

Seeing the Forest Through the Trees: Innovation and More

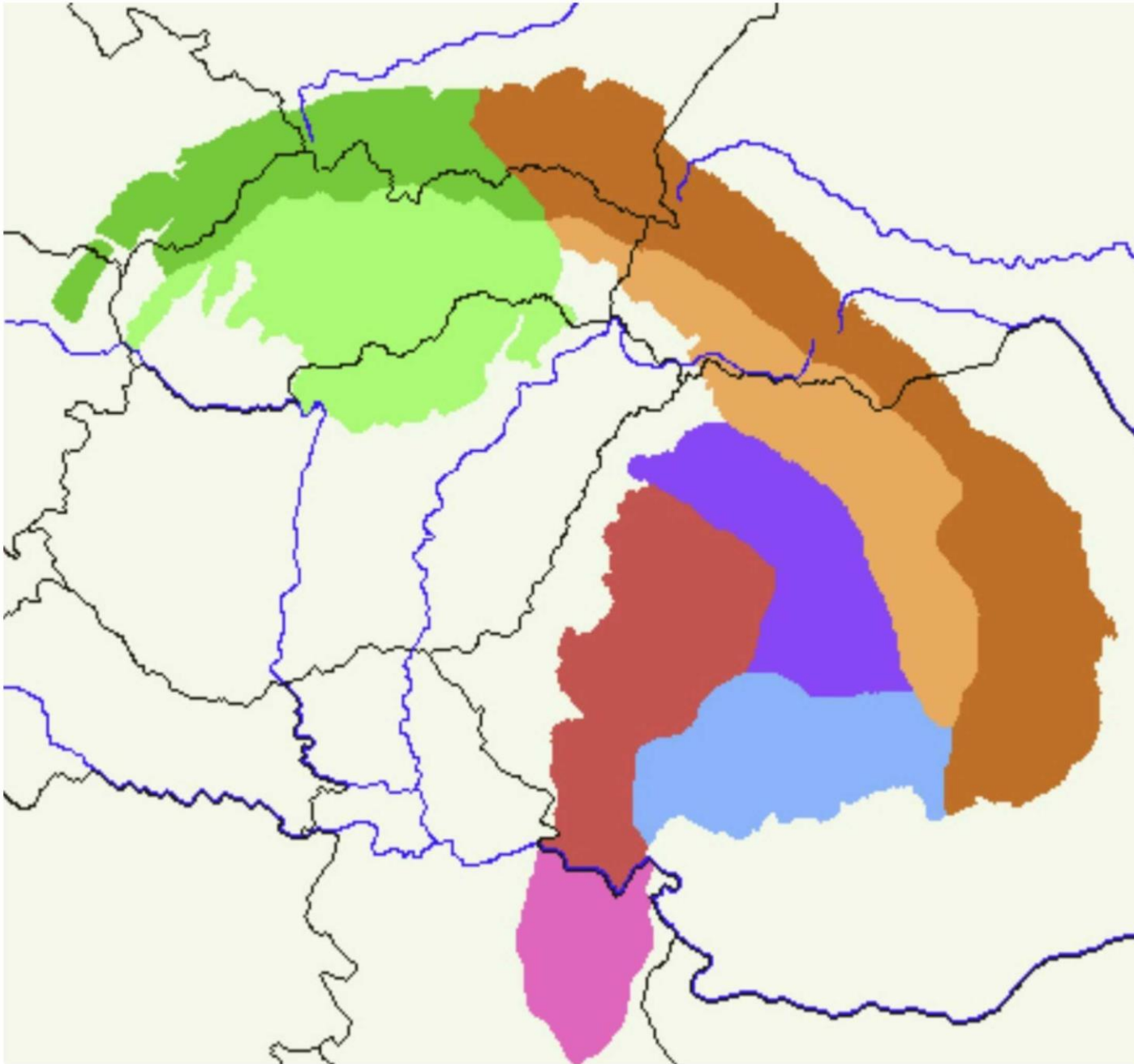




Reality
is Based
in **Brutal
Honesty**



Peaks that
Pique
Our Love
of Nature



Forests
and Mountains
Belonging
to Many



Red Dots
are Generally
a Bad
Indication



Tree Cover Loss with at Least 75% Canopy Density – 2001



Tree Cover Loss with at Least 75% Canopy Density – 2005



Tree Cover Loss with at Least 75% Canopy Density – 2007



Tree Cover Loss with at Least 75% Canopy Density – 2010



Tree Cover Loss with at Least 75% Canopy Density – 2013



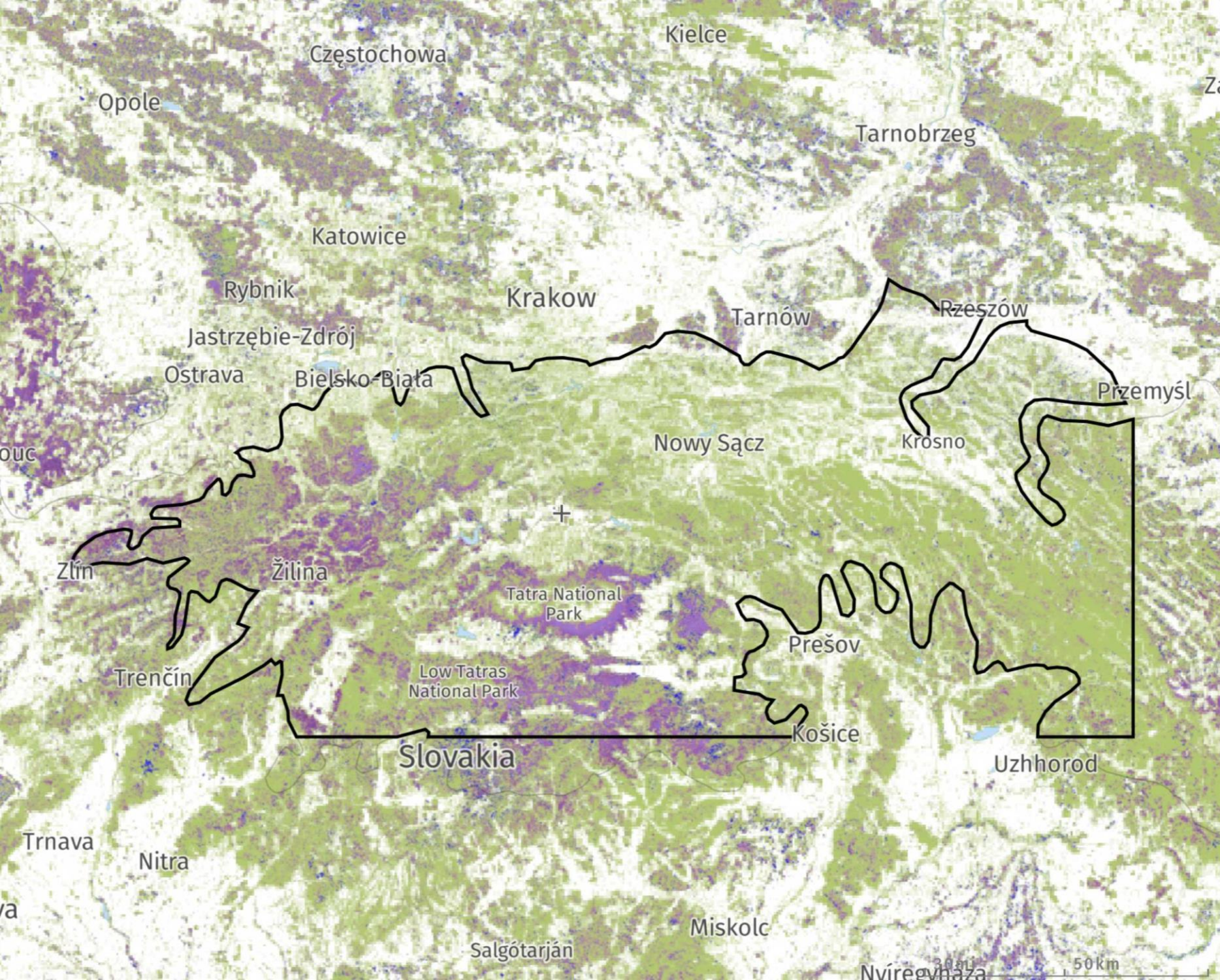
Tree Cover Loss with at Least 75% Canopy Density – 2016



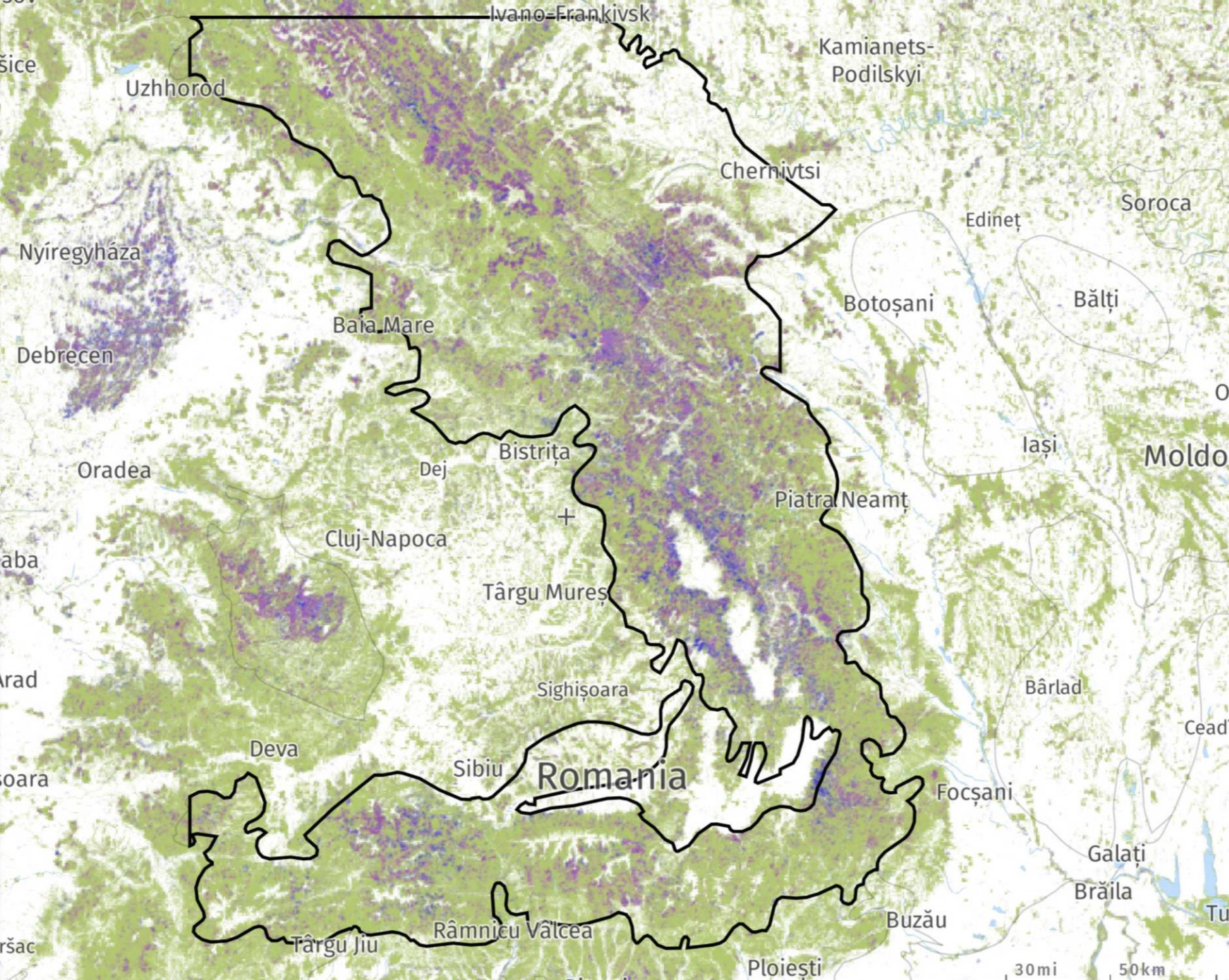
Tree Cover Loss with at Least 75% Canopy Density – 2018



Tree Cover Loss with at Least 75% Canopy Density – 2021



A Closer Look from the Slovakian Perspective

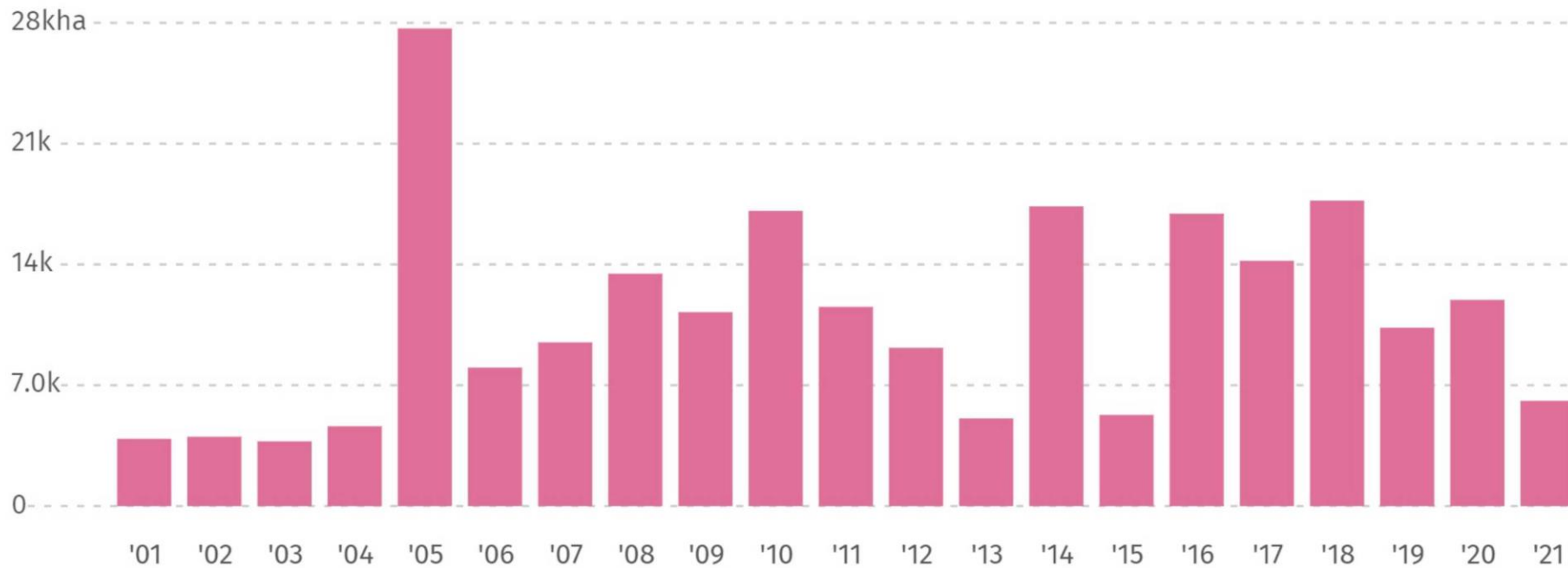


A Closer Look at the Southern Carpathians

Two Decades of Tree Cover Losses in Slovakia

TREE COVER LOSS IN SLOVAKIA

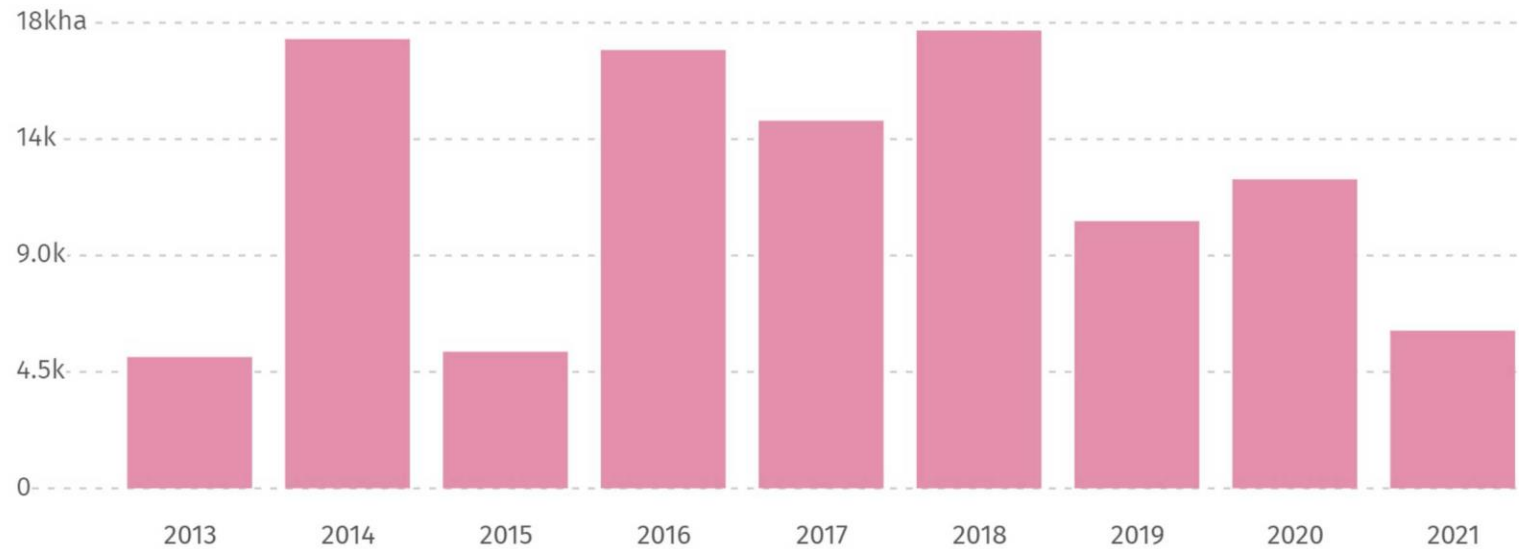
From **2011 to 2021, Slovakia** lost **299kha** of tree cover, equivalent to a **9,6%** decrease in tree cover since **2000**.



Two Decades of Forestry Loss and a 50 Megaton Problem

FOREST LOSS IN NATURAL FOREST IN SLOVAKIA

From **2013** to **2021**, **100%** of tree cover loss in **Slovakia** occurred within natural forest. The total loss within natural forest was equivalent to **57.4Mt** of CO₂e emissions.



2010 tree cover extent | >30% tree canopy

57.4 Megatons of Carbon Dioxide Equivalents

57,400,000 Metric Tons of Carbon Dioxide (CO₂) equivalent

This is equivalent to greenhouse gas emissions from:

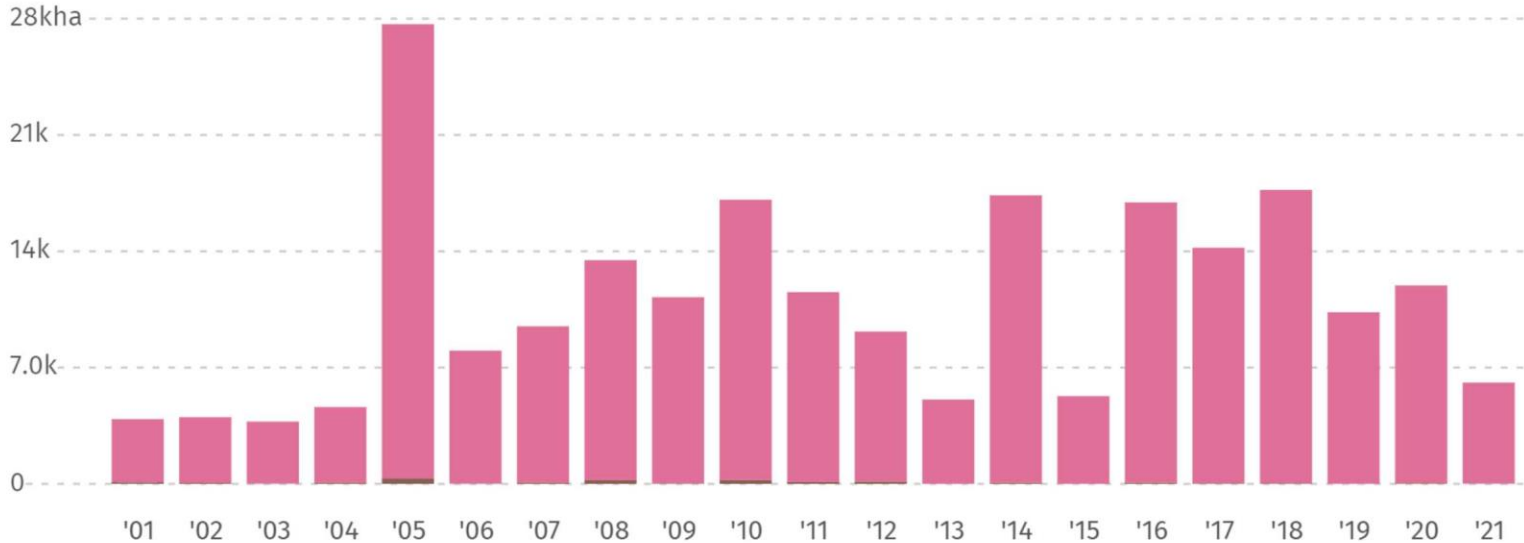
12,367,934 ? gasoline-powered passenger vehicles driven for one year 	142,478,599,176 ? miles driven by an average gasoline-powered passenger vehicle 
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This is equivalent to CO₂ emissions from:

6,458,872,510 ? gallons of gasoline consumed 	5,638,506,876 ? gallons of diesel consumed 
63,507,889,413 ? pounds of coal burned 	759,867 ? tanker trucks' worth of gasoline 
7,230,275 ? homes' energy use for one year 	11,168,580 ? homes' electricity use for one year 
316,943 ? railcars' worth of coal burned 	132,893,134 ? barrels of oil consumed 
2,343,913,645 ? propane cylinders used for home barbeques 	15.4 ? coal-fired power plants in one year 

Getting Fired Up About the Problem

TREE COVER LOSS DUE TO FIRES IN SLOVAKIA

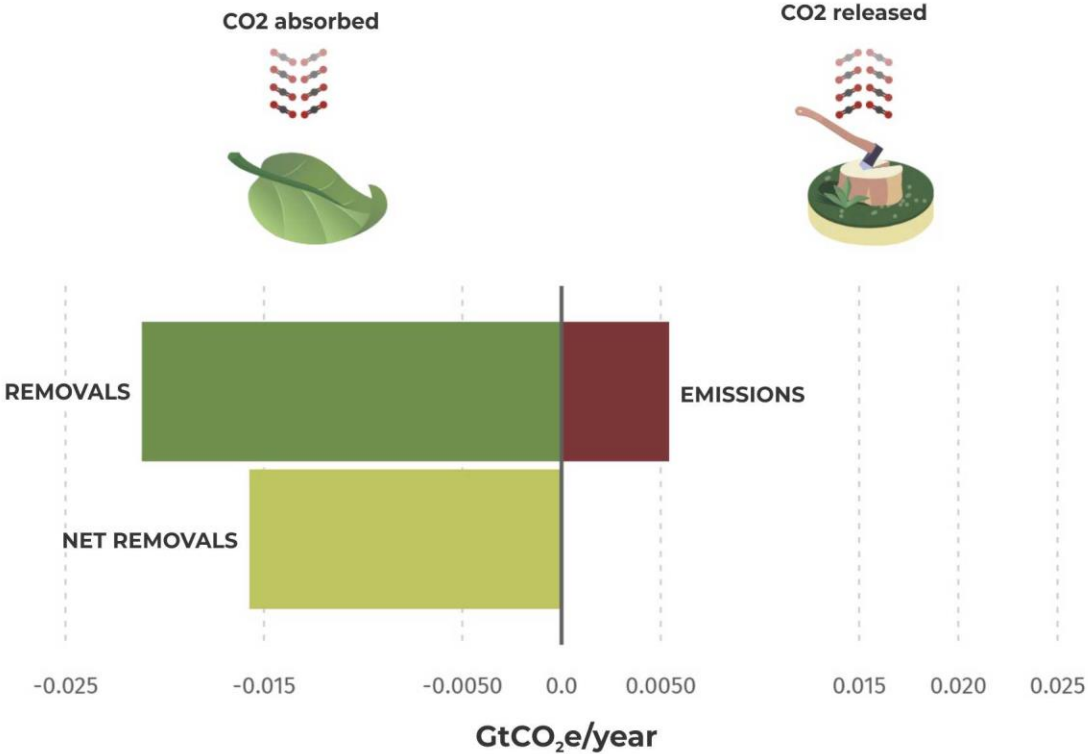


From **2001** to **2021**, **Slovakia** lost **1.71kha** of tree cover from fires and **227kha** from all other drivers of loss. The year with the most tree cover loss due to fires during this period was **2005** with **324ha** lost to fires - **1,2%** of all tree cover loss for that year.

>30% tree canopy

Slovakia: Good, but Clear Room for Improvement

FOREST RELATED GREENHOUSE GAS FLUXES IN SLOVAKIA

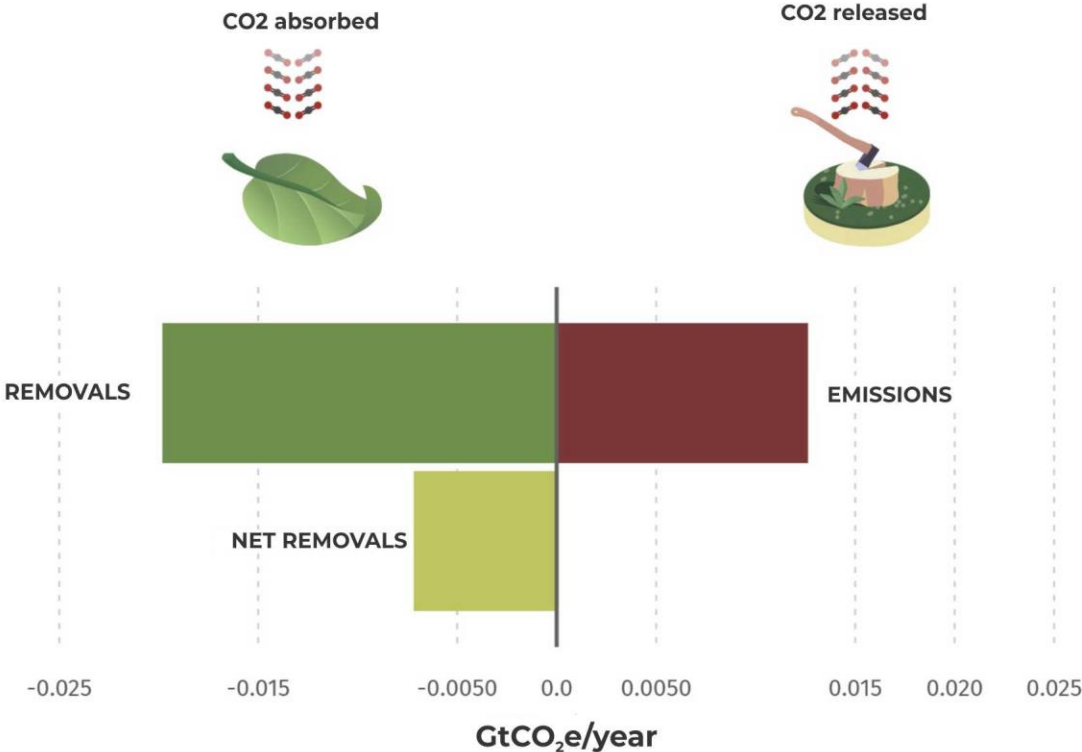


Between **2001** and **2021**, forests in **Slovakia** emitted **5.42MtCO₂e/year**, and removed **-21,2MtCO₂e/year**. This represents a net carbon flux of **-15.7MtCO₂e/year**.

>30% tree canopy and tree cover gain

Czechia: Not Half as Good as Slovakia

FOREST-RELATED GREENHOUSE GAS FLUXES IN CZECH REPUBLIC

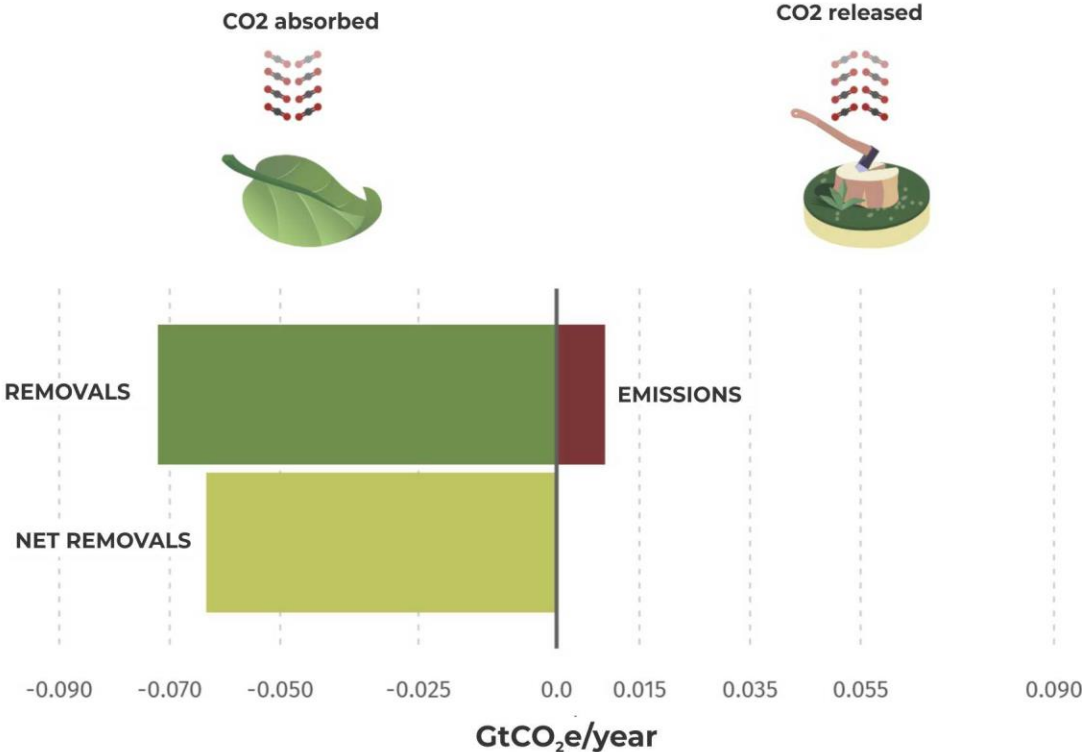


Between **2001** and **2021**, forests in **Czech Republic** emitted **12.6MtCO₂e/year**, and removed **-19.8MtCO₂e/year**. This represents a net carbon flux of **-7.19MtCO₂e/year**.

>30% tree canopy and tree cover gain

Romania: Punching Above its Weight

FOREST-RELATED GREENHOUSE GAS FLUXES IN ROMANIA

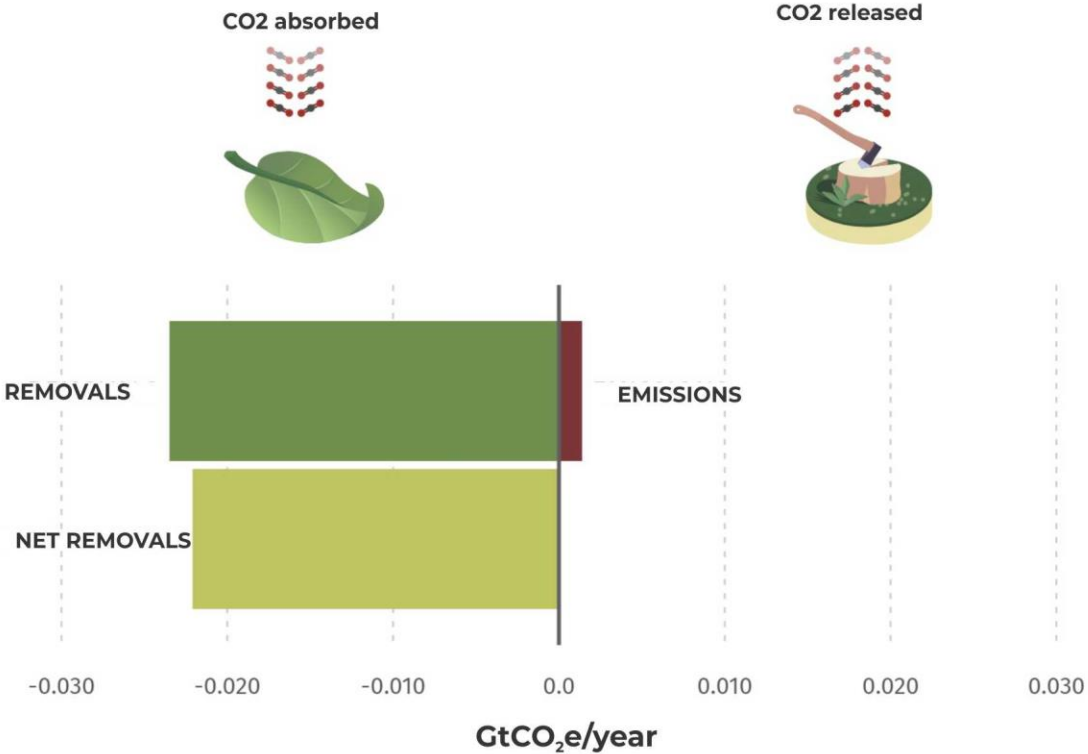


Between **2001** and **2021**, forests in **Romania** emitted **8.77MtCO₂e/year**, and removed **-72.1MtCO₂e/year**. This represents a net carbon flux of **-63.4MtCO₂e/year**.

>30% tree canopy and tree cover gain

Serbia: Also a Great Performer

FOREST-RELATED GREENHOUSE GAS FLUXES IN SERBIA



Between **2001** and **2021**, forests in **Serbia** emitted **1.39MtCO₂e/year**, and removed **-23.5MtCO₂e/year**. This represents a net carbon flux of **-22.1MtCO₂e/year**.

>30% tree canopy and tree cover gain

Major Austrian timber firm accused of illegal logging in Romania

Two-year investigation links Holzindustrie Schweighofer to destruction of Europe's last remaining virgin forests in Romania



📷 Romania contains Europe's remaining virgin forest, home to bison, lynx and bears. Photograph: Spencer Platt/Getty Images

A major Austrian timber company that supplies DIY stores across Europe has been accused of destroying Europe's last remaining virgin forests in Romania by sourcing illegally logged timber.

A two-year investigation by the Environmental Investigation Agency US

Bad Actors: Illegal Loggers

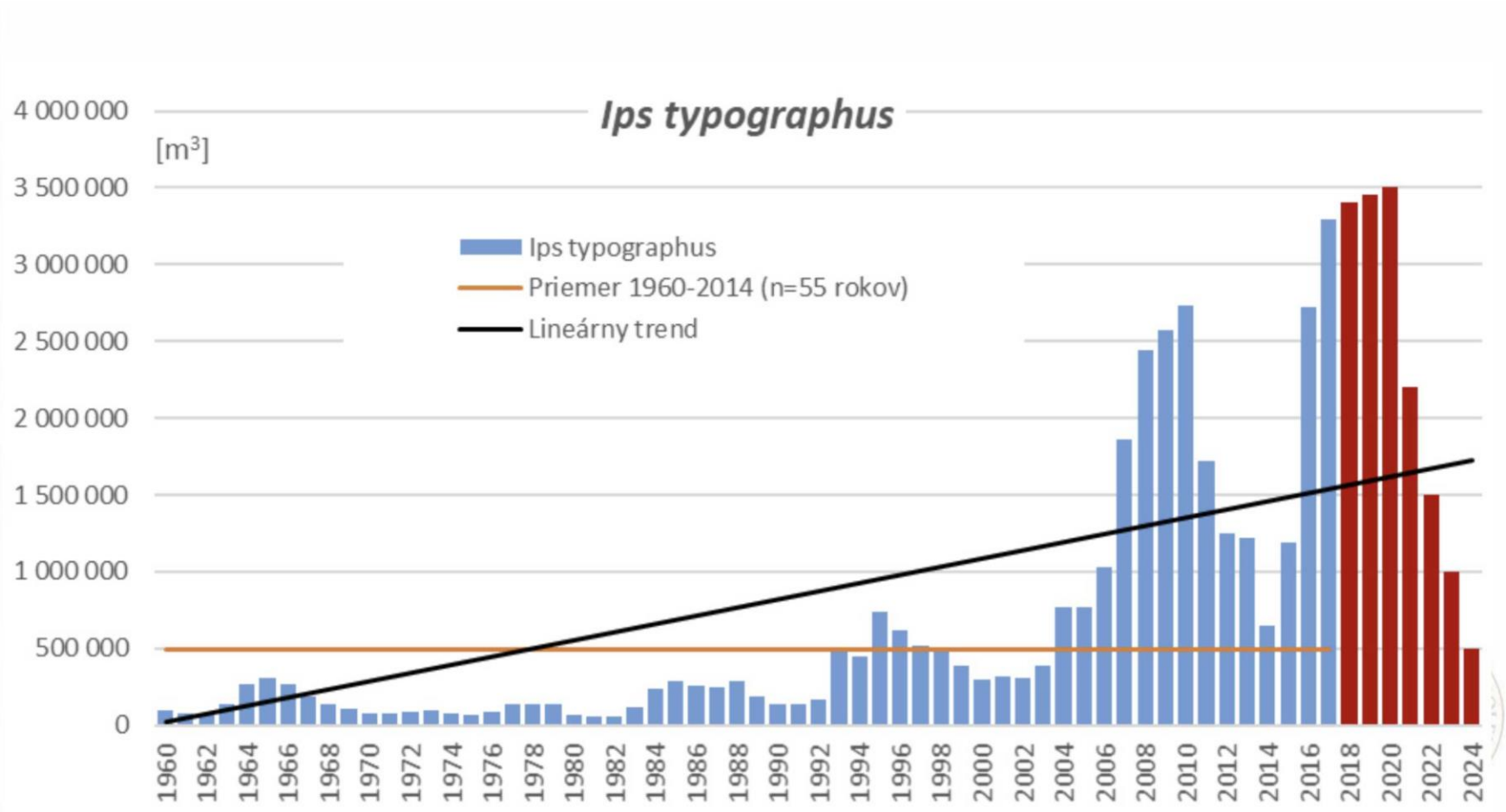


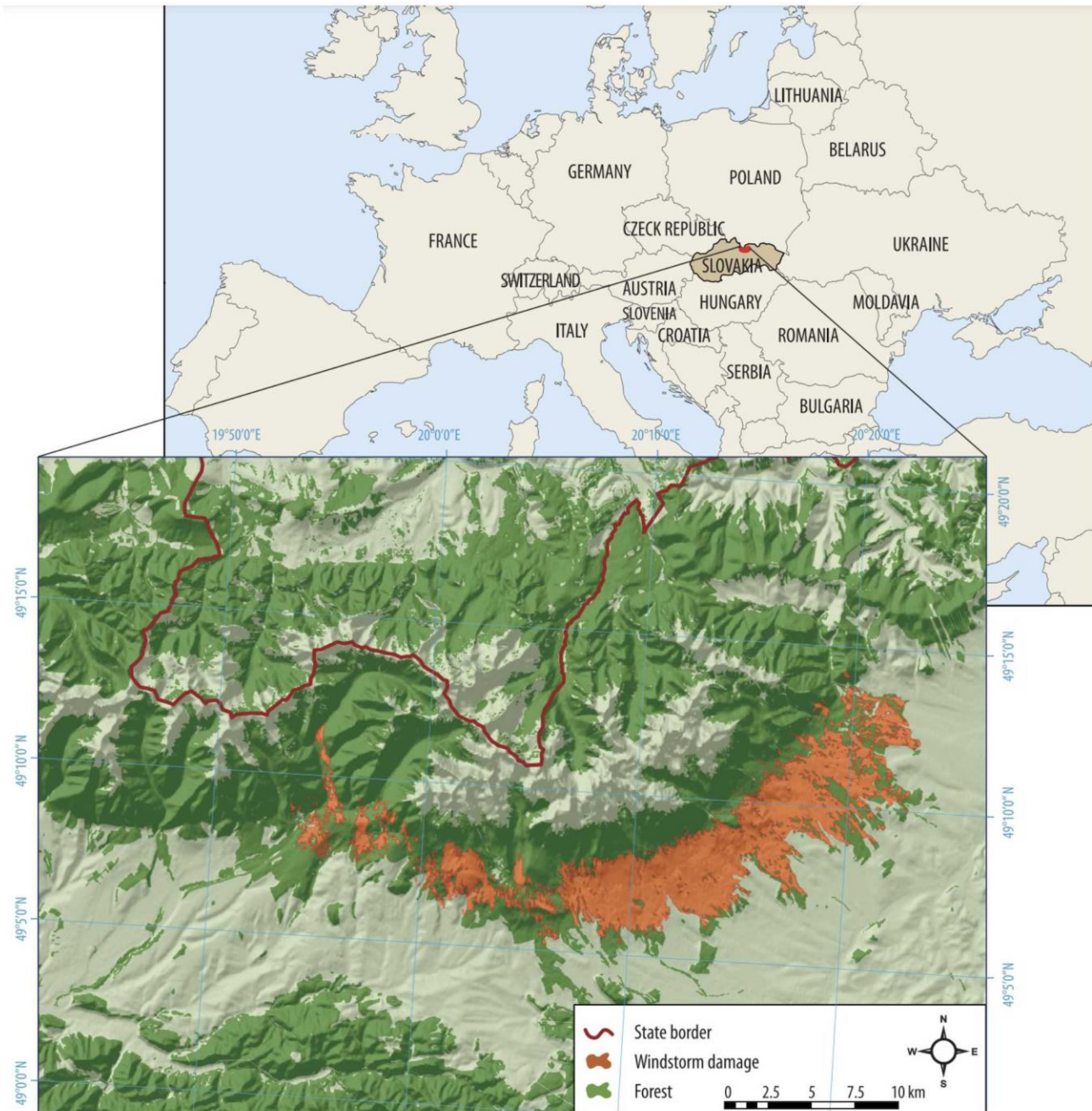
Even Our
National Parks
are Not Immune



Bad Actors: Bark Beetles

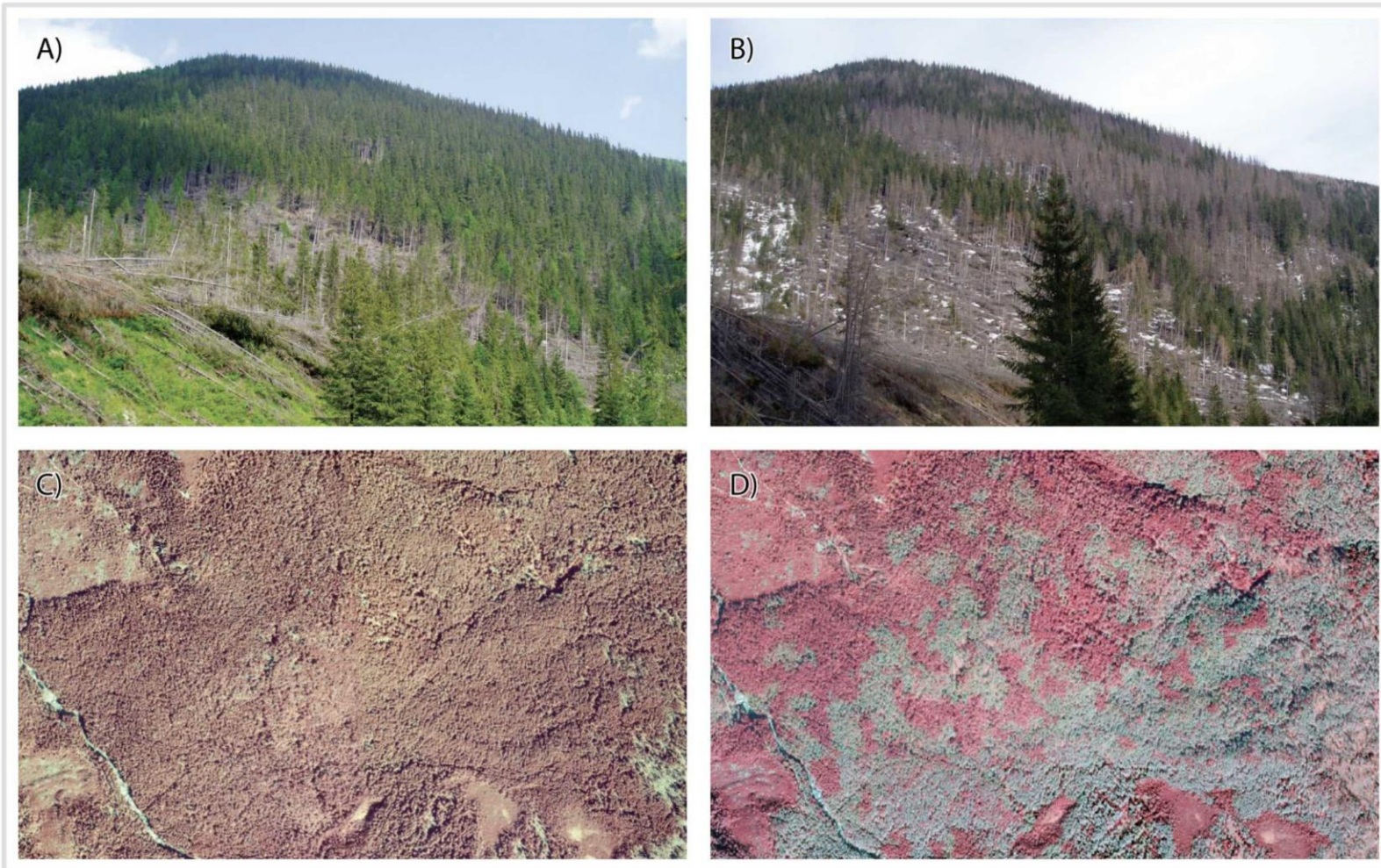
Bad Actors: Bark Beetles





Bad Actors: Windstorms

Bad Actors: Uncleared Damaged Wood





**Brutal
Honesty
Gives Way
to Improvement**



Air Quality Measurement and Management



The Invention

Scientists from M.I.T. led by **Dr. Brian Hemond** and **Prof. Ian Hunter** have invented and patented a cost-effective, portable Mass Spectrometer, **enabling molecular level air content testing anytime, anywhere.**

Technology: Patented Protected Globally

PATENT ISSUANCE

- 6 Patents have been issued protecting Intellectual Property
- Patents include coverage for US, China, Singapore, Europe, and Japan and were issued between 2014 – 2020
- No external licensed technology is used in the miniaturized mass spectrometer



UNITED STATES
PATENT AND TRADEMARK OFFICE
uspto

PATENT PROTECTION

- MIT Technology Licensing Office enforces the 6 Patents issued for the Mass Spectrometer
- MIT TLO has 54 Full Time Staff and spent \$24M USD in Patent enforcement in 2021



TLO Technology
Licensing
Office

Paradigm Shift for Carbon Management Industry

Mass Spectrometry for the Masses

Mainframe to Laptop:



Land Line to Cellular:



Fixed Laboratories to Mobile Analyses:



Measurement, reporting, and verification (MRV) innovation is required to enable organizations to meet their obligations under the Paris Agreement and the United Nations Secretariat's Climate Action Plan to reduce greenhouse gas emissions 45% by 2030.

In order to broadly meet rigorous “Scope 3” emissions reporting requirements, instrumentation must be adaptable, portable, and inexpensive.

Our technology is the only known such solution that enables this.



Bring the lab
to the samples
Not the samples
to the lab

Unique Properties of Miniaturized Mass Spectrometry



Portable

Less than 1 cubic foot, under 5 kgs, and strong enough to be mounted on mobile assets such as moving trucks.



Inexpensive

Less than \$2K MSRP and provides carbon credit upside.



Out of the Box and Low Power

Installation in minutes with minimal impact to Fleet Assets.

Technical Comparison with Industry Leaders



Cost	\$1,999	\$130,000	\$249,999
Maintenance Sub.	\$995 / Year	\$5K / Year	\$10K / Year
Weight	8lbs.7oz.	42lbs.	265lbs.
VOC Measured	170	53	170
Accuracy	1Part / Million	1Part / Thousand	1Part / Million
Compliance Report	✓	✗	✗
Portability	✓	✗	✗
Indoor/Outdoor	✓	✓	✗
Truck Exhaust	✓	✗	✗
Carbon Credit Eligible	✓	✗	✓

Industry Adoption Led by Logistics Sector

One of the leading system service providers for the automobile industry in Europe

We are targeting industries through penetration and expansion with strategic partners



Mosolf Group have purchased 1000 units to reduce their emissions tax burden and participate in Carbon Credit Marketplaces.

Mosolf additionally will also participate as a brand ambassador to their extended network of logistics organizations.



“When we visited M.I.T. and saw their technology combined with the applications expertise and certification capability we know we have a long-term partner for success.”

– Dr. Jörg Mosolf Chairman MOSOLF SE & Co. KG

Mosolf Group will earn \$10m+ Annually from \$1.5m Purchase

Economic

Signed Purchase order for 1000 Units
- \$1.5M USD / \$1M USD Annually

Estimated Tax Savings For Mosolf :
\$7.8M USD / Year

Estimated Carbon Credit Revenue to
Mosolf: \$6.4M USD / Year

Impact

1000 Trucks Will Be Equipped with
Climate Goals' Technology

300,000+ Carbon Credits will be
Generated Annually

73% Estimated Reduction in CO₂e
Calculations



Carbon Sequestration and Carbon Sinks

Forestry management plays a critical role in helping countries meet their Nationally Determined Contributions (NDCs) – their global warming obligations with the United Nations – because trees and flora are natural decarbonizing agents.

Combining Drone and Artificial Intelligence Technology

New Forests

Drone technology can seed 14 hectares of land per hour, a task that would require 100 manual workers. Our pilots can operate 5 drones simultaneously.

Advanced software and high-speed processing provide detailed, large-scale mapping and instant analysis of field data such as soil conditions, germination rates, and growth progression.

In addition to catalyzing greater carbon sequestration, these activities can qualify for certified carbon credit programs under existing standards.



Existing Forests

Artificial intelligence (AI) technology provides a data-driven solution to managing existing forestry assets to measure carbon and greenhouse gases (GHG) in near real-time.

These AI techniques also incorporate drone and satellite technology for spatial mapping, and atmospheric sensors.

In addition to measuring existing and ongoing carbon sequestration, these activities can qualify for carbon credit programs under existing standards.

Slovakia's Nationally Determined Contributions

PARAMETERS	TARGET
Base Year	1990
Target Year	2030
Emission Reduction target	-40% in 2030 compared to 1990
Fases covered	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆
Global Warming Potential	AR4
Sectors Covered	All IPCC sources and sectors, as measured by the full annual inventory and international aviation to the extent it is included in the EU ETS Land Use,
Land Use Change, and Forests (LULUCF)	Accounted under KP, reported in EU inventories under the Convention Assumed to produce net removals..
Use of International credits (JI and CDM)	Possible subject to quantitative and qualitative limits
Other	Conditional offer to move to a 45% reduction by 2030 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2020.

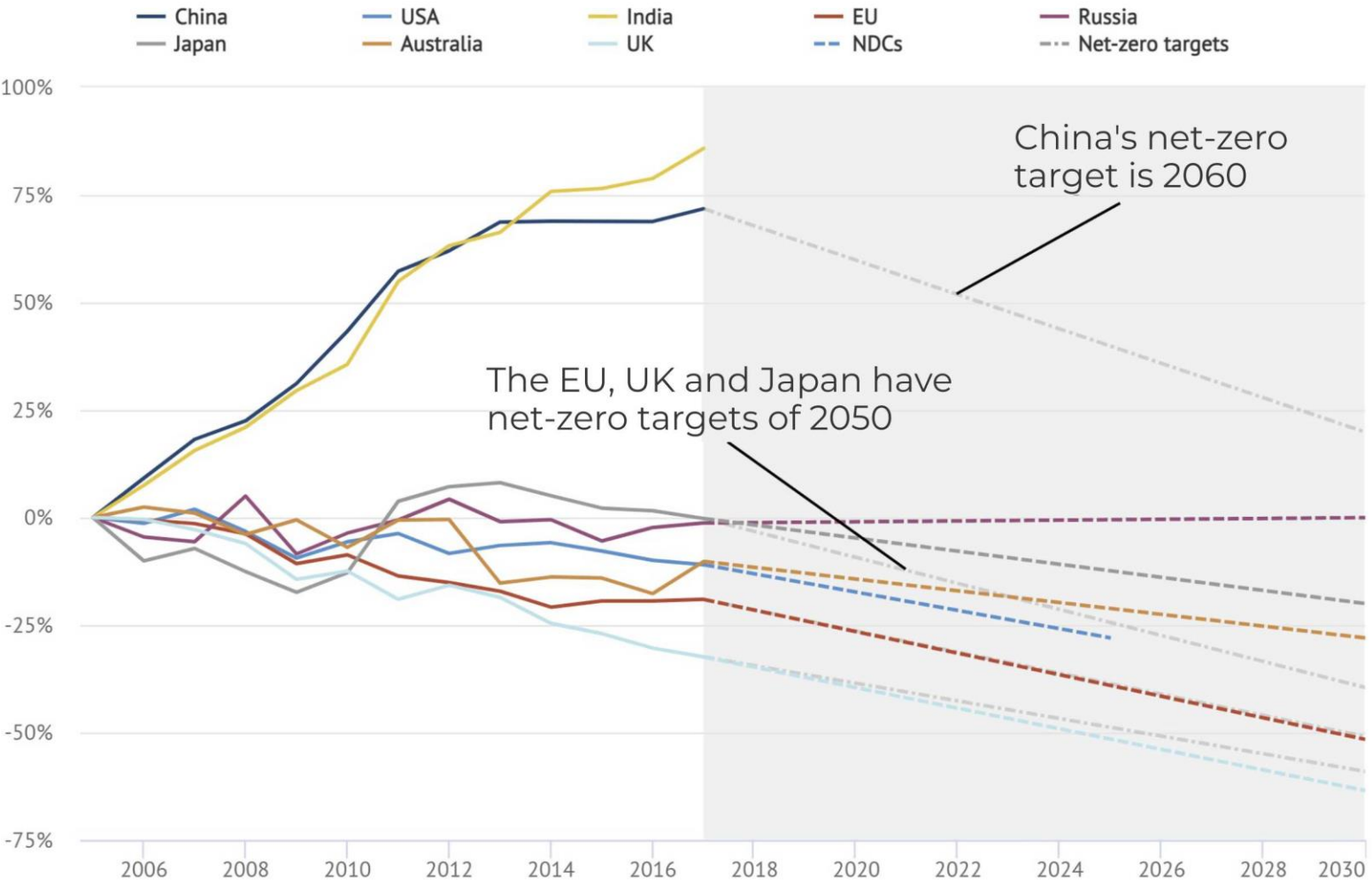


Moldova – Enhancing NDCs through Improved Forestry Management

Recommended Action: Improve Policy Coordination



Recommended Action: Strive for Progress Beyond NDCs

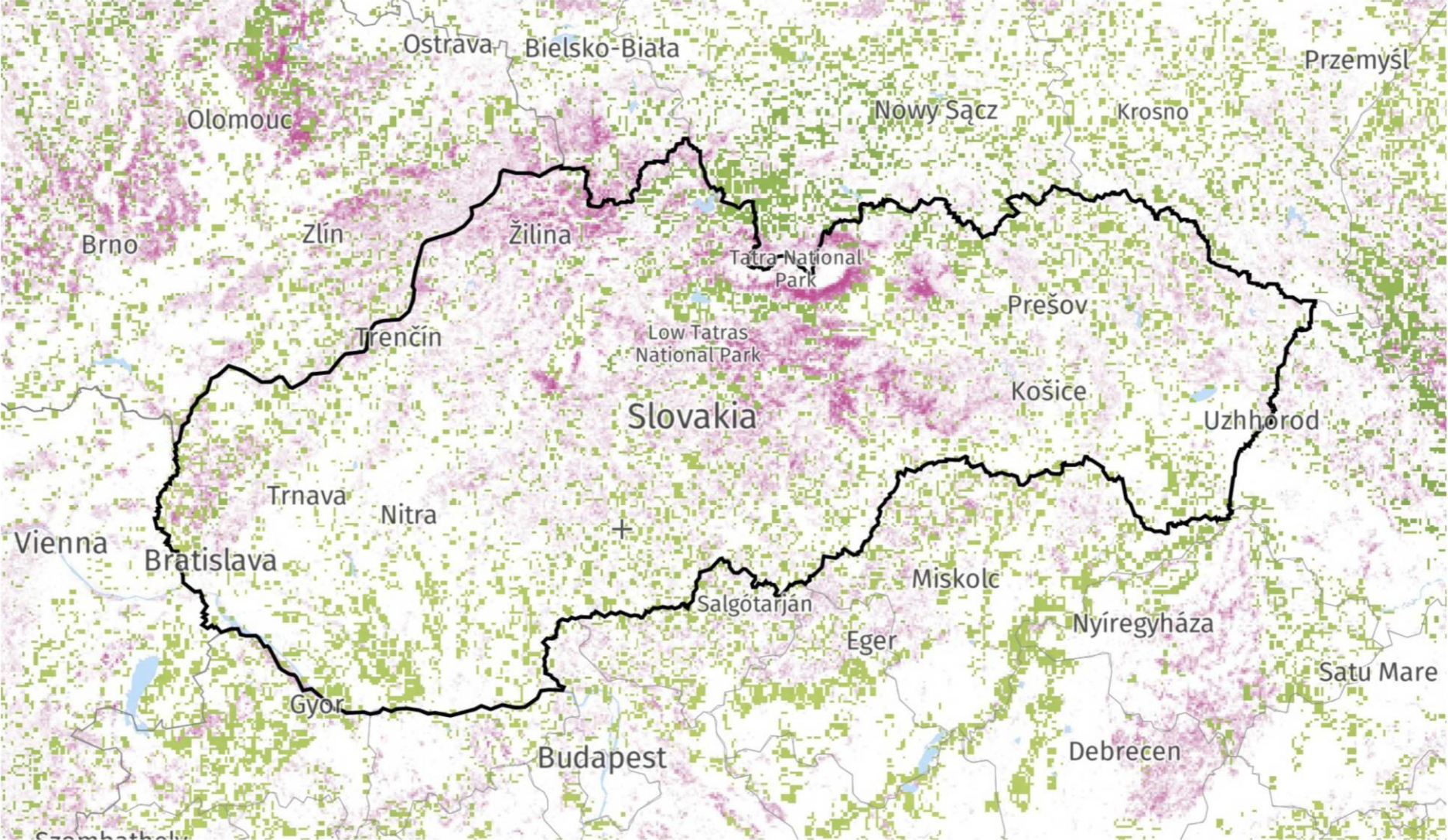


China's net-zero target is 2060

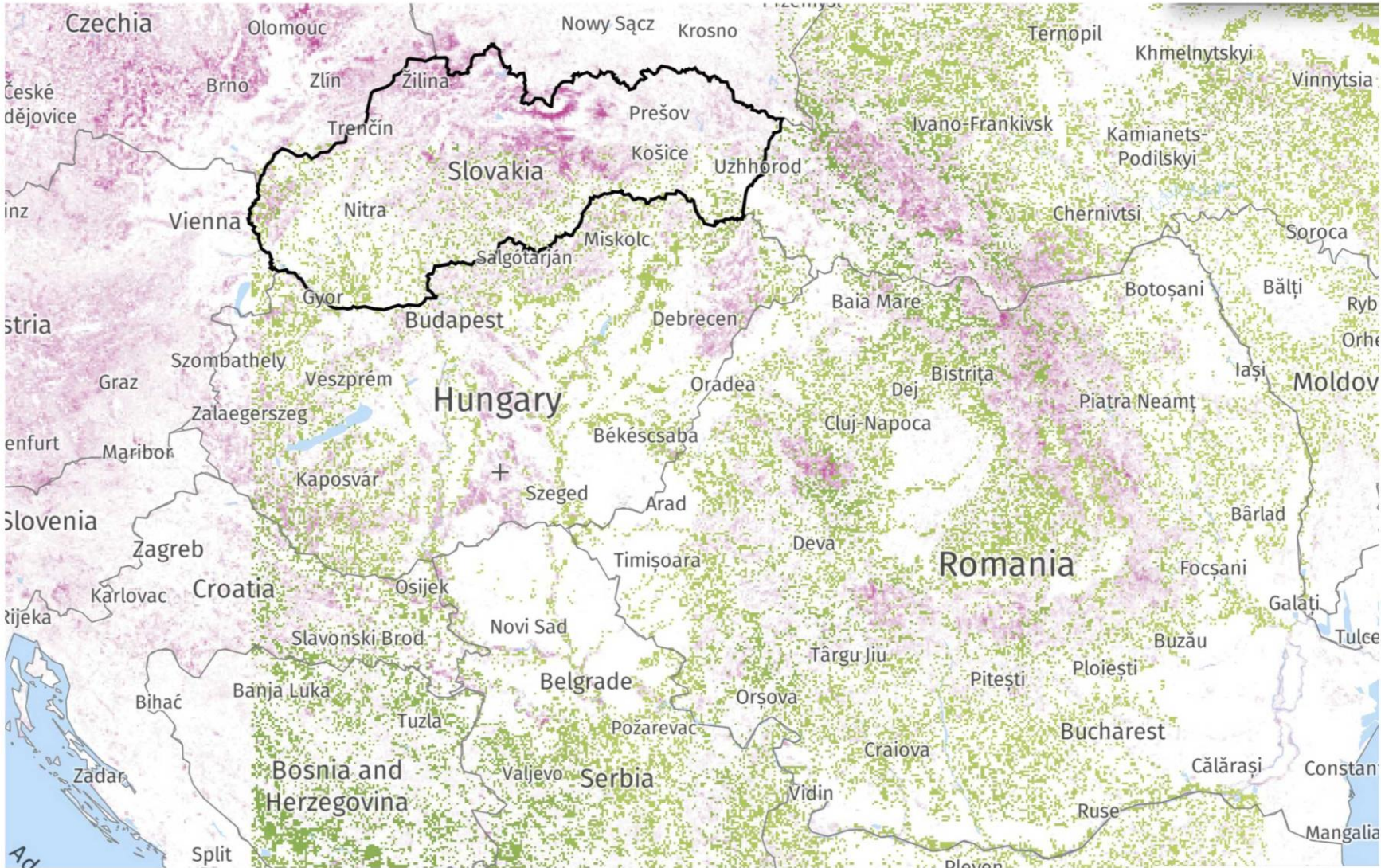
The EU, UK and Japan have net-zero targets of 2050

Changes in emission in major economies since 2005

30 years of Projected Carbon Sequestration of Natural Forest Regrowth – Slovakia



30 years of Projected Carbon Sequestration of Natural Forest Regrowth - Carpathia



Recommended Action: Incorporate Artificial Intelligence



These autonomous drones are doing the work of a crew of foresters.

Recommended Action:

Improve Quantitative GHG Targets from Forestry

WEM SCENARIO	2016*	2020	2025	2030	2035	2040
4. LULUCF	-6 861.09	-6 145.1	-5 040.4	-4 434.0	-4 155.8	-4 231.2
4.A Forest land	-4 664.40	-4 408.6	-3 462.1	-2 916.8	-2 666.1	-2 823.9
4.B Cropland	-1 146.19	-1 047.9	-1 043.3	-1 019.7	-996.9	-976.2
4.C Grassland	-178.40	-108.5	-68.1	-92.6	-125.7	-132.3
4.E Settlements	83.95	107.5	116.6	108.7	106.5	106.9
4.F Other Land	102.68	138.3	149.4	153.2	137.8	138.6
4.G Harvested Wood Products	-1 063.63	-825.9	-733.0	-666.9	-611.5	-544.2
WAM SCENARIO	2016*	2020	2025	2030	2035	2040
4. LULUCF	-6 861.09	-6 159.9	-5 072.2	-4 482.8	-4 221.6	-4 307.5
4.A Forest land	-4 664.40	-4 414.8	-3 478.5	-2 943.3	-2 702.9	-2 869.9
4.B Cropland	-1 146.19	-1 047.8	-1 043.1	-1 019.4	-996.5	-975.7
4.C Grassland	-178.40	-117.2	-83.7	-115.1	-155.1	-163.1
4.E Settlements	83.95	107.5	116.6	108.7	106.5	106.9
4.F Other Land	102.68	138.3	149.4	153.2	137.8	138.6
4.G Harvested Wood Products	-1 063.63	-825.9	-733.0	-666.9	-611.5	-544.2

* real values 2018 submission

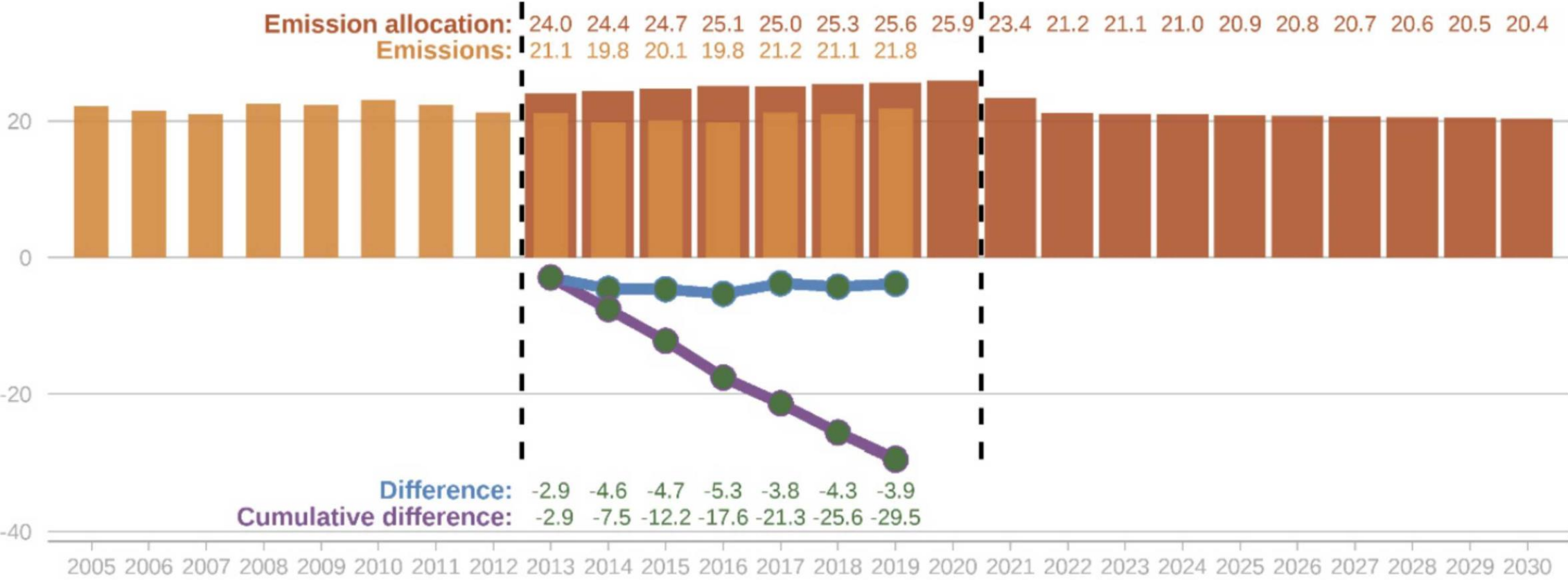
Recommended Action: Broaden Response Targets



Reduce Deforestation
Limit Forest Degradation
Improve Forest Management
and Afforestation
Expand Reforestation and
Restoration

Recommended Action: Update National Adaptation Plans

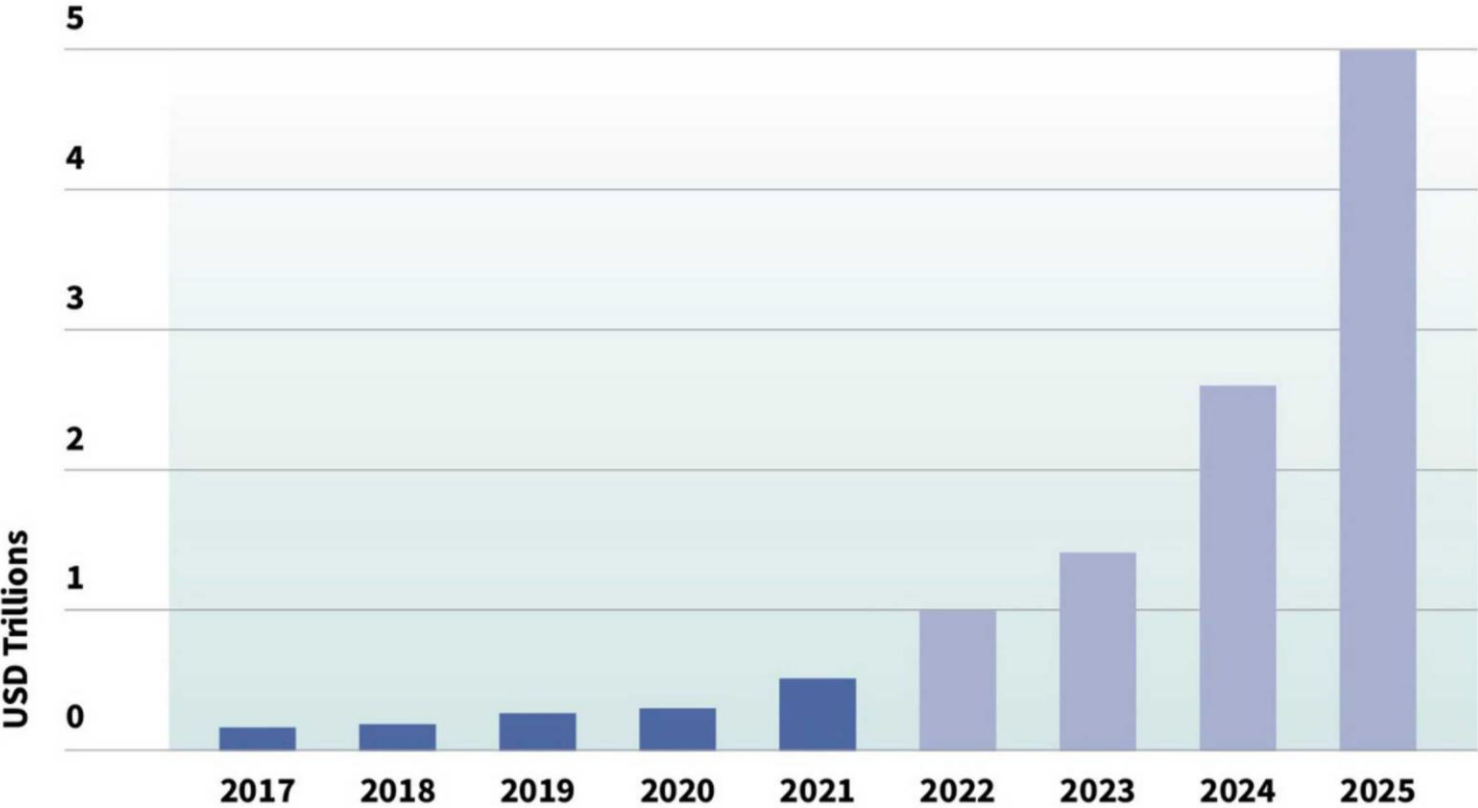
Slovakia's emissions under the Effort-sharing Decision/Regulation (MtCO₂e)



Recommended Action:

Incorporate market-linked opportunities for potential financing sources

Green Bond Issuance (USD Trillion)



© Climate Bonds Initiative 2022

Thank You

Ďakujem

Děkuji

Köszönöm

Dziękuję Ci

Vielen Dank

Hvala Vam

Dyakuyu



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