr^{-1}

ΔC_i = carbon stock change of the HWP category during year i, kt C yr^{-1}

Default half-lives of two years for paper, 25 years for wood-based panels, and 35 years for sawn wood[6] were used to estimate emissions resulting from products coming out of use.

[6] Product categories, half-lives and methodologies outlined in para 27, page 31 of FCCC/KP/AWG/2010/CRP.4/Rev.4

Table 6. Annual inflows of sawnwood (SW), wood-based panels (WBP), paper and paper board (PPB) from domestic harvest for the FMRL for periods up to the beginning of the second commitment period

Year	f_{FWi}	Sawnwood inflow kt C	Woodbased panels inflow kt C	Paper inflow kt C	Sawnwood stock kt C	Woodbased panels stock kt C	Paper stock kt C	Sawnwood Δstock kt C	Woodbased panels Δstock kt C	Paper Δstock kt C	Total Δstock kt CO_2
1900	0.82	5,146	2,733	1,753	5,095	2,695	1,481				
1920	0.82	6,476	3,439	2,206	100,248	49,488	6,191	4,536	2,096	72.2	-24.6
1940	0.82	8,151	4,329	2,777	189,319	88,762	5,943	4,446	1,894	856.6	-26.4
1960	0.82	10,259	5,448	3,495	280,772	126,922	9,810	4,745	1,956	112.9	-25.0
1970	0.82	10,908	30,283	3,591	324,689	233,487	10,791	4,523	24,142	-177.8	-104.5
1980	0.90	28,760	16,774	7,797	417,058	433,919	21,768	20,705	4,809	302.1	-94.7
1990	0.97	86,629	63,271	0	931,996	703,059	817	68,851	44,391	-338.3	-414.0
1995	0.97	149,887	87,255	0	1,480,955	940,082	144	121,760	62,047	-59.8	-673.7
2000	0.97	191,957	189,168	0	2,100,235	1,559,323	26	151,862	147,977	-10.6	-1099.4
2001	0.99	199,650	186,126	0	2,256,737	1,700,252	18	156,502	140,930	-7.5	-1090.6
2002	0.99	173,979	174,977	0	2,384,751	1,826,333	13	128,014	126,080	-5.3	-931.7
2003	0.99	211,403	205,768	0	2,547,311	1,979,333	9	162,560	153,001	-3.7	-1157.0
2004	0.99	194,669	204,839	0	2,690,114	2,127,233	6	142,803	147,900	-2.6	-1065.9
2005	0.99	221,204	237,902	0	2,856,391	2,303,699	5	166,276	176,465	-1.9	-1256.7
2006	0.99	228,270	254,002	0	3,026,403	2,491,217	3	170,013	187,518	-1.3	-1310.9
2007	0.99	206,142	238,142	0	3,171,171	2,657,966	2	144,768	166,749	-0.9	-1142.2
2008	0.98	132,735	190,596	0	3,240,416	2,773,262	2	69,245	115,296	-0.7	-676.6
2009	0.93	142,131	152,879	0	3,317,606	2,848,206	1	77,190	74,944	-0.5	-557.8
2010	0.93	161,899	185,141	0	3,412,857	2,952,919	1	95,250	104,713	-0.3	-733.2
2011	0.93	149,373	170,703	0	3,493,837	3,040,530	1	80,980	87,611	-0.2	-618.2
2012	0.92	143,877	187,825	0	3,567,786	3,142,631	0	73,949	102,101	-0.2	-645.5

k) An indication of whether it intends to apply the provisions to exclude emissions from natural disturbances for the accounting for afforestation and reforestation under Article 3, paragraph 3, of the Kyoto Protocol and/or forest management under Article 3, paragraph 4, of the Kyoto Protocol during the second commitment period

Ireland may wish to apply the provisions to exclude emissions from natural disturbances for the accounting for afforestation and reforestation under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, of the Kyoto Protocol during the second commitment period in accordance with decision 2/CMP.7, annex, paragraph 33.

Emissions for wild fires will be excluded under the natural disturbance provision for both Article 3, paragraph 3, and Article 3, paragraph 4 activities. The calibration data to calculate the background level and margin includes the period 1990-2009, but has been extended to 2012 to account for most recent data (Table 7a and 7b). Wildfires have only been recorded in AR lands since 2008 and are assumed not to occur before 2008.

Table 7a. Total and area specific emissions from disturbances for the calibration period for FM

Total annual emission kt CO_2 eq.

Year	Wildfires	Insect attacks /diseases	extreme weather	geological disturbances	other	Area (ha)
1990	113					389
1991	73					250
1992	47					161
1993	94					324
1994	108					372
1995	148					508
1996	164					565
1997	90					309
1998	47					163
1999	39					133
2000	97					334
2001	194					666
2002	45					153
2003	275					944
2004	160					550
2005	58					200
2006	58					200
2007	65					225
2008	51					175
2009	28					98
2010	185					636
2011	69					237
2012	17					60

Table 7b. Total and area specific emissions from disturbances for the calibration period for AR

	Total annual emission kt CO_2 eq.					
Year	Wildfires	Insect attacks /diseases	extreme weather	geological disturbances	other	Area (ha)
2008	17					99
2009	10					57
2010	64					377
2011	24					139
2012	6					35

Ireland does not include disturbance event emissions associated with windthrow damage under the natural disturbance provision because all timber in windthrown areas is assumed to be recovered by salvage logging. Emissions associated with windthrow (i.e. biomass, litter, deadwood etc.) are captured in the NFI inventory and included under ARD or FM CSCs. Insect and disease infestations currently cause minimal emissions and are assumed to be captured by the inventory as reflected by the NFI permanent sample plot data.

The default method for estimating the background and margin for the natural disturbance provision is applied to the calibration data for both FM and AR disturbances using default approaches (Box 2.3.6 IPCC 2013 GPG KP-LULUCF). The final background and margin is derived at step VI, as outlined in the IPCC 2013 GPG KP-LULUCF (see table 8 below).

Table 8. Calculation steps used to derive the background and harvest for FM and AR for the second commitment period (see Box 2.3.6 of IPCC 2013 GPG KP-LULUCF for detailed methods).

	kt CO_2 eq. for FM					
Background/margin	I step	II step	III step	IV step	V step	VI step
Arithmetic mean	97	89	84	79	74	69
standard deviation	64	52	48	43	39	33
background+margin	225	193	179	164	151	136

	kt CO_2 eq. for AR					
Background/margin	I step	II step	III step	IV step	V step	VI step
Arithmetic mean	0.09	0.09	0.09	0.09	0.09	0.09
standard deviation	0.08	0.08	0.08	0.08	0.08	0.08
background+margin	0.25	0.25	0.25	0.25	0.25	0.25

l) A description of its national system in accordance with Article 5, paragraph 1, of the Kyoto Protocol

In accordance with paragraph 1 (l), in Annex I to Decision 2/CMP.8, a description of the national system in accordance with Article 5, paragraph 1, of the Kyoto Protocol, reported in accordance with

the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol” is not included in this report as Ireland did have a quantified emission limitation and reduction target in the first commitment period.

m) A description of its national registry, reported in accordance with the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol

In accordance with paragraph 1 (m), in Annex I to Decision 2/CMP.8, a description of its national registry, reported in accordance with the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”, is not included in this report as Ireland did have a quantified emission limitation and reduction target in the first commitment period.

Annex I

Ireland's total emissions and removals of Greenhouse Gases for 1990-2014

GREENHOUSE GAS EMISSIONS	Base year[1]	1990	1995	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change from base to latest reported year
	CO_2 equivalent (kt)															(%)
CO_2 emissions without net CO_2 from LULUCF	32768.53	32768.53	35718.75	45123.34	46042.40	47952.20	47405.97	47493.13	47175.54	41996.32	41558.28	37895.20	38031.62	37049.42	36559.07	11.57
CO_2 emissions with net CO_2 from LULUCF	38605.05	38605.05	42336.90	51011.28	51260.33	53056.11	53348.43	52116.17	50731.54	44874.00	45804.39	41798.47	42256.77	41192.73	41010.00	6.23
CH_4 emissions without CH_4 from LULUCF	14881.83	14881.83	15129.79	14532.20	14248.85	13980.91	13992.23	13363.27	13206.66	12870.74	12632.79	12594.40	12891.04	13224.50	13433.35	-9.73
CH_4 emissions with CH_4 from LULUCF	15124.12	15124.12	15458.83	14828.90	14663.48	14293.98	14324.16	13704.95	13586.24	13215.29	13258.10	13036.50	13237.49	13671.72	13858.62	-8.37
N_2O emissions without N_2O from LULUCF	8402.25	8402.25	8658.24	8640.47	7563.72	7367.67	7137.90	6964.07	6954.77	6881.96	7032.35	6624.15	6703.77	7084.87	6985.06	-16.87
N_2O emissions with N_2O from LULUCF	8545.86	8545.86	8844.69	8862.82	7848.19	7647.98	7433.05	7270.96	7298.54	7219.72	7421.27	6969.98	7035.73	7432.65	7330.23	-14.22
HFCs	1.23	1.23	103.19	456.66	682.54	678.88	899.16	906.28	845.81	915.14	932.08	955.22	948.64	1070.05	1155.42	93524.88
PFCs	0.12	0.12	97.61	397.76	234.81	216.39	190.96	168.10	136.14	83.63	46.58	15.88	9.56	8.32	9.00	7417.75
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
SF_6	33.88	33.88	79.11	51.76	65.34	96.78	60.21	62.94	54.69	39.18	33.08	45.45	37.39	43.53	46.29	36.63
NF_3	NO	NO	4.37	49.17	18.08	28.38	28.21	37.67	NO	NO	NO	NO	0.78	0.90	0.96	
Total (without LULUCF)	56087.84	56087.84	59791.07	69251.35	68855.75	70321.21	69714.62	68995.46	68373.60	62786.98	62235.15	58130.30	58622.80	58481.61	58189.15	3.75
Total (with LULUCF)	62310.27	62310.27	66924.71	75658.34	74772.77	76018.50	76284.18	74267.08	72652.95	66346.96	67495.50	62821.50	63526.36	63419.91	63410.53	1.77
Total (without LULUCF, with indirect)	56168.55	56168.55	59872.75	69324.96	68932.67	70396.33	69795.17	69083.20	68451.00	62859.38	62299.01	58194.67	58685.21	58546.73	58253.67	3.71
Total (with LULUCF, with indirect)	62390.98	62390.98	67006.38	75731.94	74849.70	76093.61	76364.72	74354.82	72730.35	66419.36	67559.36	62885.87	63588.78	63485.03	63475.05	1.74

Ireland's total emissions and removals of Greenhouse Gases for 1990-2014

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1995	2000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change from base to latest reported year
	CO_2 equivalent (kt)															(%)
1. Energy	31118.46	31118.46	33893.12	42526.07	43826.42	45648.87	45151.78	45115.15	45210.08	40741.86	40358.42	36871.68	36911.88	35726.89	35000.11	12.47
2. Industrial processes and product use	3200.02	3200.02	3199.21	4673.25	3580.50	3693.91	3796.28	3844.87	3419.38	2605.87	2386.79	2262.74	2464.72	2503.40	2942.29	-8.05
3. Agriculture	20123.65	20123.65	20722.75	20300.42	19529.21	19192.19	18883.60	18599.11	18428.65	18269.11	18315.27	17729.52	18060.13	18905.48	18754.32	-6.80
4. Land use, land-use change and forestry[5]	6222.43	6222.43	7133.64	6406.99	5917.02	5697.29	6569.56	5271.62	4279.35	3559.98	5260.34	4691.20	4903.56	4938.30	5221.38	-16.09
5. Waste	1645.71	1645.71	1975.99	1751.62	1919.62	1786.23	1882.96	1436.34	1315.50	1170.14	1174.67	1266.35	1186.07	1345.84	1492.43	-9.31
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Total (including LULUCF)[5]	62310.27	62310.27	66924.71	75658.34	74772.77	76018.50	76284.18	74267.08	72652.95	66346.96	67495.50	62821.50	63526.36	63419.91	63410.53	1.77

Annex II

The agreement under Article 4 of the Kyoto Protocol for the second commitment period, where the Party has reached such an agreement to fulfil its commitments under Article 3 of the Kyoto Protocol jointly with other Parties

II

(Non-legislative acts)

INTERNATIONAL AGREEMENTS

COUNCIL DECISION (EU) 2015/1339

of 13 July 2015

on the conclusion, on behalf of the European Union, of the Doha Amendment to the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1), in conjunction with point (a) of second subparagraph of Article 218(6), thereof,

Having regard to the proposal from the European Commission,

Having regard to the consent of the European Parliament ([1]),

Whereas:

(1) At the Doha Climate Change Conference in December 2012, parties to the Kyoto Protocol to the United Nations Framework Convention on Climate Change ('the Kyoto Protocol') adopted the Doha Amendment, establishing a second commitment period of the Kyoto Protocol, starting on 1 January 2013 and ending on 31 December 2020 ('the Doha Amendment'). The Doha Amendment amends Annex B to the Kyoto Protocol, setting out further legally-binding mitigation commitments for parties listed in that Annex for the second commitment period, and amending and further laying down provisions on the implementation of parties' mitigation commitments during the second commitment period.

(2) The Union and its Member States agreed to the Doha Amendment as part of a package whereby parties to the United Nations Framework Convention on Climate Change ('the Convention') agreed to adopt, by the end of 2015, a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all parties, which should come into effect and be implemented from 2020. Negotiations on this legally-binding instrument are ongoing under the *Ad Hoc* Working Group on the Durban Platform for Enhanced Action.

(3) The Doha Amendment is subject to acceptance by the parties to the Kyoto Protocol, and will enter into force for those parties having accepted it on the 90th day after the date of receipt by the Convention Depositary of an instrument of acceptance by at least three fourths of the parties to the Kyoto Protocol. A total of 144 instruments of acceptance are required for the entry into force of the Doha Amendment.

(4) The Council agreed, in its conclusions of 9 March 2012, to propose a joint quantified emission reduction commitment of 20 % for the second commitment period of the Kyoto Protocol for the Union and its Member States. That commitment was determined on the basis of the total greenhouse gas emissions allowed during the period 2013-2020 under the climate and energy package ([2]).

(1) Consent of 10 June 2015 (not yet published in the Official Journal).
(2) Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, p. 63) and Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (OJ L 140, 5.6.2009,p. 136).

(5) The Council further agreed, in line with this approach, that the emission reduction obligations of individual Member States are not to exceed the obligations agreed in Union legislation, and that the commitment is to be based on the sum of base year emissions of the Member States in accordance with the Kyoto Protocol. Accordingly, the Union and its Member States agreed at the Doha Climate Change Conference to a quantified emission reduction commitment that limits their average annual emissions of greenhouse gases during the second commitment period to 80 % of the sum of their base year emissions. This is reflected in the Doha Amendment.

(6) In line with the Council's conclusions of 9 March 2012, the Union and its Member States have also offered to move to a 30 % reduction by 2020 compared to 1990 levels, as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions, and that developing countries contribute adequately according to their responsibilities and respective capabilities. This offer is also reflected in the Doha Amendment.

(7) The targets for the Union and its Member States are listed in the Doha Amendment with a footnote stating that those targets are based on the understanding that they will be fulfilled jointly by the European Union and its Member States, in accordance with Article 4 of the Kyoto Protocol. The Union, its Member States, Croatia and Iceland also issued a joint declaration upon the adoption of the Doha Amendment, expressing their intention to fulfil jointly their commitments for the second commitment period. This declaration is reflected in the Report of the Conference and was reiterated in the Council's conclusions of 17 December 2012.

(8) In deciding to fulfil their commitments jointly in accordance with Article 4 of the Kyoto Protocol, the Union and its Member States are jointly responsible, under paragraph 6 of that Article and in accordance with Article 24(2) of the Kyoto Protocol, for the fulfilment of their quantified emission reduction commitments under Article 3(1 *bis*) of the Kyoto Protocol. Consequently, and in accordance with Article 4(3) of the Treaty on European Union, Member States individually and collectively have the obligation to take all appropriate measures, whether general or particular, to ensure fulfilment of the obligations resulting from action taken by the institutions of the Union, to facilitate the achievement of that commitment and to abstain from any measure that could jeopardise its attainment.

(9) In the same declaration, the Union, its Member States, Croatia and Iceland also stated, in line with Article 4(1) of the Kyoto Protocol which allows parties to fulfil their commitments under Article 3 of the Kyoto Protocol jointly, that Article 3(7 *ter*) of the Kyoto Protocol will be applied to the joint assigned amount pursuant to the agreement on joint fulfilment by the Union, its Member States, Croatia and Iceland and will not be applied to any Member State, Croatia or Iceland individually. The Council, at its meeting on 15 December 2009, welcomed a request by Iceland to fulfil its commitments under a second commitment period jointly with the Union and its Member States and invited the Commission to present a recommendation for the opening of the necessary negotiations on an agreement with Iceland that is in line with the principles and criteria set out in the Union's climate and energy package. The Agreement between the European Union and its Member States, of the one part, and Iceland, of the other part, concerning Iceland's participation in the joint fulfilment of the commitments of the European Union, its Member States and Iceland for the second commitment period of the Kyoto Protocol to the United Nations Framework Convention on Climate Change ([1]) (the 'Agreement with Iceland') sets out the terms of that participation.

(10) Article 4 of the Kyoto Protocol requires parties that agree to fulfil their commitments under Article 3 of the Kyoto Protocol jointly to set out in the relevant joint fulfilment agreement the respective emission level allocated to each of the parties. The Kyoto Protocol requires the parties to a joint fulfilment agreement to notify the Convention Secretariat of the terms of that agreement on the date of deposit of their instruments of ratification or approval.

(11) Under the Convention and the Kyoto Protocol Member States are primarily responsible for their emissions. In order to facilitate accounting and compliance under the second commitment period, they have resolved to entrust the Union with the management of part of their assigned amount units by creating an assigned amount for the Union.

(12) In line with existing Union legislation, the respective emission level allocated to the Union covers the emissions of greenhouse gases under the Directive 2003/87/EC of the European Parliament and of the Council ([2]), to the extent that those greenhouse gas emissions are covered by Annex A to the Kyoto Protocol.

(1) See page 17 of this Official Journal.
(2) Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ L 275, 25.10.2003, p. 32).

(13) The respective emission levels of the Member States and Iceland cover the greenhouse gas emissions by sources and removals by sinks on their territories where those sources and sinks are not covered by Directive 2003/87/EC but are covered by the Kyoto Protocol. That includes all emissions by sources and removals by sinks from human-induced land use, land-use change and forestry (LULUCF) activities covered by Article 3(3) and (4) of the Kyoto Protocol, which are accounted by the respective Member States and Iceland, as well as all nitrogen trifluoride (NF_3) emissions.

(14) Any net emissions from LULUCF and NF_3 in a Member State can be compensated by that Member State's overperformance in other sectors not covered under the Union Emission Trading Scheme or by use of the Kyoto Protocol's flexible mechanisms. A Member State may also use surplus emission rights carried over from the first commitment period held in its Previous Period Surplus Reserve (PPSR) to cover emissions from LULUCF and NF_3, to the extent that its emissions exceed its assigned amount. Should it become apparent that a Member State still faces significant unexpected net emissions from LULUCF and NF_3, despite implementing robust policies to limit them, the Commission should consider further options to assist such a Member State.

(15) In line with the Council's conclusions of 9 March 2012 and the offer of the Union and its Member States to take on an 80 % target under the second commitment period, the emission levels of the Member States are equal to the sum of the annual emission allocations for the period 2013-2020 determined pursuant to Decision No 406/2009/EC of the European Parliament and of the Council ([1]). That amount, based on global warming potential values from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, was determined under Annex II to Commission Decision 2013/162/EU ([2]) and adjusted by Commission Implementing Decision 2013/634/EU ([3]). The emission level for Iceland was determined in the Agreement with Iceland.

(16) In line with recital 11, assigned amount units available in the Union registry at the end of the second commitment period should be returned to the Member States' registries after the Union has complied with its obligation laid down in Article 11(3) of Regulation (EU) No 525/2013 of the European Parliament and of the Council ([4]) and without prejudice to Article 10(7) of that Regulation. The allocation of the returned assigned amount units addresses the unique circumstances of the ratification of the Doha Amendment, and is not applicable to and does not prejudge any distribution of efforts among Member States in other contexts, either at international or Union level.

(17) Pursuant to Regulation (EU) No 525/2013, Member States are required to report the actual or estimated allocation of verified emissions reported by installations and operators under Directive 2003/87/EC to the source categories of the national greenhouse gas inventory, where possible, and the ratio of those verified emissions to the total reported greenhouse gas emissions in the source categories. That enables Member States to report separately on the emissions covered by their own emission levels. The section on the Union assigned amount in the Union report should identify the amount of emissions covered by the Union's assigned amount that occurred in each Member State.

(18) The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol has decided that each party with a commitment listed for the second commitment period should, by 15 April 2015, submit to the Convention Secretariat a report to facilitate the calculation of its assigned amount. The Commission should prepare a report to facilitate the calculation of the assigned amount of the Union, and a report to facilitate the calculation of the joint assigned amount of the Union, its Member States and Iceland. The Commission, Member States and Iceland should submit their reports by 15 April 2015, which will determine their assigned amounts as equal to their emission levels as listed in Annex I to this Decision.

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(1) Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (OJ L 140, 5.6.2009, p. 136).

(2) Commission Decision 2013/162/EU of 26 March 2013 on determining Member States' annual emission allocations for the period 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (OJ L 90, 28.3.2013, p. 106).

(3) Commission Implementing Decision 2013/634/EU of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (OJ L 292, 1.11.2013, p. 19).

(4) Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (OJ L 165, 18.6.2013, p. 13).

(19) In order to underline the commitment of the Union and its Member States to a timely entry into force of the Doha Amendment, the Union, its Member States and Iceland should endeavour to ratify it not later than the third quarter of 2015.

(20) The Doha Amendment should be approved on behalf of the Union,

HAS ADOPTED THIS DECISION:

Article 1

The Doha Amendment to the Kyoto Protocol to the United Nations Framework Convention on Climate Change agreed on 8 December 2012 in Doha is hereby approved on behalf of the Union.

The text of the Doha Amendment is attached to this Decision.

Article 2

The Union and its Member States shall fulfil their commitments under Article 3 of the Kyoto Protocol and the Doha Amendment in accordance with the notification of the terms of the agreement to fulfil jointly the commitments of the European Union, its Member States and Iceland under Article 3 of the Kyoto Protocol in accordance with Article 4 of the Kyoto Protocol ('the Notification'), set out in Annex I to this Decision.

Article 3

1. The assigned amounts of the Member States and Iceland shall be equal to the emission levels set out in the Notification. By 15 April 2015, each Member State shall submit to the Convention Secretariat a report to facilitate the calculation of its assigned amount, in accordance with the requirements of the Kyoto Protocol, the Doha Amendment and decisions adopted thereunder.

2. The Commission shall prepare a report to facilitate the calculation of the assigned amount of the Union, and a report to facilitate the calculation of the joint assigned amount of the Union, its Member States and Iceland ('the joint assigned amount'), in accordance with the requirements of the Kyoto Protocol, the Doha Amendment and decisions adopted thereunder. The Commission shall submit these reports to the Convention Secretariat by 15 April 2015.

Article 4

1. All assigned amount units issued for the second commitment period available in the Union registry after the Union has complied with its obligation laid down in Article 11(3) of Regulation (EU) No 525/2013 and after any transfer of assigned amount units pursuant to implementing acts adopted on the basis of Article 10(7) of Regulation (EU) No 525/2013 has been carried out ('Union surplus') shall be returned to the Member States at the end of the second commitment period.

2. The Union surplus shall be allocated to the Member States as follows:

(a) one sixth of the Union surplus to Member States that reduced their total average annual emissions by more than 20 % relative to their individual base year or period under the Kyoto Protocol by the end of the second commitment period proportionally to their overachievement in tonnes;

(b) one third of the Union surplus to Member States that receive a transfer under point (a) and that have a GDP per capita (GDP in 2013 in euro at market prices) below 60 % of the Union average proportionally to their overachievement in tonnes;

(c) one third of the Union surplus to all Member States proportionally to their total emission levels as set out in Table 1 in Annex I to this Decision;

(d) one sixth of the Union surplus to Member States that have a GDP per capita (GDP in 2013 in euro at market prices) below 90 % of the Union average proportionally to their total emission levels as set out in Table 1 in Annex I to this Decision.

Article 5

1. The President of the Council shall designate the person(s) empowered to deposit, on behalf of the Union, the instrument of acceptance with the Secretary-General of the United Nations in accordance with Articles 20(4) and 21(7) of the Kyoto Protocol, together with the declaration of competence set out in Annex II to this Decision, in accordance with Article 24(3) of the Kyoto Protocol.

2. The President of the Council shall also designate the person(s) empowered to notify, on behalf of the Union, the Notification to the Convention Secretariat in accordance with Article 4(2) of the Kyoto Protocol.

Article 6

1. Member States shall endeavour to take the necessary steps with a view to depositing their instruments of acceptance simultaneously with the instrument of acceptance of the Union, and to the extent possible in the third quarter of 2015. When depositing their instruments of acceptance, Member States shall notify, on their own behalf, the Notification to the Convention Secretariat in accordance with Article 4(2) of the Kyoto Protocol.

2. Member States shall inform the Commission in advance of the third session of the *Ad Hoc* Working Group on the Durban Platform for Enhanced Action to be held from 8 to 13 February 2015, of their decisions to accept the Doha Amendment or, according to the circumstances, of the probable date of completion of the necessary procedures for such acceptance. The Commission shall, in cooperation with the Member States, arrange a date for simultaneously depositing the instruments of approval or acceptance.

Article 7

This Decision is addressed to the Member States.

Article 8

This Decision shall enter into force on the third day following that of its publication in the *Official Journal of the European Union*.

Done at Brussels, 13 July 2015.

For the Council

The President

F. ETGEN