

# Advancing Climate Action with Stronger Partnerships

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# ClimateTRACE/WattTime, GEO, and WGIC Partnership



Development of the first systematic database of public, private and hybrid missions for GHG monitoring from Space in lead-up to COP26.

Report available at: [www.WGICouncil.org](http://www.WGICouncil.org)

# Leverages Decades of Work by the Committee on Earth Observation Satellites (CEOS) Missions, Measurements, and Instruments (MIM) Database

Database of the GHG Monitoring capabilities from space across Public, Private and Hybrid missions

COUNTRY/REGION, ORGANIZATION, MISSION AND INSTRUMENT					GHG MONITORED DIRECTLY			POTENTIAL POLICY-RELEVANT APPLICATION			DATA ACCESS
Country/Region	Organization	Mission (Instrument)	Status	Mission Goal and Application	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Point-Source level	National level	Global level	Open access / Limited access / Paid subscription
<b>PUBLIC MISSIONS: 21</b>											
Canada	CSA ESA NASA	SciSat-1 (ACE)	In orbit	Mission Goal: To monitor and analyze the chemical processes that control the distribution of ozone in the upper troposphere and stratosphere. Applications: SciSat-1 can measure the vertical resolutions of all major GHG identified for monitoring under the Paris Agreement.	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O				Open access
China	NRSCC NSMC- CMA	FengYun-3D (GAS)	In orbit	Mission Goal: Operational meteorology with substantial contribution to ocean and ice monitoring, climate monitoring, atmospheric chemistry and space weather. Application: Retrieve GHG in the atmosphere.	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O				Limited access
China	CNSA	Gaofen-5 (GM)	In Orbit	Mission Goal: Hyperspectral observations of Earth's environments to track environmental impacts, water quality, and atmospheric change. Applications: To measure carbon dioxide and methane in the troposphere and understand the source and sink processes that affect these GHG.	CO <sub>2</sub>	CH <sub>4</sub>					Limited access
China	NRSCC NSMC- CMA	TanSat (ACGS)	In orbit	Mission Goal: To retrieve the atmospheric column averaged CO <sub>2</sub> dry air mole fraction (XCO <sub>2</sub> ) with precisions of 1% on national and global scales. Applications: To improve the understanding on the global CO <sub>2</sub> distribution and its contribution to the climate change. Additionally, to monitor the CO <sub>2</sub> variation on seasonal time scales.	CO <sub>2</sub>	CH <sub>4</sub>					Limited access
Europe	EC ECMWF ESA EUMETSAT	Copernicus Carbon Dioxide Monitoring/ CO <sub>2</sub> M	In development	Mission Goal: The CO <sub>2</sub> M will focus on measuring carbon dioxide and methane emissions, which are released into the atmosphere specifically through human activity. Application: Reduce current uncertainties in estimates of emissions of CO <sub>2</sub> from the combustion of fossil fuel at national and regional scales. Produce an independent source of information to assess the effectiveness of policy measures, track their impact towards decarbonizing Europe and meeting national emission reduction targets. Note: this mission will deploy a constellation of satellites.	CO <sub>2</sub>	CH <sub>4</sub>					Open access

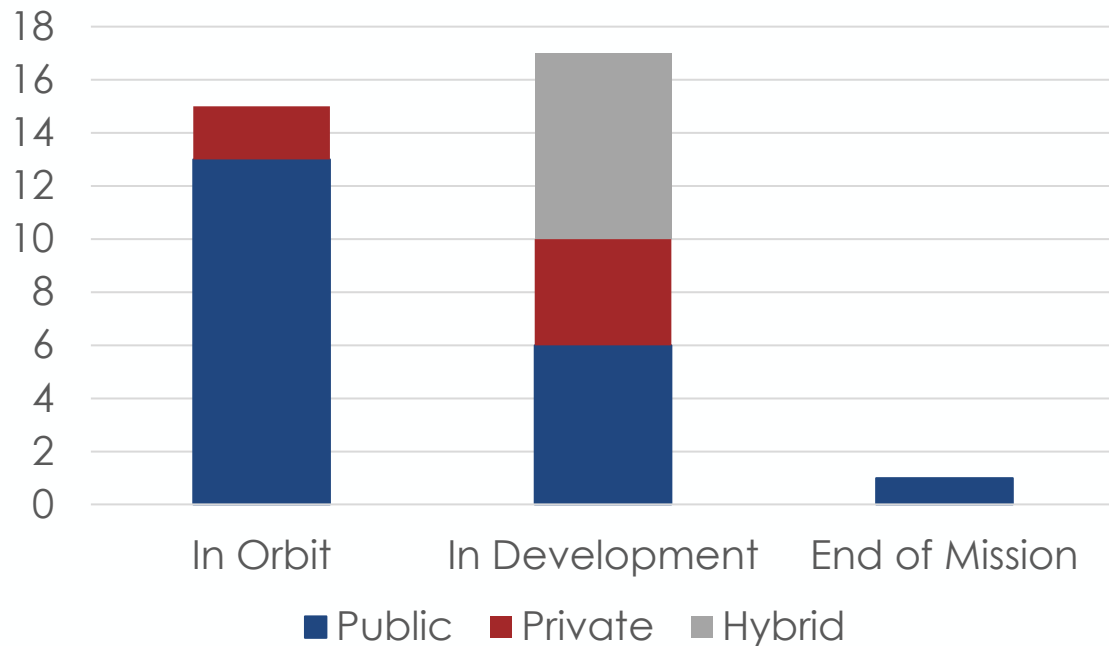
Three GHGs are generally recognized as the critical drivers of climate change: **carbon dioxide (CO<sub>2</sub>)**, **methane (CH<sub>4</sub>)** and **nitrous oxide (N<sub>2</sub>O)**.

## 33 identified missions:

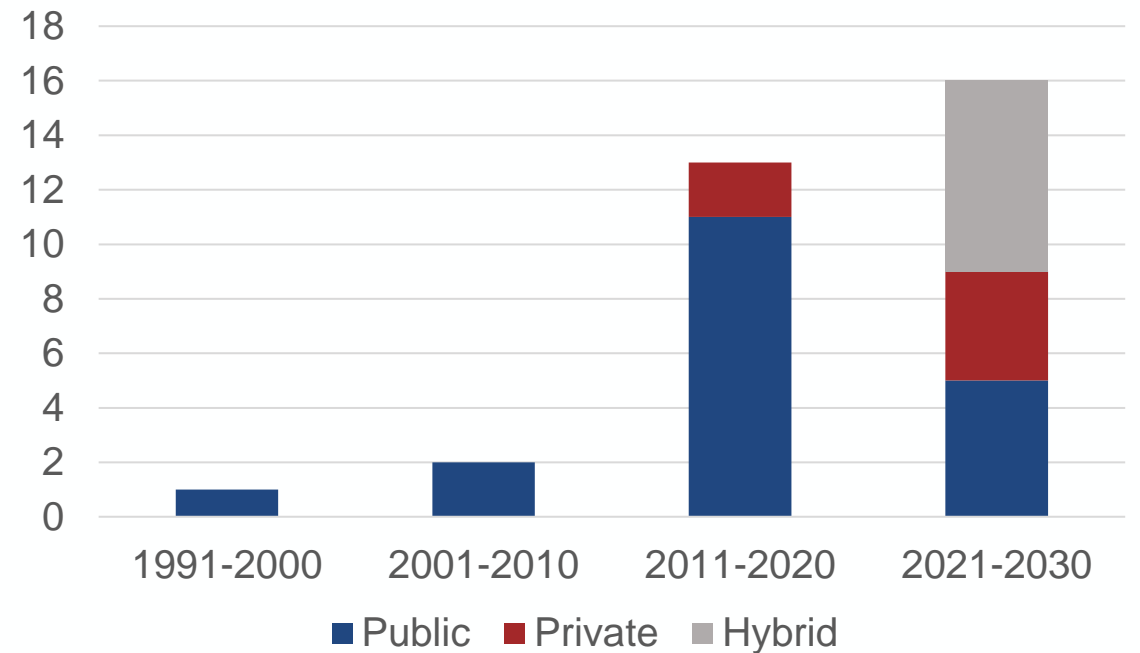
- **Public:** 21 total, 13 in orbit, 7 in development, 1 end of life;
- **Private:** 7 total, 1 in orbit and operational, 1 in its final trial period, and 5 in development;
- **Hybrid:** 5 missions (all in development) with proposed launch dates until the 2040s.

# GHG Mission Status and Missions by Decade

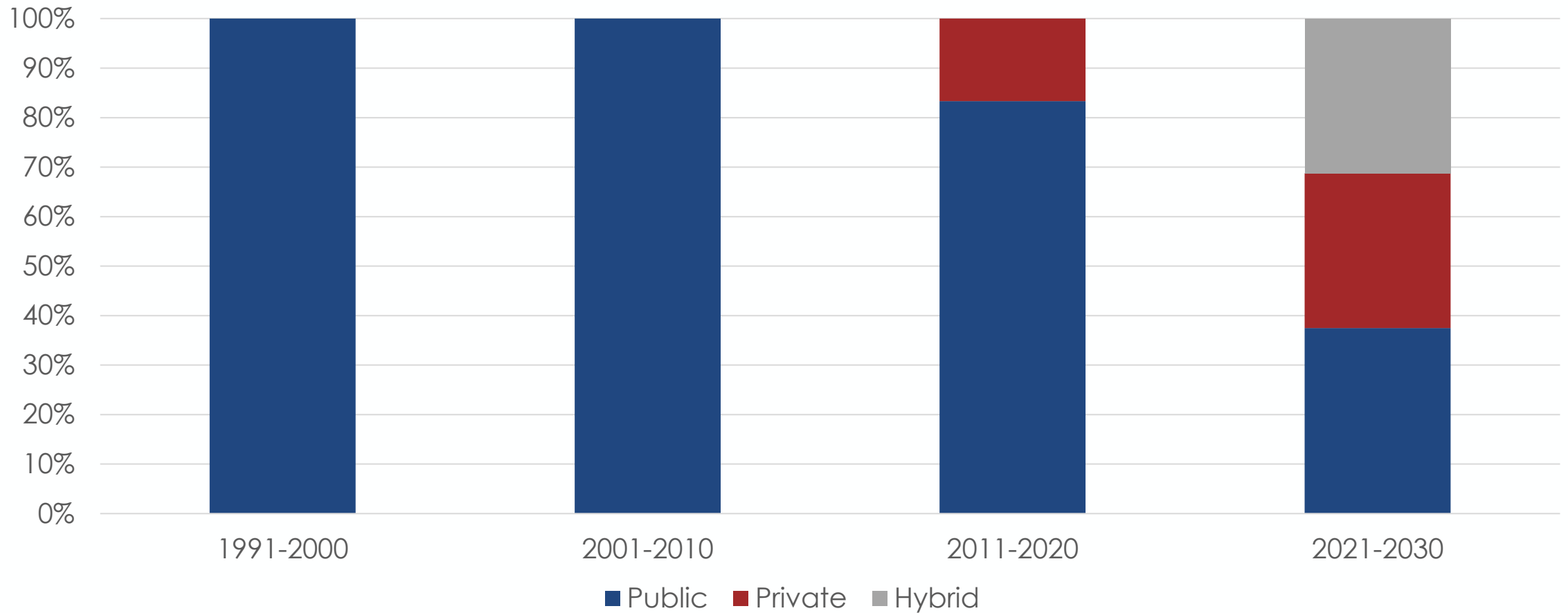
## GHG Mission Status



## GHG Missions by Decade

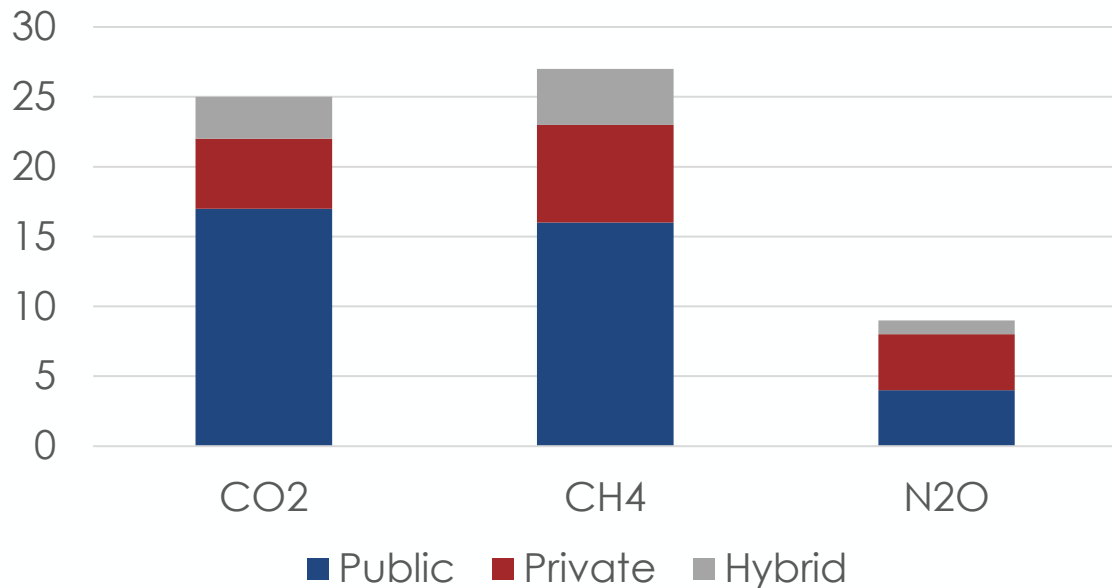


# GHG Missions by Decade

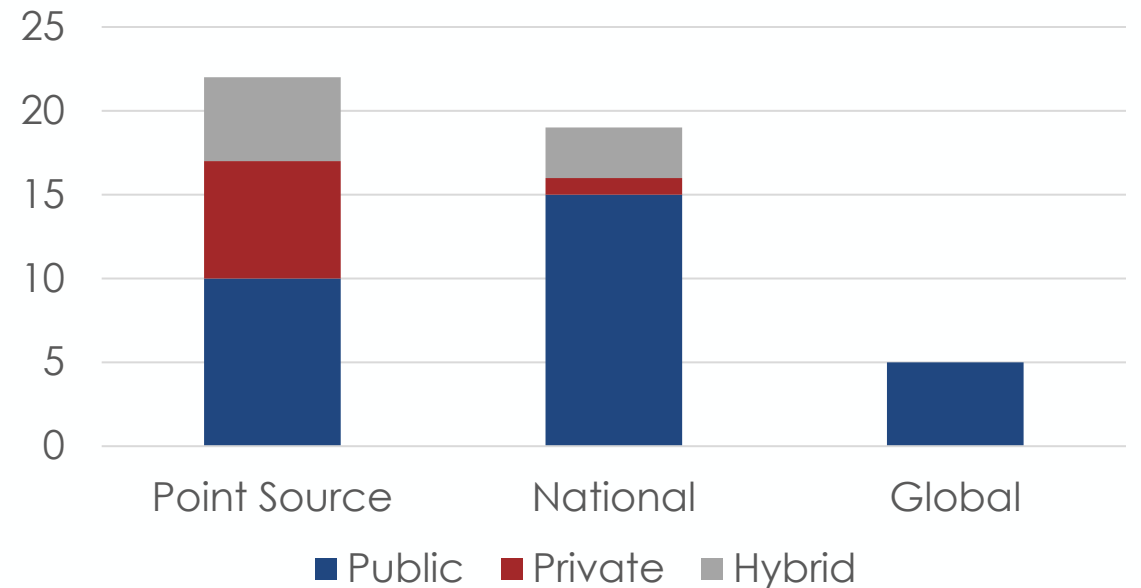


# GHG Missions by Gas and Scale

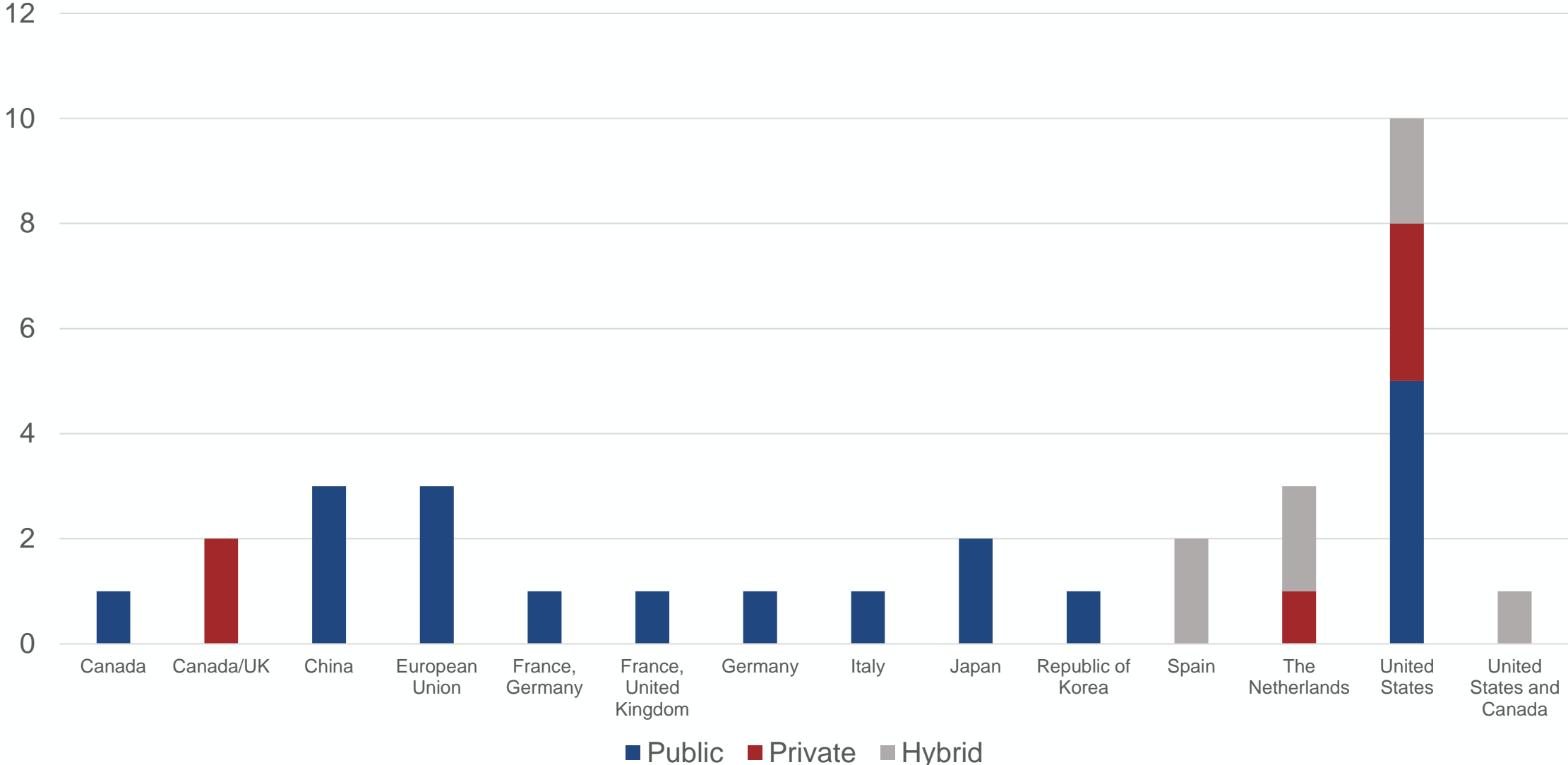
## GHG Missions by Gas Type (In-Orbit & Planned)



## Applicable Scale of Data by Mission Type (In-Orbit & Planned)



# GHG Missions by Country



# Key Policy Messages from the Report

-  **1** Satellite observations reduce uncertainty in GHG emission monitoring by providing data across a range of spatial, temporal, and spectral resolutions or scales;
-  **2** Government space agencies have the capability to collect national and global baseline data for all relevant GHGs in a sustained manner with measurement availability ranging into the 2040s;
-  **3** Private sector companies are speedily entering the market and bringing additional point-source emissions monitoring capabilities for specific GHGs;
-  **4** Hybrid models are increasingly emerging and leveraging respective strengths;
-  **5** Collaboration, innovation, and financing are key levers for GHG monitoring from space;
-  **6** Open data, open science and open knowledge are essential to drive on-the-ground solutions
-  **7** New opportunities are arising for analysing secondary remote sensing measurements with frontier IT technologies which call for transparency and capacity development.



Based on these findings, we call for continued cooperation between public and private sector entities to fully maximize complementary capacities and synergies to **support policy makers in the race to net zero emissions going forward.**





A global trade association of  
private-sector companies  
working in the geospatial  
and Earth observations  
sectors

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**Thank you**

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