



LULUCF: what would a good proposal look like?



LULUCF could weaken the EU emissions reduction target to less than 37 per cent (down from the current 40 per cent target)

The EU has set itself the target of reducing greenhouse gas emissions by at least 40 per cent by 2030, using 1990 levels as its benchmark. This is part of a longer-term effort to reduce emissions by 80 per cent by 2050.¹ The EU developed these targets in 2011 to put it on course² to keep global temperature rises to below 2 degrees centigrade.

Since then, 195 countries have adopted the Paris Agreement, which strengthened the global goal to limit temperature rises to *well below 2 degrees, to pursue efforts to limit warming to 1.5 degrees*. As a signatory of the Paris Agreement, the EU is therefore obliged to review and increase its target to reflect this increased ambition.

Until the EU decides to increase its target – a prerequisite for keeping rises in temperature well below 2 degrees – it is crucial that the EU follows through on the pledges it has made to reduce emissions for 2030 by 40 per cent.

One essential piece of the puzzle is what the EU decides to do with ‘emissions and removals from land and forests’, referred to in climate jargon as LULUCF. Until now, these emissions and removals have not been included in the EU climate targets (See Box 1). The EU proposes to change this, but depending on how it does this, it could have a positive or negative impact on the climate.

Previous research from the Oeko-Institut, commissioned by Fern and IFOAM, shows that incorporating LULUCF into EU emissions accounting could effectively reduce the target from the current 40 per cent to less than 37 per cent.³

¹ COM(2011)112, 'A roadmap for moving to a competitive low carbon economy in 2050', available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0112&from=EN>

² Calculated on the basis of the Fourth Assessment Report of the IPCC available at https://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

³ www.fern.org/LULUCF2030

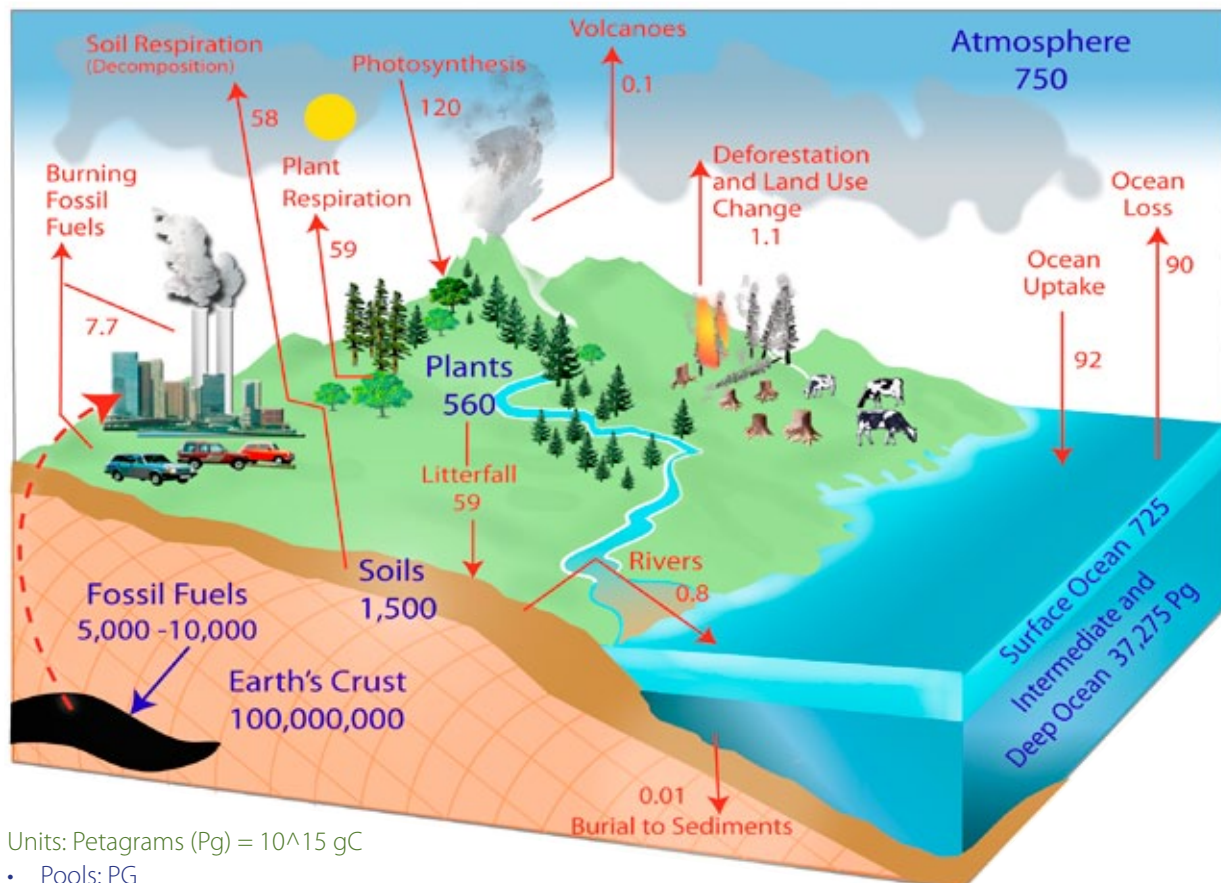
Box 1: History of LULUCF in the EU

Until now, the EU has kept LULUCF separate from other sectors that produce emissions,^I on the grounds there were too many inherent differences for them to be addressed with the same instrument. While CO₂ emissions from forest loss or wetland degradation warm the planet as much as any other emissions, the temporary uptake of CO₂ in biomass cannot cancel out emissions from fossil fuels which stay in the atmosphere for centuries to millennia (see figure below).^{II}

Since the EU's LULUCF sector was (and still is) a net sink, excluding it from greenhouse gas accounting means it does not serve as a distraction from the need to decarbonise our economies.

Modelling done by the Oeko-Institut showed that if all the credits that might be produced by the current LULUCF accounting rules were included in the Effort Sharing Decision from 2021 to 2030, this could reduce the ESD target (currently 30 per cent by 2030) by up to 65 per cent.^{III} This could mean that economies would not in fact be reducing emissions by 40 per cent, but between 33 and 37 per cent.

The carbon cycle shown in petagrams, designed by the GLOBE Carbon Cycle Project.



Units: Petagrams (Pg) = 10¹⁵ gC

- Pools: Pg
- Fluxes: Pg/year

Data Sources: Adapted from Houghton, R.A. Balancing the Global Carbon Budget. *Annu. Rev. Earth Planet. Sci.* 007.35.313-347, updated emissions values are from the Global Carbon Project: Carbon Budget 2009.

I Available at <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013D0529>

II See Mackey B. et al. (2013) 'Untangling the confusion around land carbon science and climate change mitigation policy' *Science*, available at <http://www.nature.com/nclimate/journal/v3/n6/full/nclimate1804.html>

III See www.fern.org/LULUCF2030

What is LULUCF and why is it important?

With forests, wetlands and fields covering 90 per cent of the EU's surface area, it is clear that the LULUCF sector is fundamental, not just to the climate, but also to its natural environment, its wildlife and people.

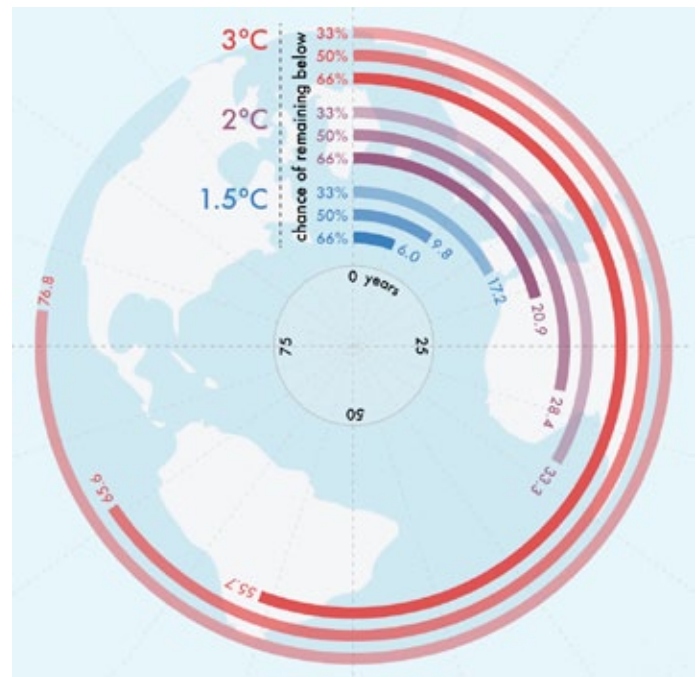
If the world carries on emitting carbon at the current rate for the next six and a half years, it will be impossible to limit warming to 1.5 degrees.⁴ Staying within our budget will require us to 'decarbonise' almost completely by 2040–2050 (something which should probably happen even earlier in the EU, considering our disproportionately large part in causing the problem of climate change),⁵ as well as ending deforestation and the destruction of other ecosystems that act as crucial carbon stores.

As well as protecting the forests and wetlands we have, we should also be striving to restore these terrestrial carbon stores. But they should not be seen as a way of replacing emissions reductions, since this carbon stored in the natural landscape can be lost through storms, pests, fires, drought or the choice of land use.⁶ Beyond its carbon-capturing value, restoring ecosystems has other important benefits, such as reducing desertification, protecting biodiversity and maintaining rainfall, all important functions to maintain life on earth. It is crucial that restoration involves local communities, since those who live in and depend on forests are increasingly recognised as the best guardians of these ecosystems, and are therefore a vital part of the climate solution.⁷

LULUCF in the EU: what are the stakes?

Across the EU, the LULUCF sector is a net sink (it removes carbon from the atmosphere), removing about 350MT of CO₂ per year. This is partly because a large proportion of forests are young, and growing trees sequester more carbon (see Box 2). However, these new forests should be seen in the context of past deforestation and intense forest management in the EU that led to record lows of forest cover and forest carbon stock.

This large sink masks a picture of environmental degradation, where biodiversity continues to decline as natural forests are logged, land is converted to plantations, ancient grasslands are ploughed, and peatlands are degraded. All of this causes



Carbon countdown. How many years of current emissions would use up the IPCC's carbon budgets for different levels of warming?

Source: <http://www.carbonbrief.org/scientists-discuss-the-1-5c-limit-to-global-temperature-rise>

emissions, reduces the resilience of landscapes, and undermines the quality of life of local communities.

In this document, Fern suggests three things must happen to ensure that the LULUCF sector makes a meaningful contribution to the fight against climate change.

1. A separate pillar for LULUCF with its own target

The EU has confirmed that the new 2030 climate and energy package includes LULUCF, and the European Commission will make a legislative proposal for this sector before the summer of 2016. The Commission has outlined three possible ways of integrating LULUCF in the EU's 2030 climate and energy package.

- **Option 1**, LULUCF pillar: develop a LULUCF sector policy approach separately.
- **Option 2**, land sector pillar: merge LULUCF and non-CO₂ agriculture⁸ sector emissions into one new independent pillar of the EU's climate policy.
- **Option 3**: include LULUCF in the Effort Sharing Decision (ESD).

⁸ This refers to methane and nitrous oxide emissions, which are currently covered in the Effort Sharing Decision.

⁴ <http://www.carbonbrief.org/scientists-discuss-the-1-5c-limit-to-global-temperature-rise>

⁵ <http://climateequityreference.org/>

⁶ For more information, see NGO LULUCF principles paper available at: http://www.fern.org/sites/fern.org/files/LULUCF%20principles_Final.pdf

⁷ <http://www.wri.org/securingrights>

Box 2: Current LULUCF rules

LULUCF brings together a number of activities, each of which are encouraged or disincentivised by different rules. There are five categories that EU countries must currently report on: afforestation, deforestation, forest management, cropland management and grazing land management.

Wetlands and peatlands are examples of ecosystems that contain a lot of carbon and emit CO₂ when degraded. However, countries do not have to account for these emissions, though many organic soils are accounted for under the cropland and grazing land categories. Since EU Member States drain peatland for agriculture and extract peat to burn in power stations or use in gardens, it is likely that there are still emissions from this sector that are currently not being accounted for.

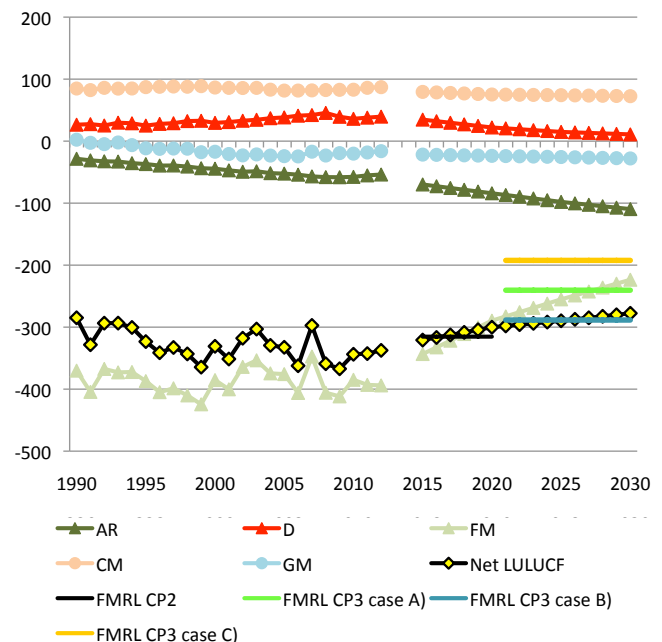
The accounting rules themselves are complex, but the reasoning behind them is often simple.

Deforestation has a negative impact on the climate, since not only does it emit as CO₂ all the carbon that is captured in the plants and soil on that land, it is also not replaced, meaning that the world loses a vital carbon store. Hence LULUCF rules discourage deforestation by making sure that it is subject to substantial debits (technically known as gross-net accounting, where a country accounts for the total amount of emissions or removals from that activity in the year when accounting happens).

In theory, afforestation has a positive impact on the climate since it can increase the carbon storage of the planet and also increases the availability of timber. Hence the rules encourage afforestation in the same way that they discourage deforestation, by applying *gross-net* accounting to the credits. However, the current rules currently do not incentivise additional action. Once a Member State plants land with trees, it accrues a large amount of credits (due to the *gross-net* rules – see box 3 for more explanation) indefinitely, rather than acknowledging that after a period this land simply becomes part of a country's forest area, and is accounted for within the rules for all other forests. As a result, the current rules do not really justify additional action and are not in line with international rules, where after 20 years new forest plantations are considered part of the existing forest stock and accounted for accordingly. In addition, afforestation in the form of large-scale monocultures often has a negative impact on water, soil and biodiversity, and has encountered much resistance from local communities across the EU and abroad.

'Forest management' refers to existing forests that are being actively managed. Its rules are complex, for the good reason that forests naturally sequester carbon, something that should not be credited as action to address climate change. Since the emphasis of climate targets has been to reduce emissions, counting full removals was considered to be a distraction from the urgent need to reduce fossil fuel emissions. However, the current way of accounting for forests means that there is no way to protect them, since decreases in forest carbon levels are measured against a business-as-usual baseline set by the country: so if the country uses a reference based on increased logging, it incurs no debits for the decrease in carbon storage, and even incurs credits if it does not decrease the carbon sink by as much as in the projection. Crucially, it means that if policies to increase harvesting for bioenergy are included in the reference level, those emissions are not accounted for and hence lead to missing emissions. A report released by Chatham House estimates that 21 Member States have included bioenergy in their reference levels.¹

European Union



¹ Chatham House, forthcoming. Greenglass N, Forest-based biomass energy accounting under the UNFCCC: finding the 'missing' carbon emissions.

Box 3: Accounting rules explained

Scenario 1

Country A has a sink of 10 MT CO₂ in 1990 and 13 MT CO₂ in 2012. It projected that in 2012, it would have a reduced sink of 8 MT CO₂.

Under *net-net* accounting, it would account for the difference between 1990 and 2012, i.e. 3 MT CO₂ of removals.

Under *gross-net* accounting it would calculate the size of the sink in the year accounting takes place, in this case 2012. If the commitment period was 2008–2012, and it had 10MT in 2008 rising to 13MT in 2012, it would account for approximately 13 MT CO₂ in 2012.

Using a business as usual reference level (as currently used to calculate credits from forest management), it would account 5 MT CO₂ removals, since the sink in 2012 was 5 MT CO₂ larger than foreseen.

Scenario 2

Country B has a forest sink of 15 MT CO₂ in 1990 and 10 MT CO₂ in 2012. It projected that it would have a reduced sink of 6 MT CO₂.

Under *net-net* accounting, it would account for the difference between 1990 and 2012, i.e. 5 MT CO₂ of emissions.

Under *gross-net* accounting it would calculate the size of the sink every year of the commitment period being counted and add it together. If the commitment period was 2008–2012, and it had 13MT in 2008 decreasing to 10MT in 2012, it would account for approximately 10 MT CO₂ of removals.

Under a business as usual reference level reference level, it would account 4 MT CO₂ of removals, since though the sink has declined, it has done so 4 MT less than it projected.

Fern supports the development of a separate pillar as long as it ensures that any removals from land and forests do not remove the need to reduce fossil fuel emissions and shift to a low-carbon economy.⁹ It would also mean that removals could be incentivised in this sector without the risk of watering down targets in other sectors.

A LULUCF pillar could also provide more clarity and visibility over what is happening in the EU's land and forests, and provide much-needed oversight, as this sector plays a crucial role in meeting global temperature limits as agreed in the Paris Agreement. It would also help recognise the core values of land and forests to provide clean air, water and food.

Separating LULUCF in this way, especially if combined with a long-term target for 2050, would support the implementation of the Paris agreement, which has a net-zero goal (i.e. where emissions of CO₂ balance out removals of CO₂). Since removals of carbon from forests are significantly limited,¹⁰ this would help ensure that the levels of carbon removals included in emission reduction pathways are realistic.

Crucially, developing a separate pillar for LULUCF would recognise that the EU's forests and land, which cover 90 per cent of the territory, are more than just about carbon, and that decisions made about these ecosystems need to be good for people and biodiversity, as well as good for the climate. It is possible to do both, but it requires looking at criteria other than just carbon. Building a separate pillar would enable that to happen.

Such a separate pillar would, however, require adequate and independent oversight to provide guidance on implementing LULUCF policy and to monitor accounting.



A separate pillar for LULUCF with its own target would support the implementation of the Paris Agreement

2. Improving LULUCF rules

Box 2 shows that LULUCF rules fail to adequately incentivise additional removals (rules relating to afforestation), overlook reductions in forest carbon stocks and hide bioenergy emissions (rules relating to forest management), as well as

⁹ For more information, see www.fern.org/LULUCFpillar

¹⁰ For more information see www.fern.org/emissionpathways2050

Box 4: Definition of environmental integrity

Adapted from Oeko-Institut 2016. Going beyond 40% – options to ensure LULUCF maintains high environmental integrity of the EU climate and energy package.

In the Preamble of the Paris Agreement the term is defined as the *'integrity of all ecosystems, including oceans, and the protection of biodiversity, recognised by some cultures as Mother Earth.'*¹¹

The European Commission interprets environmental integrity as the set of principles outlined in the Marrakesh Accords.¹² These principles respond to concerns that the use of LULUCF activities should not undermine the environmental integrity of the Kyoto Protocol. They should *'govern the treatment of LULUCF activities'* in the following ways:

- the treatment of these activities should be based on sound science;
- consistent methodologies should be used over time for the estimation and reporting of these activities;
- the aim stated in Article 3, paragraph 1 of the Kyoto Protocol (the emission reduction target of 5 per cent relative to 1990) should not be changed by accounting for land use, land-use change and forestry activities;
- the mere presence of carbon stocks should be excluded from accounting;
- the implementation of LULUCF activities should contribute to the conservation of biodiversity and sustainable use of natural resources;
- accounting for land use, land-use change and forestry should not imply a transfer of commitments to a future commitment period;
- reversal of any removal due to LULUCF activities should be accounted for at the appropriate point in time;
- accounting should exclude removals resulting from: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the reference year.

i <https://unfccc.int/resource/docs/2015/cop21/eng/109r01.pdf>

ii <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+E-2015-007729+0+DOC+XML+VO//EN&language=en>

overlooking emissions from wetlands. In addition, there is no long-term approach as there is no long-term target (limiting how constructive LULUCF can really be), there is little oversight, and the rules are complex, with little guidance provided. If the EU is serious about LULUCF being treated with 'environmental integrity',¹¹ (see box 4) it must do better.

In response to a parliamentary question, the European Commission clarified¹² that environmental integrity is defined by the Marrakesh Accords (see box 4). Fern commissioned research from the Oeko-Institut¹³ which suggested improvements in line with this definition. These improvements would encourage additional action, increase accuracy, transparency and governance, facilitate external monitoring and oversight,

11 <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf>

12 <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+WQ+E-2015-007729+0+DOC+XML+VO//EN&language=en>

13 www.fern.org/LULUCFtarget

and incentivise the use of wood with maximum greenhouse gas savings. The institute make the following suggestions which would help devise a separate target for LULUCF.

All carbon pools should be included. Currently Member States do not have to account for emissions from wetlands, which emit CO₂ when they are drained and degraded. In its report, the Oeko-Institut suggests that it would be more accurate to move towards a 'land-based' system, which would mean countries cannot cherry-pick between those land use activities that generate credits and others that produce debits. Wetlands are a good example. Since many countries still extract peat for energy purposes and permit the sale of peat in garden centres, it is clear that there are emissions related to this activity that must be recognised and reversed.¹⁴

14 Though Member States are not required to account for emissions from wetlands, many organic soils are accounted for under the 'crop land' and 'grazing land category'.

The rules for afforestation should be changed. Afforestation (planting on land that has not been forested in the past 20 years) is heavily incentivised under the present accounting rules, which are different from the UNFCCC reporting rules. The Oeko-Institut report suggests changing the rules to be in line with the UNFCCC reporting rules, so that after 20 years these plantations would no longer receive gross-net credits, but would be accounted for in the same way as forests that remain forests, i.e. according to a business-as-usual reference level, which in theory produces fewer credits (see Box 3 for a more in-depth explanation of the impact of different ways of accounting).

The rules for forest management should be changed too. Currently, countries are asked to project how much their forests will sequester (which is a calculation based on the age of trees and harvesting rates), and debits and credits only result from a deviation from this projected baseline. This means that countries can increase harvesting in forests and decrease the forest sink without leading to any debits. Crucially, this means that if harvesting levels increase due to bioenergy, these emissions are not being accounted for anywhere, since when biomass is burnt, emissions are not counted at the smokestack.

Worse still, countries could even get credits for a reduction in the forest sink, as long as they harvest less than projected (for example due to an economic slump). Harvesting records in 2013-2014 show that countries grossly overestimated the amount they would harvest, which could lead to a windfall of credits if this trend continued until 2020. Early estimates show that in 2013-2014 alone, a miscalculation in the reference level has led to 100MT of credits.¹⁵ Since LULUCF is not included in the EU's target to reduce emissions by 20 per cent by 2020, the target has not been watered down. However, if LULUCF were accounted towards the same target as other sectors in the period 2021-2030, and the same level of credits were accounted, this would decrease the target by more than 7 per cent, when considering credits from all the activities together, bringing the 2030 target down to less than 33 per cent.

The Oeko-Institut therefore recommends that forest management is accounted for more transparently, such as by comparing emissions from a base year or period, which would mean that only a genuine increase in the sink would lead to credits. In addition, if a country's forest sink naturally declined due to the ageing of forests – and therefore the subsequent slow-down in sequestration levels – this should not be penalised, since maintaining stocks is positive for the climate.



3. EU bioenergy policy

The European Union's renewable energy policy aims to cut carbon emissions by replacing fossil fuels with sustainable and low-carbon alternatives, and one of its main tools is the promotion of bioenergy.

Heating and electricity produced by biomass accounts for more than half of the renewable energy produced in the EU.¹⁶ About 70 per cent of bioenergy is produced using 'woody biomass', in the form of direct forest harvests or residues from forest-based industries. If Member States were to use biomass according to their renewable energy plans, by 2020 the amount of wood used for energy alone would be equivalent to today's total EU wood harvest.¹⁷ This policy increases forest biomass demand, as confirmed by Member States' LULUCF projections which foresee large and rapid decreases in the forest carbon stock (see Annex 1).¹⁸ The EU's renewable energy policy is therefore clearly having a serious impact on forests.

EU policy currently treats bioenergy as a carbon-neutral energy source, meaning it assumes net zero emissions from bioenergy production. It justifies this on two main assumptions: that CO₂ emissions from biomass production will be fully compensated for by the future growth of biomass; and that emissions from biomass combustion are fully accounted for in LULUCF.¹⁹

¹⁶ Commission SWD (2014) 259, 'State of play on the sustainability of biomass for electricity, heating and cooling.' According to the Commission's 2015 renewable energy progress report, bioenergy accounts for 84 per cent of renewable energy used in heating and cooling.

¹⁷ EU Forest Strategy, COM (2013) 659 final.

¹⁸ This is according to the EU Reference Scenario released in 2013.

¹⁹ This is why bioenergy emissions are not accounted for through the EU Emission Trading System and the Efforts Sharing Decision, both of which count emissions from bioenergy emissions as zero.

¹⁵ http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/9492.php

Both assumptions have proved to be wrong. Research has shown that the first assumption – that emissions from bioenergy production will be compensated for by future biomass growth – is often incorrect.²⁰ This briefing has already explained that current accounting rules for forest management do not ensure that bioenergy emissions are accounted for (see above).

The upcoming LULUCF decision offers an opportunity to – at least partly – close the current loopholes regarding accounting for bioenergy carbon emissions from land use, for example if a historical reference period were used for all activities. However, that would still not ensure robust and verifiable greenhouse gas emissions savings compared to fossil fuels over a certain bioenergy production chain, nor would it tackle emissions from imported biomass – something that needs to be addressed by a bioenergy sustainability policy.

The European Commission is expected to publish proposals for a sustainable bioenergy policy later this year, and is currently consulting the public on what sustainability criteria should be considered.²¹ The EC has already indicated that such a policy should ensure that bioenergy delivers to robust and verifiable greenhouse gas savings.

It is insufficient to rely on LULUCF to ensure robust and verifiable emissions reductions from bioenergy. LULUCF is not fit to deal with overall carbon savings from bioenergy production, the protection of forest carbon stocks, resource efficiency, reduced carbon stocks in countries exporting biomass to the EU or emissions from indirect land-use change. The Commission should design a sustainable bioenergy policy that tackles these challenges, e.g. by considering:

- a volume cap on bioenergy, to ensure that bioenergy demand does not lead to significantly decreasing carbon sinks or depleted carbon stocks, exceeding sustainable harvest levels, or increasing competition over wood resources;
- a minimum threshold for combustion efficiency in energy installations;
- the exclusion of certain feedstocks for bioenergy production, e.g. primary forest materials, and/or only allowing end-of-life material – or at the minimum excluding the use of whole trees, stumps, and crops that cause emissions from indirect land use change (ILUC).

2030 Climate and Energy Package: more ambition needed from all sectors

With each year warmer than the last and weather conditions becoming more and more erratic, we are already seeing the impact of a changing climate. A new and more ambitious target to limit warming to well below 2 degrees, or 1.5 degrees, will require countries to decarbonise deeper and faster than previously thought. In addition, land and forests must do more to mitigate climate change too. To achieve both of these outcomes, we make the following proposals:

1. A separate LULUCF pillar should be developed, with a long-term target and an independent supervisory body. This should ensure that removals in the land sector do not weaken greenhouse gas cuts in carbon-emitting sectors and encourages removals from this sector at the same time.

2. LULUCF rules should be improved. The current LULUCF rules are weak and outdated, leading to credits that do not translate into real gains for the climate. They do not incentivise additional action, and do not provide a long term perspective for how this sector could help meet the commitments made in the Paris Agreement.

3. Subsidies for bioenergy should be stopped, to ensure that bioenergy becomes more sustainable, and strong sustainability criteria are needed. The EU's bioenergy policy is putting pressure on forests and increasing emissions of CO₂ into the atmosphere, and the LULUCF framework is not strong enough to counter this.



A new and more ambitious target to limit warming to well below 2 degrees, or 1.5 degrees, will require countries to decarbonise deeper and faster than previously thought.

²⁰ See numerous publications such as Searchinger TD et al. (2009) 'Fixing a critical climate accounting error', *Science* 326: 527–528; Walker T et al. (2010) *Biomass Sustainability and Carbon Policy Study* (Manomet Center for Conservation Sciences); European Commission, Joint Research Center *Carbon Accounting of Forest Bioenergy*, EU (2013); Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy (2011).

²¹ <https://ec.europa.eu/energy/en/consultations/preparation-sustainable-bioenergy-policy-period-after-2020>

Emissions and removals of LULUCF activities [Mt CO₂]

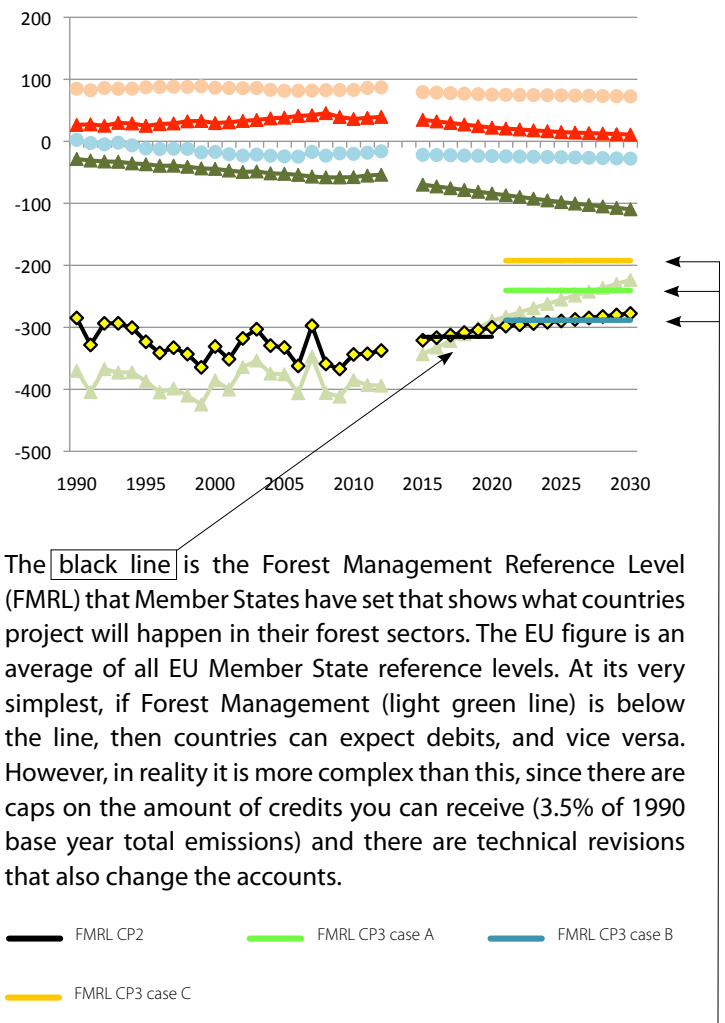
These graphs show the historical and projected emissions and removals from LULUCF-sector activities [MT CO₂e]. They were compiled by the Oeko-Institut in 2015.²²

The historical data (1990-2012) is based on data reported by Member States to the UNFCCC. We use the most recent data reported in 2015 as compiled in the Joint Research Centre (JRC) LULUCF tool.²³

The projected data (2013-2020) is based on the data in the Reference Scenario 2013 published by the European Commission in the Trends to 2050 Report.²⁴ A core element of the projection is what Member States intend to include in their energy systems, notably, the level of bioenergy they plan to use. It includes current trends on population and economic development including the latest 2010 statistics and takes into account the highly volatile energy import price environment of recent years. It portrays economic decisions, which are driven by market forces in the energy and building sector and technology progress in the framework of concrete national and EU policies and measures adopted until spring 2012 and which are or will be implemented over the next years. The projection includes all binding targets set out in EU legislation regarding development of renewable energies and reductions of greenhouse gas emissions, as well as the latest legislation promoting energy efficiency. Regarding LULUCF the scenario considers population growth, income growth, demand for bioenergy, wood, food and feed as well as land use policies up to 2012.

The European Commission is currently updating the Reference Scenario and will publish this alongside the LULUCF Decision in the Summer 2016. It is likely that the projections for LULUCF will change.

EUROPEAN UNION



The **black line** is the Forest Management Reference Level (FMRL) that Member States have set that shows what countries project will happen in their forest sectors. The EU figure is an average of all EU Member State reference levels. At its very simplest, if Forest Management (light green line) is below the line, then countries can expect debits, and vice versa. However, in reality it is more complex than this, since there are caps on the amount of credits you can receive (3.5% of 1990 base year total emissions) and there are technical revisions that also change the accounts.

The **other coloured lines** are hypothetical reference levels devised by the Oeko-Institute.²⁵

²² www.fern.org/LULUCF2030

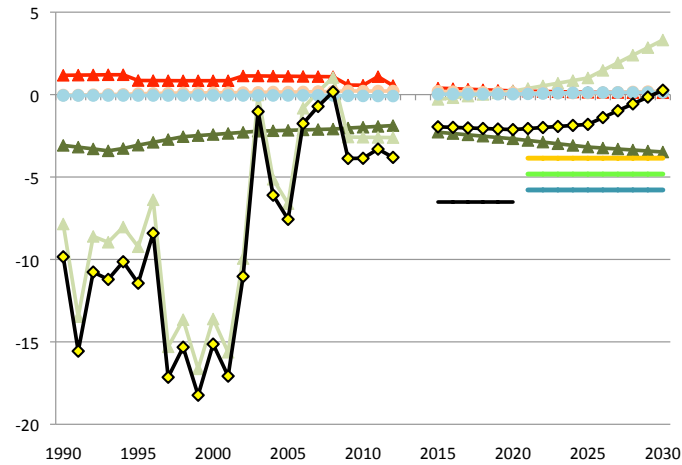
²³ Version of May 2015, personal communication G. Grassi. An older version is available on the JRC website: <http://mars.jrc.ec.europa.eu/Afoludata/Public/DS242>

²⁴ EC 2014: EU energy, transport and GHG emissions, trends to 2050 - Reference scenario 2013 <http://ec.europa.eu/transport/media/publications/doc/trends-to-2050-update-2013.pdf>

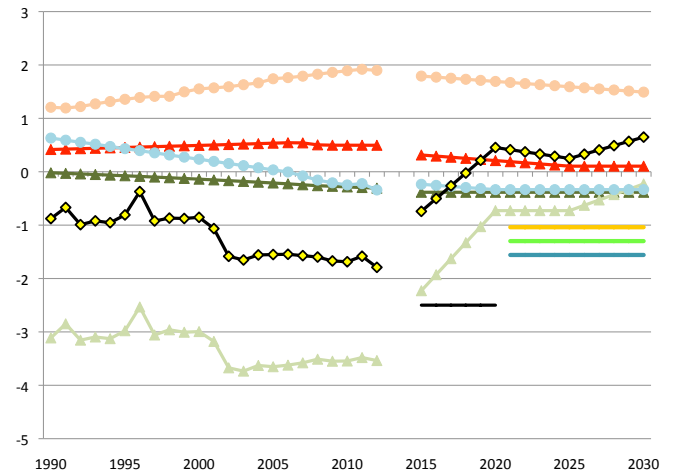
²⁵ For more information about how these reference levels were set, see www.fern.org/LULUCF2030 in particular, p.20

Emissions and removals of LULUCF activities [Mt CO₂]

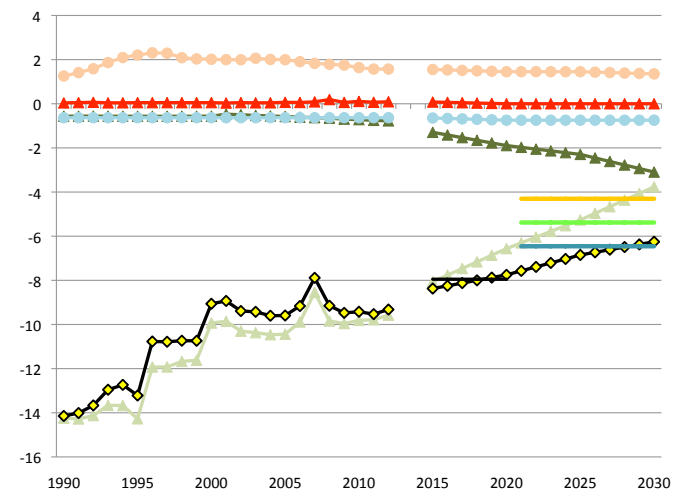
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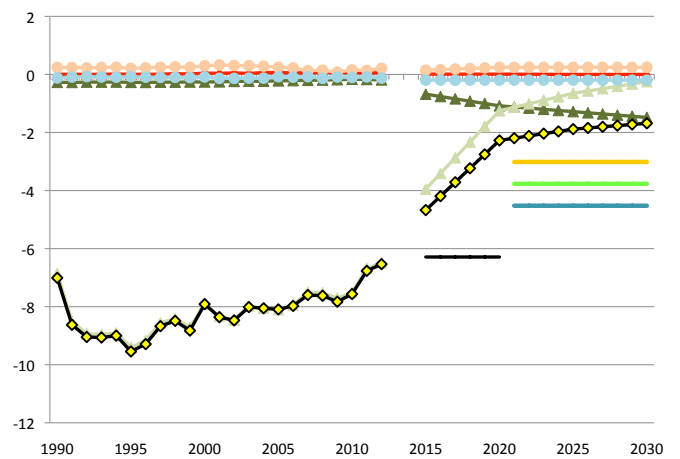
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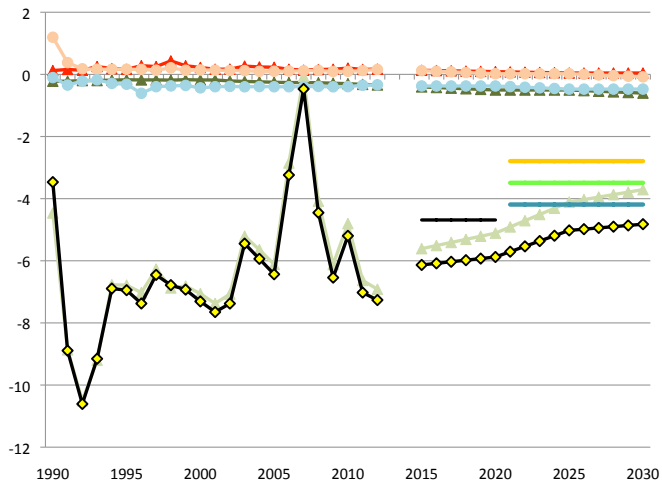


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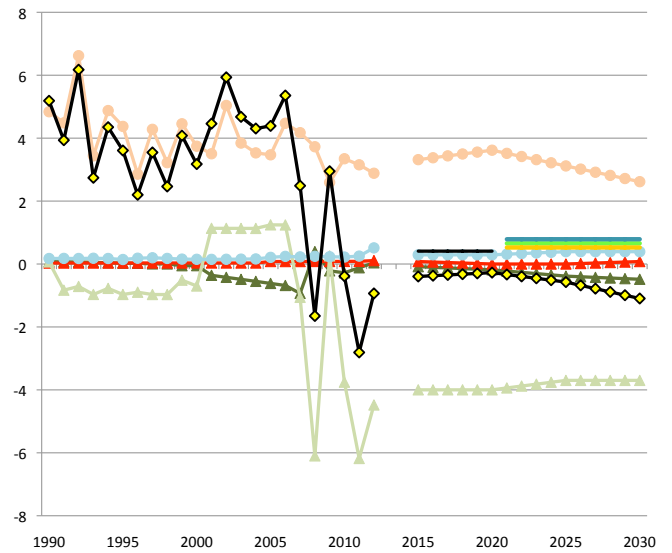


Emissions and removals of LULUCF activities [Mt CO₂]

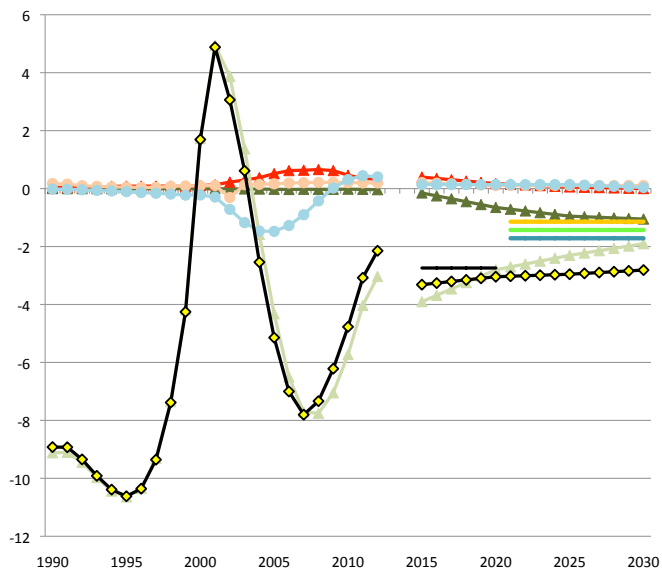
CZECH REPUBLIC



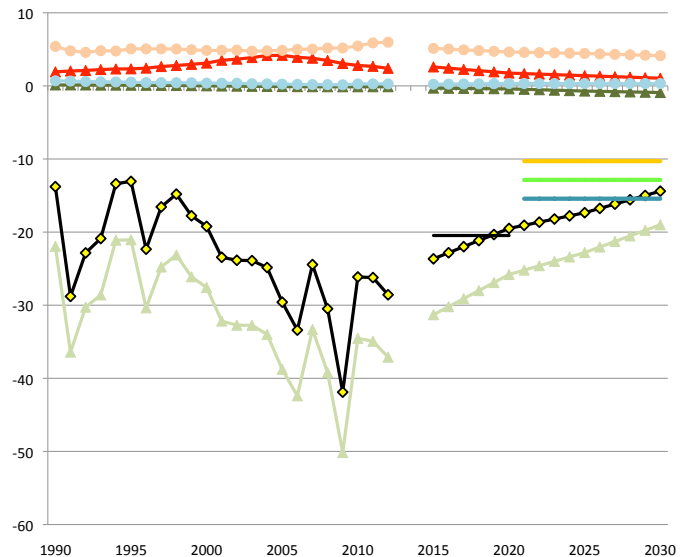
DENMARK



ESTONIA

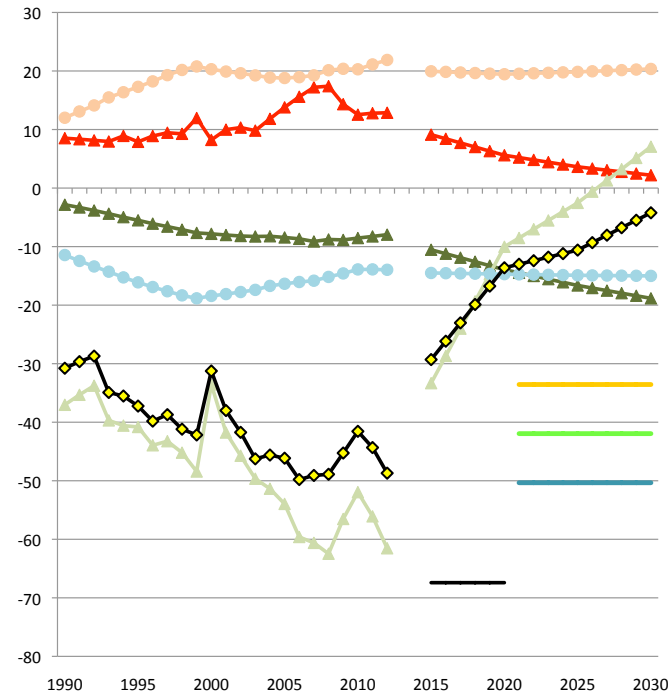


FINLAND

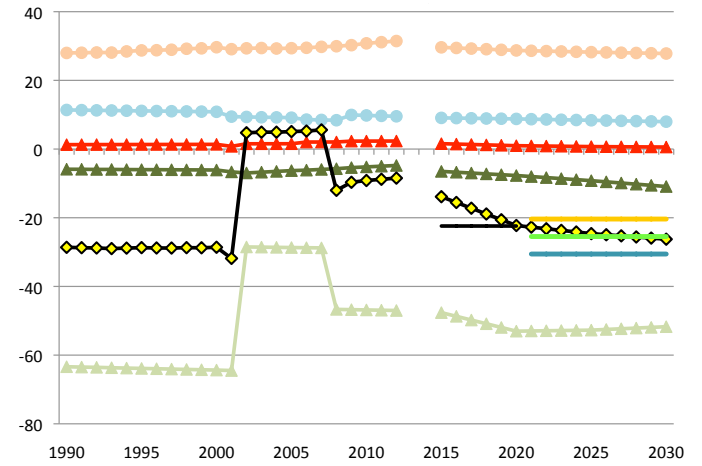


Emissions and removals of LULUCF activities [Mt CO₂]

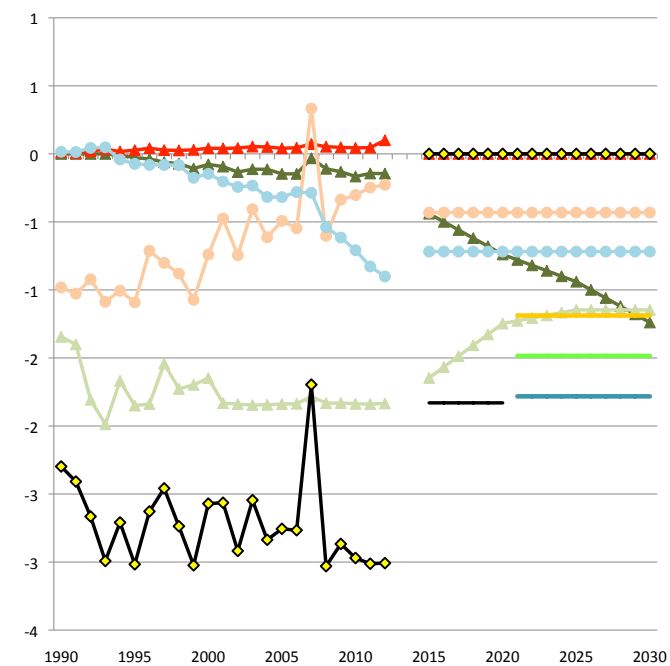
FRANCE



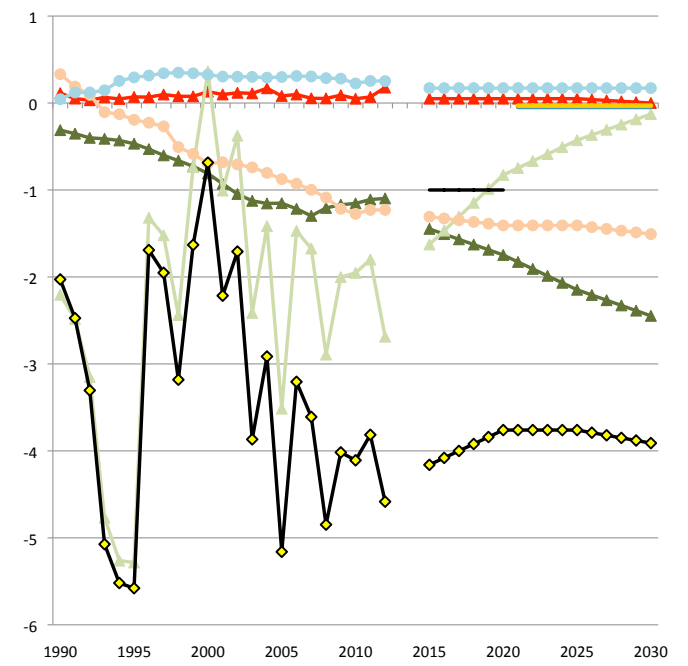
GERMANY



GREECE

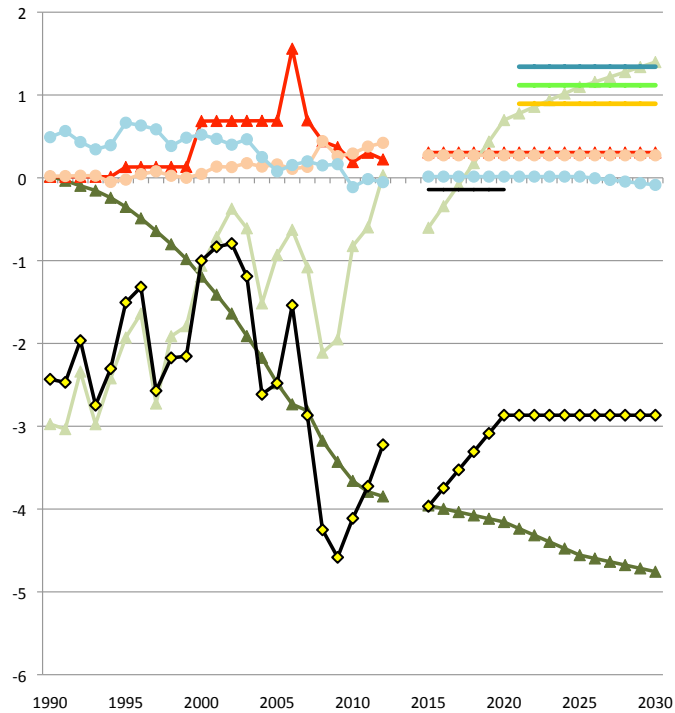


HUNGARY

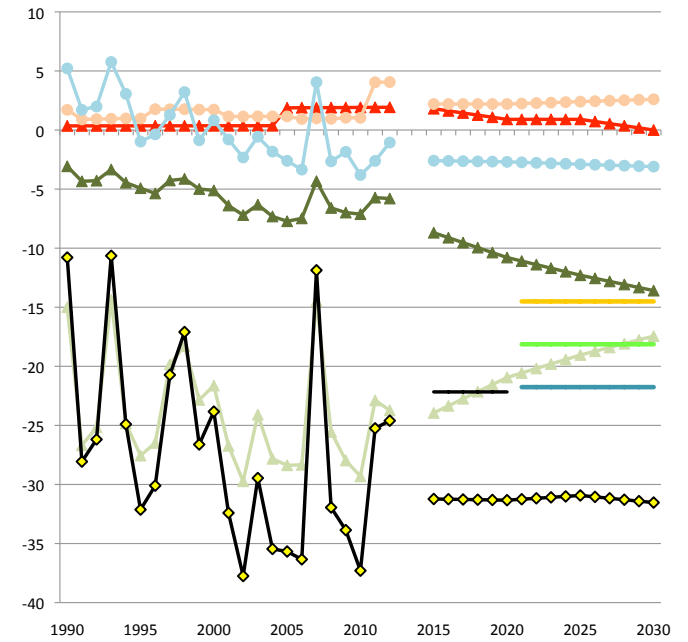


Emissions and removals of LULUCF activities [Mt CO₂]

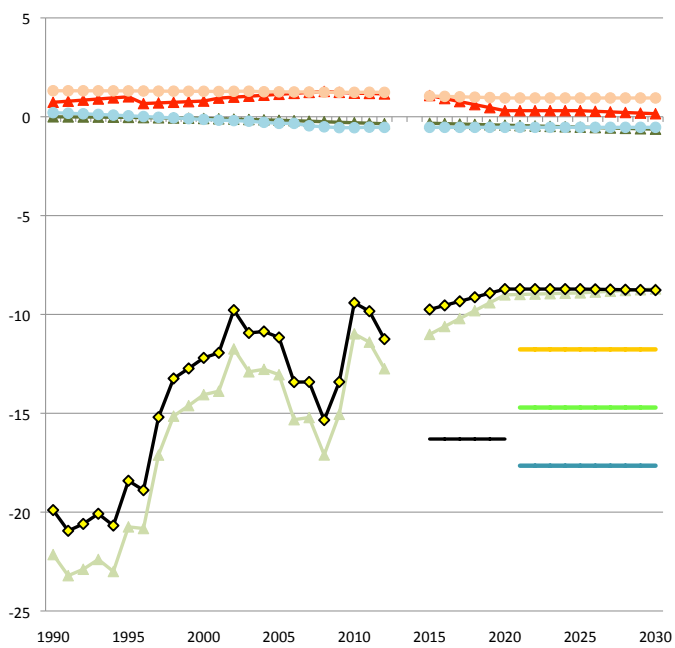
IRELAND



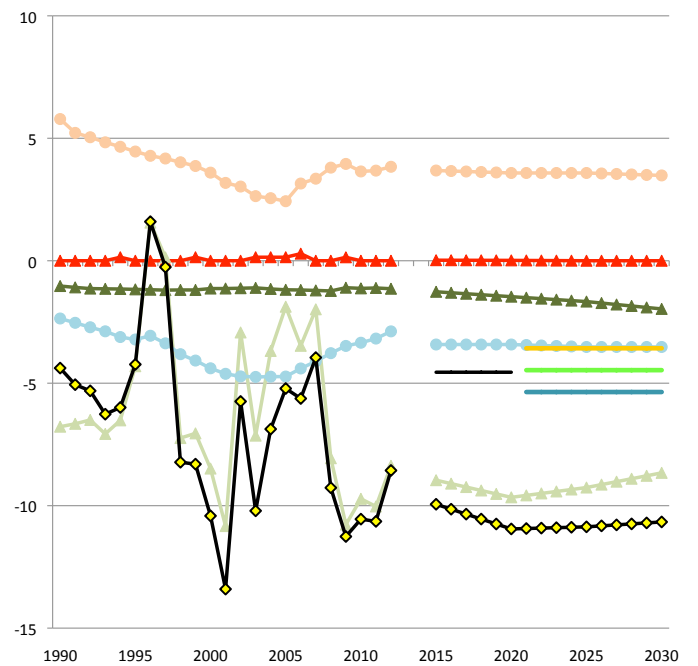
ITALY



LATVIA



LITHUANIA

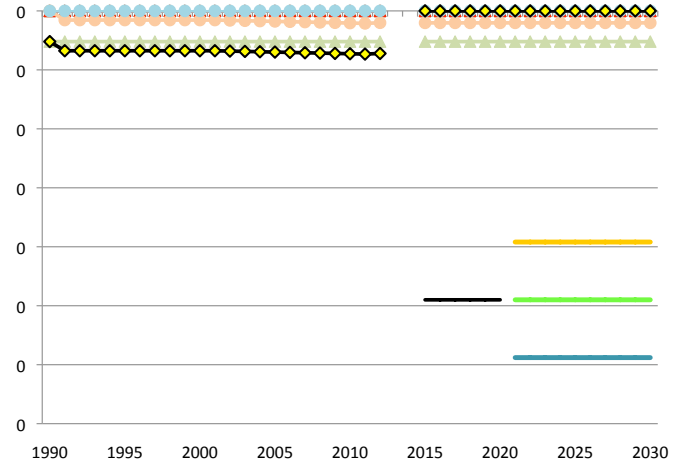


Emissions and removals of LULUCF activities [Mt CO₂]

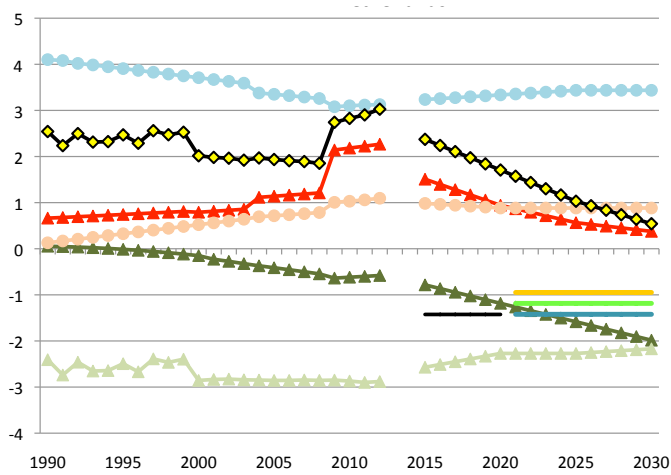
LUXEMBOURG



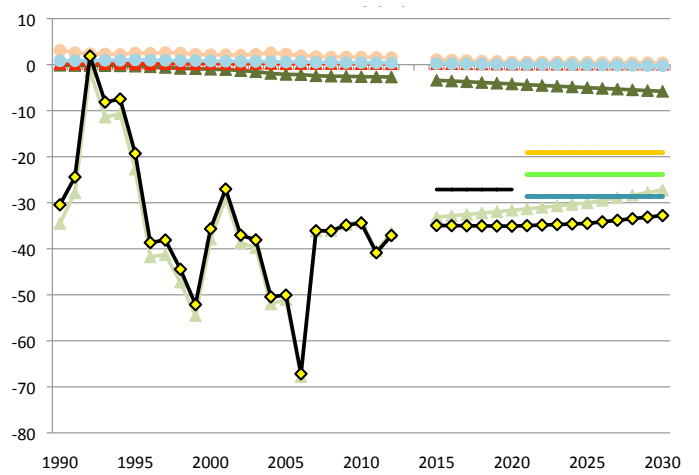
MALTA



NETHERLANDS

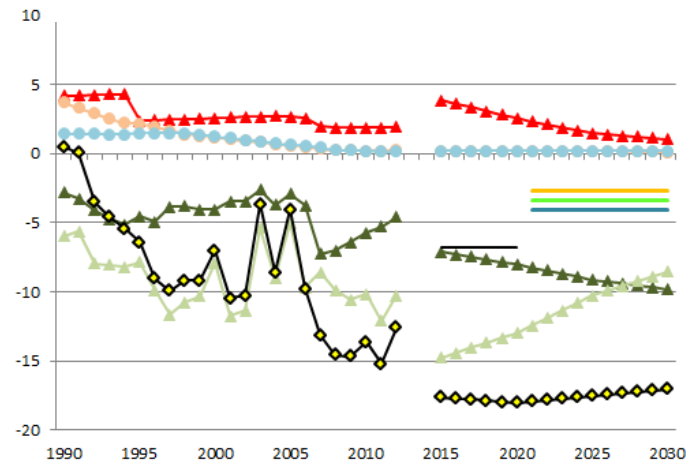


POLAND

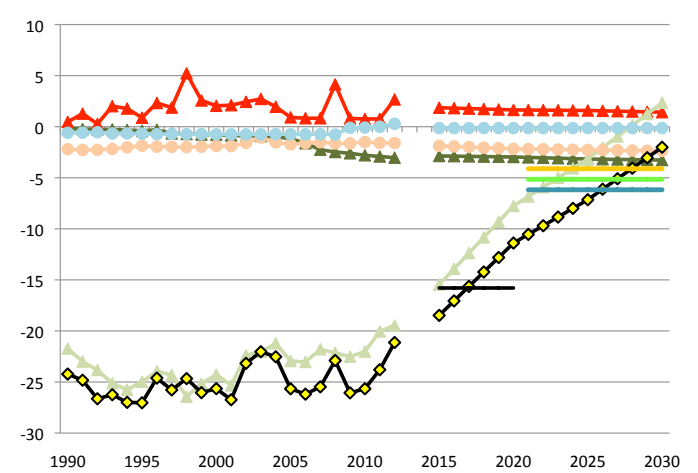


Emissions and removals of LULUCF activities [Mt CO₂]

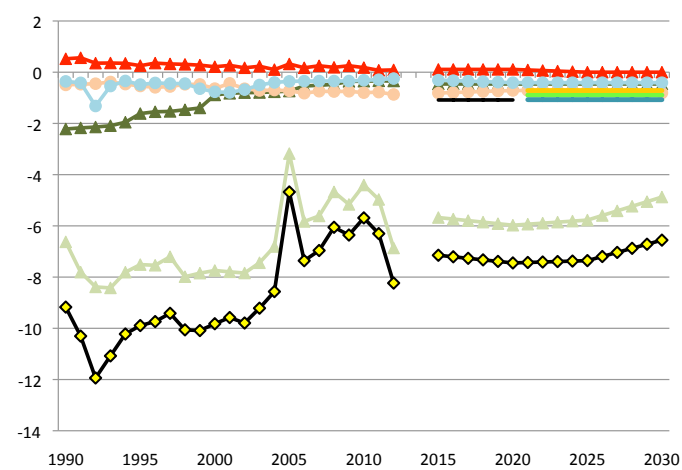
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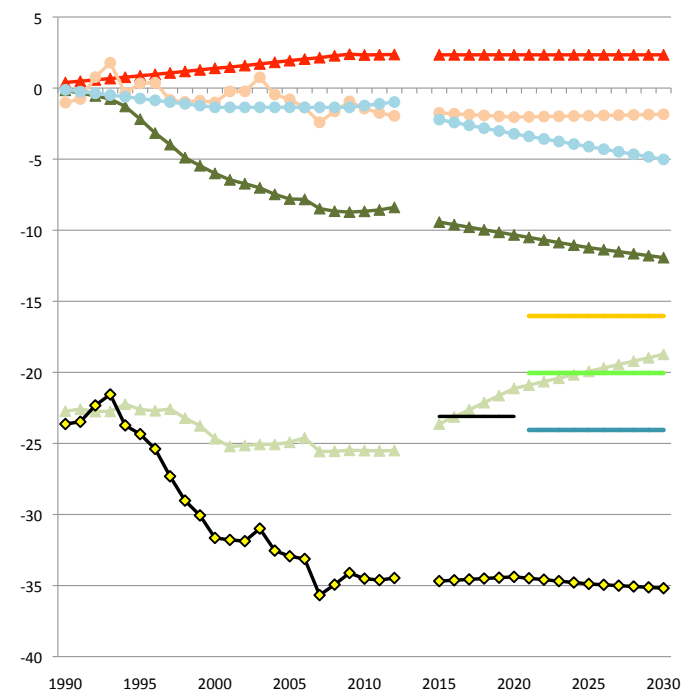
ROMANIA



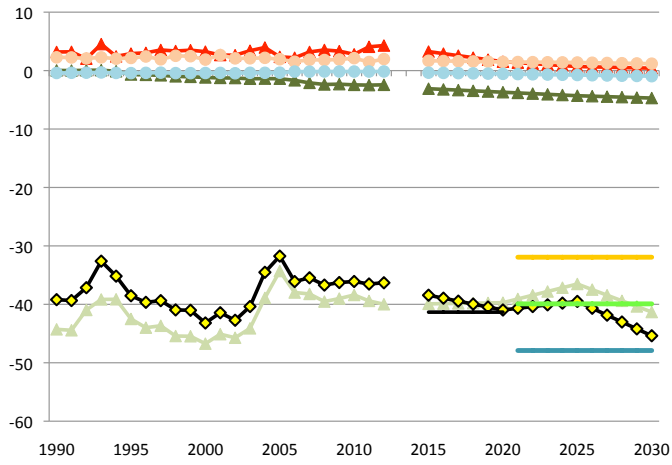
SLOVAKIA



SPAIN



SWEDEN



UNITED KINGDOM

