



EO-based Solutions for LULUCF & Climate Action



Keep it traceable!

<https://ghg-kit.at/> & ClimateLENS
[FFG #FO999928737]

Turning challenge into opportunity

Environmental Challenge

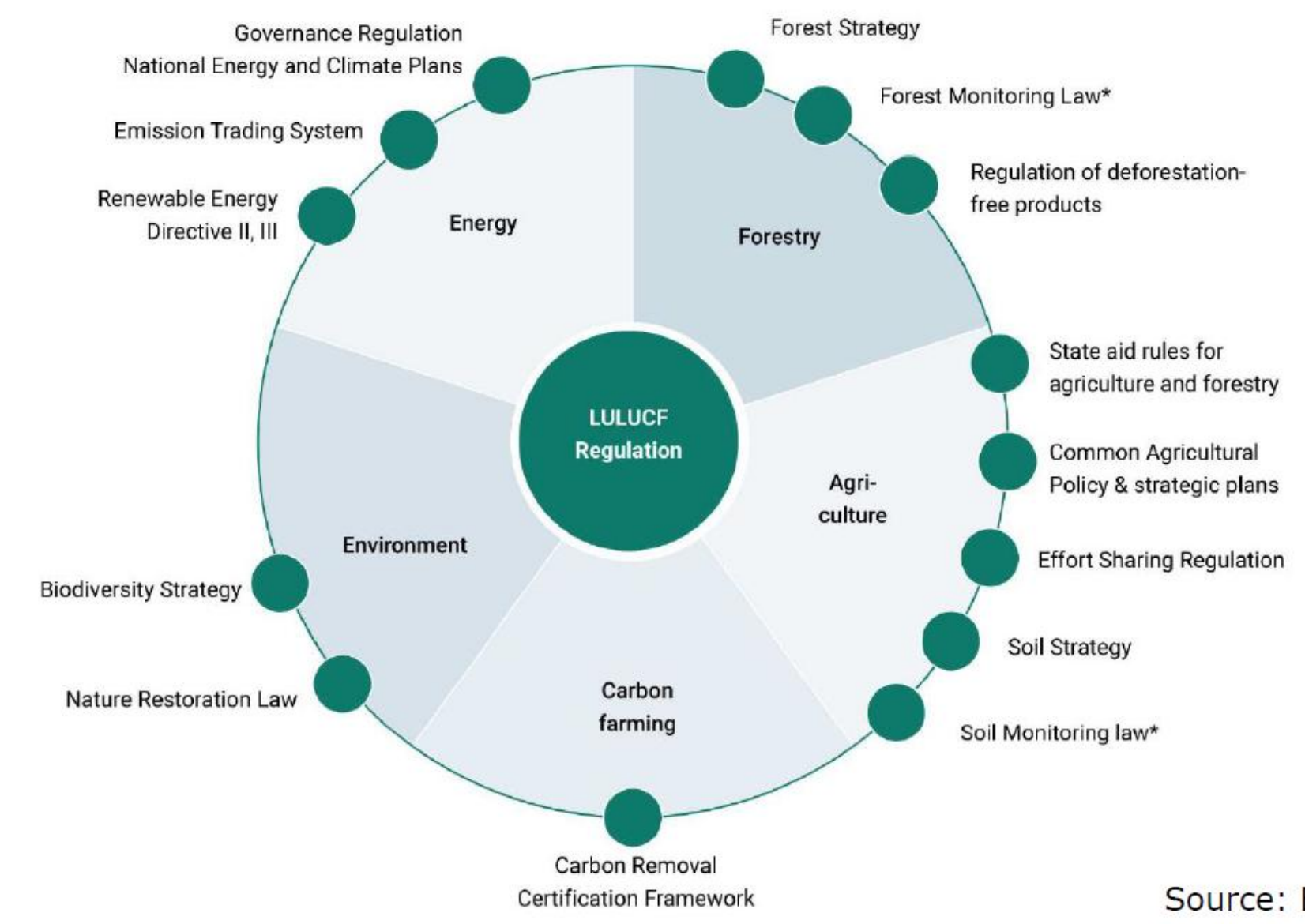
- ✓ Drastic reduction of greenhouse gas (GHG) emissions and increase of carbon pools needed to meet EU climate neutrality targets
- ✓ The Land Use Land Use Change and Forestry (LULUCF) sector is the largest source of uncertainty in emissions/removals

Political context

- The EU LULUCF regulation mandates:
 - ✓ Use of Earth Observation (EO) data & Copernicus
 - ✓ Compliance with IPCC tier 3 approach & wall-to-wall methodologies
- Overarching aim: Transparent, Accurate, Consistent, Complete and Comparable Monitoring Reporting and Verification (MRV) across Europe

Opportunity

- ✓ Develop EO-based MRV methodologies supporting multiple EU Green Deal policies, including LULUCF-R, Carbon Removals and Carbon Farming (CRCF) Certification Framework
- ✓ At local scale, pioneer cities/regions are driving voluntary climate action plans



Source: EEA, 2024

Combined EO & in-situ approach

LULUCF Activity Data with backward extension for the period 1983-status, at detailed Level 3 of the LULUCF nomenclature is derived by means of an Artificial Intelligence (AI) Deep Learning Convolutional Neural Network (CNN) U-Net trained model and rule-based post-processing combining Sentinel-2 and Landsat heritage time series harmonics, Copernicus Land Monitoring Service (CLMS) and national geospatial datasets, with 97% overall accuracy for the 2015-2023 period.



Best practice Austrian demonstrator

The Austrian Space Application Program (ASAP18) flagship *GHG-KIT – "Prototyping an EO-enabled kit supporting GHG reporting"* project successfully implemented an EO-integrated MRV system for LULUCF and atmospheric modelling of CO₂ & CH₄ fluxes in Austria, a first in Europe. Follow-up research activities within the new *ClimateLENS* (ASAP25) project starting October 2025 (30-month duration) aim to prototype an Information & Communication Technology (ICT) system rolled-out on the Green Transition Information Factory (GTIF) Austria to track climate action at consistent nested NUTS national to city levels, scalable pan-European.

National scale
Focus from national towards municipal scale

<p>LULUCF Methodological developments of LULUCF activity data backward extension 1990-2015</p>	<p>GHG emission source monitoring Calculation of emissions and allocation to their source</p>
<p>Atmospheric modelling Atmospheric modelling approach for CH₄, CO₂ & NO_x on national and sub-national level</p>	<p>Biomass Insights into the possibilities of carbon sequestration</p>
<p>GHG accounting Sector based GHG accounting on national, sub-national and municipal level</p>	<p>Climate protection indicators Development of indicators for urban climate protection</p>
<p>CO₂M Concept and testing for integration of upcoming CO₂M mission</p>	<p>Transition paths EO-based transition pathways and scenarios for climate protection indicators</p>

LULUCF as a service

- ✓ *Flexible ICT kit* offering advanced technological solutions and services in support to national inventory compilers, related European monitoring programmes & local administrations
- ✓ Fully compliant with UNFCCC, IPCC Guidelines & EU reporting obligations
- ✓ Contributes to latest state-of-the-art industry standards for EO-MRV methodologies serving both the compliance and voluntary carbon markets



EO experts

Scientific experts

Advisory board

Stakeholders, Pioneer Cities & Federal States

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