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Technical information

Accompanying the document

Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Speeding up European climate action towards a green, fair and prosperous future

EU Climate Action Progress Report 2021

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1. OVERVIEW OF EU CLIMATE TARGETS

Table 1: Overview of existing and proposed new climate targets (in the “Delivering the European Green Deal” package - July 2021)

	International commitments		EU domestic legislation				
	The EU’s commitment under the Kyoto Protocol (KP)	The EU’s commitment under the Paris Agreement	2020 Climate and Energy Package		2030 Climate and Energy Framework		
			EU ETS	Effort Sharing Decision (ESD)	EU ETS	Effort Sharing Regulation (ESR)	LULUCF
Target year of period	Second commitment period (2013-2020)	Already in force – covers the period post 2020	2013-2020	2013-2020	2021-2030	2021-2030	2021-2030
Emission reduction target	-20%	at least -55% net emissions in 2030	-21% in 2020 compared to 2005 for ETS emissions	-10% in 2020 compared to 2005 for non-ETS emissions Annual targets by MS.	-43% in 2030 compared to 2005 for ETS emissions <u>Proposed new target: -61%</u>	Annual targets by MS. In 2030 -30% compared to 2005 for non-ETS emissions <u>Proposed new target: -40%</u>	No-debit target based on accounting rules <u>Proposed new targets:</u> - For 2030 the EU target is -310 MT CO2-eq - For 2035 the EU target is a climate neutral land sector (combining LULUCF and emission from agriculture non-CO2).
			Overall target: -20% GHG emissions reduction vs 1990		<u>Overall target:</u> at least -55% net domestic reduction vs 1990		

Further targets	-	<ul style="list-style-type: none"> • limiting global warming to well below 2°C.; • every 5 years to set more ambitious targets as required by science; • report on implementation/ track progress towards the long-term goal through a robust transparency and accountability system. • balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century. 					
Base year	1990, but subject to flexibility rules. 1995 or 2000 may be used as its base year for Nitrogen trifluoride (NF3)	1990	2005	2005	2005	2005	Subject to accounting rules
			1990 for overall emission reduction target		1990 for overall emission reduction target		

LULUCF	Included: afforestation, reforestation and deforestation and forest management, other activities if elected (new accounting rules)	Included: Contributes to the commitment of decreasing emissions by at least -55%.	Excluded from target, but reported in inventories.		Included: Contributes to the commitment of decreasing emissions by at least -55%. The <u>Climate Law</u> limits contribution of removals to the net target at the minimum level of 225 million tonnes (Mt) of CO2 equivalents.		
Aviation¹	Domestic aviation included. International aviation not attributed.	Civil aviation included: outgoing flights that start in the EU (emissions calculated on the basis of fuels sold in the EU).	EU ETS: Domestic (national) and intra-EEA international aviation included.	ESD: CO ₂ from domestic aviation excluded	EU ETS: Domestic and intra-EEA international aviation and departing flights to UK and CH included.	ESR: CO ₂ from domestic aviation excluded. Aviation generally excluded.	
Use of international credits	Use of KP flexible mechanisms subject to KP rules	The EU will not use international credits (according to its NDC)	Upper limit for credit use for period 2008-2020 at a maximum of 50% of the reduction effort below 2005 levels.	Annual use of carbon credits is limited to up to 3% of each Member State's ESD emissions in 2005	No ²	No	No

¹ May be reviewed in the light of the implementation of ICAO's global measure and the EU's enhanced target.

² A link with the permit system in Switzerland has been ratified.

Carry-over of units from preceding periods³	Subject to KP rules including those agreed in the Doha Amendment		No	EU ETS allowances can be banked into subsequent ETS trading periods since the second trading period.	No carry over from previous period.	Indefinite validity of allowances not limited to trading periods, no need to carry over.	No	No
Gases covered	CO ₂ , CH ₄ , N ₂ O, HFCs ⁴ , PFCs, SF ₆ , NF ₃		CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	CO ₂ , N ₂ O, PFCs,	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	CO ₂ , N ₂ O, PFCs,	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	CO ₂ , CH ₄ , N ₂ O
Sectors included	Energy, IPPU, agriculture, waste, LULUCF	Energy, IPPU, agriculture, waste, LULUCF	Energy, IPPU, agriculture, waste, LULUCF	Power & heat generation, energy-intensive industry sectors, aviation	Transport (except aviation), buildings, non-ETS industry, agriculture (non-CO ₂) and waste	Power & heat generation, energy-intensive industry sectors, aviation	Transport (except aviation), buildings, non-ETS industry, agriculture (non-CO ₂) and waste	Land use, land use change and forestry
Global Warming Potentials used	IPCC SAR	IPCC AR4	IPCC AR5	IPCC AR4	IPCC AR5			

³ For the CP2 it refers to carry over from CP1. For the ETS it refers to carry-over from previous trading period under the scheme itself.

⁴ HFCs are also covered by the Kigali Amendment to the Montreal Protocol, which entered into force on the 1st of January 2019.

Applicable to number of MS	15 (additional KP targets for single MS)	EU-27, UK and Iceland	EU-27	EU-27 ⁵	EU-27 ⁶
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⁵ In addition to the 27 Member States, Northern Ireland, Iceland, Liechtenstein and Norway are also covered under the EU-ETS.

⁶ Within the Agreement on the European Economic Area, Iceland and Norway cooperate with the EU-27 towards achieving the 2030 targets in the LULUCF and Effort Sharing sectors.

2. GREENHOUSE GAS EMISSIONS COVERED BY THE KYOTO PROTOCOL AND THE CLIMATE AND ENERGY PACKAGE

	Base year emissions (Mt CO ₂ -eq.)	1990 emissions (Mt CO ₂ -eq.)	2019 emissions (Mt CO ₂ -eq.)	2019 emissions (% change from base year)	2020 targets (Mt CO ₂ -eq.)	2020 target (% change from base year)
Climate and energy package:						
Total GHG emissions, including international aviation (EU-27, Convention scope)	4925	4925	3743	-24%	3940	-20%
Kyoto Protocol:						
Total GHG emissions, excluding international aviation (EU-27+IS+UK, KP scope)	5876	5669	4067	-31%	4701	-20%

Table 2: Emissions covered by the EU Climate and Energy Package and by the Kyoto Protocol, second commitment period 1990, 2019 and 2020 targets (Mt CO₂-eq. and % change from base year emissions)

Table shows progress towards the EU's 2020 targets as defined under the EU Climate and Energy Package and under the Kyoto Protocol. The main differences between the two approaches are the sectoral coverage and the geographical scope. Notably, emissions from international aviation are included in the Climate and Energy Package, but excluded under the Kyoto Protocol. The geographical scope of the commitment under the Kyoto protocol includes Iceland, the United Kingdom and certain regions not included in the Climate and Energy Package.

Under the Kyoto Protocol, base year emissions differs from 1990 because some Member States have used a different base year. Moreover, for NF₃ emissions, 1995 or 2000 may have been used as base year.

Under the Kyoto Protocol, Member States also need to account for emissions and removals from certain activities of land use, land use change and forestry (LULUCF) by applying the accounting rules of the Kyoto Protocol. Table does not include emissions and removals from LULUCF. For the EU as a whole, the LULUCF sector has been a net accounted sink in 2013-2019, thereby contributing to achieving the commitment.

3. MAIN ELEMENTS OF THE COMMISSION'S PROPOSALS FOR REVISED AND NEW LEGISLATION UNDER THE "DELIVERING THE GREEN DEAL" PACKAGE, JULY 2021

Carbon pricing

- Stronger carbon pricing system with additional revenues generated feeding into the **revamped Innovation Fund and Modernisation Fund**. For the Innovation Fund an additional 50 million allowances from the existing ETS, 150 allowances from the new emission trading sectors, and the allowances that will be freed from the introduction of the Carbon Border Adjustment Mechanism. The Commission proposes to increase the Modernisation Fund by an additional 2.5% of allowances from the current ETS.
- A new **Social Climate Fund** to support EU citizens most affected or at risk of energy or mobility poverty to ensure a fair transition leaving no one behind. The Fund will provide EUR 72.2 billion between 2025-2032 in funding for renovation of buildings, access to zero and low emission mobility as well as income support.
- A new **Carbon Border Adjustment Mechanism** which puts carbon price on imports of targeted products to avoid 'carbon leakage'.

Effort-sharing

- New target of -40% at EU27 level by 2030 compared to 2005 (from current -29%) in line with cost-efficient projections for 2030 for sectors currently not subject to EU ETS (buildings, road and domestic maritime transport, agriculture, waste and small industries), with national targets ranging from -10% to -50%.
- Current scope stable, flexibilities and compliance regime maintained, and a new safety reserve proposed.

Energy

- Higher binding target for renewables in the EU's final energy consumption (40% by 2030), with Member States setting national contributions in the Governance process.
- Higher and binding energy efficiency targets at EU level to achieve an overall reduction of at least 9% by 2030 compared to the 2020 Reference Scenario projections for 2030 (equivalent to a reduction of 36% for final and 39% for primary energy consumption compared to the 2007 Reference Scenario projections for 2030), with Member States setting their national contributions based on a new formula.
- Revision of minimum tax rates for heating and transport fuels/energy carriers.
- Phase out of exemptions and reduced tax rates that encourage fossil fuels use.
- Binding increase in the use of renewable energy in heating and cooling (+1.1 percentage points annually until 2030) in the Member States.
- Indicative target of 2.1 percentage points renewable energy and waste heat and cold in district heating and cooling.

Industry

- New indicative target of a 1.1 percentage point annual increase in renewable energy use in industry.
- 50% of renewable share in hydrogen consumption.

Buildings

- From 2026 a separate new emissions trading system to be set up for fuel distribution for buildings that would also cover fuels in road transport.
- Higher annual renovation rate of at least 3% of total floor area of all public buildings in the Member States.
- A benchmark of 49% of renewables in buildings by 2030.

Transport

All transport modes:

A GHG intensity reduction target of 13% for all transport fuels by 2030 (Renewable Energy Directive revision). In addition, the Member States would need to ensure that sub-targets of 2.6% renewable fuels of non-biological origin and 2.2% advanced biofuels are achieved.

Road

- More ambitious targets for reducing CO₂ emissions of new cars and vans:
 - New car registrations: 55% in 2030 and 100% in 2035 compared to 2021.
 - New vans: 50% by 2030 and 100% by 2035 compared to 2021.
- From 2026 fuels in road transport to be covered by a separate emissions trading system which will also cover fuels in buildings.
- Targets for alternative fuels infrastructure on major highways (every 60 km for electric charging and every 150km for hydrogen refuelling).

Aviation

- Phase out of free emission allowances and alignment with ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as appropriate.
- Promotion of sustainable aviation fuels with an obligation for fuel suppliers to blend increasing levels of sustainable fuels in jet fuels for all departures from EU airports.
- Taxation of fuel used for intra-EU passenger flights with reduced rates applicable to sustainable aviation fuels. Major airports would be required to provide an electricity supply to planes at all gates.

Maritime

- Carbon pricing with the extension of the EU's Emissions Trading System to large ships (above 5000 gross tonnage) covering all CO₂ emissions from intra-EU voyages and 50% of the emissions from extra-EU voyages.
- Promotion of sustainable alternative fuels in shipping and at European ports by limiting the greenhouse gas intensity of the energy used on-board large ships and by mandating the use of onshore power supply for certain ship types.
- Taxation of fuel used for intra-EU waterborne regular service navigation, fishing and freight transport (same EU minimum rates as applicable to agriculture).

Restoring nature and biodiversity

- A new target of -310 Mt CO₂ eq. for the EU carbon sink by 2030 and national targets to increase absorption of CO₂.
- Aiming for climate neutrality in the land sector combining LULUCF and emissions from agriculture non-CO₂ by 2035.
- A roadmap to plant 3 billion trees by 2030.
- New strict criteria to avoid unsustainable forest harvesting and to ensure high-biodiversity.

4. COMMISSION'S ASSESSMENT OF NATIONAL LONG-TERM STRATEGIES

By October 2021, 20 Member States⁷ had submitted their long-term strategies, as required by the Governance Regulation⁸. Of these, 13 Member States⁹ clearly expressed their aim to achieve climate neutrality or carbon neutrality¹⁰ by 2050 or before¹¹. Others aim to be largely climate neutral¹² or to achieve reductions of 80-95% by 2050. Whereas most of the national strategies received to date reflect the ambition to be climate neutral by 2050, they do not yet allow to conclude that the long-term strategies are adequate for the collective achievement of the objectives and targets of the Energy Union. Providing information on any remaining collective gap would have required a more complete and detailed set of strategies, including on the role of land use and removals. This underlines the importance to continue developing policies to increase and meet ambition over time. Overall, the recommended content¹³ on needs for research, development and innovation, estimated long-term investments and CO₂ intensity of GDP is not covered comprehensively while information linked to energy consumption and certain sector specific emission reductions is often missing.¹⁴ Member States are therefore encouraged to consider to update and, where possible, to increase the ambition of their national long-term strategies.

⁷ AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IT, LV, LT, NL, PT, SE, SI, SK. LT and HU submitted an update of their initial strategies in July and September 2021, respectively. In July 2021, the Luxembourgish government adopted a draft national long-term strategy. A public consultation will be carried-out before its final adoption.

⁸ Article 15 of Regulation (EU) 2018/1999 stating that MS should submit their LTS by January 2020.

⁹ AT, DK, ES, FI, FR, HU, IT, LT, LV, PT, SE, SI, SK.

¹⁰ While neutrality means by definition that residual emissions are compensated by removals, not all Member States provided the respective share of emission reductions and removals and the level of ambition for actual reductions varies.

¹¹ FI by 2035 and SE by 2045.

¹² DE - it should be noted, however, that the German long-term strategy, as submitted to the Commission in January 2020, was prepared in 2016. According to the Climate Change Act, as amended in July 2021, Germany now aims at achieving climate neutrality by 2045.

¹³ See Annex IV of Regulation (EU) 2018/1999.

¹⁴ See SWD for detailed assessment per Member State.

Table 3: Summary table

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. international maritime and	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
Austria (27/12/2019)	Climate neutrality	(-74% , -84%)	yes	no	yes	(76% , 93%)	(-52% , -38%)	positive impact on GDP and jobs natural and technical sinks needed to reach carbon neutrality	CO2 intensity of GDP of GDP investment needs socio-economic impact
Belgium (02/03/2020)	Different regional goals	(-85% , -87%) (excluding ETS sector)	?	no	no	n.a.	n.a.	investment needs significant in buildings exposure of agricultural system to climate change address energy poverty	information at national level GHG and CO2 intensity of GDP emission reductions for ETS and LULUCF
Croatia (24/06/2021)	Unspecified	(-57% , -73%)	yes	no	?	(53.2% , 65.6%)	(-25% , -37%)	overall impact on GDP uncertain around 40'000 new green jobs additional investment above 1.5% of GDP	reductions and removals in LULUCF socio-economic impact emission reductions industrial sectors
Czechia (20/12/2019)	Unspecified	-80%	?	no	?	n.a.	n.a.	investment peak with expansion of CCS strengthen energy taxation Increase share of nuclear in energy mix	GHG and CO2 intensity of GDP emission reductions by sector socio-economic impact
Denmark (20/12/2019)	Climate neutrality	n.a.	?	no	?	n.a.	n.a.	targets enshrined in law doubling organic farming increase spending in green research	public consultation emission reductions power & buildings socio-economic impact
Estonia (30/12/2019)	Quantitative GHG emission reduction target	-80%	yes	no	no	n.a.	n.a.	targets enshrined in law large investment needed in RES minor impact on GDP and jobs	CO2 intensity of GDP emission reductions in buildings RES, FEC/PEC targets
Finland (22/04/2020)	Carbon neutrality by 2035	(-87.5% , -90%)	yes	no	?	(64% , 80%)	(-16% , -5%)	slightly positive impact on GDP and jobs employment sensitive to arable lands annual investment ~3% of GDP	CO2 intensity of GDP emission reductions in buildings strategies for related R&D&I

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. International maritime and	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
France (12/05/2020)	Carbon neutrality	-83%	yes	no	no	n.a.	n.a.	targets enshrined in law positive impact on GDP annual investment ~3.5% of GDP	GHG and CO2 intensity of GDP reductions and removals in LULUCF share of renewable energy in 2050
Germany (02/01/2020)	Largely climate neutral	(-80% , -95%)	yes	no	no	n.a.	n.a.	document outdated compared to recent review of the country's target aimed at reaching climate neutrality by 2045	GHG and CO2 intensity of GDP emission reductions by sector investment & socio-economic impact
Greece (08/01/2020)	Unspecified	(-83% , -95%)	?	?	?	(82% , 114%)	n.a.	increase use of heat pumps (buildings) and biofuel (transport) investment needs €0.1 to €1.1 bn per year	GHG and CO2 intensity of GDP emission reductions in agriculture and waste socio-economic impact
Hungary (21/09/2021)	Climate neutrality	-100%	yes	yes	no	close to 90%	(-30% , -37.4%) (compared to 2017)	positive impact on GDP and jobs annual investment ~4.8% of GDP avoided damage and benefits exceed costs	reductions and removals in LULUCF emission reductions in buildings
Italy (11/02/2021)	Climate neutrality	(-84% , -87%)	yes	no	no	(85% , 90%)	-49%	slightly negative impact on GDP boost sustainable finance focus on adaptation strategies	emission reductions in waste Investment needs socio-economic impact
Latvia (27/12/2019)	Climate neutrality	-85% (by 2040)	?	yes	?	n.a.	-37% (primary energy consumption)	positive impact on GDP annual investment ~1.4% of GDP creation of new (green) jobs	CO2 intensity of GDP emission reductions in buildings adaptation policies and measures
Lithuania (23/07/2021)	Climate neutrality	-100% (20% reduction from LULUCF & CCS)	yes	yes	yes	90%	final & primary energy intensity 2.4 times lower than 2017	positive impact on GDP and jobs 4% of GDP invested in R&D&I by 2040 focus on adaptation strategies	public consultation GHG and CO2 intensity of GDP emission reductions by sector

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. International maritime and	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
Netherlands (18/12/2019)	Quantitative GHG emission reduction target	-95%	yes	yes	no	n.a.	n.a.	net-zero requires large scale CO2 capture by 2030, limited impact on GDP and jobs increase income disparities	reductions and removals in LULUCF emission reductions in all sectors by 2050 investment needs
Portugal (15/01/2020)	Carbon neutrality	(-85%, -90%)	?	no	?	(86% , 88%)	(-36% , -35%)	positive impact on GDP and jobs annual investment ~1.2% of GDP better air quality	GHG and CO2 intensity of GDP strategies related to R&D&I adaptation policies and measures
Slovakia (11/03/2020)	Climate neutrality	-80%	?	no	?	n.a.	n.a.	positive impact on GDP negative impact on jobs & wages annual investment ~4.2% of GDP	GHG and CO2 intensity of GDP emission reductions in buildings LULUCF, RES, FEC/PEC targets
Slovenia (19/07/2021)	Climate neutrality	(-80%, -90%)	?	no	no	at least 60%	at least -33%	positive impact on GDP and jobs additional investment from €66 to €72 bn focus on a climate resilient society	GHG and CO2 intensity of GDP emission reductions industrial sectors
Spain (11/12/2020)	Climate neutrality	-90%	yes	no	yes	97%	-44%	positive impact on GDP and jobs negative impact on jobs & wages annual investment ~1% of GDP	CO2 intensity of GDP emission reductions in agriculture & waste emission reductions for industrial sectors
Sweden (19/12/2019)	Climate neutrality by 2045 and negative emissions thereafter	-85% (by 2045)	yes	no	no	n.a.	final energy intensity 50% lower than 2005	limited impact on GDP and jobs better air quality focus on adaptation strategies	GHG and CO2 intensity of GDP share of renewable energy investment & socio-economic impact

Notes: (1) An "unspecified" goal refers to cases where the goal was not expressed in clear terms (e.g. "to approach", "to move towards", etc.). (2) In the case of DE the long-term strategy, as submitted to the Commission in January 2020, reflects the goal of the Climate Action Plan 2050 adopted in November 2016. According to the Climate Change Act, as amended in July 2021, Germany now aims at achieving climate neutrality by 2045. (3) Projected GHG emission reductions are all expressed as percentage change compared to 1990 level (except for BE, PT and SI where reduction rates refer to 2005 GHG emission levels, and FR to 2015 level), as a target or as the extreme values of the projected range. In the case of DK, projections in the LTS refer to a scenario with existing measures, not in line with the goal, therefore they have not been reported in the table. (4) "?" means that the LTS does not provide enough or clear information on the exact scope of projected GHG emission reductions. In the case of ES, only international maritime emissions were included in the projections. (5) Where feasible, final energy consumption has been expressed as percentage change compared to 2005 consumption level. (6) Annual investment needs are generally considered additional to a business as usual (BAU) or with existing measures (WEM) scenarios for the period 2020-2050. (7) Key reporting gaps are meant to provide only a general view of the completeness of the LTS and do not

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF incl. International maritime and	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
<p><i>distinguish between mandatory and non-mandatory elements. (8) For the acronyms see the glossary.</i></p>								

5. EU GREENHOUSE GAS EMISSIONS BY SECTOR

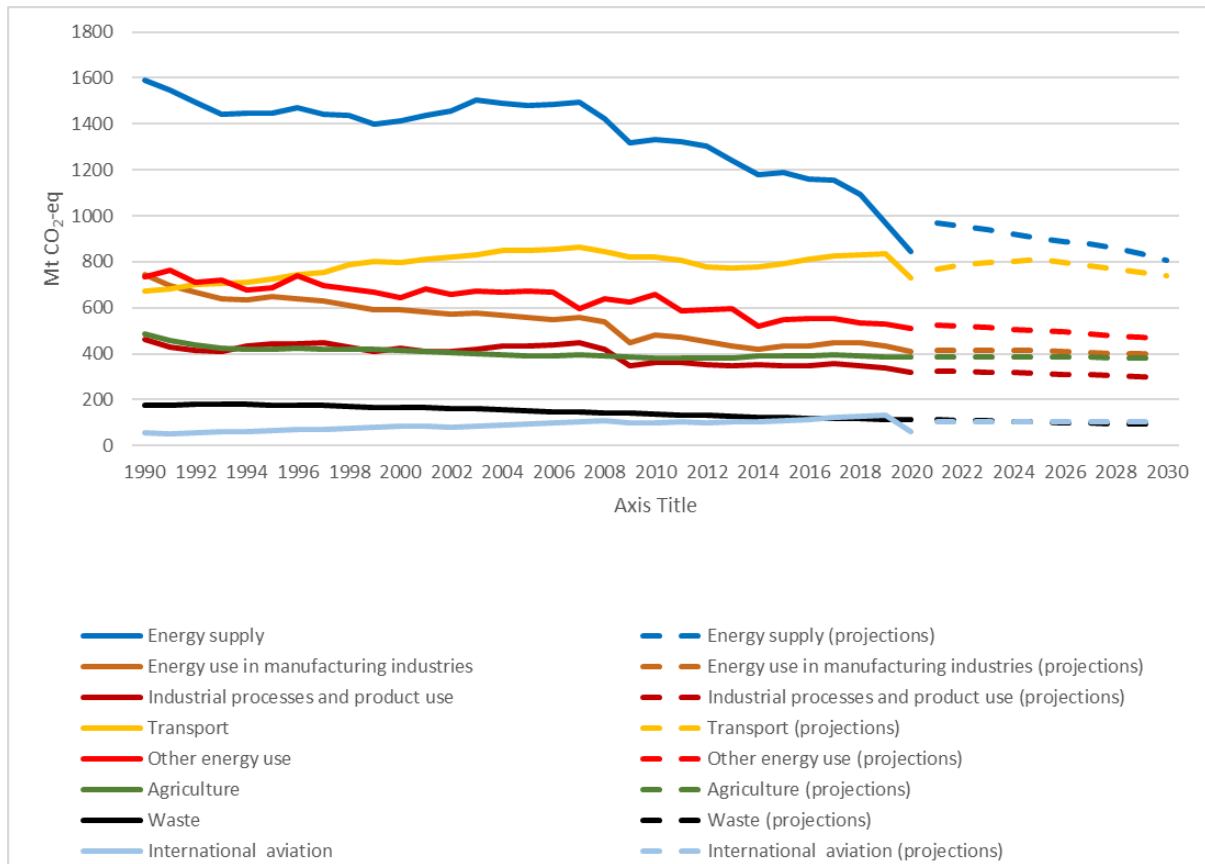


Figure 1: EU-27 greenhouse gas emissions by sector, historical data (1990-2020) and projections (2021-2030).¹⁵

¹⁵ Sources: EU greenhouse gas inventory 1990-2019. EU approximated greenhouse gas inventory 2020 (EEA). Member States projections with 'existing measures' reviewed by EEA (2021).

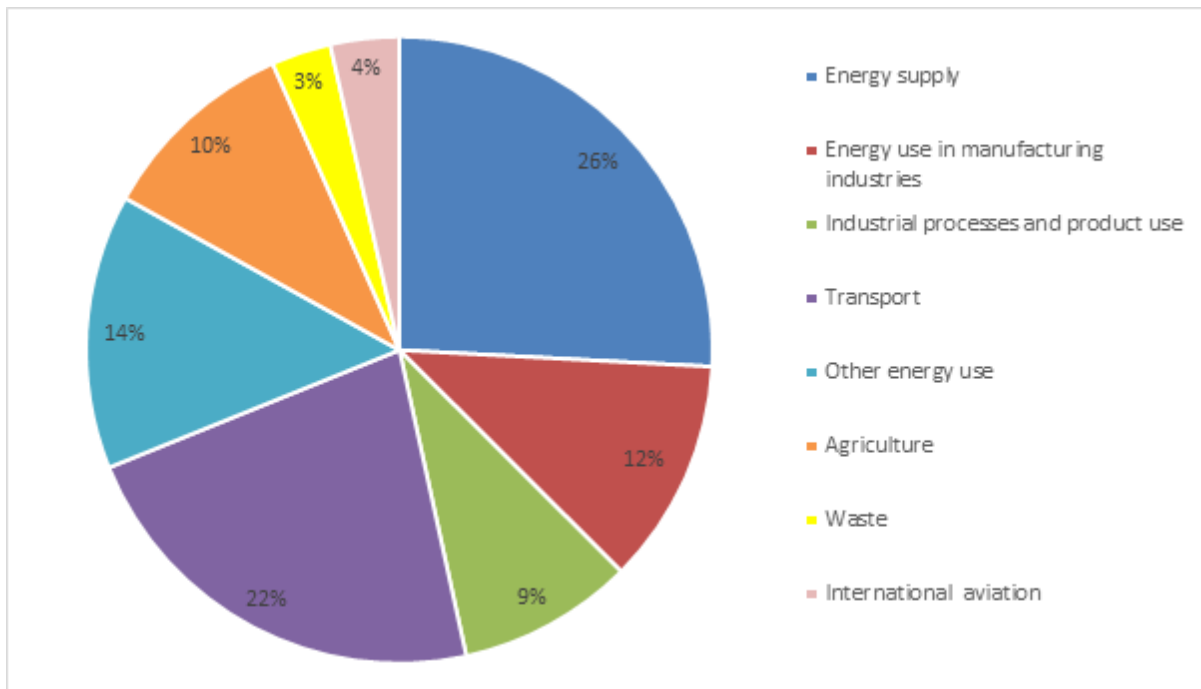


Figure 2: EU-27 greenhouse gas emissions by sector 2019 (in % of total emissions).¹⁶

The sectors used in Figure 1 and 2 correspond to the following IPCC sectors¹⁷:

- Energy supply: 1A1, 1B and 1C,
- Energy use in manufacturing industries: 1A2,
- Industrial processes and product use: 2,
- Transport (includes domestic aviation) : 1A3,
- Other energy use: 1A4, 1A5 and 6,
- Agriculture: 3,
- Waste: 5,
- International aviation: 1.D.1.A

¹⁶ EU greenhouse gas inventory 1990-2019.

¹⁷ Source: EEA greenhouse gases - data viewer, European Environment Agency.

6. TOTAL GHG EMISSIONS PER MEMBER STATE

	1990	2005	2020	2020/1990	2020/2005
EU-27	4925	4639	3377	-31%	-27%
Austria	79	94	75	-6%	-21%
Belgium	149	149	113	-24%	-24%
Bulgaria	101	63	53	-48%	-17%
Croatia	32	30	24	-25%	-21%
Cyprus	6	10	9	35%	-15%
Czechia	199	150	119	-40%	-20%
Denmark	73	69	42	-42%	-40%
Estonia	41	19	12	-72%	-40%
Finland	72	71	49	-32%	-31%
France	553	567	404	-27%	-29%
Germany	1261	1016	753	-40%	-26%
Greece	106	139	76	-28%	-45%
Hungary	95	78	64	-33%	-18%
Ireland	55	73	59	6%	-19%
Italy	523	598	387	-26%	-35%
Latvia	26	11	11	-59%	-4%
Lithuania	48	23	20	-58%	-12%
Luxembourg	13	14	11	-17%	-24%
Malta	3	3	2	-19%	-30%
Netherlands	225	224	171	-24%	-24%
Poland	477	406	375	-21%	-8%
Portugal	60	88	60	-1%	-32%
Romania	267	150	109	-59%	-27%
Slovakia	74	51	38	-49%	-25%
Slovenia	19	20	16	-14%	-22%
Spain	295	454	278	-6%	-39%
Sweden	73	69	48	-33%	-30%

Table 4: Total GHG Emissions 2020, excl. LULUCF, including international aviation (Mt CO₂-eq. and % change from 1990 and 2005).

7. GREENHOUSE GAS INTENSITY IN THE EU AND ITS MEMBER STATES

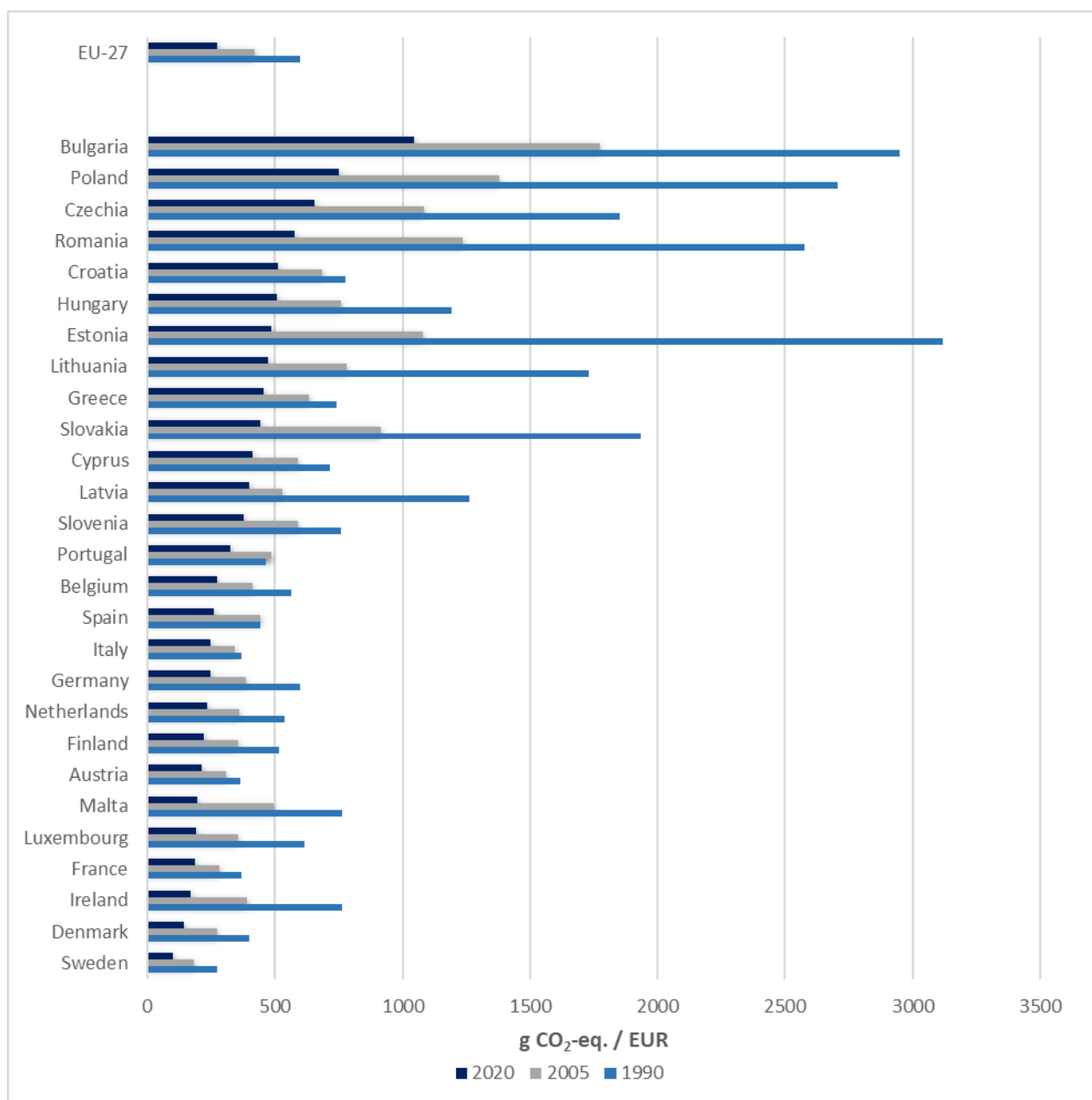


Figure 3: Greenhouse gas emissions intensity (i.e. the ratio between emissions and GDP) in the EU and its Member States 1990, 2005 and 2020 (g CO₂-eq./EUR2015).¹⁸

¹⁸ Sources: EU greenhouse gas inventory 1990-2019, EU approximated greenhouse gas inventory 2020 (EEA). GDP in 2015-prices, data from Ameco database (European Commission, DG ECFIN) gap-filled by EEA.

8. GREENHOUSE GAS EMISSIONS PER CAPITA IN THE EU AND ITS MEMBER STATES

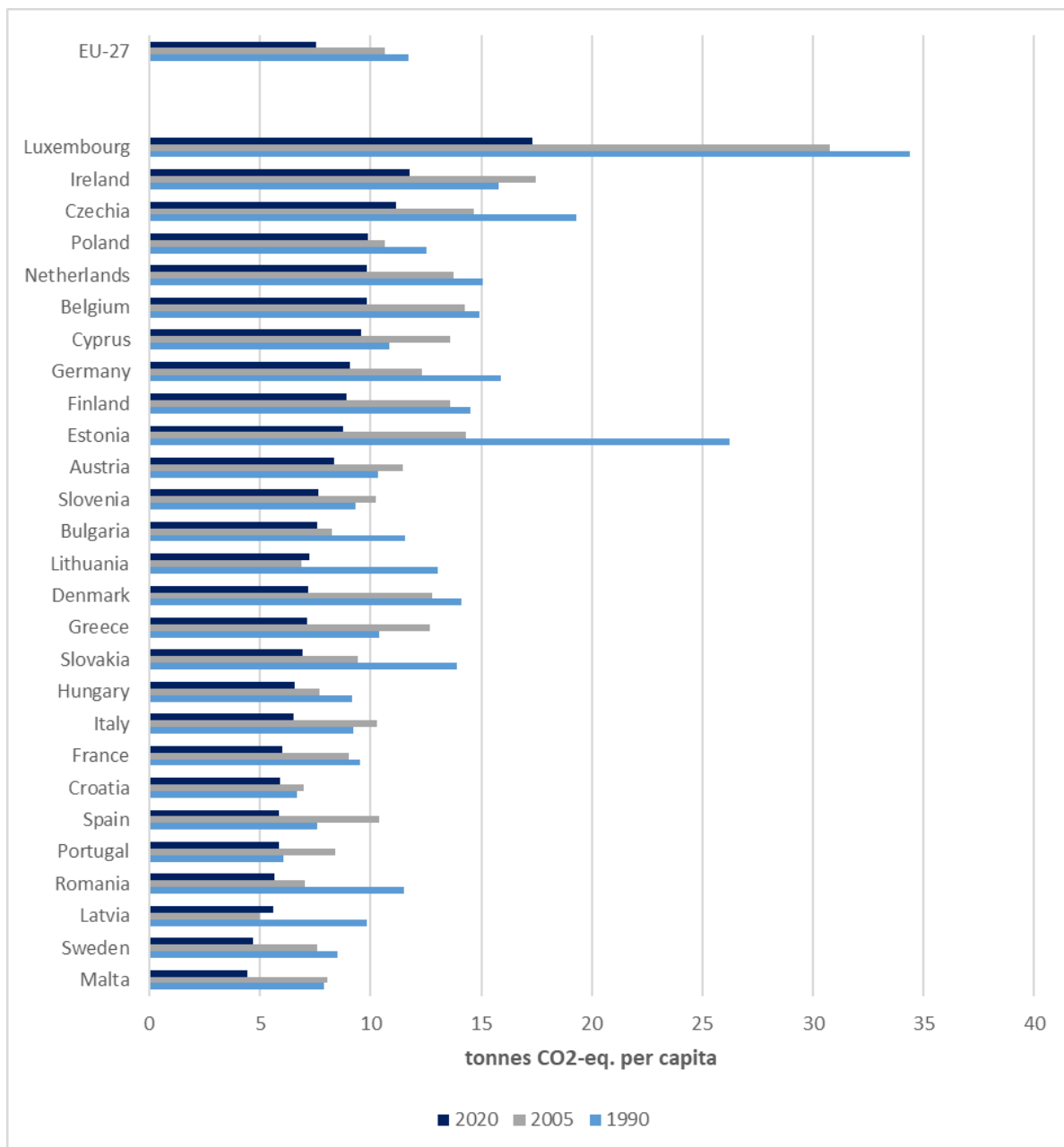


Figure 4: Greenhouse gas emissions per capita in the EU and its Member States 1990, 2005 and 2020 (tonnes CO2-eq. per capita).¹⁹

¹⁹ Sources: EU greenhouse gas inventory 1990-2019, EU approximated greenhouse gas inventory 2020 (EEA). Average population (total) (Eurostat).

9. EU ETS EMISSIONS

Verified Emissions	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Stationary, total	1.904	1.867	1.908	1.814	1.803	1.751	1.755	1.683	1.530	1.355
<i>Change to year x-1</i>		-2,0%	2,2%	-4,9%	-0,6%	-2,9%	0,2%	-4,1%	-9,1%	-11,4%
Electricity and Heat Production	1.261	1.254	1.191	1.100	1.091	1.046	1.036	964	822	696
<i>Change to year x-1</i>		-0,5%	-5,0%	-7,7%	-0,8%	-4,1%	-1,0%	-7,0%	-14,7%	-15,3%
Industry	643	613	717	714	712	704	719	719	708	659
<i>Change to year x-1</i>		-4,7%	17,0%	-0,4%	-0,3%	-1,1%	2,0%	0,1%	-1,6%	-7,0%

Table 5: Verified ETS emissions from stationary installations up to 2020 (Mt CO₂-eq. and percentage change from year X-1).²⁰

²⁰ Source: EUTL (data extracted 30/06/2021). Figures for EU27, UK and EEA. The categorization into electricity and heat production and industry is based on the NACE classification from the 2020 submission by Member States of their National Implementation Measures pursuant to Article 11 of Directive 2003/87/EC.

10. EMISSIONS COVERED BY THE EFFORT SHARING LEGISLATION

In 2021, Member States submitted projections in the context of the Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

The original data have different metrics: Historical and projected emissions, ESD targets and 2005 base year emissions are expressed in the Global Warming Potential (GWP) of IPCC's 4th Assessment Report (AR4), whereas the ESR targets and 2005 base year emissions are in GWP of the 5th Assessment Report. For comparability, the latter have been approximately converted into GWP AR4, preserving the level of ambition as expressed in Commission Implementing Decision (EU) 2020/2126 which sets the annual emission allocations (AEAs) of each Member State for each year in 2012-2030 under the ESR. For these reasons, the distances to targets for 2030 are provided here for illustrative purposes only.

Due to UK's withdrawal from the EU, and the opt-out from the ETS of certain small installations in some Member States the aggregated targets (AEAs) for the 27 Member States, as in Commission Implementing Decision (EU) 2020/2126 (which result in -28.7% for the EU), do not exactly match the current EU-level effort sharing reduction targets expressed in percent (-30%).

Table 6: Member States targets, historical and projected emissions under the effort-sharing legislation and distance to targets in percentage change from 2005 base year emissions. ESR base year emissions and targets have been approximately converted into GWP AR4 for comparability. Positive values indicate projected overachievement while negative values indicate projected underachievement. WEM = with existing measures, WAM = with additional measures.

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM)
Austria						
Target	-13%	-14%	-15%	-16%	-36%	-36%
Emissions	-9%	-11%	-12%	-18%	-17%	-27%
Distance to target (pp)	-4%	-2%	-3%	2%	-19%	-9%
Belgium						
Target	-10%	-11%	-13%	-15%	-35%	-35%
Emissions	-12%	-8%	-10%	-17%	-14%	-38%
Distance to target (pp)	2%	-4%	-3%	2%	-21%	3%
Bulgaria						
Target	17%	18%	19%	20%	0%	0%
Emissions	20%	19%	17%	26%	11%	6%
Distance to target (pp)	-3%	-1%	2%	-6%	-11%	-6%
Croatia						
Target	7%	9%	10%	11%	-7%	-7%
Emissions	-4%	-7%	-8%	-9%	-14%	-19%
Distance to target (pp)	12%	15%	18%	20%	7%	12%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM)
Cyprus						
Target	0%	-1%	-3%	-5%	-24%	-24%
Emissions	2%	-1%	5%	-3%	-7%	-17%
Distance to target (pp)	-2%	-1%	-8%	-2%	-17%	-7%
Czechia						
Target	6%	7%	8%	9%	-14%	-14%
Emissions	1%	-2%	-2%	4%	-22%	-37%
Distance to target (pp)	5%	9%	10%	5%	8%	23%
Denmark						
Target	-13%	-15%	-18%	-20%	-39%	-39%
Emissions	-18%	-17%	-20%	-25%	-36%	-36%
Distance to target (pp)	5%	2%	2%	5%	-3%	-3%
Estonia						
Target	9%	10%	10%	11%	-13%	-13%
Emissions	14%	13%	14%	10%	-12%	-14%
Distance to target (pp)	-5%	-3%	-4%	1%	-1%	1%
Finland						
Target	-11%	-13%	-14%	-16%	-39%	-39%
Emissions	-11%	-12%	-13%	-16%	-31%	-34%
Distance to target (pp)	0%	-1%	-2%	0%	-8%	-5%
France						
Target	-10%	-11%	-13%	-14%	-37%	-37%
Emissions	-11%	-14%	-16%	-22%	-31%	-31%
Distance to target (pp)	1%	3%	3%	8%	-6%	-6%
Germany						
Target	-10%	-11%	-13%	-14%	-38%	-38%
Emissions	-2%	-9%	-7%	-12%	-29%	-29%
Distance to target (pp)	-7%	-2%	-5%	-2%	-9%	-9%
Greece						
Target	-5%	-5%	-4%	-4%	-16%	-16%
Emissions	-27%	-29%	-28%	-33%	-27%	-36%
Distance to target (pp)	22%	24%	24%	29%	11%	20%
Hungary						
Target	4%	6%	8%	10%	-7%	-7%
Emissions	-10%	-10%	-7%	-7%	-7%	-22%
Distance to target (pp)	14%	16%	15%	17%	0%	15%
Ireland						
Target	-13%	-15%	-18%	-20%	-30%	-30%
Emissions	-7%	-4%	-3%	-6%	-6%	-22%
Distance to target (pp)	-6%	-12%	-15%	-14%	-24%	-8%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM)
Italy						
Target	-11%	-12%	-12%	-13%	-33%	-33%
Emissions	-19%	-17%	-18%	-24%	-29%	-40%
Distance to target (pp)	8%	5%	6%	11%	-4%	7%
Latvia						
Target	14%	15%	16%	17%	-6%	-6%
Emissions	8%	7%	1%	-1%	-4%	-10%
Distance to target (pp)	6%	8%	15%	18%	-2%	4%
Lithuania						
Target	7%	9%	12%	15%	-9%	-9%
Emissions	7%	8%	8%	5%	-11%	-23%
Distance to target (pp)	0%	2%	4%	10%	2%	14%
Luxembourg						
Target	-14%	-16%	-18%	-20%	-40%	-40%
Emissions	-14%	-11%	-9%	-22%	-14%	-53%
Distance to target (pp)	0%	-5%	-9%	2%	-26%	13%
Malta						
Target	5%	5%	5%	5%	-19%	-19%
Emissions	28%	24%	28%	17%	50%	50%
Distance to target (pp)	-23%	-19%	-23%	-12%	-69%	-69%
Netherlands						
Target	-11%	-13%	-14%	-16%	-36%	-36%
Emissions	-20%	-22%	-24%	-29%	-31%	-31%
Distance to target (pp)	9%	9%	10%	13%	-5%	-5%
Poland						
Target	11%	12%	13%	14%	-7%	-7%
Emissions	18%	18%	16%	12%	6%	-12%
Distance to target (pp)	-6%	-6%	-3%	2%	-13%	5%
Portugal						
Target	-1%	-1%	0%	1%	-17%	-17%
Emissions	-17%	-17%	-15%	-19%	-39%	-42%
Distance to target (pp)	16%	16%	15%	20%	22%	25%
Romania						
Target	11%	14%	16%	19%	-2%	-2%
Emissions	0%	3%	0%	0%	5%	2%
Distance to target (pp)	12%	11%	17%	19%	-7%	-4%
Slovakia						
Target	9%	10%	12%	13%	-12%	-12%
Emissions	-7%	-8%	-13%	-15%	9%	1%
Distance to target (pp)	17%	19%	24%	28%	-21%	-13%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM)
Slovenia						
Target	3%	3%	4%	4%	-14%	-14%
Emissions	-8%	-7%	-9%	-16%	-9%	-25%
Distance to target (pp)	11%	10%	12%	20%	-5%	11%
Spain						
Target	-8%	-8%	-9%	-10%	-26%	-26%
Emissions	-15%	-14%	-14%	-23%	-18%	-38%
Distance to target (pp)	7%	6%	5%	13%	-8%	12%
Sweden						
Target	-13%	-14%	-16%	-17%	-40%	-40%
Emissions	-25%	-28%	-27%	-29%	-39%	-39%
Distance to target (pp)	12%	13%	11%	12%	-1%	-1%
EU 27						
Target	-6%	-7%	-7%	-8%	-29%	-29%
Emissions	-9%	-10%	-11%	-16%	-22%	-30%
Distance to target (pp)	3%	3%	3%	7%	-7%	1%
Iceland						
Target					-29%	-29%
Emissions					-28%	-28%
Distance to target (pp)					-1%	-1%
Norway						
Target					-40%	-40%
Emissions					-32%	-32%
Distance to target (pp)					-8%	-8%
EU 27 + IS + NO						
Target					-29%	-31%
Emissions					-22%	-30%
Distance to target (pp)					-7%	-1%

Table 7: Annual emissions allocations (FN12), historical and proxy emissions and distance to targets under the Effort Sharing Decision (Mt. CO₂-eq.). Positive values indicate overachievement, negative values indicate underachievement.

FN12: AEAs for the years 2017-2020 were revised in 2017 for all Member States to reflect updates in methodologies for reporting of GHG inventories. This recalculation ensures maintaining the originally intended effort of each Member State (in % of 2005 emissions). The values of ‘cumulative surplus of AEAs’ are the cumulative annual distances to target and do not take into account cancellations and transfers. 2019 ESD emissions are based on the ‘Final Review Reports’ from the 2021 annual ESD review. 2020 emissions are based on the ‘proxy inventories’ submitted by Member States (not available for the UK).

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Austria									
AEA		52,6	52,1	51,5	51,0	49,5	48,9	48,3	47,8
Emissions	56,8	50,1	48,2	49,3	50,6	51,7	50,3	50,2	46,6
Distance to target		2,5	3,9	2,2	0,4	-2,1	-1,4	-1,9	1,2
Cumulative surplus of AEAs		2,5	6,4	8,7	9,0	6,9	5,5	3,6	4,7
Belgium									
AEA		78,4	76,9	75,3	73,8	72,5	71,1	69,7	68,2
Emissions	80,3	74,3	70,1	72,7	74,1	70,8	74,3	72,0	66,6
Distance to target		4,1	6,8	2,6	-0,3	1,7	-3,2	-2,4	1,7
Cumulative surplus of AEAs		4,1	10,9	13,5	13,2	14,9	11,7	9,4	11,1
Bulgaria									
AEA		26,9	27,2	27,5	27,7	25,9	26,1	26,3	26,5
Emissions	22,1	22,2	22,9	25,4	25,6	26,5	26,3	25,8	27,9
Distance to target		4,7	4,3	2,1	2,1	-0,6	-0,2	0,5	-1,4
Cumulative surplus of AEAs		4,7	9,0	11,1	13,3	12,6	12,4	12,9	11,5
Croatia									
AEA		19,6	19,8	20,0	20,2	18,7	18,9	19,1	19,3
Emissions	17,4	15,1	14,7	15,6	16,0	16,7	16,2	16,1	15,9
Distance to target		4,5	5,1	4,4	4,2	2,0	2,7	3,0	3,5
Cumulative surplus of AEAs		4,5	9,6	14,1	18,2	20,3	22,9	26,0	29,4
Cyprus									
AEA		5,9	5,9	5,9	5,9	4,2	4,1	4,0	4,0
Emissions	4,2	3,9	3,9	4,1	4,1	4,3	4,2	4,4	4,1
Distance to target		2,0	2,0	1,9	1,8	-0,1	0,0	-0,3	-0,1
Cumulative surplus of AEAs		2,0	4,0	5,8	7,7	7,6	7,5	7,2	7,1

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Czechia									
AEA		62,5	63,2	64,0	64,7	65,2	65,9	66,5	67,2
Emissions	61,7	61,5	57,6	61,3	62,8	62,4	60,6	60,5	64,3
Distance to target		1,0	5,6	2,7	1,9	2,8	5,3	6,0	2,9
Cumulative surplus of AEs		1,0	6,6	9,3	11,2	14,0	19,2	25,2	28,1
Denmark									
AEA		36,8	35,9	35,0	34,1	34,8	33,9	33,0	32,1
Emissions	40,1	33,7	32,6	32,5	33,1	32,7	33,1	32,1	29,9
Distance to target		3,1	3,3	2,5	1,0	2,1	0,7	0,9	2,2
Cumulative surplus of AEs		3,1	6,4	8,9	9,9	12,0	12,7	13,6	15,8
Estonia									
AEA		6,3	6,3	6,3	6,4	5,9	6,0	6,0	6,0
Emissions	5,4	5,8	6,1	6,1	6,2	6,2	6,1	6,2	6,0
Distance to target		0,5	0,2	0,2	0,2	-0,3	-0,2	-0,2	0,1
Cumulative surplus of AEs		0,5	0,8	1,0	1,1	0,9	0,7	0,5	0,5
Finland									
AEA		31,8	31,3	30,8	30,3	30,2	29,6	29,1	28,5
Emissions	33,9	31,6	30,1	29,9	31,4	30,1	29,9	29,6	28,6
Distance to target		0,2	1,1	0,9	-1,0	0,1	-0,3	-0,6	-0,1
Cumulative surplus of AEs		0,2	1,3	2,2	1,2	1,3	1,0	0,4	0,3
France									
AEA		394,1	389,5	384,4	379,4	358,2	352,9	347,7	342,5
Emissions	398,2	366,1	353,5	353,0	351,9	352,8	342,2	336,4	310,5
Distance to target		28,0	35,9	31,4	27,5	5,4	10,7	11,4	31,9
Cumulative surplus of AEs		28,0	63,9	95,3	122,8	128,2	138,9	150,3	182,2
Germany									
AEA		472,5	465,8	459,1	452,4	432,3	425,2	418,1	410,9
Emissions	477,8	460,2	436,8	444,1	454,2	466,9	434,0	444,3	418,5
Distance to target		12,3	29,0	15,1	-1,7	-34,5	-8,8	-26,2	-7,6
Cumulative surplus of AEs		12,3	41,4	56,4	54,7	20,2	11,3	-14,9	-22,4
Greece									
AEA		59,0	59,3	59,6	59,9	59,1	59,4	59,7	60,0
Emissions	62,6	44,2	44,4	45,4	44,9	45,4	44,7	44,7	42,0
Distance to target		14,8	14,9	14,2	15,0	13,7	14,7	15,0	18,1
Cumulative surplus of AEs		14,8	29,6	43,8	58,8	72,5	87,3	102,3	120,3

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Hungary									
AEA		50,4	51,5	52,6	53,8	50,1	51,0	51,9	52,8
Emissions	48	38,4	38,4	41,4	42,1	43,1	43,2	44,9	44,6
Distance to target		12,0	13,1	11,2	11,7	6,9	7,7	7,0	8,2
Cumulative surplus of AEs		12,0	25,1	36,3	47,9	54,9	62,6	69,6	77,8
Ireland									
AEA		46,9	45,8	44,6	43,5	40,9	39,8	38,7	37,7
Emissions	47,1	42,2	41,7	43,0	43,8	43,8	45,4	45,6	44,3
Distance to target		4,7	4,1	1,6	-0,3	-2,9	-5,6	-6,9	-6,6
Cumulative surplus of AEs		4,7	8,8	10,4	10,1	7,1	1,6	-5,3	-11,9
Italy									
AEA		308,2	306,2	304,2	302,3	298,3	295,8	293,4	291,0
Emissions	334,5	273,3	265,3	273,3	270,7	270,1	278,7	274,9	255,1
Distance to target		34,8	40,9	31,0	31,6	28,1	17,1	18,5	35,9
Cumulative surplus of AEs		34,8	75,7	106,7	138,3	166,4	183,5	202,0	237,9
Latvia									
AEA		9,3	9,4	9,4	9,5	9,7	9,8	9,9	10,0
Emissions	8,5	8,8	9,0	9,0	9,1	9,2	9,1	8,7	8,4
Distance to target		0,5	0,3	0,4	0,4	0,5	0,7	1,3	1,5
Cumulative surplus of AEs		0,5	0,8	1,3	1,7	2,2	2,9	4,1	5,7
Lithuania									
AEA		12,9	13,3	13,7	14,0	14,1	14,5	14,9	15,2
Emissions	13,3	12,4	12,9	13,3	13,9	14,1	14,3	14,3	13,9
Distance to target		0,5	0,4	0,4	0,1	0,0	0,2	0,6	1,3
Cumulative surplus of AEs		0,5	0,9	1,3	1,4	1,4	1,6	2,1	3,5
Luxembourg									
AEA		9,5	9,3	9,1	8,9	8,7	8,5	8,3	8,1
Emissions	10,1	9,4	8,9	8,6	8,5	8,7	9,1	9,2	7,9
Distance to target		0,2	0,5	0,5	0,4	0,0	-0,5	-0,9	0,3
Cumulative surplus of AEs		0,2	0,7	1,2	1,6	1,6	1,1	0,1	0,4
Malta									
AEA		1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Emissions	1,1	1,3	1,3	1,3	1,3	1,4	1,4	1,4	1,3
Distance to target		-0,1	-0,1	-0,1	-0,2	-0,3	-0,2	-0,3	-0,1
Cumulative surplus of AEs		-0,1	-0,2	-0,3	-0,5	-0,8	-1,0	-1,2	-1,4

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Netherlands									
AEA		122,9	120,7	118,4	116,1	114,1	111,8	109,6	107,4
Emissions	127,8	108,3	97,9	101,1	101,3	102,3	99,7	97,1	90,4
Distance to target		14,7	22,8	17,3	14,8	11,7	12,1	12,5	17,0
Cumulative surplus of AEs		14,7	37,5	54,8	69,6	81,3	93,4	105,9	122,9
Poland									
AEA		193,6	194,9	196,1	197,4	200,0	201,7	203,4	205,2
Emissions	180	186,1	181,5	186,8	198,7	211,5	213,0	209,1	201,9
Distance to target		7,5	13,3	9,4	-1,3	-11,5	-11,3	-5,6	3,3
Cumulative surplus of AEs		7,5	20,9	30,2	29,0	17,4	6,1	0,5	3,8
Portugal									
AEA		49,3	49,6	49,9	50,1	47,9	48,3	48,7	49,1
Emissions	48,6	38,6	38,8	40,6	41,6	40,2	40,6	41,5	39,3
Distance to target		10,7	10,8	9,2	8,6	7,7	7,7	7,2	9,8
Cumulative surplus of AEs		10,7	21,5	30,7	39,3	47,0	54,7	61,9	71,7
Romania									
AEA		75,6	77,5	79,3	81,1	84,1	86,0	87,9	89,8
Emissions	75,5	72,7	72,5	74,6	73,1	75,4	77,6	75,2	75,8
Distance to target		2,9	4,9	4,7	8,0	8,7	8,3	12,7	14,0
Cumulative surplus of AEs		2,9	7,8	12,5	20,5	29,2	37,5	50,2	64,3
Slovakia									
AEA		24,0	24,4	24,7	25,1	25,0	25,3	25,6	25,9
Emissions	23	21,1	19,8	20,1	19,8	21,2	21,1	20,1	19,5
Distance to target		2,9	4,6	4,7	5,3	3,8	4,3	5,6	6,4
Cumulative surplus of AEs		2,9	7,5	12,2	17,5	21,3	25,6	31,2	37,6
Slovenia									
AEA		12,3	12,4	12,4	12,4	12,2	12,2	12,3	12,3
Emissions	11,8	10,9	10,5	10,7	11,2	10,9	11,0	10,8	9,9
Distance to target		1,4	1,9	1,7	1,2	1,3	1,2	1,5	2,4
Cumulative surplus of AEs		1,4	3,3	4,9	6,1	7,4	8,6	10,1	12,5
Spain									
AEA		227,6	225,6	223,7	221,8	218,3	216,3	214,3	212,4
Emissions	236	200,3	199,8	196,2	198,5	201,1	203,0	201,9	181,0
Distance to target		27,3	25,9	27,6	23,3	17,2	13,3	12,5	31,4
Cumulative surplus of AEs		27,3	53,2	80,8	104,1	121,3	134,5	147,0	178,4

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Sweden									
AEA		41,7	41,0	40,4	39,8	37,8	37,2	36,7	36,1
Emissions	43,5	35,3	34,5	33,9	32,6	32,5	31,4	31,7	30,8
Distance to target		6,4	6,5	6,5	7,2	5,3	5,8	5,0	5,3
Cumulative surplus of AEs		6,4	12,9	19,4	26,6	31,9	37,7	42,7	47,9
United Kingdom									
AEA		358,7	354,2	349,7	345,2	360,4	357,2	354,1	350,9
Emissions	417,8	339,5	324,4	326,0	333,9	332,1	329,9	329,1	305,5
Distance to target		19,3	29,8	23,7	11,3	28,4	27,4	25,0	45,4
Cumulative surplus of AEs		19,3	49,1	72,7	84,0	112,4	139,7	164,7	210,2

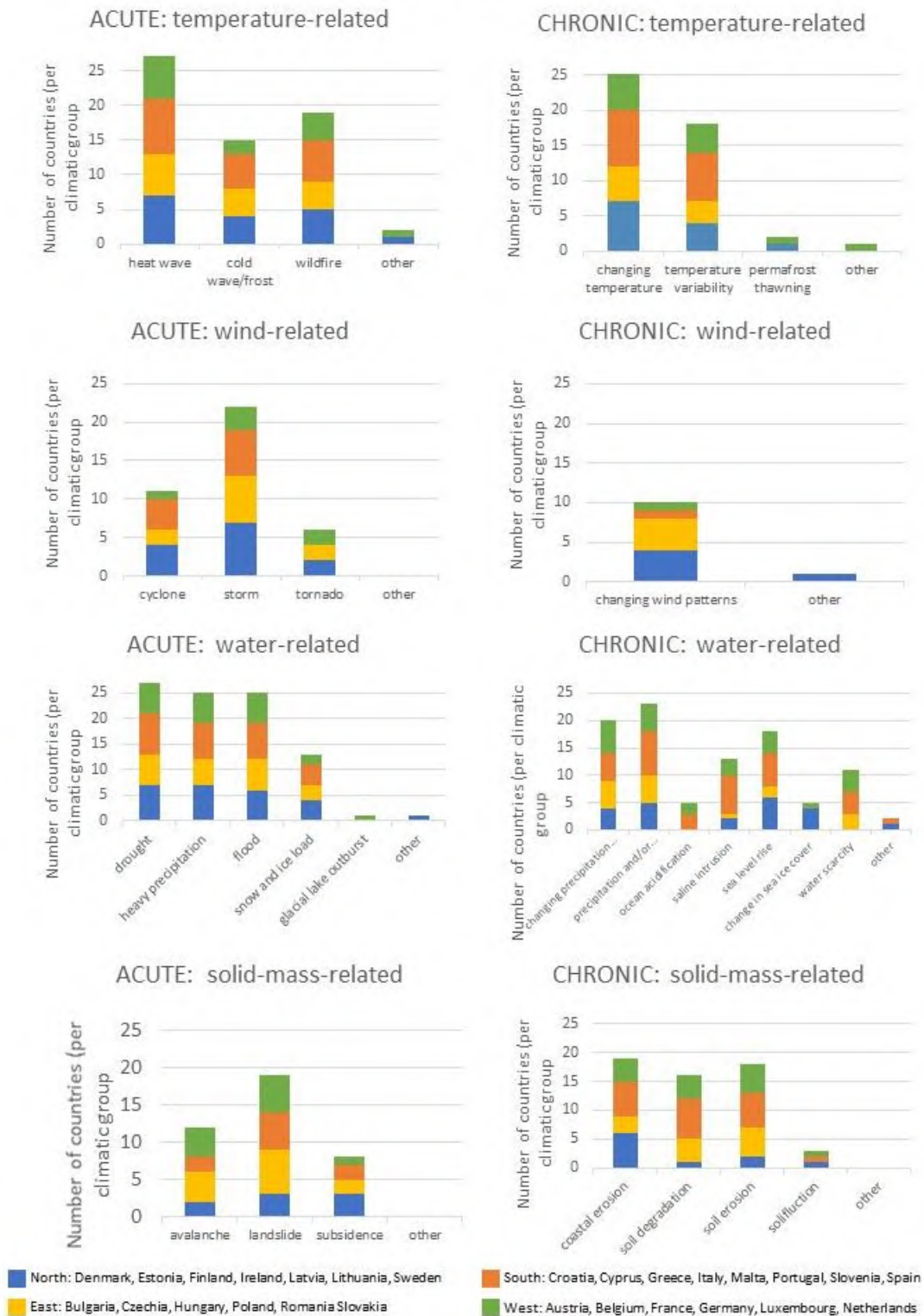
11. FIRST ASSESSMENT OF ADAPTATION STRATEGIES

Member States reported on their national adaptation policies by 15 March 2021 on the basis of Article 19 of the Governance Regulation. The content of the reporting is set out in Annex VIII of the Regulation and further detailed in an implementing act of the Commission. By the end of September 2021, all Member States submitted the required reporting through the EEA's Reportnet interface.

Countries were grouped into climatic zones according to a frequently used nomenclature in climate-related assessments of the European Environment Agency and of the Commission: northern (DK, EE, FI, IE, LT, LV, SE), eastern (BG, CZ, HU, PL, RO, SK), southern (CY, EL, ES, HR, IT, MT, PT, SI) and western (AT, BE, FR, DE, LU, NL).

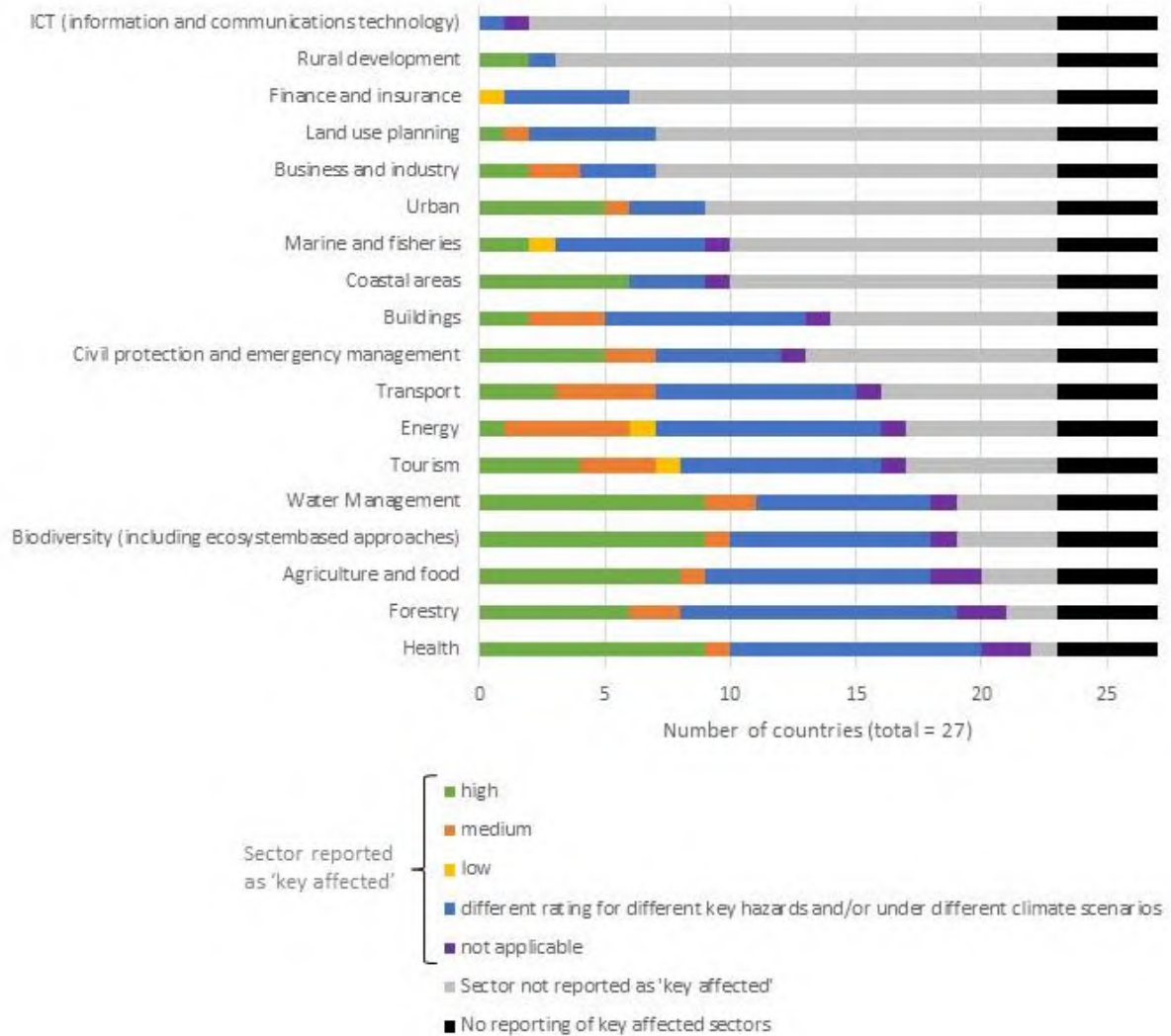
Figure 5: Key observed climate hazards in the different climatic zones

Key observed hazards

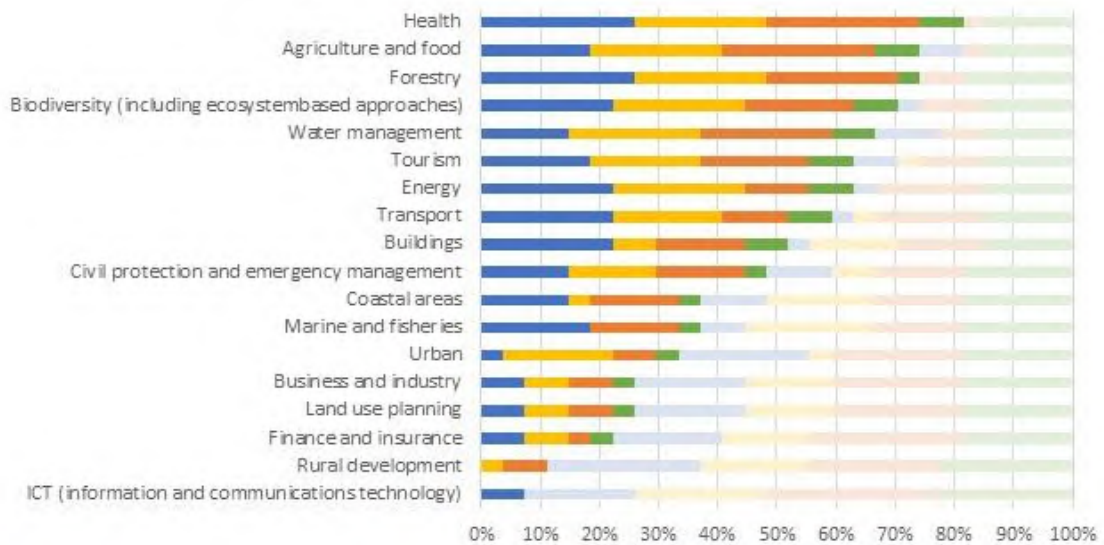


Figures 6 and 7: Key sectors at risk of future climate impacts

Qualitative evaluation of the risk of potential future impacts for different sectors



Risk of potential future impacts
percentage of countries reporting a sector (total = 27)



- ■ ■ ■ Sector reported as 'key affected'
- ■ ■ ■ Sector not reported as 'key affected'
- ■ North: Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Sweden
- ■ East: Bulgaria, Czechia, Hungary, Poland, Romania, Slovakia
- ■ South: Croatia, Cyprus, Greece, Italy, Malta, Portugal, Slovenia, Spain
- ■ West: Austria, Belgium, France, Germany, Luxembourg, Netherlands

Notes:

1. only 2 out of 6 countries in the group Western Europe reported information on key affected sectors
2. 23 sectors reported as 'other' (by 7 different countries) are assigned by analogy to one of the sectors in the graph. In addition, there are 13 sectors reported as 'other' (by 8 different countries) that could not be assigned to any of the sectors in the graph and excluded from the analysis.

12. USE OF REVENUES FROM AUCTIONING OF ETS ALLOWANCES

Auctions of phase 3 emission allowances for both stationary installations and aircraft operators have provided the EU-27 countries with revenues listed in the Table.²¹ Member States report annually on the use of auctioning revenues for climate change and energy purposes, under Article 17 of Regulation (EU) No 525/2013. These are used in the Chapter 6 in the Climate Action Progress Report to estimate the share of revenues used for climate change and energy purposes. It should be noted that annual reporting does not necessarily cover on how the revenues of that year are spent, but the spending of revenues during that year, i.e. it can include revenues from earlier years. Member States only report on spending for the purposes of addressing climate change and energy, but this does not mean that the amount not covered in the report is necessarily spent for other purposes: it is also possible that revenues are spent later, or used to fund many projects/activities, only part of which are linked to climate change and energy, or that a certain amount has been set aside for climate and energy but not all of it has yet been formally attributed to specific projects.

In the latter case, and when Member States have reported having a national minimum set aside for climate and energy, this has been reflected in the “% spent on climate and energy” row²². Additionally, multiple Member States do not earmark their auction revenues for a specific purpose, but instead attribute part or all of their revenues to a broad budget such as the general budget, that is funded by more than just auctioning revenues, and can be spent on both climate change and energy and other purposes. Often, in such cases example projects funded by the broad budget are reported, but a direct link to auctioning revenues cannot be made. Such country specific contexts are described below. Reported spending can also be higher than the revenues of that year, if either it includes spending of previous years’ revenues or if the reported projects were co-funded with other funds.²³

Table 8: Member States’ revenues from auctioning of ETS allowances (EUR million), amounts spent on climate and energy purposes (EUR million) and share of the revenues spent on climate and energy purposes (%), 2013-2020.²⁴

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Austria								
Revenues from auctioning	55.8	53.6	78.6	59.5	79.4	210.4	183.8	184.2
Reported as spent on climate etc.	36.9	54.8	79.8	59.9	79.2	0	0	986.4
% spent on climate and energy	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
Revenues are not earmarked. National spending on climate and energy is >100% of auctioning revenues. In several years, climate and energy projects financed from the national budget were reported, even though their funding cannot be directly linked to the auctioning revenues.								

²¹ The table lists annual total revenues of the auctioned phase 3 allowances on the [EEX](#) platform. Some phase 3 allowances were auctioned in 2012 and some phase 2 allowances were auctioned in 2013, these are not included here.

²² Where relevant, the amount resulting from the “% spent on climate and energy” row that is not covered in the row “Reported as spent on climate etc.” has been included in Figure 9 of the Climate Action Progress Report as “Used for climate change and energy, (unspecified)”.

²³ For the purposes of Figure 9 of the Climate Action Progress Report and the estimated shares spent on climate and energy, the annual shares have been capped at 100% in order to avoid distortion of the figures.

²⁴ Data in this table is based on the annual reporting by the Member States with some modifications made to ensure consistency across all Member States and over the reporting period. In 2020/2021 the harmonisation, methodology and analysis were conducted by SQ Consult in a study for the European Commission. Proposed modifications have been discussed with the Member States as part of the quality checks.

N/A = Not available, * = Member States that do not earmark auction revenues, (*) = Member States that partially earmarks auction revenues.

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Belgium								
Revenues from auctioning	115.0	97.1	141.6	107.9	144.3	381.5	356.8	356.1
Reported as spent on climate etc.	0.0	0.0	0.0	37.5	133.1	213.7	357.8	162.6
% spent on climate and energy	N/A	N/A	N/A	35%	92%	56%	99%	46%
Between 2013-2015 auctioning revenues were not spent pending a legal decision. The auctioning revenues from 2013 to 2015 have been earmarked and were partly committed and disbursed over the following years. In addition, the general budget is used to finance many climate and energy projects (data not included here).								
Bulgaria								
Revenues from auctioning	52.6	36.4	121.8	85.3	130.4	368.2	440.3	448.6
Reported as spent on climate etc.	51.3	36.2	103.5	94.1	138.2	368.2	440.3	448.6
% spent on climate and energy	97%	99%	85%	>100%	>100%	100%	100%	100%
Unspent revenues are carried over to later years, therefore in some years spending is higher than the revenues.								
Croatia								
Revenues from auctioning	N/A	N/A	86.9	20.3	27.2	71.5	72.7	72.2
Reported as spent on climate etc.	N/A	N/A	77.5	46.1	18.9	29.0	13.4	44.0
% spent on climate and energy	N/A	N/A	100%	>100%	100%	100%	100%	100%
According to the law, 100% of the auctioning revenues are spent on climate and energy. This table lists the amount spent during the same year as the revenue earned. The remainder is carried over to the next years.								
Cyprus(*)								
Revenues from auctioning	0.3	0.7	1.4	0.4	6.6	26.0	26.1	40.1
Reported as spent on climate etc.	1.9	0.7	2.8	0.3	0.8	6.4	57.5	57.6
% spent on climate and energy	>100%	100%	>100%	100%	100%	100%	>100%	>100%
The auctioning revenues go to a fund, which different ministries can use for climate and energy projects. This fund also receives money from the general budget, so in practice a higher amount than 100% of revenues is spent on climate and energy overall.								
Czechia *								
Revenues from auctioning	80.7	55.7	111.5	118.0	199.8	584.4	630.4	719.4
Reported as spent on climate etc.	73.2	26.9	111.5	118.0	199.8	367.3	408.4	309.7
% spent on climate and energy	91%	48%	100%	100%	100%	63%	65%	43%
Revenues are not earmarked. Reported spending represents the amounts allocated for climate change and energy projects in the national budget of each year (if this allocation is higher than 100%, it is reported as 100% of revenues).								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Denmark *								
Revenues from auctioning	56.1	48.1	71.3	53.7	71.7	189.8	166.1	166.5
Reported as spent on climate etc.	56.0	48.1	71.3	53.7	71.7	189.8	166.1	166.5
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are not earmarked, example projects have been reported up to 100% of revenues each year.								
Estonia (*)								
Revenues from auctioning	18.1	7.4	21.3	23.6	39.4	140.0	142.8	142.4
Reported as spent on climate etc.	9.0	3.6	9.5	12.2	15.9	53.3	64.5	142.4
% spent on climate and energy	50%	49%	44%	52%	40%	38%	45%	100%
50% of the auctioning revenues are earmarked and directed through the four-year State Budget Strategy and spent on climate and energy projects and measures, which may take multiple years. Unspent revenues are carried over to later years and always used for climate and energy projects. The remaining 50% goes to the general budget, which, among others, covers climate and energy investment (not included here).								
Finland *								
Revenues from auctioning	67.0	63.5	93.8	71.2	95.3	251.8	219.9	220.6
Reported as spent on climate etc.	2.0	31.1	93.8	71.2	9.5	251.8	219.9	220.6
% spent on climate and energy	3%	49%	100%	100%	10%	100%	100%	100%
Revenues are not earmarked. National spending on climate and energy is >100% of auctioning revenues. Only a part of actual spending has been reported, in some years covering specific projects, in other years up to 100% of revenues, even though this funding cannot be directly linked to the auctioning revenues.								
France (*)								
Revenues from auctioning	219.2	215.3	312.1	234.7	313.4	829.6	726.5	728.1
Reported as spent on climate etc.	219.2	215.3	312.1	234.7	313.4	550.0	420.0	728.1
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
The auctioning revenues co-fund energy efficiency improvements of low-income housing, up to a ceiling of EUR 420 million per year. The remainder is not earmarked but goes to the general budget, which, among others, covers climate and energy investments (not included here).								
Germany								
Revenues from auctioning	791.3	750.0	1110.2	850.4	1146.8	2581.7	3164.0	2662.4
Reported as spent on climate etc.	790.9	750.0	1110.2	845.6	1130.8	2563.0	3147.2	2662.4
% spent on climate and energy	100%	100%	100%	98%	99%	99%	99%	100%
100% of revenues is spent on energy and climate projects. All revenues go to a fund for climate and energy projects, which is additionally co-funded from the general budget.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Greece								
Revenues from auctioning	147.6	131.1	195.2	148.1	198.0	523.5	509.5	506.7
Reported as spent on climate etc.	147.6	131.1	195.2	148.1	198.0	523.5	509.5	506.7
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are earmarked and fully spent on domestic climate change and energy projects.								
Hungary (*)								
Revenues from auctioning	34.6	56.5	83.3	63.7	85.2	225.4	228.0	226.3
Reported as spent on climate etc.	17.3	13.1	32.8	18.5	68.7	65.9	74.0	71.8
% spent on climate and energy	50%	50%	39%	29%	81%	50%	50%	50%
50% of the revenues are spent on climate and energy (any revenues not spent are carried over to future years) and the remainder goes to the national general budget. Amounts included in the latter can be spent on climate change and energy are not covered here.								
Ireland *								
Revenues from auctioning	41.7	36.0	53.5	40.1	53.6	142.1	124.3	124.5
Reported as spent on climate etc.	41.7	36.0	53.5	40.1	53.6	142.1	124.3	124.5
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
While ETS auction revenues are not earmarked for specific purposes, amounts spent are equivalent to 100% of these revenue (less ETS administration costs for the Environmental Protection Agency) and are attributed to emission reduction activities in line with the purposes specified in the ETS Directive.								
Italy (*)								
Revenues from auctioning	386.0	366.5	542.4	411.2	549.7	1453.3	1289.0	1290.5
Reported as spent on climate etc.	N/A	192.8	237.7	118.1	383.7	148.4	148.1	506.6
% spent on climate and energy	50%	53%	44%	29%	70%	50%	50%	50%
Italian law guarantees that, 50% of the revenues are used for climate and energy but only after the year has ended, which can cause underreported spending. . The remaining 50% was initially used to compensate for the depleted phase 2 of the New Entrants Reserve, and later it was allocated to the general budget, which funds, among others, climate and energy projects (not included here).								
Latvia								
Revenues from auctioning	10.8	10.2	15.3	11.5	15.4	40.7	42.6	42.3
Reported as spent on climate etc.	0.0	0.1	0.1	7.4	3.8	12.3	11.4	5.8
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
100% of revenues go to the EAAI, a national green investment scheme aimed at tackling global climate change. Reported spending shows actually disbursed amounts per year, all leftovers are carried over to future years.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Lithuania								
Revenues from auctioning	20.0	17.3	28.4	20.8	31.5	80.4	84.0	86.6
Reported as spent on climate etc.	20.0	17.3	28.4	20.8	31.5	80.4	83.7	86.6
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are put in a Climate Change fund that is only for climate action and only funded by auctioning revenues, and spent on climate and energy projects								
Luxembourg *								
Revenues from auctioning	5.0	5.2	6.8	5.1	6.9	18.3	17.1	17.0
Reported as spent on climate etc.	2.5	2.9	3.5	2.6	3.5	9.2	17.1	17.0
% spent on climate and energy	50%	56%	52%	51%	50%	51%	100%	100%
Revenues are not earmarked, example projects have been reported up to 100% of revenues each year.								
Malta *								
Revenues from auctioning	4.5	3.9	6.2	4.5	6.0	15.7	15.9	15.8
Reported as spent on climate etc.	2.9	5.7	12.0	9.7	6.9	4.9	9.1	47.2
% spent on climate and energy	100%	100%	>100%	>100%	>100%	100%	100%	>100%
All revenues go to a fund for climate and energy projects, which is additionally co-funded from the general budget.								
Netherlands *								
Revenues from auctioning	134.2	131.1	187.3	142.6	190.7	504.2	440.1	441.4
Reported as spent on climate etc.	134.2	131.1	187.3	142.6	190.7	504.2	440.1	441.4
% spent on climate and energy	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
Auctioning revenues go to the national general budget which is used to finance climate and energy projects. Amounts spent are higher than 100% of revenues, but it is not possible to link auctioning revenues to specific projects funded.								
Poland*								
Revenues from auctioning	244.0	78.0	132.8	136.1	506.0	1211.6	2548.8	3157.6
Reported as spent on climate etc.	128.7	39.0	68.5	68.1	290.4	609.9	1274.4	1564.0
% spent on climate and energy	53%	50%	52%	50%	57%	50%	50%	50%
Revenues are not earmarked, example projects have been reported for around 50% of revenues each year.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Portugal								
Revenues from auctioning	72.8	67.1	99.2	75.1	100.3	265.6	257.1	255.8
Reported as spent on climate etc.	71.4	64.8	83.7	72.8	95.1	201.2	235.3	251.3
% spent on climate and energy	98%	97%	84%	97%	95%	76%	92%	98%
All revenues from auctioning are channelled to the Environment Fund (alongside other revenues) which is financing environmental projects that may or may not be directly related to climate objectives. The amounts reported as spent represent climate change and energy projects paid by the Environmental Fund.								
Romania (*)								
Revenues from auctioning	122.7	97.9	195.2	194.0	260.8	719.1	749.8	803.1
Reported as spent on climate etc.	91.2	97.9	195.2	194.0	0.0	160.0	42.7	165.9
% spent on climate and energy	74%	100%	100%	100%	0%	22%	6%	17%
50% of revenues is earmarked for climate change and energy purposes and an additional 6% is earmarked for GHG reduction projects (and 15% goes to indirect carbon cost compensation and 29% to the general budget). Part of unspent revenues are carried over to later years.								
Slovakia								
Revenues from auctioning	61.7	57.6	84.5	65.0	87.1	229.9	244.7	242.1
Reported as spent on climate etc.	0.1	15.1	30.0	35.6	40.9	55.6	44.6	27.4
% spent on climate and energy	0%	26%	36%	55%	47%	24%	18%	11%
All auctioning revenues are earmarked and go to the Environmental Fund, which also receives money from other sources. The values reported as spent represent the funding of climate change and energy projects known at the time of reporting. Part of unspent revenues are carried over to later years.								
Slovenia								
Revenues from auctioning	17.7	16.6	24.4	18.7	25.1	66.3	65.3	65.0
Reported as spent on climate etc.	8.9	8.3	24.4	18.7	25.1	66.3	65.3	90.2
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	>100%
100% of the auctioning revenues are used for climate and energy projects. Some projects receive funding later than in the year in which the auctioning revenues were generated.								
Spain (*)								
Revenues from auctioning	346.1	330.1	489.5	369.5	493.6	1306.0	1245.2	1240.3
Reported as spent on climate etc.	346.1	370.2	387.8	390.8	445.5	788.6	1054.1	1081.5
% spent on climate and energy	100%	>100%	79%	>100%	90%	60%	85%	87%
Estimated revenues are earmarked for energy and climate project ahead of each year (up to a cap, which was EUR 500 million up to 2018 and EUR 1100 million after). The remainder goes to the general budget, part of which also funds climate projects, but are not included here (2013 spending includes phase 3 allowances auctioned in 2012).								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Sweden *								
Revenues from auctioning	35.7	34.4	52.4	38.6	51.5	136.3	128.5	127.9
Reported as spent on climate etc.	35.7	18.9	52.4	21.7	28.8	76.5	73.9	65.0
% spent on climate and energy	100%	55%	100%	56%	56%	56%	58%	51%
Revenues are not earmarked, example projects have been reported for at least the minimum required spending on energy and climate.								

13. EXAMPLES OF FUNDING OF CLIMATE RELATED PROJECTS

Example 1: Adapting to climate change in urban areas

The HARMONIA project financed by Horizon 2020 (2021-2025) aims to help urban areas cope with climate change and extreme events using GEOSS and Advanced Modelling Tools. The project will deliver an Integrated Resilience Assessment Platform (IRAP), a system that allows stakeholders to model a range of planning options against a number of climate change scenarios, in order to mitigate climate change effects in urban areas.

Example 2: Just Transition Platform - offering technical assistance and space for open dialogue and exchanges for regions relying on coal and carbon-intensive industries

The Platform provides a single access point for stakeholders, comprehensive technical and advisory support, and offers dedicated project and expert databases. High-level events take place twice a year and there are dedicated stakeholders working groups (steel, cement, chemicals and horizontal stakeholders strategy).

Latest event with Member States, local and regional authorities, non-governmental organisations, social partners, and EU institutions covered both declining and transforming sectors by integrating the Coal Regions Virtual Week and the Carbon-intensive Regions Seminar. Stakeholders discussed challenges and opportunities and exchanged best practices regarding the development of territorial just transition plans (TJTP) and programmes, for instance, in Wielkopolska region (lignite) in Poland and in Norrbotten (iron and steel) in Sweden.

Example 3: Co-Creating Positive and Sustainable Lifestyle Tool

The PSLifestyle project (2021-2025) financed under the Horizon 2020 Green Deal call aims to help close the gap between climate awareness and individual action, and to increase citizen participation in sustainability topics. It aims to build a data-driven momentum for sustainable behaviour change across eight European countries. This by engaging citizens through a digital application to co-research, co-develop and to take up everyday life solutions for climate change by providing them with tools for collection, monitoring and analysis of their environmental and consumption data.

Example 4: Reducing GHG emissions in commercial refrigeration sector

The LIFE C4R project (2018-2021) demonstrated the feasibility and efficiency of innovative technological solutions for reducing GHG emissions and particularly HFCs in the commercial refrigeration sector.

The project covered five pilots (three in Italy, one in Spain and one in Romania), all using the two innovative technologies developed to increase the efficiency of the refrigeration systems with CO₂. The monitoring results confirmed that the combination of high efficiency and use of low global warming potential (GWP) natural refrigerant (i.e. CO₂ has GWP=1) guarantees the lowest possible impact on climate change. The energy saving - compared to conventional CO₂ systems - is 13% for Full Transcritical Efficiency (active in all seasons) and 16% for Extreme Temperature Efficiency (active in summer above 30°C outdoor temperature).

Without taking into account the direct benefits linked to the use of low GWP refrigerant (both in terms of gas leakage and end of life management), the energy savings were evident in all cases ranging from 34.2% to 11.8%.

Example 5. Forest management practices

The Haut Languedoc forest (France) is located at the intersection of different climatic regions and has suffered by high dieback of trees. The LIFE FORECCAST project (2016-2020) provided forest owners and managers with tools to help build their forest management strategy in view of climate change. A mobile phone application was developed to help evaluate and manage the risk of forest dieback, and was used to diagnose 4 300 ha of forests. New climate change management practices were carried out, including reforestation over 30 000 trees belonging to 32 species.

Example 6: Emission reduction in the livestock sector with co-benefits in grasslands

The LIFE BEEF CARBON project develops innovative livestock farming systems and associated practices. Project partners are raising climate awareness, testing and promoting innovative practices for emission reduction and carbon sequestration at the farm level, providing advisory approaches and creating BEEF CARBON action plans in France, Ireland, Italy and Spain.

Example 7: Natural Water Retention Measures in the Altovicentino area (Italy)²⁵

The communities of Santorso and Marano Vicentino implemented several measures (e.g. bio retention, detention basins, porous paving, rain gardens) to cope with the increasing risk of floods, landslides and erosion due to increasing precipitation and land use as part of the LIFE BEWARE project. They deployed Natural Water Retention Measures (NWRMs) to increase the resilience of their territory to flooding in five locations in Santorso and two in Marano Vicentino (Italy). The interventions aim at solving existing hydraulic problems and preventing future ones. They are also used as best practice examples.

Example 8: Supported projects from NER300 unspent funds under the InnovFin EDP and CEF DI (October 2020 - September 2021)

CH New Charging and Energy Storage Solutions (InnovFin EDP)

To provide power system services, the project aims to develop a technology platform that enables integration of electric vehicles (“EVs”) into the power grid by aggregating and leveraging the energy storage potential of end-user EVs batteries as stationary storage devices. The project demonstration sites are located in Germany, France and the Netherlands and the NER 300 contribution amounts to EUR 2.1 million.

DK EVERFUEL GREEN HYDROGEN PROJECT (CEF DI)

The project covers deployment of hydrogen distribution infrastructure and setting up of hydrogen production plant as to supply green hydrogen to a large-scale fleet of Fuel Cell

²⁵ <https://climate-adapt.eea.europa.eu/metadata/case-studies/natural-water-retention-measures-in-the-altovicentino-area-italy>

electric buses (FC buses) in Denmark. The financing of EUR 20.7 million is provided under the Future Mobility product, backed by the Connecting Europe Facility (CEF), and the NER300 Programme.

ES EVEREST (CEF DI)

The project aims to roll out an Electric Vehicle (EV) charging network consisting of 476 Charging Points (CP) in 200 sites over a 3-year period in Spain. Charging points will sell only electricity sourced from renewable sources backed by relevant certificates. This project requested the EIB loan of EUR 50 million, fully covered from NER300 unspent funds.

Example 9: Capacity building in African Regional Climate Centres

Funded by the 11th European Development Fund (EUR 85 million), the ongoing Climate Services and Related Applications (ClimSA) Programme is strengthening the capacity of African Regional Climate Centres to convert data into user-friendly information for decision-makers at all levels, eventually informing the design and implementation of NDCs and National Adaptation Plans (NAPs) and other cross-cutting and sectoral planning, including poverty reduction, nature conservation and disaster risk reduction (DRR) strategies.