

National Forestry Accounting Plan Portugal 2021-2025



Final version, 1 March 2019



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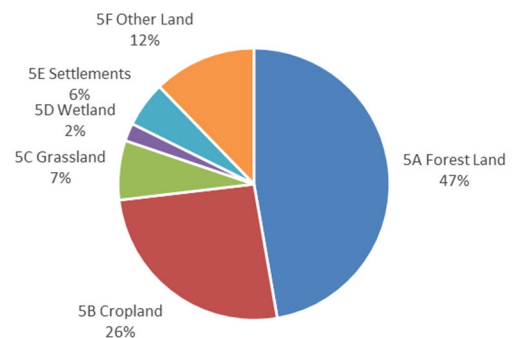
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1 Forests in Portugal

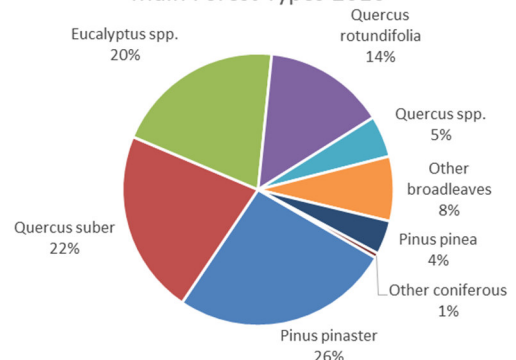
Forests are the main land-use in Portugal. In the Mainland forests are dominated by indigenous species, namely several oaks (including cork oak and holm oak “montados”) and pine trees. Eucalyptus (mainly Tasmanian blue gum and shinning gum) represent a large share of the forest area and the remaining area is occupied by less common species (including sweet chestnut, carob tree, acacia, poplar, riparian and other species). In the islands of the Azores there is a predominance of sweet pittosporum, formations of laurissilva and cedar, Japanese red-cedar, blackwood, eucalyptus and firetree. In the islands of Madeira laurissilva is the main forest type, followed by eucalyptus, maritime pine and blackwood and other acacias.

During the last century, there were significant changes in land use and forest cover in the Mainland. In the first half of the 20th century, there was a significant increase in agriculture and forest areas, at the expense of the area of shrubs and spontaneous (“uncultivated”) pastures; since the 1950s, the area under cultivation has substantially decreased. Regarding forest cover, after the growth of the maritime pine area, reaching its maximum in the 1980s, there was a significant decrease in its area, in parallel with the rapid increase of eucalyptus (since the 1960s).

Land-Use per UNFCCC Category 2016



Main Forest Types 2016



The Ministry of Agriculture, Forests and Rural Development and, in the Autonomous Regions, the Regional Secretariats of Agriculture and Forest (in the Azores) and the Environment and Natural Resources (in Madeira) are responsible for defining and implementing forest policy. The ICNF is the national forest authority and, simultaneously, the national authority for nature conservation and biodiversity.

The Portuguese forest sector is subordinated to the instruments of political administration provided for in the 1976 Constitution and the Forest Policy Act of 1996, as well as other specific legislation. The development of the sector follows government programs and the National Strategy for Forests (approved in 2006 and updated in 2015), which is implemented by 22 PROF (regional forest plans), of which 21 cover the Mainland (they will be 7 after the current revision) and 1 covers the Autonomous Region of Madeira. Public and community forests, as well as private properties above a given size, and ZIFs (forest intervention zones) must have a FMP (forest management plan). In the Mainland, about 3 000 FMP are approved, corresponding to 29% of the forest total area. Stone pine, cork oak and eucalyptus stands have a FMP coverage rate above the national average.

The National Forest Strategy (NFS) has been updated (RCM 6-B/2015) with a view to integrate the outcome of diagnostic studies carried out within the framework of the Rural Development Program 2020 and of Forest Health and Vitality Operational Programme (which deals with the phytosanitary issues of the main forest species).

Simultaneously, the NFS update also considered the efforts carried out within the framework of both the National Strategy for Climate Change Adaptation and the National Action Programme to Combat Desertification.

The EU Forest Strategy's concerns and orientations together with the ones from the EU Biodiversity Strategy and from the "Europe 2020: A European strategy for smart, sustainable and inclusive growth" particularly in

relation to Green Economy were also taken into account. Finally, the reinforcement of the sustainable forest management guidance, as a result of Forest Europe and United Nations Forum on Forests commitments and outcomes, was also incorporated.

Following the NFS update and focusing now on its operationalisation, the Regional Programmes on Forest Planning (PROF) are also being updated in order to cope with the revised NFS, thus assuring, at regional level, the development of its options and objectives and defining the implementation guidelines, establishing the necessary format of articulation with the other relevant land planning instruments.

It should be highlighted that PROFs are sectoral land planning instruments foreseen in the Forest Policy Act (Law 33/96, 17 August) which establish the framework for the use of forest areas with a view of a sustainable and sustained production of forest goods and services.

Portugal is *sui generis* with regard to forest ownership. In fact, only about 3% of the forest land is owned by the State and other Public Administration agencies, the remainder being held by local communities (the so-called “commons”, “baldios” in Portuguese), with about 6%, largely subject to the compulsory Forest Regime Act, and by private owners (92%, 4% of which are managed by industrial companies). The family forest holdings number several hundred thousand. At European level, (EU-28) 40% of the forest is owned by public agencies, ranging from 19% (in Austria) to 86% (in Bulgaria).

There are 11.7 million rural properties inscribed in the Ministry of Finance tax registry and 1,107 commons. Only 46% of the forest properties have an official land registry title. It is estimated that more than 20% of the total forest area has no owner, or its owner is unknown.

Therefore, the promotion of associativism of the private owners of natural and forest resources has been, for some decades, one of the main objectives in the forestry, hunting and inland fisheries public policies. Currently, 135 forest owners' organisations are registered in the ICNF, which include associations of forest owners and producers, forest cooperatives or cooperatives with a forest section, and their federations, 77% having a municipal level.

On the other hand, since 2005 there has been a significant expansion of the cooperative management of the forest lands through the “forest intervention zones” (ZIF), which currently cover 1.1 M ha and include more than 23 000 forest owners and are managed by more than 70 different entities (including forest owners associations, cooperatives and companies).

The production function is the most significant contributor to forest gross value, with its associated 876 M€. This is followed by the protection function 136 M€, the conservation function 66 M€ and to the function of silvopastoralism, hunting and fishing in the inland waters, which accounts for 312 M€. Expenditure on forest fires, phytosanitary measures and control of alien invasive species amounts a negative value of -394 M€ per year. Traditional forest related activities (forestry, hunting, fishing and forest industries) are responsible for about 80 000 jobs, particularly in economically depressed and depopulated regions.

Trees in the Portuguese forest represent a total volume of 186 million m³, and on average produce annually 11.5 million m³ of wood, mainly log of eucalyptus and pinewood, and 100 kt of cork, representing 50% of world cork production. The production of resin (8 kt), pine nuts (70 kt of stone pine cones) and chestnut (25 kt) is also relevant, as well as numerous other non-wood forest products, which are the raw material of several industries.

The GVA (gross value added) of forestry and forest industries is 800 million euros and represents 0.6% of the national GVA (2014, main products), while the forest sector is worth an estimated 2.5% of the national GDP. Forest products account for an average of 10% of exports (in value), with a high national incorporation rate (71%) and its value is of the same order of magnitude as the entire Portuguese food trade deficit.

Forest biomass is one of the main sources of energy currently used in Portugal and (among renewable energy sources) is the most easily used at any time of the year. A recent assessment estimated the potential availability of biomass for energy production (from forest and wood processing industry sources) at 2.2 Mt/year. According to DGEG (2016), about 54% of renewable energy production comes from biomass [2.7 ktoe], which corresponds

to 13% of the country's total final energy consumption. Regarding the electro producer system, installed capacity is 553 MW (4.1% of total renewables), of which 123 MW without cogeneration (9 dedicated plants). Firewood and charcoal are very relevant for industrial and domestic consumption, with coal production rising to an average of 16,800 tons per year in the last decade. The Portuguese production of pellets is also significant, with 1.1 million tons per year, of which 80% for export.

Most of the forest areas have silvopastoral uses, either under tree cover (mainly in the "montado") or in improved pastures (eg. in the forest perimeters in the Azores), or in shrublands and spontaneous pastures, representing 2.3 million ha. The main autochthonous breeds, including the black pig, several mountain cattle breeds or the fighting bull, depend on forest areas. On the other hand, according to 2016 data, 87% of the territory is managed for hunting and 114,333 hunting licenses were issued. In relation to inland waters fishing there are already 313 fishing concessions and 166,450 fishing licenses issued, with 8 State aquaculture stations or fish hatcheries and 30 private fish farms in fresh water. There are hundreds of thousands of people involved in hunting and fishing, including tourists.

Forests contribute significantly to carbon sequestration and storage and Portugal was one of the few countries that elected forest activities to offset greenhouse gas emissions in other sectors (transportation, industry, etc.), within the Kyoto Protocol (2008-2012). The Portuguese forests are a reservoir of 265 Mt CO₂eq [carbon] and sequester 13.5 Mt CO₂eq per year, more than double the industrial emissions.

On the other hand, combating desertification and land degradation required the adoption of a specific strategy for the 63% of the Mainland (plus part of Madeira) classified as "susceptible", in which the forest area decreased by 2% between 1995 and 2010.

Forest fires, storms, droughts, pests and invasive alien species are the main natural factors that threaten the sustainability of forest uses. In mainland Portugal and Madeira, recurrent fires and pests (affecting mainly pine, eucalyptus and oaks) are the cause of the largest losses of forest area and productivity, with 85,000 ha of forest stands burned annually in the last decade (average). In the Azores, storms and alien plant invasions are the main limiting factors.

Portugal is increasingly urbanized: in 2011, 61% of the population lives in urban centers with more than 2,000 inhabitants. In municipal land-use plans, the "urban land" (including both totally or partially built soil and soil included in the ecological reserve) covers about 550 000 ha, of which 12% has forest and 15% other semi-natural land uses. Urban and peri-urban forests are becoming increasingly more important for the quality of life of citizens, as demonstrated by the Monsanto Forest Park (Lisbon), the Choupal National Forest (Coimbra) or the Amarante Forest Park, among others.

Forests are among the most important national tourism resources, sometimes associated with monuments (eg. Buçaco National Forest or Pena Park). Some case studies show the dimension of this value: the Laurissilva Forest of Madeira makes possible a touristic offer that is worth more than 140 M € annually [Rego, 2012].

In the Azores there is a network of forest recreation reserves (26, with 375 ha) and in Madeira a network of forest parks (7) and recreational and leisure areas (23). In the Mainland, in the areas subject to the forest regime (forest perimeters and national forests) there are 231 forest recreation facilities, in addition to 14 urban/peri-urban forest parks managed by ICNF.

2 Description of the Forest Reference Level

2.1 Approach to FRL Construction

Portugal adopted a relatively simple approach to the construction of its Forest Reference Level (FRL).

The FRL is totally based on the National Inventory Report and the structure and contents of the respective Common Reporting Tables. The FRL refers to the UNFCCC category "4.A.1 Forest Land Remaining Forest Land" and results from the sum of the following quantities:

- Living Biomass Gains (CRF 4.A)
- Living Biomass Losses (CRF 4.A)
- Dead Wood Net-Emissions (CRF 4.A)
- Litter Net-Emissions (CRF 4.A)
- Mineral Soil Net-Emissions (CRF 4.A)
- Organic Soil Net-Emissions (CRF 4.A)
- Harvested Wood Products Net-Emissions (CRF 4.G)
- Emissions from Nitrogen Inputs to Managed Soils (CRF 4(I))
- Drainage and Rewetting of Soils (CRF 4(II))
- Direct N₂O Emissions from N Mineralization associated with Loss of Soil Organic Carbon (CRF 4(III))
- Indirect N₂O Emissions (CRF 4(IV))
- Biomass Burning Emissions (CRF 4(V))

Each of these quantities was estimated for the commitment period 2021-2025 bearing in mind the obligations under Article 8, paragraph 5 of Regulation (EU) 2018/841, which requires that the FRL to be "based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data".

The general approach to implement this requirement was to find in the period 2000-2009 one or more relevant "intensity indicators" which could then be used to characterise the same "management intensity" during the FRL period 2021-2025.

Regulation (EU) 2018/841 further states that "Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land". This requirement is naturally ensured by using the NIR calculation model to calculate the emission estimates in the FRL period 2021-2025. This approach ensures full estimation consistency and will also allow for future recalculations to be done in a transparent and accurate manner.

The following sections detail the approach used for each of the above mentioned quantities.

2.2 General Assumptions and Coverage

2.2.1 Definition of Forest and Application of the Managed Land Proxy

Portugal has adopted a forest definition consisting of the following parameters:

- Minimum land area: 1 ha
- Minimum tree cover: 10%
- Minimum tree height: 5 m
- Minimum width: 20 m

Consistent with national definitions, agri-forest systems (mostly of cork-oak and holm-oak) were included as forests whenever the tree cover exceeded 10%. Where the tree cover is below 10%, the areas are classified according to the dominant land-cover, most commonly as cropland, pastures or shrublands.

Also consistent with national definitions, some woody perennial crops like olive groves, vineyards and fruit production orchards were included as cropland, even if the characteristics of the vegetation would reach the forest thresholds mentioned above.

These parameters and definition were elected in Portugal's Initial Report to the 1st Commitment Period, confirmed for the 2nd Commitment Periods of the Kyoto Protocol and are within the agreed values in decisions 16/CMP.1 and 2/CMP.7, respectively. These parameters are also consistent with the values contained in Annex V of Decision 529/2013/EU and Annex II of Regulation (EU) 2018/841.

This definition was applied in the Portuguese GHG Inventory, in KP reporting and accounting, and will be maintained and applied for the implementation Regulation (EU) 2018/841.

This definition is to be applied consistently both in the reference period 2000-2009 and in the compliance period 2021-2025.

All lands, including forest land, are considered managed in the Portuguese LULUCF GHG Inventory.

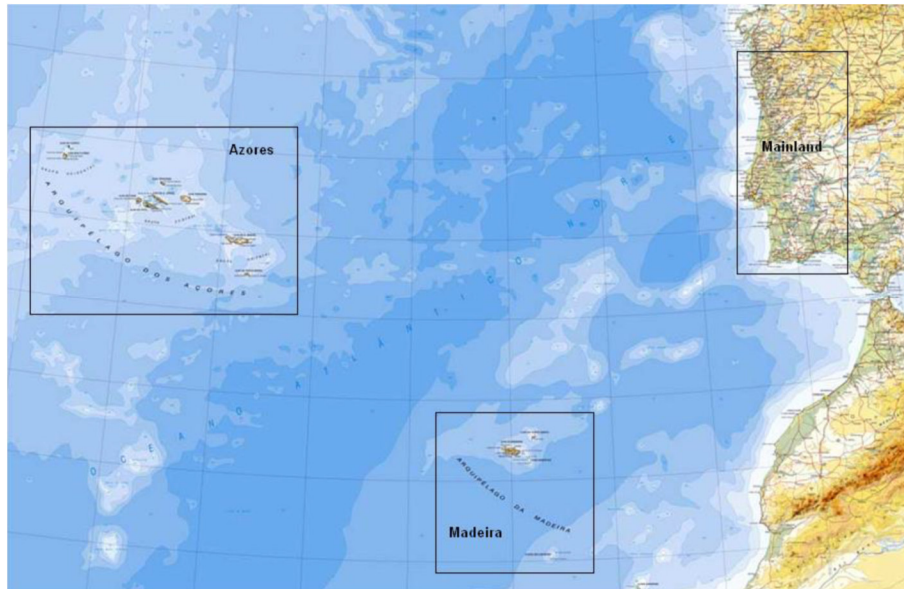
This assumption is to be applied consistently in both the reference period 2000-2009 and in the compliance period 2021-2025.

2.2.2 Geographical Coverage

Portugal has 9 239 318 ha, divided by the Mainland with 8 927 540 ha (96.6%), the Archipelago of Azores with 231 676 ha (2.5%) and Archipelago of Madeira with 80 102 ha (0.9%).

All lands in these three territories are considered and included in the Portuguese GHG Inventory.

This geographical coverage is to be applied consistently and is reflected in both in the reference period 2000-2009 and in the compliance period 2021-2025.



2.2.3 Conversion Period for Land-Use Changes

All land-use conversions in the Portuguese LULUCF GHG Inventory consider the IPCC default conversion period of 20 years. This includes all land-use transitions to and from forest land, as well as changes within forest land (e.g. changes in trees species).

Portugal will not apply the derogation foreseen in paragraph 2 of Article 6 of Regulation (EU) 2018/841 and consequently, land is shifted from the UNFCCC reporting category “A.2 Land Converted to Forests” (LF) to the category “A.1 Forest Land Remaining Forest Land” (FF) 20 years after the year of conversion.

This conversion period is applied consistently and is reflected in both in the reference period 2000-2009 and in the compliance period 2021-2025.

2.2.4 Stratification of Forest Land and other Land-uses

For the purposes of the Portuguese National GHG Inventory, land-use is stratified into 19 different classes, out of which forest lands are stratified according to eight classes.

All possible 19x19 land-use transitions are considered in PT NIR 2018.

UNFCCC Category	Land-use Category Name	Description
Forest Land	Pinus pinaster	Forests dominated by maritime pine
	Quercus suber	Forests dominated by cork oak
	Eucalyptus spp.	Forests dominated by eucalypt species
	Quercus rotundifolia	Forests dominated by holm oak
	Quercus spp.	Forests dominated by other oaks
	Other broadleaves	Forests dominated by any other broadleaf species
	Pinus pinea	Forests dominated by umbrella pine
	Other coniferous	Forests dominated by any other coniferous species
Cropland	Rain-fed annual crops	Includes all land cultivated with annual crops without irrigation Includes fallow-land integrated into crop-rotations
	Irrigated annual crops	Includes all land cultivated with annual crops that is under irrigation (except rice) and greenhouses
	Rice paddies	Includes all land prepared for rice cultivation
	Vineyards	Includes all areas used for cultivation of table and/or wine grapes
	Olive groves	Includes all areas used for cultivation of <i>Olea europea</i> ¹
	Other permanent crops	Includes all areas used for cultivation of all other species of woody crops, including fruit orchards ²
Grassland	All grasslands	Includes all lands covered in permanent herbaceous cover
Wetlands	Wetlands	Includes all lands permanently or temporarily covered in water, such as natural wetlands, water reservoirs and inland natural lagoons, lakes and estuaries
Settlements	Settlements	Includes all artificial territories, including cities and villages, industry, roads and railway, ports and airports
Other Land	Shrubland	Includes all lands covered in woody vegetation that do not meet the forest or permanent crop definitions
	Other land	Includes all lands that do not meet the previous definitions, such as lands covered in rocks, sand dunes, etc.

This stratification is applied consistently and is reflected in both in the reference period 2000-2009 and in the compliance period 2021-2025.

2.2.4.1 Recalculations

Recalculations may be required during the Commitment Period in the event of changes in the stratification which affect relevant land-uses for the calculation of the FRL.

¹ Olive trees used for the production of olive oil and/or olives. The Wild Olive Tree (sub-species *Olea europea sylvestris*) is reported as Forest Land / Other Broadleaves

² Except Sweet Chestnut (*Castanea sativa*), Carob Trees (*Ceratonia siliqua*) and Umbrella Pines (*Pinus pinea*), which are reported to FAO as forest land, even though their main production objective is the respective fruit.

2.2.5 Forest Land and Area per Forest Stratum

In the Portuguese National GHG Inventory, the area of “Forest Land Remaining Forest Land” (FL↔FL) in year X is calculated as:

- the area of FL↔FL in year X-1

minus

- the area of “Forest Land converted to Other Land Uses” (FL→L) in year X

plus

- the area of “Other Land Uses converted to Forests” (L→FL) in year X-20.

Keeping unchanged the most recent trends in land-use changes (latest data available = LUC between 2007 and 2010) would lead to a stabilisation of the total forest area in Portugal (+0.05% by 2050 compared with estimate for 2016).

However, the area of Forest Land Remaining Forest Land (FL↔FL) is expected to increase by 5.49% by 2050 compared with estimate for 2016, as land afforested more than 20 years ago is moved from the reporting category L→FL into FL↔FL and deforestation (FL→L) is reduced from an annual average of 10.1kha in the period 2000-2009 to an average of 6.2kha in 2021-2025.

Table 1: Area of Forest Land in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	4 219	4 239	4 258	4 278	4 297	4 317	4 337	4 356	4 357	4 358	4 302
Pinus pinaster	1 254	1 250	1 246	1 241	1 237	1 233	1 228	1 224	1 219	1 214	1 235
Quercus suber	894	898	901	905	908	912	916	919	921	922	910
Eucalyptus spp.	747	758	770	781	793	805	816	828	831	834	796
Quercus rotundifolia	613	611	609	608	606	604	603	601	601	601	606
Quercus spp.	206	207	208	209	210	211	212	214	214	214	210
Other broadleaves	310	313	317	321	325	329	333	336	338	339	326
Pinus pinea	169	174	179	184	190	195	200	206	206	206	191
Other coniferous	27	28	28	28	28	28	29	29	29	28	28

unit: 1000ha

Table 2: Area of Forest Land Considered in the Period 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Total	4 367	4 367	4 368	4 368	4 368	4 368
Pinus pinaster	1 156	1 151	1 146	1 141	1 136	1 146
Quercus suber	939	940	942	943	945	942
Eucalyptus spp.	873	875	878	881	884	878
Quercus rotundifolia	600	600	600	599	599	600
Quercus spp.	213	213	213	213	213	213
Other broadleaves	353	355	356	357	358	356
Pinus pinea	211	211	212	212	212	212
Other coniferous	23	22	22	21	20	22

unit: 1000ha

Table 3: Area of Forest Land Remaining Forest Land in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	3 633	3 638	3 643	3 648	3 653	3 671	3 689	3 732	3 755	3 787	3 685
Pinus pinaster	1 186	1 171	1 155	1 139	1 124	1 108	1 092	1 086	1 079	1 071	1 121
Quercus suber	811	810	809	808	807	811	815	822	827	833	815
Eucalyptus spp.	502	519	536	553	570	594	618	644	662	685	588
Quercus rotundifolia	604	601	598	595	592	589	585	583	582	582	591
Quercus spp.	180	182	185	187	189	190	190	192	192	192	188
Other broadleaves	224	227	229	231	234	239	245	253	259	265	241
Pinus pinea	106	109	112	116	119	122	124	132	134	137	121
Other coniferous	19	19	19	19	19	19	19	20	20	21	20

unit: 1000ha

Table 4: Area of Forest Land Remaining Forest Land Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	4 118	4 142	4 166	4 191	4 215	4 166
Pinus pinaster	1 064	1 069	1 073	1 077	1 081	1 073
Quercus suber	899	903	908	913	918	908
Eucalyptus spp.	838	843	849	854	860	849
Quercus rotundifolia	583	583	584	585	585	584
Quercus spp.	203	204	205	206	207	205
Other broadleaves	326	330	333	337	341	333
Pinus pinea	186	190	195	200	205	195
Other coniferous	20	20	19	19	18	19

unit: 1000ha

Table 5: Area of Land Converted to Forest Land in the Reference Period 2000-2009

4.A.2 Land Converted to Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	586	600	615	629	644	645	647	625	602	572	616
Pinus pinaster	68	79	91	102	113	124	136	138	140	143	113
Quercus suber	83	87	92	97	101	101	101	97	94	89	94
Eucalyptus spp.	244	239	234	228	223	211	198	183	169	149	208
Quercus rotundifolia	9	10	11	13	14	16	17	18	18	19	15
Quercus spp.	26	25	24	22	21	22	22	22	22	21	23
Other broadleaves	85	87	88	90	91	89	88	83	79	73	85
Pinus pinea	63	65	67	69	71	73	76	74	72	69	70
Other coniferous	8	8	9	9	9	9	9	9	8	8	9

unit: 1000ha

Table 6: Area of Land Converted to Forest Land Considered in the FRL 2021-2025

4.A.2 Land Converted to Forest Land	2021	2022	2023	2024	2025	FRL
Total	250	225	201	177	153	201
Pinus pinaster	91	82	73	64	55	73
Quercus suber	40	37	34	30	27	34
Eucalyptus spp.	35	32	29	27	24	29
Quercus rotundifolia	17	16	16	15	14	16
Quercus spp.	11	10	9	7	6	9
Other broadleaves	27	25	22	20	17	22
Pinus pinea	25	21	17	12	8	17
Other coniferous	3	3	2	2	2	2

unit: 1000ha

2.2.5.1 Recalculations

Recalculations will be required to reflect the observed total areas and areas of land-use changes that occur during the Commitment Period.

2.2.6 Carbon Pools and Gases

Portugal currently reports CO₂ in the carbon pools referred to in Table 7. In addition, other emission sources and GHG gases mentioned in tables CRF 4(I) to 4(V) as detailed in

Table 8. The FRL 2021-2025 considers the exact same coverage.

Table 7: Carbon Pools considered in the reporting of CO₂ emissions and removals in Portugal 1990-2016 and in the FRL 2021-2025

Table 4.A	Living Biomass			Dead Organic Matter		Soils	
CO ₂	Gains	Losses	Net-change	Dead wood	Litter	Mineral	Organic
Forest Land	Reported	Reported	Reported	Included elsewhere	Reported	Reported	Not occurring

Table 8: Other GHG gases and sources considered in the reporting of emissions and removals in Portugal 1990-2016 and in the FRL 2021-2025

CRF Table	CO ₂	CH ₄	N ₂ O
4(I) N inputs to soils Forest Land remaining Forest Land			Included elsewhere
4(II) Drainage and rewetting Forest Land remaining Forest Land	Not occurring	Not occurring	Not occurring
4(III) N mineralisation / loss of SOC Forest Land remaining Forest Land			Reported
4(IV) Indirect N ₂ O emissions Forest Land remaining Forest Land			Reported
4(V) Biomass burning Forest Land remaining Forest Land	Reported	Reported	Reported

2.2.6.1 Recalculations

Recalculations may be required during the Commitment Period in the event of increases in the coverage of pools and/or gases.

2.2.7 Age Structure of Main Strata and Rotation Length

Age-class structure, combined with rotation age, is usually a good proxy for estimating harvesting expectations in the future. This is certainly the case for the main wood producing species, Eucalypts (*Eucalyptus* spp.) and to a certain degree Maritime Pine (*Pinus pinaster*), although about 36% and 44%, respectively, of the stands of these species are irregular/uneven aged.

However, for many tree species occurring in Portugal, age class is less relevant for that purpose for a number of reasons:

- Some forest types are managed mostly for non-wood purposes. That is the case for species used for seed production for human and/or animal consumption;
 - Holm Oak (*Quercus rotundifolia*); Umbrella Pine (*Pinus pinea*); Carob Tree (*Ceratonia siliqua*); Strawberry Tree (*Arbutus unedo*); and partially Chestnut Tree (*Castanea sativa*); Walnut Tree (*Juglans regia*)
- Cork Oaks (*Quercus suber*) are managed mostly for cork (=bark) production, and harvestable surface, rather than volume is the correct production unit. There is no incentive for harvest, as wood has a very low value compared to cork, and cork production increases with tree size;
- Some species, notably Cork Oaks (*Quercus suber*) and Holm Oaks (*Quercus rotundifolia*), are protected by law, and it is illegal to harvest or deforest those areas without a special permit. Large areas of these forest types are managed in agro-forest systems, i.e., with agriculture or grasslands in their undercover.

Additionally, forest fires affect age class structure by increasing tree mortality in affected areas and by being indirectly responsible for harvesting at ages lower than rotation age, associated with post-fire salvaging and regeneration management. The nature of forest fires (future forest fire size and location impossible to model with reasonable accuracy) limits the use of age class structure for predicting future harvest levels.

For the reasons outlined above, age class structure was not a main driver for the construction of the Forest Reference Level.

2.2.8 Biomass Conversion and Expansion Factors, Root-to-Shoot Factors, Carbon Fractions

The Biomass Conversion and Expansion Factors (BCEF), Root-to-Shoot Factors (RtS) and Carbon Fractions (CF) used in the PT NIR 2018 are described in section 6.1.3.1.

They are constant per each forest type over the entire time series, including the reference period 2000-2009. The FRL 2021-2025 uses the same values.

Table 9: Biomass Conversion and Expansion Factors, Root-to-Shoot Factors, Carbon Fractions considered in the reporting of emissions and removals in Portugal 1990-2016 and in the FRL 2021-2025

Forest Species	BCEF	RtS	CF (tree)	CF (litter)
<i>Pinus pinaster</i>	0,528	0,118	0,51	0,37
<i>Quercus suber</i>	1,239	0,147	0,48	0,37
<i>Eucalyptus</i> spp.	0,630	0,234	0,48	0,37
<i>Quercus rotundifolia</i>	0,797	0,587	0,48	0,37
<i>Quercus</i> spp.	0,900	0,295	0,48	0,37
Other broadleaves	0,825	0,433	0,48	0,37
<i>Pinus pinea</i>	1,166	0,078	0,51	0,37
Other coniferous	0,532	0,121	0,51	0,37

2.2.8.1 Recalculations

Recalculations may be required during the Commitment Period in the event of revision of these values.

2.2.9 Natural Disturbances – Background Level and Margin

Natural disturbances are an important feature and emission driver in Portuguese forests. They are characterised by a strong inter-annual variability and unpredictability.

The most important type of natural disturbances affecting forests in Portugal are forest fires, and their emissions are currently reported under CRF table 4(V), using the methodologies described in PT NIR 2018 section 6.13.

Although other natural disturbances also occur, notably wind damage, drought and insects, there is currently no estimation of emissions and removals associated with these types of natural disturbances. This is due to a lack of data to characterise the annual impact of such disturbance types and a lack of methodologies to estimate the corresponding annual emissions and removals.

Therefore, the contribution of natural disturbances for the FRL was made equal to the background level for natural disturbances, calculated following the methodology described in Annex VI of Regulation (EU) 2018/841 and considering only the emissions from forest fires. As showed in the table below, the iteration process foreseen in the referred methodology was stopped at the 2nd iteration.

Table 10: Calculation of the background level for Natural Disturbances in forest land remaining forest land

Estimation of Background Level and Margin of Natural Disturbances		Average	Standard deviation	Exclusion criteria	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A.1. Forest land remaining Forest land	GgCO _{2eq}	1 536	1 832	> than 5 199	1 096	1 655	6 479	1 098	5 533	803	234	149	410	1 168	461	1 452	1 319	139	708	1 868	NA	NA	NA	NA
1st iteration					keep	keep	excl.	keep	excl.	keep	keep	keep	keep	keep	keep	keep	keep	keep	keep	keep	NA	NA	NA	NA
A.1. Forest land remaining Forest land	GgCO _{2eq}	897	569	> than 2 034	1 096	1 655	excl.	1 098	excl.	803	234	149	410	1 168	461	1 452	1 319	139	708	1 868	NA	NA	NA	NA
2nd iteration					keep	keep	excl.	keep	excl.	keep	keep	keep	keep	keep	keep	keep	keep	keep	keep	keep	NA	NA	NA	NA
Background level FL↔FL	GgCO _{2eq}	897																						
Margin FL↔FL	GgCO _{2eq}	569																						

Using the average of burnt areas per forest type as a reference, and excluding the same years, the burnt areas per forest type implicit for the period 2021-2025 are the ones presented in the table below. These areas are used to estimated volumes of salvage wood (see section 0) and Indirect N₂O emission (see section 2.13)

Table 11: Historical 2001-2020 annual burnt areas per forest stratum and implicit FRL 2021-2025 annual burnt areas

Activity data - Annual Burnt Area		FRL 2021-2025	Historical average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A.1. Forest land remaining Forest land	ha	10 247	18 871	16 018	25 226	78 938	11 451	79 536	8 832	2 410	1 688	3 960	13 900	4 619	15 000	14 606	1 161	7 915	16 678	NA	NA	NA	NA
Pinus pinaster	ha	1 982	4 329	2 550	2 228	40 195	10 409	1 315	891	319	76	496	391	337	6 273	980	874	512	1 414	NA	NA	NA	NA
Quercus suber	ha	9 398	14 917	5 290	8 627	61 004	8 990	46 097	11 285	1 852	1 622	3 173	12 321	5 416	13 865	13 155	2 086	7 907	35 981	NA	NA	NA	NA
Eucalyptus spp.	ha	857	1 273	1 449	1 771	7 751	3 920	610	417	481	0	555	104	584	864	306	523	645	381	NA	NA	NA	NA
Quercus rotundifolia	ha	807	1 065	1 482	1 735	2 864	830	2 880	486	338	114	786	1 141	715	893	893	46	634	1 210	NA	NA	NA	NA
Quercus spp.	ha	1 845	2 535	1 698	1 927	6 449	1 234	8 272	1 201	916	454	1 670	2 849	1 184	4 112	4 202	172	1 724	2 491	NA	NA	NA	NA
Other broadleaves	ha	404	481	340	220	1 806	1 731	235	196	165	0	83	382	37	1 888	57	108	129	318	NA	NA	NA	NA
Pinus pinea	ha	661	881	524	1 290	1 916	482	2 911	508	243	60	863	612	724	850	1 630	121	692	662	NA	NA	NA	NA
Other coniferous	ha	26 202	44 351	29 349	43 023	200 924	39 047	141 857	23 816	6 724	4 015	11 587	31 699	13 617	43 746	35 828	5 091	20 158	59 134	NA	NA	NA	NA
A.1. Forest land remaining Forest land	ha	26 202	44 351	29 349	43 023	200 924	39 047	141 857	23 816	6 724	4 015	11 587	31 699	13 617	43 746	35 828	5 091	20 158	59 134	NA	NA	NA	NA

2.2.9.1 Recalculations

Regulation (EU) 2018/541 requires that the background level of emissions from natural disturbances is to be calculated on the basis of real data for the period 2001-2020. At the time of this submission, data is only available for the period 2001-2016. A recalculation of the background level will be made as new data is made available. Future changes in the methodologies for estimating fire emissions affecting the period 2001-2020 will also trigger recalculations. Finally, additional recalculations may be required in case methodologies for estimating the emission impacts of other types of disturbances are developed and implemented during the commitment period.

2.3 CRF 4.A Living Biomass Pool / CO₂ Removals

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be “based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data”. It further states that “Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land”.

In the case of Forest Annual Growth this is ensured by:

- Using the average growth rates (m³/ha), average BCEF and RTS factors per forest type in the period 2000-2009 and applying them to the areas per forest type in the period 2021-2025
- Using the same calculation methods and factors described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.1)

The historical growth rates per unit of area are shown in Table 12 (above ground) and in Table 14 (below ground) for the reference period 2000-2009 and in Table 13 (above ground) and in Table 15 (below ground) for the forest reference level 2021-2025.

Table 12: Forest Annual Growth Rates in Above Ground Biomass per Unit of Area Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total											
Pinus pinaster	2,03	2,02	2,02	2,01	2,01	2,00	2,00	2,00	2,00	2,00	2,01
Quercus suber	0,59	0,59	0,58	0,58	0,57	0,56	0,56	0,56	0,56	0,56	0,57
Eucalyptus spp.	3,02	3,02	3,02	3,02	3,02	3,02	3,02	3,02	3,02	3,02	3,02
Quercus rotundifolia	0,29	0,28	0,27	0,27	0,26	0,25	0,25	0,25	0,25	0,25	0,26
Quercus spp.	1,64	1,63	1,62	1,61	1,60	1,59	1,59	1,59	1,59	1,59	1,60
Other broadleaves	1,80	1,80	1,79	1,79	1,78	1,78	1,78	1,78	1,78	1,78	1,79
Pinus pinea	3,54	3,53	3,52	3,51	3,51	3,50	3,50	3,50	3,50	3,50	3,51
Other coniferous	1,49	1,49	1,48	1,47	1,47	1,46	1,46	1,46	1,46	1,46	1,47

unit: GgC.ha⁻¹.year⁻¹

Table 13: Forest Annual Growth Rates in Above Ground Biomass per Unit of Area Considered in the Forest Reference Level 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total						
Pinus pinaster	2,01	2,01	2,01	2,01	2,01	2,01
Quercus suber	0,57	0,57	0,57	0,57	0,57	0,57
Eucalyptus spp.	3,02	3,02	3,02	3,02	3,02	3,02
Quercus rotundifolia	0,26	0,26	0,26	0,26	0,26	0,26
Quercus spp.	1,60	1,60	1,60	1,60	1,60	1,60
Other broadleaves	1,79	1,79	1,79	1,79	1,79	1,79
Pinus pinea	3,51	3,51	3,51	3,51	3,51	3,51
Other coniferous	1,47	1,47	1,47	1,47	1,47	1,47

unit: GgC.ha⁻¹.year⁻¹

Table 14: Forest Annual Growth rates in Below Ground Biomass per unit of area considered in the reference period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total											
Pinus pinaster	0,30	0,30	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29
Quercus suber	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08
Eucalyptus spp.	0,69	0,69	0,69	0,69	0,69	0,69	0,69	0,69	0,69	0,69	0,69
Quercus rotundifolia	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12
Quercus spp.	0,47	0,47	0,46	0,45	0,44	0,44	0,44	0,44	0,44	0,44	0,45
Other broadleaves	0,59	0,60	0,61	0,62	0,62	0,63	0,63	0,63	0,63	0,63	0,62
Pinus pinea	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29	0,29
Other coniferous	0,25	0,24	0,23	0,22	0,20	0,19	0,19	0,19	0,19	0,19	0,21

unit: GgC.ha⁻¹.year⁻¹

Table 15: Forest Annual Growth rates in Below Ground Biomass per unit of area considered in the Forest Reference Level 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total						
Pinus pinaster	0,29	0,29	0,29	0,29	0,29	0,29
Quercus suber	0,08	0,08	0,08	0,08	0,08	0,08
Eucalyptus spp.	0,69	0,69	0,69	0,69	0,69	0,69
Quercus rotundifolia	0,12	0,12	0,12	0,12	0,12	0,12
Quercus spp.	0,45	0,45	0,45	0,45	0,45	0,45
Other broadleaves	0,63	0,63	0,63	0,63	0,63	0,63
Pinus pinea	0,29	0,29	0,29	0,29	0,29	0,29
Other coniferous	0,20	0,20	0,20	0,20	0,20	0,20

unit: GgC.ha⁻¹.year⁻¹

The application of the above mentioned factors to the areas described in section 2.2.5 results in the annual gains shown in Table 16, for reference period 2000-2009, and in Table 17, for the Forest Reference Level period of 2021-2025. The average for the period 2021-2025 equals 8 436 ktC.year⁻¹, and therefore the contribution of this variable for the Forest reference Level 2021-2025 is +30 932 ktCO_{2eq}.year⁻¹ (= 8 436 ktC.year⁻¹ x 44/12).

Table 16: Forest Gains considered in the reference period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	6 776	6 802	6 827	6 853	6 879	6 937	7 016	7 154	7 231	7 331	6 981
Pinus pinaster	2 756	2 713	2 669	2 626	2 583	2 540	2 504	2 489	2 473	2 456	2 581
Quercus suber	548	542	536	530	524	522	524	529	532	536	532
Eucalyptus spp.	1 866	1 928	1 990	2 052	2 114	2 201	2 289	2 387	2 455	2 539	2 182
Quercus rotundifolia	250	244	238	232	226	221	220	219	218	218	229
Quercus spp.	380	382	384	385	387	384	385	388	389	390	385
Other broadleaves	537	543	549	556	562	577	590	610	623	639	579
Pinus pinea	406	417	428	440	451	461	472	499	508	519	460
Other coniferous	34	33	33	32	31	32	32	33	33	34	33

unit: GgC

Table 17: Forest Gains considered in the Forest Reference Level 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	8 311	8 374	8 436	8 498	8 561	8 436
Pinus pinaster	2 450	2 460	2 469	2 479	2 488	2 469
Quercus suber	587	590	593	596	599	593
Eucalyptus spp.	3 108	3 129	3 149	3 170	3 190	3 149
Quercus rotundifolia	226	226	227	227	227	227
Quercus spp.	415	417	419	422	424	419
Other broadleaves	787	796	805	814	823	805
Pinus pinea	705	723	742	760	778	742
Other coniferous	34	33	32	31	31	32

unit: GgC

2.3.1 Recalculations

Recalculations will be required in the event of changes to the historical growth rates per unit of area, in the methodologies and/or in the expansion factors affecting any of the years in the period 2000-2009. Recalculations will also be necessary as the forest area is replaced from the estimates presented in section 2.2.5 with their final values.

2.4 CRF 4.A Living Biomass Pool / CO2 Emissions

As explained in the PT NIR 2018 (please refer to table 6.23, page 6-32), Carbon losses are estimated as the sum of: Industrial harvest; Other wood uses; Salvage wood; Forest conversion; and Natural Mortality.

Table 18: Summary of types of losses in living biomass considered in the estimations of emissions and removals in forest land

Type of C loss	Definition / data source	Allocation L->FL and FL->FL
Industrial harvest	Industry wood consumption. Hardwoods fully allocated to Eucalyptus spp. and softwoods fully allocated to Pinus pinaster as these are the main tree species used by industry; estimates include the loss of biomass from the entire tree (AG and BG biomass) at the year of harvest / INE	L->FL = only eucalyptus has harvesting before the end of the transition period. Allocated based on share of L->Eucalyptus / total Eucalyptus area FL->FL = total – L->FL
Other wood use	Wood uses for un-declared purposes (small industry or households), pruning and non-industrial thinning; estimated as 25% of mean annual increment / Expert judgment ¹³⁰	L->FL = allocation based on area per forest type FL->FL = allocation based on area per forest type
Salvaged wood	Wood with industry or household use resulting from forest fires; estimates include the loss of biomass from the entire tree (AG and BG biomass) at the year of fire / Expert judgment	L->FL = allocation based on area per forest type FL->FL = allocation based on area per forest type
Forest conversion	Losses from converting one forest type into another forest type (change in dominant species); estimated based on loss of standing volume of previous forest type; estimates include the loss of biomass from the entire tree (AG and BG biomass) at the year of conversion / IFN (2005)	L->FL = not applicable FL->FL = based on land-use change areas in reporting year
Natural mortality (non-fire related)	Natural mortality and self-thinning of trees; estimated based on percentage of number of non-burnt dead trees and assuming all standing dead trees died over the past 3 years / IFN (2005)	L->FL = allocation based on area per forest type FL->FL = allocation based on area per forest type
Conversion to forest (afforestation)	Losses from converting a non-forest land-use type into a forest type; estimated based on loss of living biomass of previous land-use type / EEA and Spanish NIR	L->FL = allocation based on area per previous land-use per new forest type FL->FL = not applicable
Non-salvaged wood	Wood with industry or household use resulting from forest fires; estimates include the loss of biomass from the entire tree (AG and BG biomass) at the year of fire / Expert judgment	<u>Reported as "fire emissions" not as "losses"</u> L->FL = allocation based on area per forest type FL->FL = allocation based on area per forest type
Deforestation	Losses from converting one forest type into another land-use; estimated based on loss of standing volume of previous forest type; estimates include the loss of biomass from the entire tree (AG and BG biomass) at the year of deforestation / IFN (2005)	<u>Reported as "losses" from FL->L in the respective land-use and not as Forest land emissions</u>

2.4.1 Harvesting for Industry

As outlined in PT NIR 2018 (section 6.2.1.2.2):

"Emissions from industrial harvesting were estimated from domestic industrial wood consumption statistics (collected by INE, the National Statistics Office) for the main forest types with industrial use and allocated to the categories "Pinus pinaster" and "Eucalyptus spp.". Eucalyptus plantations are harvested in a rotation period of 12 years, i.e., before the 20 years conversion period is completed. In this case, harvesting was further divided into harvesting in "Forest remaining Forest" and "Land converted to Forest". The harvesting under lands converted to forest was estimated based share of lands converted to eucalyptus to total eucalyptus area, the remaining of the industrial consumption of eucalyptus wood was assumed to come from forest land remaining forest land."

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be "based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data". It further states that "Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land".

In the case of Harvesting for Industry, this is ensured by:

- Using the average industrial harvest rates (m^3/ha), average BCEF and RTS factors per forest type in the period 2000-2009 and applying them to the areas per forest type in the period 2021-2025
- Using the same calculation methods, factors and allocation criteria described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.2)

Industrial harvesting has varied between 2.7 and 4.2 m^3/ha in the reference period 2000-2009 for pine³ and between 6.1 and 8.6 m^3/ha for eucalyptus⁴. The average intensity for the reference period 2000-2009 was also used to estimate harvesting in the period 2021-2025.

Table 19: Industrial Harvest Intensity Implicit in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total											
Pinus pinaster	4,20	3,21	2,67	2,92	3,54	2,95	3,20	3,35	2,89	3,19	3,21
Quercus suber											
Eucalyptus spp.	7,03	6,05	6,57	7,35	7,93	8,55	8,21	7,96	7,77	6,65	7,41
Quercus rotundifolia											
Quercus spp.											
Other broadleaves											
Pinus pinea											
Other coniferous											

unit: $\text{m}^3 \cdot \text{ha}^{-1}$

³ Estimated as total industrial wood from conifers divided by area of pine forest under forest land remaining forest land. PT NIR 2018 assumes that industrial harvest from conifers is not possible in areas included under land converted to forest.

⁴ Estimated as total industrial wood from broadleaves divided by the total national area of eucalyptus. PT NIR 2018 assumes that industrial harvest from eucalyptus is possible in eucalyptus areas under both land converted to forests and forest land remaining forest land.

Table 20: Industrial Harvest Intensity Considered in the Period 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Total						
Pinus pinaster	3,21	3,21	3,21	3,21	3,21	3,21
Quercus suber						
Eucalyptus spp.	7,41	7,41	7,41	7,41	7,41	7,41
Quercus rotundifolia						
Quercus spp.						
Other broadleaves						
Pinus pinea						
Other coniferous						

unit: m³.ha⁻¹

The application of the above intensities to the areas per forest stratum presented in section 2.2.5, results in the total industrial harvest estimates presented in Table 21 and Table 22.

Table 21: Total Industrial Harvest Considered in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total											
Pinus pinaster	4 982	3 758	3 085	3 332	3 977	3 268	3 501	3 637	3 116	3 419	3 608
Quercus suber											
Eucalyptus spp.	5 249	4 588	5 057	5 741	6 292	6 878	6 704	6 586	6 453	5 545	5 909
Quercus rotundifolia											
Quercus spp.											
Other broadleaves											
Pinus pinea											
Other coniferous											

unit: m³

Table 22: Total Industrial Harvest Considered in the Period 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Total						
Pinus pinaster	3 420	3 433	3 446	3 460	3 473	3 446
Quercus suber						
Eucalyptus spp.	6 462	6 484	6 505	6 527	6 548	6 505
Quercus rotundifolia						
Quercus spp.						
Other broadleaves						
Pinus pinea						
Other coniferous						

unit: m³

Applying the same allocation criteria of total harvest to the Forest Land Remaining Forest Land as described in PT NIR 2018, section 6.1.3.2, results in the harvest levels presented in Table 23 and Table 24.

Table 23: Industrial Harvest Considered in Forest Land Remaining Forest Land Areas Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total											
Pinus pinaster	4 982	3 758	3 085	3 332	3 977	3 268	3 501	3 637	3 116	3 419	3 608
Quercus suber											
Eucalyptus spp.	3 532	3 142	3 522	4 064	4 523	5 077	5 074	5 126	5 144	4 552	4 376
Quercus rotundifolia											
Quercus spp.											
Other broadleaves											
Pinus pinea											
Other coniferous											

unit: m³

Table 24: Industrial Harvest Considered in Forest Land Remaining Forest Land Areas Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total						
Pinus pinaster	3 420	3 433	3 446	3 460	3 473	3 446
Quercus suber						
Eucalyptus spp.	6 206	6 247	6 288	6 328	6 369	6 288
Quercus rotundifolia						
Quercus spp.						
Other broadleaves						
Pinus pinea						
Other coniferous						

unit: m³

The average emissions from industrial harvesting for the period 2000-2009 equal 2 770 ktC.year⁻¹ and are estimated for the period 2021-2025 at 3 187 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -11 685 ktCO_{2eq}.year⁻¹ (= -3 187 ktC.year⁻¹ x 44/12).

Table 25: Emissions from Industrial Harvest Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-2 836	-2 326	-2 274	-2 561	-2 936	-2 945	-3 021	-3 087	-2 942	-2 774	-2 770
Pinus pinaster	-1 499	-1 131	-928	-1 002	-1 197	-983	-1 053	-1 094	-937	-1 029	-1 085
Quercus suber											
Eucalyptus spp.	-1 337	-1 196	-1 346	-1 558	-1 740	-1 962	-1 968	-1 993	-2 004	-1 745	-1 685
Quercus rotundifolia											
Quercus spp.											
Other broadleaves											
Pinus pinea											
Other coniferous											

unit: GgC

Table 26: Emissions from Industrial Harvest Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-3 157	-3 172	-3 187	-3 202	-3 217	-3 187
Pinus pinaster	-1 029	-1 033	-1 037	-1 041	-1 045	-1 037
Quercus suber						
Eucalyptus spp.	-2 128	-2 139	-2 150	-2 161	-2 172	-2 150
Quercus rotundifolia						
Quercus spp.						
Other broadleaves						
Pinus pinea						
Other coniferous						

unit: GgC

2.4.2 Other Wood Uses

As outlined in PT NIR 2018 (section 6.2.1.2.2):

“There are no statistics for harvesting from other wood use (domestic use of biomass for energy, thinning with no industrial use, and pruning). In those cases, it was assumed (expert judgement) that 25% of the mean annual increment was harvested every year, which is believed to be an overestimation of the actual wood harvested for those purposes and, therefore, a conservative estimate.”

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be “based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data”. It further states that “Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land”.

In the case of Other Wood Uses, this is ensured by:

- Using the average other wood use harvest rates (m^3/ha), average BCEF and RTS factors per forest type in the period 2000-2009 and applying them to the areas per forest type in the period 2021-2025
- Using the same calculation methods, factors and allocation criteria described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.2)

The average emissions from other wood use for the period 2000-2009 equal $690 \text{ ktC}\cdot\text{year}^{-1}$ and are estimated for the period 2021-2025 at $723 \text{ ktC}\cdot\text{year}^{-1}$. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is $-2\,653 \text{ ktCO}_{2\text{eq}}\cdot\text{year}^{-1}$ ($= -723 \text{ ktC}\cdot\text{year}^{-1} \times 44/12$).

Table 27: Emissions from Other Wood Use Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-697	-700	-674	-678	-681	-683	-691	-698	-699	-700	-690
Pinus pinaster	-63	-63	-44	-44	-44	-36	-35	-35	-35	-35	-43
Quercus suber	-144	-145	-140	-138	-138	-139	-140	-140	-140	-141	-140
Eucalyptus spp.	-8	-8	0	0	0	-5	-5	-5	-5	-5	-4
Quercus rotundifolia	-65	-63	-63	-61	-57	-55	-55	-55	-55	-55	-58
Quercus spp.	-97	-95	-94	-93	-93	-92	-92	-93	-93	-93	-93
Other broadleaves	-152	-154	-157	-161	-163	-166	-168	-170	-170	-171	-163
Pinus pinea	-156	-161	-164	-169	-174	-179	-184	-189	-189	-189	-175
Other coniferous	-12	-11	-12	-11	-12	-11	-12	-12	-12	-11	-12

unit: GgC

Table 28: Emissions from Other Wood Use Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-722	-723	-723	-724	-725	-723
Pinus pinaster	-40	-40	-40	-40	-40	-40
Quercus suber	-145	-145	-145	-145	-146	-145
Eucalyptus spp.	-4	-4	-4	-4	-4	-4
Quercus rotundifolia	-58	-58	-58	-58	-58	-58
Quercus spp.	-94	-94	-94	-94	-94	-94
Other broadleaves	-178	-178	-179	-180	-180	-179
Pinus pinea	-194	-194	-195	-195	-195	-195
Other coniferous	-9	-9	-9	-8	-8	-9

unit: GgC

2.4.3 Salvage Wood

As outlined in PT NIR 2018 (section 6.2.1.2.2):

"Emissions from salvaged wood are considered in addition to emissions from industrial harvesting, which again is considered a conservative estimate, since salvaged wood has, by definition, industrial use."

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be "based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data". It further states that "Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land".

In the case of Salvaged Wood, this is ensured by:

- Using the average mortality and salvage wood rates factors per forest type in the period 2000-2009 (please refer to PT NIR 2018, section 6.13.6) and applying them to the areas per forest type in the period 2021-2025
- Using the average burnt area per forest stratum implicit in the Background Level of Natural Disturbances (see Table 11 in section 2.2.9)
- Using the same calculation methods, factors and allocation criteria described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.2)

The average emissions from salvage wood for the period 2000-2009 equal 332 ktC.year⁻¹ and are estimated for the period 2021-2025 at 150 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -550 ktCO_{2eq}.year⁻¹ (= -150 ktC.year⁻¹ x 44/12).

Table 29: Emissions from Salvage Wood Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-232	-186	-285	-1 160	-193	-979	-148	-39	-26	-68	-332
Pinus pinaster	-173	-133	-209	-651	-94	-652	-72	-20	-14	-32	-205
Quercus suber	-4	-7	-6	-114	-30	-4	-3	-1	0	-1	-17
Eucalyptus spp.	-31	-28	-46	-330	-49	-253	-62	-10	-9	-17	-84
Quercus rotundifolia	0	-2	-2	-9	-4	-1	0	-1	0	-1	-2
Quercus spp.	-7	-4	-5	-9	-2	-9	-1	-1	0	-2	-4
Other broadleaves	-11	-9	-10	-35	-7	-48	-7	-5	-3	-10	-14
Pinus pinea	0	-1	-1	-5	-5	-1	-1	0	0	0	-1
Other coniferous	-4	-2	-5	-8	-2	-13	-2	-1	0	-4	-4

unit: GgC

Table 30: Emissions from Salvage Wood Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-148	-149	-150	-151	-152	-150
Pinus pinaster	-78	-78	-79	-80	-80	-79
Quercus suber	-5	-5	-5	-5	-5	-5
Eucalyptus spp.	-49	-49	-49	-49	-50	-49
Quercus rotundifolia	-1	-1	-1	-1	-1	-1
Quercus spp.	-2	-2	-2	-2	-2	-2
Other broadleaves	-9	-9	-10	-10	-10	-10
Pinus pinea	-1	-1	-1	-1	-1	-1
Other coniferous	-2	-2	-2	-2	-2	-2

unit: GgC

2.4.4 Forest Conversions

As outlined in PT NIR 2018 (section 6.2.1.2.2):

"Emissions from forest conversion are associated with changes in species, which may happen following final felling followed by a reforestation using a different species or by more subtle changes in dominant species (which lead to a change in forest type classification). Forest conversions are not deforestation (because a forest type is followed by another forest type), but the emissions from conversion are calculated in a similar manner as deforestation, i.e., it consists on the emission of all the living biomass carbon present in the previous forest type."

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be "based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data". It further states that "Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land".

In the case of Forest Conversions, this is ensured by:

- Using the average land-use (i.e. forest type) changes in the period 2000-2009 and applying them to the areas per forest type in the period 2021-2025
- Using the same calculation methods, factors and allocation criteria described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.2)

The average emissions from forest conversions for the period 2000-2009 equal 473 ktC.year⁻¹ and are estimated for the period 2021-2025 at 351 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -1 289 ktCO_{2eq}.year⁻¹ (= -351 ktC.year⁻¹ x 44/12).

Table 31: Emissions from Forest Conversion Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-528	-528	-528	-528	-528	-528	-529	-343	-344	-344	-473
Pinus pinaster	-51	-52	-52	-53	-54	-55	-55	-50	-50	-50	-52
Quercus suber	-28	-28	-28	-28	-28	-28	-28	-31	-31	-31	-29
Eucalyptus spp.	-345	-343	-342	-341	-339	-338	-338	-186	-187	-187	-295
Quercus rotundifolia	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Quercus spp.	-16	-16	-16	-16	-16	-16	-16	-5	-5	-5	-13
Other broadleaves	-52	-52	-53	-53	-54	-54	-55	-37	-38	-38	-48
Pinus pinea	-24	-24	-24	-24	-24	-23	-23	-19	-19	-19	-22
Other coniferous	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-3

unit: GgC

Table 32: Emissions from Forest Conversion Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-350	-351	-351	-352	-353	-351
Pinus pinaster	-49	-49	-49	-49	-49	-49
Quercus suber	-31	-31	-31	-31	-31	-31
Eucalyptus spp.	-190	-190	-190	-190	-190	-190
Quercus rotundifolia	-10	-10	-10	-10	-10	-10
Quercus spp.	-5	-5	-5	-5	-5	-5
Other broadleaves	-42	-43	-43	-44	-44	-43
Pinus pinea	-20	-20	-20	-20	-20	-20
Other coniferous	-4	-4	-4	-4	-4	-4

unit: GgC

2.4.5 Natural Mortality

As outlined in PT NIR 2018 (section 6.2.1.2.2):

"Emissions from natural mortality include emissions from trees that die from natural causes (self-thinning, pests and diseases) but excludes forest fires (since these emissions are reported in Table 4(V)). These are estimated from the number of dead trees from causes other than fire, assuming that all dead trees present at any point in time died in the past 3 years. This information is collected in the National Forest Inventory."

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be "based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data". It further states that "Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land".

In the case of Natural Mortality, this is ensured by:

- Using the percentage of number of non-burnt dead trees in the period 2000-2009 and applying the same percentages to the areas per forest type in the period 2021-2025
- Using the same calculation methods, factors and allocation criteria described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.2.1.2.2)

The average emissions from natural mortality for the period 2000-2009 equal 759 ktC.year⁻¹ and are estimated for the period 2021-2025 at 866 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -3 174 ktCO_{2eq}.year⁻¹ (= -866 ktC.year⁻¹ x 44/12).

Table 33: Emissions from Natural Mortality Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-742	-736	-741	-753	-750	-761	-766	-775	-781	-788	-759
Pinus pinaster	-290	-274	-271	-271	-264	-261	-257	-255	-254	-252	-265
Quercus suber	-168	-167	-167	-167	-167	-168	-169	-170	-171	-172	-169
Eucalyptus spp.	-84	-89	-92	-97	-100	-106	-111	-115	-119	-123	-104
Quercus rotundifolia	-65	-65	-63	-63	-59	-59	-58	-58	-58	-58	-61
Quercus spp.	-34	-34	-34	-35	-35	-36	-36	-36	-36	-36	-35
Other broadleaves	-88	-93	-100	-104	-111	-119	-122	-126	-128	-132	-112
Pinus pinea	-10	-11	-11	-11	-11	-10	-10	-11	-11	-11	-11
Other coniferous	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-3

unit: GgC

Table 34: Emissions from Natural Mortality Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-855	-860	-866	-871	-876	-866
Pinus pinaster	-251	-252	-253	-254	-255	-253
Quercus suber	-186	-187	-188	-189	-190	-188
Eucalyptus spp.	-147	-148	-149	-150	-151	-149
Quercus rotundifolia	-60	-60	-60	-60	-60	-60
Quercus spp.	-38	-38	-38	-38	-39	-38
Other broadleaves	-152	-154	-156	-158	-160	-156
Pinus pinea	-17	-17	-18	-18	-19	-18
Other coniferous	-3	-3	-3	-3	-3	-3

unit: GgC

2.4.6 Recalculations

Recalculations may be required during the Commitment Period in the event of revision of input values affecting the reference period 2000-2009, or if the methodologies for estimating forest losses are revised and improved.

2.5 CRF 4.A Dead Wood Pool / Net-CO₂ Emissions

As mentioned in PT NIR 2018 section 6.1.3.6:

“Dead organic matter (other than litter) is considered to be “Included Elsewhere”. The two main sources for dead wood are harvesting residues (included and reported as losses in living biomass, that include the emission of the whole tree) and dead trees from fire (included and reported as indirect emissions from fire, that include the emission of the whole tree). Other dead wood sources are considered negligible compared to these two sources or included in harvesting and are not reported separately.”

Consistently, emissions and removals from the dead wood pool are considered to the “Included Elsewhere” and are not considered or estimated separately in the FRL.

2.5.1 Recalculations

Recalculations may be required during the Commitment Period in case an explicit methodology to address emissions and removals from dead wood is developed and implemented in the PT NIR.

2.6 CRF 4.A Litter Pool / Net-CO₂ Emissions

In Forest Land Remaining Forest Land, litter emissions and removals are estimated only for changes in forest type (forest conversions). The methodology is common to all land-use changes and is described in PT NIR 2018 in section 6.1.3.4.

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be “based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data”. It further states that “Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land”.

In the case of litter emissions and removals, this is ensured by:

- Using the annual emission/sequestration factors of PT NIR 2018 table 6.18 (see section 6.1.3.4) in the period 2000-2009 and applying the same factors to the areas under forest conversion in the period 2021-2025

The average net-emissions from litter for the period 2000-2009 equal -13 ktC.year⁻¹ and are estimated for the period 2021-2025 at -7 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -26 ktCO_{2eq}.year⁻¹ (= -7 ktC.year⁻¹ x 44/12).

Table 35: Net-Emissions from Litter Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-13	-14	-14	-15	-14	-14	-13	-12	-12	-11	-13
Pinus pinaster	1	1	1	1	1	1	1	2	2	2	1
Quercus suber	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Eucalyptus spp.	-10	-10	-11	-11	-11	-11	-11	-10	-10	-10	-11
Quercus rotundifolia	0	0	0	0	0	0	0	0	0	0	0
Quercus spp.	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	-3	-3	-3	-3	-3	-3	-2	-2	-2	-2	-3
Pinus pinea	0	0	0	0	0	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0	0	0	0	0	0

unit: GgC; positive number denotes removals; negative numbers denote emissions

Table 36: Net-Emissions from Litter Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-8	-7	-7	-7	-6	-7
Pinus pinaster	2	2	2	2	2	2
Quercus suber	0	0	0	0	0	0
Eucalyptus spp.	-8	-7	-7	-7	-7	-7
Quercus rotundifolia	0	0	0	0	0	0
Quercus spp.	0	0	0	0	0	0
Other broadleaves	-2	-1	-1	-1	-1	-1
Pinus pinea	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0

unit: GgC; positive number denotes removals; negative numbers denote emissions

2.6.1 Recalculations

Recalculations may be required during the Commitment Period in the event of revision of input values affecting the reference period 2000-2009, or if the methodologies for estimating litter emissions are revised and improved.

2.7 CRF 4.A Mineral Soil Pool / Net-CO₂ Emissions

In Forest Land Remaining Forest Land, soil emissions and removals are estimated only for changes in forest type (forest conversions). The methodology is common to all land-use changes and is described in PT NIR 2018 in section 6.1.3.5.

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be “based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data”. It further states that “Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land”.

In the case of litter emissions and removals, this is ensured by:

- Using the annual emission/sequestration factors of PT NIR 2018 table 6.22 (see section 6.1.3.5) in the period 2000-2009 and applying the same factors to the areas under forest conversion in the period 2021-2025

The average net-emissions from soil for the period 2000-2009 equal +12 ktC.year⁻¹ and are estimated for the period 2021-2025 at -24 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -87 ktCO_{2eq}.year⁻¹ (= -24 ktC.year⁻¹ x 44/12).

Table 37: Net-Emissions from Soil Considered in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	31	26	22	17	13	9	6	2	-2	-5	12
Pinus pinaster	3	3	3	4	4	5	5	6	6	7	4
Quercus suber	-68	-70	-71	-72	-74	-68	-62	-57	-52	-48	-64
Eucalyptus spp.	71	69	66	64	61	55	48	41	35	30	54
Quercus rotundifolia	-2	-2	-2	-2	-3	-3	-3	-3	-4	-4	-3
Quercus spp.	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	27	26	25	24	24	21	18	16	13	11	20
Pinus pinea	0	0	0	0	0	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0	0	0	0	0	0

unit: GgC; positive number denotes removals; negative numbers denote emissions

Table 38: Net-Emissions from Soil Considered in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-23	-23	-24	-24	-24	-24
Pinus pinaster	10	10	10	10	10	10
Quercus suber	-34	-34	-34	-35	-35	-34
Eucalyptus spp.	6	6	6	6	6	6
Quercus rotundifolia	-7	-7	-7	-7	-7	-7
Quercus spp.	0	0	0	0	0	0
Other broadleaves	1	1	1	1	1	1
Pinus pinea	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0

unit: GgC; positive number denotes removals; negative numbers denote emissions

2.7.1 Recalculations

Recalculations may be required during the Commitment Period in the event of revision of input values affecting the reference period 2000-2009, or if the methodologies for estimating soil emissions are revised and improved.

2.8 CRF 4.A Organic Soil Pool / Net-CO₂ Emissions

As mentioned in section 2.2.6 above, organic soils are reported as “Not Occurring”. Consistently the FRL does not consider any emissions from Organic Soils.

2.8.1 Recalculations

Recalculations may be required during the Commitment Period in case organic soils are identified in Portugal and an explicit methodology to address emissions and removals from organic soils is developed and implemented in the PT NIR.

2.9 CRF 4.G Wood Use and Harvested Wood Products

Article 8, paragraph 5 of Regulation (EU) 2018/841 requires that the Forest Reference Level to be “based on the continuation of sustainable forest management practices, as documented in the period 2000-2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data”. It further states that “Member States shall demonstrate consistency between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land”, and that “a constant ratio between solid and energy use of forest biomass as documented in the period from 2000 to 2009 shall be assumed;”.

In the case of HWP net-emissions and removals, this is ensured by:

- Using the average industrial harvest rates (m^3/ha) in the period 2000-2009 and applying them to the areas per forest type in the period 2021-2025 (see section 2.4.1 above)
- Calculating “intensity indicators” for wood imports and wood exports in the period 2000-2009 and applying them to the industrial wood production in the period 2021-2025
 - “intensity indicator for wood imports” is defined as the average of $\frac{\text{wood imports}_{\text{year } x}}{\text{industrial wood production}_{\text{year } x}}$ for all years in the period 2000-2009 (7.1%, see Table 39)
 - “intensity indicator for wood exports” is defined as the average of $\frac{\text{wood exports}_{\text{year } x}}{\text{industrial wood production}_{\text{year } x}}$ for all years in the period 2000-2009 (10.8%, see Table 39)
- Calculating “intensity indicators” for pulp production, wood panel production and sawnwood production in the period 2000-2009 and applying them to the apparent wood consumption in the period 2021-2025
 - “intensity indicator for wood pulp production” is defined as the average of $\frac{\text{pulp production}_{\text{year } x}}{\text{apparent wood consumption}_{\text{year } x}}$ for all years in the period 2000-2009 ($0.218 \text{ t}/\text{m}^3$, see Table 41)
 - “intensity indicator for wood panels production” is defined as the average of $\frac{\text{panel production}_{\text{year } x}}{\text{apparent wood consumption}_{\text{year } x}}$ for all years in the period 2000-2009 ($0.143 \text{ m}^3/\text{m}^3$, see Table 43)
 - “intensity indicator for sawnwood production” is defined as the average of $\frac{\text{sawnwood production}_{\text{year } x}}{\text{apparent wood consumption}_{\text{year } x}}$ for all years in the period 2000-2009 ($0.130 \text{ m}^3/\text{m}^3$, see Table 43)
- Calculating “intensity indicators” for wood pulp imports and wood pulp exports in the period 2000-2009 and applying them to the wood pulp production in the period 2021-2025
 - “intensity indicator for wood pulp imports” is defined as the average of $\frac{\text{wood pulp imports}_{\text{year } x}}{\text{wood pulp production}_{\text{year } x}}$ for all years in the period 2000-2009 (5.4%, see Table 41)
 - “intensity indicator for wood pulp exports” is defined as the average of $\frac{\text{wood pulp exports}_{\text{year } x}}{\text{wood pulp production}_{\text{year } x}}$ for all years in the period 2000-2009 (49.4%, see Table 41)
- Calculating “intensity indicators” for paper and board production in the period 2000-2009 and applying them to the apparent pulp consumption in the period 2021-2025
 - “intensity indicator for wood pulp production” is defined as the average of $\frac{\text{paper production}_{\text{year } x}}{\text{apparent pulp consumption}_{\text{year } x}}$ for all years in the period 2000-2009 ($141.5 \text{ t}/\text{t}$, see Table 41)

- Using the same calculation methods, factors and allocation criteria between the UNFCCC categories “land converted to forests” and “forest land remaining forest land” described in the National Inventory Report of 2018 (please refer to PT NIR 2018, section 6.8)

Table 39: Industrial Wood Production, Imports, Exports and Apparent Wood Consumption in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Industrial wood production	10 231	8 346	8 142	9 073	10 269	10 146	10 205	10 223	9 569	8 964	9 517
Wood production L->FL	1 717	1 446	1 535	1 677	1 769	1 801	1 629	1 460	1 309	992	1 534
Share of wood from L->FL	16,8%	17,3%	18,8%	18,5%	17,2%	17,7%	16,0%	14,3%	13,7%	11,1%	16,1%
Wood imports	1 340	1 109	901	468	364	362	335	746	521	473	662
Imports / production	13,1%	13,3%	11,1%	5,2%	3,5%	3,6%	3,3%	7,3%	5,4%	5,3%	7,1%
Wood exports	557	809	820	1 018	1 009	1 274	1 422	1 526	1 345	602	1 038
Exports / production	5,4%	9,7%	10,1%	11,2%	9,8%	12,6%	13,9%	14,9%	14,1%	6,7%	10,8%
Apparent wood consumption	11 015	8 646	8 223	8 523	9 624	9 234	9 118	9 443	8 745	8 835	9 141
Wood from domestic production	87,8%	87,2%	89,0%	94,5%	96,2%	96,1%	96,3%	92,1%	94,0%	94,6%	92,8%

unit: 1000m³

Table 40: Industrial Wood Production, Imports, Exports and Apparent Wood Consumption in the FRL 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Industrial wood production	9 882	9 917	9 952	9 986	10 021	9 952
Wood production L->FL	256	237	218	198	179	218
Share of wood from L->FL	2,6%	2,4%	2,2%	2,0%	1,8%	2,2%
Wood imports	702	704	707	709	712	707
Imports / production	7,1%	7,1%	7,1%	7,1%	7,1%	7,1%
Wood exports	1 072	1 075	1 079	1 083	1 087	1 079
Exports / production	10,8%	10,8%	10,8%	10,8%	10,8%	10,8%
Apparent wood consumption	9 512	9 546	9 579	9 613	9 646	9 579
Wood from domestic production	92,6%	92,6%	92,6%	92,6%	92,6%	92,6%

unit: 1000m³

Table 41: Industrial Wood Pulp Production, Imports, Exports and Apparent Pulp Consumption in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Wood pulp production	1 774	1 806	1 929	1 935	1 949	1 990	2 065	2 092	2 022	2 182	1 974
Pulp production / apparent wood consumption	16,1%	20,9%	23,5%	22,7%	20,3%	21,6%	22,6%	22,2%	23,1%	24,7%	21,8%
Wood pulp imports	94	163	145	133	112	76	68	82	85	92	105
Imports / production	5,3%	9,0%	7,5%	6,9%	5,7%	3,8%	3,3%	3,9%	4,2%	4,2%	5,4%
Wood pulp exports	969	980	962	961	933	762	1 038	1 040	945	1 149	974
Exports / production	54,6%	54,3%	49,9%	49,7%	47,9%	38,3%	50,3%	49,7%	46,8%	52,7%	49,4%
Apparent pulp consumption	899	989	1 112	1 107	1 128	1 304	1 095	1 135	1 161	1 125	1 105
Pulp from domestic production	89,5%	83,5%	87,0%	88,0%	90,1%	94,2%	93,8%	92,7%	92,7%	91,8%	90,3%
Paper production	1 290	1 419	1 537	1 530	1 664	1 570	1 644	1 644	1 662	1 634	1 559
Paper production / apparent wood pulp consumption	143,5%	143,5%	138,3%	138,2%	147,5%	120,4%	150,1%	144,9%	143,1%	145,2%	141,5%

unit: 1000m³ (wood); 1000t (pulp and paper)

Table 42: Industrial Wood Pulp Production, Imports, Exports and Apparent Pulp Consumption in the FRL 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Wood pulp production	2 070	2 077	2 084	2 092	2 099	2 084
Pulp production / apparent wood consumption	21,8%	21,8%	21,8%	21,8%	21,8%	21,8%
Wood pulp imports	112	112	112	113	113	112
Imports / production	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%
Wood pulp exports	1 022	1 026	1 030	1 033	1 037	1 030
Exports / production	49,4%	49,4%	49,4%	49,4%	49,4%	49,4%
Apparent pulp consumption	1 159	1 163	1 167	1 171	1 175	1 167
Pulp from domestic production	90,4%	90,4%	90,4%	90,4%	90,4%	90,4%
Paper production	1 639	1 645	1 651	1 657	1 663	1 651
Paper production / apparent wood pulp consumption	141,5%	141,5%	141,5%	141,5%	141,5%	141,5%

unit: 1000m³ (wood); 1000t (pulp and paper)

Table 43: Wood Panel Production and Apparent Pulp Consumption in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Wood panel production	1 293	1 243	1 250	1 215	1 323	1 306	1 306	1 337	1 352	1 385	1 301
Panel production / apparent wood consumption	11,7%	14,4%	15,2%	14,3%	13,7%	14,1%	14,3%	14,2%	15,5%	15,7%	14,3%
Sawnwood production	1 427	1 492	1 298	1 383	1 060	1 010	1 010	1 011	1 010	1 093	1 179
Sawnwood production / apparent wood consumption	13,0%	17,3%	15,8%	16,2%	11,0%	10,9%	11,1%	10,7%	11,5%	12,4%	13,0%

unit: 1000m³

Table 44: Wood Panel Production and Apparent Pulp Consumption in the FRL 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Wood panel production	1 361	1 366	1 371	1 375	1 380	1 371
Panel production / apparent wood consumption	14,3%	14,3%	14,3%	14,3%	14,3%	14,3%
Sawnwood production	1 235	1 240	1 244	1 248	1 253	1 244
Sawnwood production / apparent wood consumption	13,0%	13,0%	13,0%	13,0%	13,0%	13,0%

unit: 1000m³

The average net-removals from harvested wood products for the period 2000-2009 equal 191 ktC.year⁻¹ and are estimated for the period 2021-2025 at 166 ktC.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is +609 ktCO_{2eq}.year⁻¹ (= 166 ktC.year⁻¹ x 44/12).

Table 45: Harvested Wood Products Net-Emissions in the Reference Period 2000-2009

4.A Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Sawnwood	3	13	-20	15	-50	-61	-59	-67	-62	-41	-33
L->FL	1	5	3	8	-7	-8	-11	-16	-17	-20	-6
FL<->FL	2	9	-23	7	-43	-53	-48	-51	-45	-22	-27
Wood panels	188	169	172	177	205	195	190	178	184	189	185
L->FL	31	30	35	34	35	35	28	21	20	12	28
FL<->FL	157	140	138	143	170	160	162	157	164	178	157
Paper and Board	75	59	93	93	121	78	77	28	34	15	67
L->FL	10	10	22	19	18	14	5	-9	-7	-18	6
FL<->FL	65	49	71	73	103	65	72	36	41	33	61
HWP Total	266	242	246	285	276	213	208	138	156	163	219
L->FL	43	44	59	61	46	41	22	-4	-3	-26	28
FL<->FL	223	197	187	223	230	171	186	142	160	189	191

unit: GgC; positive number denotes removals; negative numbers denote emissions

Table 46: Harvested Wood Products Net-Emissions in the FRL 2021-2025

4.A Forest Land	2021	2022	2023	2024	2025	FRL
Sawnwood	-5	-4	-3	-2	-1	-3
L->FL	-32	-32	-32	-31	-31	-32
FL<->FL	27	28	29	30	31	29
Wood panels	131	129	126	124	122	126
L->FL	-15	-16	-16	-16	-16	-16
FL<->FL	146	144	142	140	138	142
Paper and Board	-22	-14	-8	-4	-2	-10
L->FL	-6	-5	-5	-4	-4	-5
FL<->FL	-16	-9	-4	0	2	-5
HWP Total	104	111	115	118	120	114
L->FL	-54	-53	-52	-52	-52	-52
FL<->FL	158	164	168	170	171	166

unit: GgC; positive number denotes removals; negative numbers denote emissions

2.9.1.1 Recalculations

Recalculations may be required during the Commitment Period in the event of revision of input values affecting the reference period 2000-2009, if new harvested wood products categories are added or the existing categories redefined, or if the methodologies for estimating harvested wood products are revised and improved.

2.10 CRF 4(I) Emissions from Nitrogen Inputs to Managed Soils

As explained in PT NIR 2018, section 6.9, these emissions are considered to be “Included Elsewhere” and are reported in the agriculture sector (CRF 3.D).

Consistently, emissions from N inputs to soils are considered to the “Included Elsewhere” and are not considered or estimated separately in the FRL.

2.10.1.1 Recalculations

Recalculations may be required during the Commitment Period in case an explicit methodology to address emissions from N input to soils in non-agricultural soils is developed and implemented in the PT NIR.

2.11 CRF 4(II) Drainage and Rewetting of Soils

As explained in PT NIR 2018, section 6.10, these emissions are considered to be “Not Occurring” and are reported in the agriculture sector (CRF 3.D).

Consistently, emissions and removals from drainage and rewetting soils are considered to be “Not Occurring” and are not considered or estimated separately in the FRL.

2.11.1 Recalculations

Recalculations may be required during the Commitment Period in case these activities are detected in Portugal and an explicit methodology to address emissions from drainage and rewetting soils is developed and implemented in the PT NIR.

2.12 CRF 4(III) Direct N₂O Emissions from N Mineralization associated with Loss of Soil Organic Carbon

As explained in PT NIR 2018, section 6.11, these emissions are estimated whenever the soil emission factor of a particular land-use change is negative (i.e. loss of SOC). The emission estimations were made consistently with the methods described in PT NIR 2018 section 6.11.2.

In Forest Land Remaining Forest Land, these C losses include forest conversions that involve a carbon loss in soils.

The input data is presented in Table 47 and Table 48, respectively for the reference period 2000-2009 and the FRL period 2021-2025.

Table 47: Area of Forest Land Remaining Forest Land undergoing Soil Carbon Losses in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	31	32	32	33	34	32	30	27	25	24	30
Pinus pinaster	0	0	0	0	0	0	0	0	0	0	0
Quercus suber	30	31	31	32	33	30	28	26	23	22	29
Eucalyptus spp.	0	0	0	0	0	0	0	0	0	0	0
Quercus rotundifolia	1	1	1	1	1	1	2	2	2	2	1
Quercus spp.	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	0	0	0	0	0	0	0	0	0	0
Pinus pinea	0	0	0	0	0	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0	0	0	0	0	0

unit: 1000ha

Table 48: Area of Forest Land Remaining Forest Land undergoing Soil Carbon Losses in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	20	20	20	21	21	20
Pinus pinaster	0	0	0	0	0	0
Quercus suber	16	16	17	17	17	17
Eucalyptus spp.	0	0	0	0	0	0
Quercus rotundifolia	4	4	4	4	4	4
Quercus spp.	0	0	0	0	0	0
Other broadleaves	0	0	0	0	0	0
Pinus pinea	0	0	0	0	0	0
Other coniferous	0	0	0	0	0	0

unit: 1000ha

The estimated emissions are presented in Table 49 and Table 50, respectively for the reference period 2000-2009 and the FRL period 2021-2025.

The average N₂O emissions from soil carbon losses for the period 2000-2009 equal 21 ktC_{2eq}.year⁻¹ and are estimated for the period 2021-2025 at 13 ktCO_{2eq}.year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -13 ktCO_{2eq}.year⁻¹.

Table 49: Direct N₂O Emissions from Soil Carbon Losses in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	-21,74	-22,27	-22,81	-23,34	-23,88	-22,18	-20,48	-18,91	-17,34	-16,40	-20,94
Pinus pinaster	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Quercus suber	-21,25	-21,70	-22,16	-22,61	-23,06	-21,28	-19,50	-17,82	-16,13	-15,09	-20,06
Eucalyptus spp.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Quercus rotundifolia	-0,49	-0,57	-0,65	-0,73	-0,81	-0,90	-0,98	-1,09	-1,20	-1,32	-0,87
Quercus spp.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other broadleaves	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Pinus pinea	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other coniferous	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

unit: GgCO_{2eq}.; positive number denotes removals; negative numbers denote emissions

Table 50: Direct N₂O Emissions from Soil Carbon Losses in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	-12,65	-12,78	-12,91	-13,04	-13,17	-12,91
Pinus pinaster	0,00	0,00	0,00	0,00	0,00	0,00
Quercus suber	-10,54	-10,64	-10,74	-10,83	-10,93	-10,74
Eucalyptus spp.	0,00	0,00	0,00	0,00	0,00	0,00
Quercus rotundifolia	-2,11	-2,14	-2,17	-2,21	-2,24	-2,17
Quercus spp.	0,00	0,00	0,00	0,00	0,00	0,00
Other broadleaves	0,00	0,00	0,00	0,00	0,00	0,00
Pinus pinea	0,00	0,00	0,00	0,00	0,00	0,00
Other coniferous	0,00	0,00	0,00	0,00	0,00	0,00

unit: GgCO_{2eq.}; positive number denotes removals; negative numbers denote emissions

2.12.1 Recalculations

Recalculations will be required in the event of changes to the historical time series, in the methodologies and/or emission factors affecting any of the years in the period 2000-2009. Recalculations will also be necessary as the forest area is replaced from the estimates presented in section 2.2.5 with their final values.

2.13 CRF 4(IV) Indirect N₂O Emissions

As explained in PT NIR 2018, section 6.12, these emissions are estimated in relation to:

- Indirect emissions from leaching and runoff resulting from the loss of SOM (CRF 4(III))
- Indirect emissions from atmospheric deposition resulting from emissions of NO_x and NH₃ from forest fires (CRF 4(V))

The estimated emissions are presented in Table 51 and Table 52, respectively for the reference period 2000-2009 and the FRL period 2021-2025.

The average N₂O emissions from soil carbon losses for the period 2000-2009 equal 21 ktC_{2eq.}·year⁻¹ and are estimated for the period 2021-2025 at 13 ktCO_{2eq.}·year⁻¹. Therefore, the contribution of this variable for the Forest reference Level 2021-2025 is -13 ktCO_{2eq.}·year⁻¹.

Table 51: Indirect N₂O Emissions from Atmospheric Deposition and Nitrogen Leaching and Run-Off in the Reference Period 2000-2009

4.A.1 Forest Land Remaining Forest Land	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2000-2009
Total	4	3	5	16	3	14	2	1	1	1	5
Atmospheric deposition	3	3	4	16	3	14	2	1	0	1	5
Nitrogen leaching and run-off	0	0	0	1	1	0	0	0	0	0	0

unit: GgCO_{2eq.}; positive number denotes removals; negative numbers denote emissions

Table 52: Indirect N₂O Emissions from Atmospheric Deposition and Nitrogen Leaching and Run-Off in the FRL 2021-2025

4.A.1 Forest Land Remaining Forest Land	2021	2022	2023	2024	2025	FRL
Total	2	2	2	2	2	2
Atmospheric deposition	2	2	2	2	2	2
Nitrogen leaching and run-off	0	0	0	0	0	0

unit: GgCO_{2eq.}; positive number denotes removals; negative numbers denote emissions

2.14 CRF 4(V) Biomass Burning Emissions

Biomass burning emissions included in FRL are addressed and described in section 2.2.9 “Natural Disturbances – Background Level and Margin” above.

3 Proposed Forest Reference Level

The FRL is totally based on the National Inventory Report and the structure and contents of the respective Common Reporting Tables. The FRL refers to the UNFCCC category “4.A.1 Forest Land Remaining Forest Land” and results from the sum of the following quantities:

- Living Biomass Gains (CRF 4.A)
- Living Biomass Losses (CRF 4.A)
- Dead Wood Net-Emissions (CRF 4.A)
- Litter Net-Emissions (CRF 4.A)
- Mineral Soil Net-Emissions (CRF 4.A)
- Organic Soil Net-Emissions (CRF 4.A)
- Harvested Wood Products Net-Emissions (CRF 4.G)
- Emissions from Nitrogen Inputs to Managed Soils (CRF 4(I))
- Drainage and Rewetting of Soils (CRF 4(II))
- Direct N₂O Emissions from N Mineralization associated with Loss of Soil Organic Carbon (CRF 4(III))
- Indirect N₂O Emissions (CRF 4(IV))
- Biomass Burning Emissions (CRF 4(V))

Based on the methodologies, data and assumptions described in section 2 “Description of the Forest Reference Level” above, the FRL is estimated at 11 165 GgCO_{2eq}.year⁻¹ (including the contribution of Harvested Wood Products” or at 10 556 GgCO_{2eq}.year⁻¹ (including “instantaneous oxidation” approach to harvested wood products). The contribution of each variable is presented in Table 53.

Table 53: Estimated annual emissions or removals for each FRL component

FRL component	Average 2000-2009	FRL (w/HWP) 2021-2025	FRL (inst. ox) 2021-2025
4.A.1 Forest Land Remaining Forest Land - Net CO₂ emissions	7 215	11 468	11 468
Living Biomass - CO ₂ gains	25 596	30 932	30 932
Living Biomass - CO ₂ losses	-18 421	-19 351	-19 351
Industrial harvest	-10 157	-11 685	-11 685
Other wood use	-2 531	-2 653	-2 653
Salvaged wood	-1 216	-550	-550
Forest conversion	-1 733	-1 289	-1 289
Natural mortality	-2 784	-3 174	-3 174
Dead Wood - Net CO ₂ emissions	IE	IE	IE
Litter - Net CO ₂ emissions	-49	-26	-26
Mineral Soils - Net CO ₂ emissions	89	-87	-87
Organic Soils - Net CO ₂ emissions	NO	NO	NO
4.G Harvested Wood Products	700	609	0
4(I) N inputs to managed soils - N₂O emissions	IE	IE	IE
4(II) Drainage and rewetting of soils - CO₂, CH₄, N₂O emissions	NO	NO	NO
4(III) N mineralisation from the loss of SOC - N₂O emissions	-21	-13	-13
4(IV) Indirect N₂O emissions	-5	-2	-2
4(V) Forest fires - CO₂, CH₄, N₂O emissions	-1 536	-897	-897
Net-emissions	6 353	11 165	10 556

Notes:

(1) Positive numbers denote Sequestration; Negative numbers denote Emissions;

(2) Values in annual average for the respective period;

(3) All values in GgCO_{2eq}.

3.1 Stakeholder Consultation

The current text was presented to the stakeholders referred to in Table 54⁵, in a meeting that took place on the 7th of February 2019.

The agenda of the meeting was as follows:

1. Context: the EU Climate and Energy Package 2030
 - a. EU climate targets
 - b. Main policy instruments
2. The LULUCF Regulation
 - a. Summary of rules applicable to each applicable land-use
3. The PT proposal for the FRL
 - a. Methodology and assumptions
 - b. Results
 - c. Proposed FRL

A period of comments was opened, following which 2 comments were received:

- UNAC: requesting the consideration of Cork products as HWP
- Centro Pinus: requesting that the Greenhouse Gas Inventory activity data be based on the Forest Inventory area data, rather than the Land-Use Cartography (COS)

APA and ICNF consider these requests to be related to possible improvements to the National Inventory Report of GHG Emissions and Removals and do not trigger changes to the current FRL proposal.

This is due to the fact that the FRL proposal needs to be consistent with previously submitted NIRs, which did not consider Cork Products as HWP and use COS as a basis for land-use change area reporting.

Both topics might be elaborated further as part of the future improvements of the NIR and, if considered in the future, could trigger changes to both the NIR and, for technical consistency, to the FRL.

Table 54: Stakeholders and participants in the meeting of 2019/02/07

Institution	Representative	invited	participated
Institution type			
AIFF – Associação para a Competitividade da Indústria da Fileira Florestal Association: Forest industries	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AJAP – Associação de Jovens Agricultores de Portugal Association: Farmers	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AIMMP - Associação das Indústrias de Madeira e Mobiliário de Portugal Association: Forest industries	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Altri Florestal Company: Forest owner / Paper industry	Luís Leal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AMORIM Company: Cork industry	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ANEFA – Associação Nacional de Empreiteiros Florestais e Agrícolas Association: Forest contractors	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
APCOR – Associação Portuguesa da Cortiça Association: Cork industry	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CAP – Confederação dos Agricultores de Portugal Association: Farmers and Forest Owners	João Soveral	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

⁵ The table is inserted for information on the institutions and representatives that participated in the meeting. This table should not be understood as a formal endorsement of this document by any of the institutions or individuals mentioned.

Institution Institution type	Representative	invited	participated
CELPA – Associação da Indústria Papeleira Association: Paper industry	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Centro Pinus – Associação para a Valorização da Floresta de Pinho Association: Pine Forests Value Chain	Pedro Teixeira	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CNA – Confederação Nacional da Agricultura Association: Farmers and Forest Owners	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Companhia das Lezírias Company: Forest owner	Rui Alves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CONFAGRI - Confederação Nacional das Cooperativas Agrícolas e do Crédito Agrícola de Portugal Association: Farmer Cooperatives	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DGADR – Direcção Geral de Agricultura e Desenvolvimento Rural Public Administration: Ministry of Agriculture	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DGT – Direcção Geral do Território Public Administration: Land-use planning	Mário Caetano	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EUROPAC Company: Paper industry	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Floresta Atlântica - Sociedade Gestora de Fundos de Investimento Imobiliário Company: Forest fund	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FNAPF – Federação Nacional das Associações de Proprietários Florestais	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FORESTIS – Associação Florestal de Portugal Association: Forest Owners	Rosário Alves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GPP – Gabinete de Planeamento, Políticas e Administração Geral Public Administration: Ministry of Agriculture	Clara Lopes João Paulo Marques	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ICNF – Instituto de Conservação da Natureza e Florestas Public Administration: Ministry of Agriculture / Forest Authority	Conceição Ferreira José Sousa Uva	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
INIAV – Instituto Nacional de Investigação Agrária e Veterinária Public Administration: Ministry of Agriculture	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ISA – Instituto Superior de Agronomia University: Forestry	Margarida Tomé	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IST – Instituto Superior Técnico University: Environment	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LPN – Liga para a Protecção da Natureza NGO: Environment	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Navigator Company Company: Forest owner / Paper Industry	José Luís Carvalho	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Quercus – Associação Nacional Conservação da Natureza NGO: Environment	Domingos Patacho	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SONAE Arauco Company: Wood Panel Industry	Nuno Calado	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UNAC – União das Organizações de Agricultores para o Desenvolvimento da Charneca Association: Forest Owners	Ana Paiva Brandão	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Institution	Representative	invited	participated
Institution type			
Zero – Associação Sistema Terrestre Sustentável NGO: Environment	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
APA – Agência Portuguesa do Ambiente Public Administration: Ministry of Environment / Implementing Agency	Eduardo Santos Ana Daam José Paulino Joana Veloso Paulo Canaveira	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

3.2 Document publicity

This document is publically available at the website of the Portuguese Environment Agency at:

www.apambiente.pt

Políticas > Alterações Climáticas > Mitigação