Agriculture (cows) and land use (trees) in the Commission proposals for the 2030 Climate and Energy Framework

- Policy, Impact Assessment, Models -

MACSUR Workshop, Norway, 10 October 2016
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Contents

• **Introduction:** policy context
• Impact Assessment: options, models, examples
• Proposal for Effort Sharing Regulation and LULUCF Regulation
• Conclusions and Outlook: more work for modellers!
In October 2014 the European Council gave guidance on how to implement the 2030 climate and energy framework.

**EU Climate and Energy Framework**

- **2020**
  - **-20 %** Greenhouse Gas Emissions
  - **20 %** Renewable Energy
  - **20 %** Energy Efficiency
  - **10 %** Interconnection

- **2030**
  - **≤-40 %** Greenhouse Gas Emissions (domestic)
  - **≥27 %** Renewable Energy
  - **≥ 27%** Energy Efficiency
  - **15 %** Interconnection

* * To be reviewed by 2020, having in mind an EU level of 30%
At least 40% reduction of Greenhouse Gas Emissions

- 2020: 10% reduction
- 2030: 30% reduction

EFFORT SHARING REGULATION (ESR)

LAND USE, LAND-USE CHANGE AND FORESTRY (LULUCF)

NON ETS

ETRS
Land use: in both LULUCF and the ESR

Land Use, Land Use Change and Forestry (LULUCF): CO₂

AGRICULTURE non-CO₂ (CH₄, N₂O) – in the ESR

Partly human induced (strongly linked to global natural carbon cycle)

Uncertainties? Additionality? Permanence? Leakage?

Mainly human-induced

=> More readily quantifiable
Land Use and Agriculture

**EU28 agriculture & land emissions since 1990**

Agriculture Non-CO$_2$

**Land CO$_2$**

- Cropland emissions
- Aggregate reported LULUCF sink
- Aggregate accounted LULUCF sink credits -75Mt/yr CP1
- Methane and Nitrous Oxide GHG
- Forest land, removals

**n.b.**: LULUCF is the only climate policy for which accounting rules apply!

GHG emissions and removals as reported under the UNFCCC

**Reported ≠ accounted figures!!!**
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**Objective:**

- evidence-based policy design

**Challenges:**

- Not one big option (reduce emissions by XX%), but many detailed options to be assessed
- Not one sector, but agric + forestry + energy
- What is the mitigation potential in agriculture?
- What is the credit generation potential in land use/forestry?

*Quantitative assessment has to factor in accounting rules!*
Problem setting and drivers

1. LULUCF Governance post KP is absent
2. Existing measures not sufficient to reach -30%
3. Accounting of biomass emissions

Drivers

- Need to upgrade KP rules, include in EU law
- Lower mitigation potential of Agriculture non-CO2
- Avoid double counting and incentives
- Declining forest removals and increase in use

Impact Assessment

Simplification and new governance post-2020 to upgrade accounting framework
LULUCF presents untapped potential for emission reduction and increased removals.
Policy framework to identify most sustainable biomass sources and enhance forest sink

This prepares the EU for the long term.
Post 2050, the Paris Agreement outlines that emissions might need to be counter balanced by higher removals.
Figure 8: Overview of EUCLIMIT modelling components used for the assessment of impacts related to agriculture and LULUCF

Baseline assumptions on population, GDP, bioenergy demand... (PRIMES, POLES)

CAPRI
GAINS non-CO2
Agricultural sector effects

GLOBIOM-EU
Forestry effects

LULUCF accounting tool
Projected credits and debits after accounting rules are applied for 2030:
- Forest management
- Afforestation, Re- and Deforestation
- Agricultural land

Source: SWD(2016)249 p38 and Annex 2
Figure 2: Projection of reported emissions (+) and removals (-) from LULUCF main activities for the EU28 2005 - 2030, in MtCO2eq

Notes: Removals (sink) and emissions (source) represented as negative and positive values, respectively.
Source: EUCLIMIT Reference 2016 model projections
Impact Assessment: Projections of mitigation in different sectors

Non-CO₂ GHG emissions reduce strongly until 2030

- Sectoral trends differ markedly
- Waste emissions reduce strongly, driven by policies
- Energy and transport related emissions reduce in line with energy system changes
- Significant trend shift in AC & refrigeration, reflecting revised F-gas regulation of 2014
- Decreases of industrial emissions reflect ETS inclusion
- Wastewater emission stability reflects population trends
- Agricultural emissions remain stable in absolute terms, relative increase
Mitigation options for non-CO2 agriculture in the reference projection

• Farm scale Anaerobic Digestion
• Breeding for feed efficiency
• Ban agricultural waste burning
• Rice cultivation: intermittent aeration and alternative hybrids
• Feed additives and/or changed feed management practices
Afforestation "gross-net" accounting (total annual increment)

Table 8: Impact of streamlining framework different accounting rules on credit generation potential for Afforested Land (RMUs in MtCO$_2$eq) EU28 2021-2030 including additional mitigation enhanced at a carbon price of €20/tonne, negative value is credits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Option R0 Status quo</th>
<th>Option R1: Only land-based UNFCCC, 20yr</th>
<th>Option R2: Only land-based UNFCCC, 30yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afforested land</td>
<td>-901</td>
<td>-437</td>
<td>-730</td>
</tr>
</tbody>
</table>

Source: 2015 UNFCCC Inventory data and EUCLIMIT projections

Source: SWD(2016)249 p41
Switching the **base year** from 1990 to 2005/7 for agricultural land categories, and any elected categories such as wetlands: more recent reference and **improved accuracy** (less inter-year variance).

**Example: EU 28, cropland**
### Assessment of accounting rule changes

<table>
<thead>
<tr>
<th></th>
<th>Option B0</th>
<th>Option B1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base year</strong></td>
<td>1990 Kyoto base year</td>
<td>Period 2005-2007</td>
</tr>
</tbody>
</table>

**Preferred option: B1 - period 2005-2007**

- **Reduces uncertainty of the data** – information on agricultural land was significantly improved as of 2005; more recent datasets
- **Aligns with ESR**, improves **environmental integrity**
- **Base period (2005-2006-2007) helps address potential high inter-annual variability**
Impact Assessment: accounting rule changes

Table 6: Impact of the base year change on the potentially available LULUCF RMUs for the EU28 from agricultural land, 2021-2030, including additional mitigation enhanced at a carbon price of €20/tonne, in MtCO2, negative value is credits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Option B0 Status quo 1990</th>
<th>Option B1 Base year: Avg. 2005-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land</td>
<td>-645</td>
<td>-437</td>
</tr>
</tbody>
</table>

Source: EUCLIMIT modelling

Source: SWD(2016)249 p38
### Impact Assessment: Flexibility ESR to LULUCF

Table 15: Direct impact of different levels of flexibility between LULUCF and ESD on GHG abatement costs in the agriculture non-CO₂ sector (annual costs in 2030 in € 2013) and assuming a 20% reduction in 2030 compared to 2005

<table>
<thead>
<tr>
<th>Flexibility Options</th>
<th>F0 No flex</th>
<th>F1 Low</th>
<th>F2 Medium</th>
<th>F2 Medium (excluding breeding)</th>
<th>F3 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-CO₂ Emission reduction in 2030, MtCO₂eq</td>
<td>78.0</td>
<td>43.0</td>
<td>25.0</td>
<td>25.0</td>
<td>7.0</td>
</tr>
<tr>
<td>LULUCF reduction in 2030 MtCO₂eq</td>
<td>0</td>
<td>35.7</td>
<td>53</td>
<td>53</td>
<td>70.7</td>
</tr>
<tr>
<td>Non-CO₂ Emission reduction in 2021-2030, MtCO₂eq*</td>
<td>380</td>
<td>215</td>
<td>125</td>
<td>125</td>
<td>35</td>
</tr>
<tr>
<td>LULUCF reduction in 2021-2030 cf. 2005, MtCO₂eq*</td>
<td>0</td>
<td>179</td>
<td>265</td>
<td>265</td>
<td>354</td>
</tr>
<tr>
<td>Allocated flexibility of credits (MtCO₂eq for period 2021-2030)</td>
<td>0</td>
<td>190</td>
<td>280</td>
<td>280</td>
<td>425</td>
</tr>
<tr>
<td>Marginal costs €/tCO₂eq. for non-CO₂ mitigation</td>
<td>78.6</td>
<td>32.5</td>
<td>7.3</td>
<td>31.4</td>
<td>0</td>
</tr>
</tbody>
</table>

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• Summary and outlook: more work for modellers!
Effort Sharing Regulation (ESR) in a nutshell

- Sets rules for calculating **annual emission allocations** and **5-yearly evaluation of compliance** of Member States' annual progress towards targets.
- To recognise different capacities, principal indicator to differentiate targets, **2013 GDP**.
- For 11 higher income MS, additional adjustment in this group to reflect **cost efficiency** concerns.
- Target range to remain between 0 and -40%.
What is LULUCF?

- **LULUCF: emissions and removals associated with our use of soils, trees, plants, biomass and timber.** Reporting and accounting done by Member States only – no obligation for private actors.
- The opportunity to sequester/remove CO2 from the atmosphere gives LULUCF a particularly important role in view of the objective from the Paris Agreement to reach **carbon neutrality** by (bis 2050).
- Reported removals from LULUCF currently equivalent to about 10% of the total EU greenhouse gas emissions. Decisive: how much **additional mitigation potential** can LULUCF deliver?
- **Accounting rules** aim to make that distinction.
What does the LULUCF proposal deliver? (1)

- Brings the CO2 commitment for this sector into the EU climate and energy framework for the first time
  - As a stand-alone policy pillar
  - Where the "no-debit" rule is retained. Accounted emissions from land use are entirely compensated by an equivalent removal of CO$_2$ from the atmosphere

- Is in line with:
  - the agreement by EU leaders that all sectors should contribute to the EU's 2030 emissions reduction target (October 2014)
  - the Paris Agreement on climate change

- Is compatible with food security and biodiversity objectives
What does the LULUCF proposal deliver? (2)

- Adjustments would be made to LULUCF accounting rules and architecture
  - reducing administrative burden and red tape
  - is not addressed to individual actors (farmers, foresters)
- Ensures that emissions of biomass would be recorded and counted
  - promoting bio-energy feed-stocks that are most sustainable
- Introduces new flexibilities
  - including LULUCF, driven by "the low-mitigation potential of agriculture" (EUCC, 2014)
  - incentivising additional mitigation action in all sectors
Flexibility, within LULUCF

- **Intra-account flexibility**: a Member State can balance emissions from one land accounting category by removals from another category on their territory.

- **Intra-LULUCF pillar flexibility**: Surplus accounted removals may be transferred to another Member State.

And

- Member States can cumulate net removals identified in their LULUCF accounts over the 10 year period ("banking")

- **Eligibility**: Member States are required to ensure adequate monitoring in order to use the flexibilities.
What does the proposal deliver (5)

**Flexibility from ESR towards LULUCF:**
- Allows the compensation of net emissions in LULUCF with use of emission allocations under ESR

**Flexibility from LULUCF towards ESR:**
- Upper limit of 280 Mt on total amount of flexibility in the period 2021-2030
- Credits from afforestation, cropland and grassland management
- Identified based upon the needs of the agriculture sector

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**Diagram:**
- ESR with -30% flexibility
- Full flexibility
- Max 280 MtCO2eq
- "No debit" (If LULUCF emissions exceed removals)
- "No debit" (If LULUCF removals exceed emissions)
The share of agriculture non-CO2 emissions in the ESD varies significantly between MSs.
Distribution of credit potential between Member States

According to EUCC guidance, flexibility should be allocated to each MS reflecting their needs

- For LULUCF, based on the lower mitigation potential of the agriculture sector
- While also recognising the need to preserve environmental integrity and maintain incentives to reduce emissions in ESR

MSs which have a higher share of agricultural emissions in the ESR are more affected by the limited mitigation potential in agriculture.
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-40% Greenhouse Gas Emissions by 2030 (domestic EU) compared to 2005

**ETS**
- **43%**
  - Including: Power/Energy Sector and Industry, Aviation

**Non-ETS**
- **30%**
  - Including: road transport, buildings, waste, agriculture, LULUCF

**ESR**
- **30%**
  - Max 100 MtCO2eq
  - Full flexibility

**LULUCF**
- ≤ **0%**
  - "No-Debit"
  - Max 280 MtCO2eq

New!!
Conclusions (1)

1. Fully in line with Paris Agreement, no backsliding on robustness and transparency

2. Provides for continuity
   - Addresses Member States and not individual farmers or foresters
   - Stand-alone LULUCF pillar
   - No-debit rule (from KP)
   - Flexibility within LULUCF and from ESR to LULUCF
3. Proposes limited innovations

- Flexibility to the ESR up to 280 mt CO2
- Aligning accounting rules (AF,CM/GM)
- Defining EU-internal process to set national forest management levels
- Simplifying administration
Outlook: more work for modellers!

**Policy**

- COM proposals in *negotiations with co-legislators*
- LULUCF proposals sets framework for providing *incentives for additional mitigation*, e.g. through CAP
- **Rule set** for agriculture, land use, forestry in PA
- Agriculture and land use in *mid-century strategies*

**Modelling**

- Land Use/forestry: accounting rules matter
- Non-CO2 agriculture: mitigation potential
- Dynamic effects, long-term projections
- Partial vs general equilibrium models
Thank you!

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