GHG Monitoring from Space – Contributions from the Private Sector

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WGIC

World Geospatial Industry Council

A Global not-for-profit Trade Association of Private Sector Companies working in the geospatial ecosystem.

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WGIC Strategic Goals

Strengthen contributions
of the geospatial industry to society, and the global economy

Advance global policy matters
relevant to the geospatial sector

Create business opportunities
for the geospatial industry

Implementing Goals through WGIC Programs

1. Climate as an overarching theme

Focus on thematic topics of Disaster Resilience, Energy Transition and Sustainable Infrastructure

2. Policy Advocacy

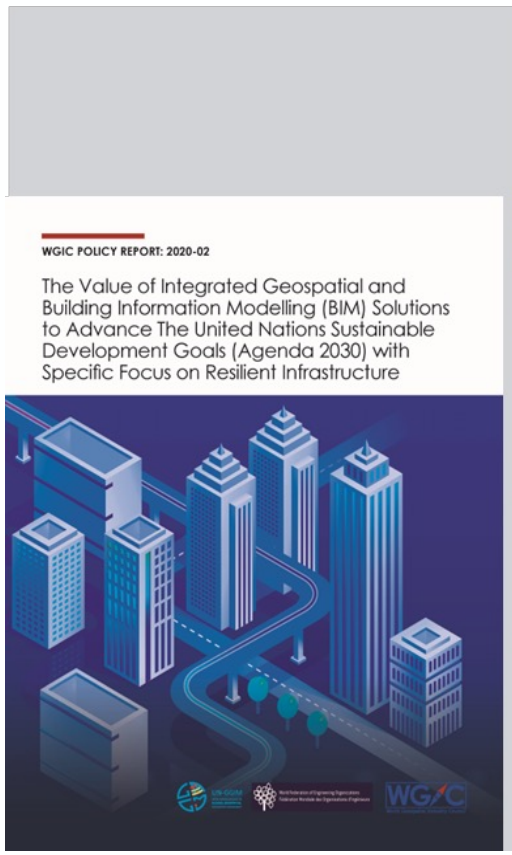
- Spatial Digital Twins
- Public-Private Partnerships (PPPs)
- Artificial Intelligence (GeoAI)
- Geospatial Data and Personal Privacy.

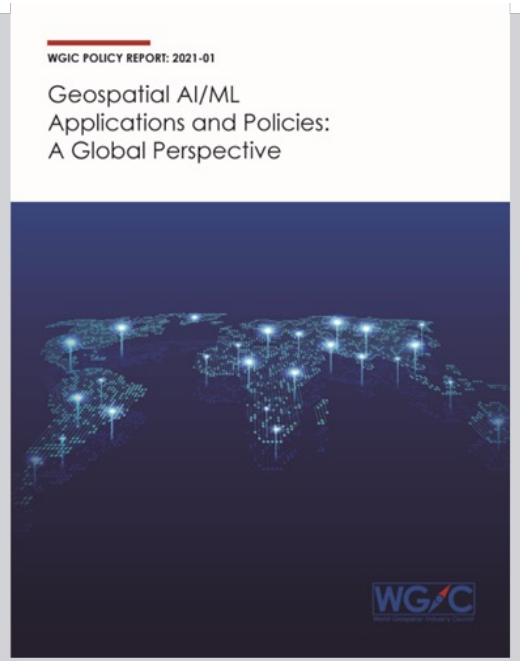
3. Cross-cutting Efforts

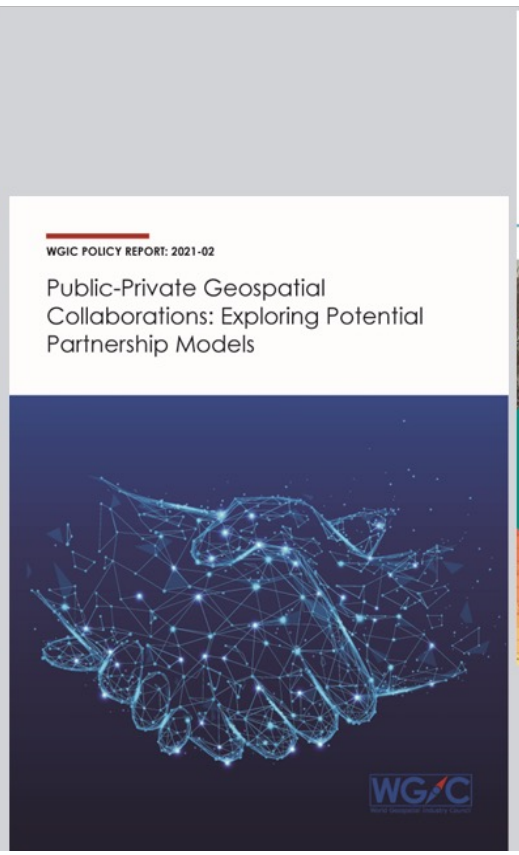
- Diversity, Equity and Inclusion(DEI)
- Industry/Academia Collaboration, and
- Collaboration with regional/ local geospatial associations.

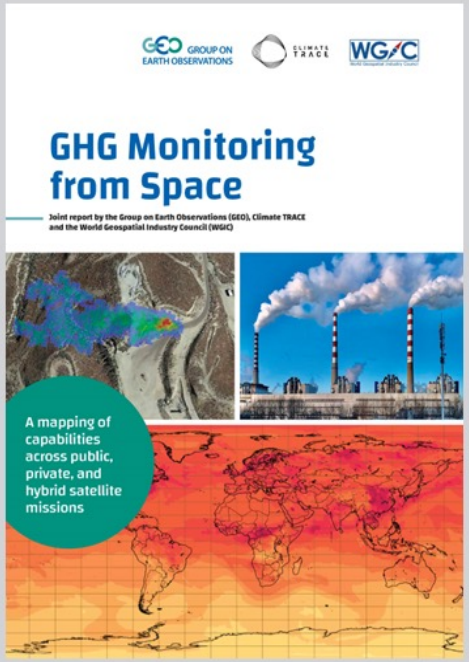
WGIC Reports

Building knowledge for the global geospatial industry









A mapping of GHG capabilities across public, private and hybrid satellite missions

Scan the QR Code to Download the Report

Development of the first systematic database of public, private and hybrid missions for GHG monitoring from Space

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

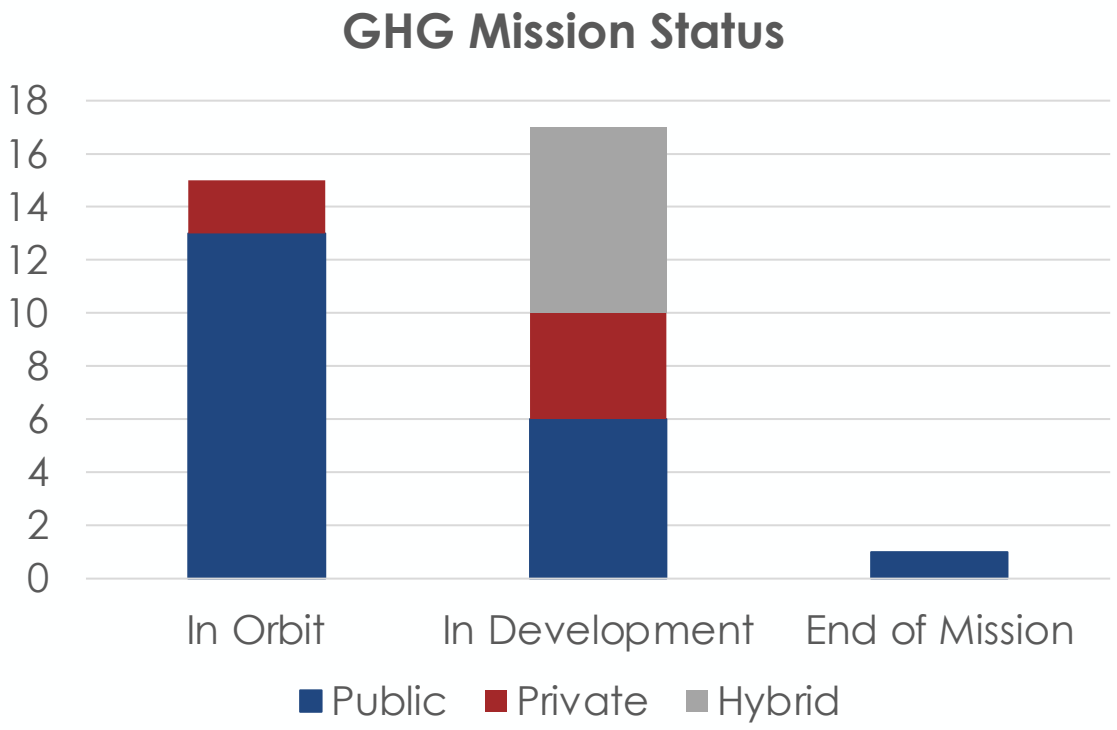
COUNTRY/REGION, ORGANIZATION, MISSION AND INSTRUMENT					GHG MONITORED DIRECTLY			POTENTIAL POLICY-RELEVANT APPLICATION			DATA ACCESS
Country/ Region	Organization	Mission (Instrument)	Status	Mission Goal and Application	CO_2	CH_4	N_2O	Point-Source level	National level	Global level	Open access / Limited access / Paid subscription
PUBLIC MISSIONS: 21											
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. Application: SciSat-1 can measure the vertical resolutions of all major GHGs identified for monitoring under the Paris Agreement.	✓	✓	✓			✓	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 GHGs in the atmosphere.	✓	✓	✓		✓	✓	Limited access
China	CNSA	Gaofen-5 (GMI)	In Orbit	Mission Goal: Hyperspectral observations of Earth's environments to track environmental impacts, water quality, and atmospheric change. Application: To measure carbon dioxide and methane in the troposphere and understand the source and sink processes that affect these GHGs.	✓	✓		✓			Limited access
China	NRSCC NSMC-CMA	TanSat (ACGS)	In orbit	Mission Goal: To retrieve the atmosphere column-averaged CO_2 dry air mole fraction (XCO_2) with precisions of 1% on national and global scales. Application: To improve the understanding on the global CO_2 distribution and its contribution to the climate change. Additionally, to monitor the CO_2 variation on seasonal time scales.	✓	✓		✓	✓	✓	Limited access
Europe	EC ECMWF ESA EUMETSAT	Copernicus Carbon Dioxide Monitoring/ CO_2M	In develop-ment	Mission Goal: The CO_2M 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_2 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 decarbonising Europe and meeting national emission reduction targets. Note- this mission will deploy a constellation of satellites.	✓	✓		✓	✓	✓	Open access

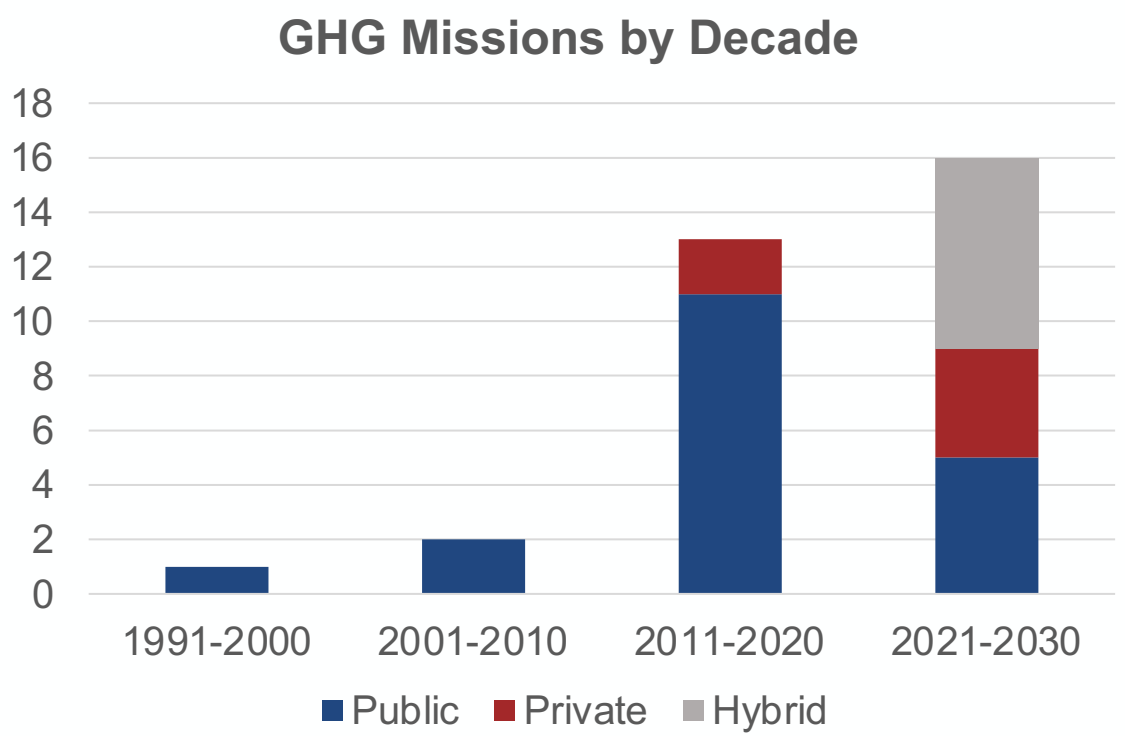
Three GHGs are generally recognized as the critical drivers of climate change: **carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O).**

33 identified missions:

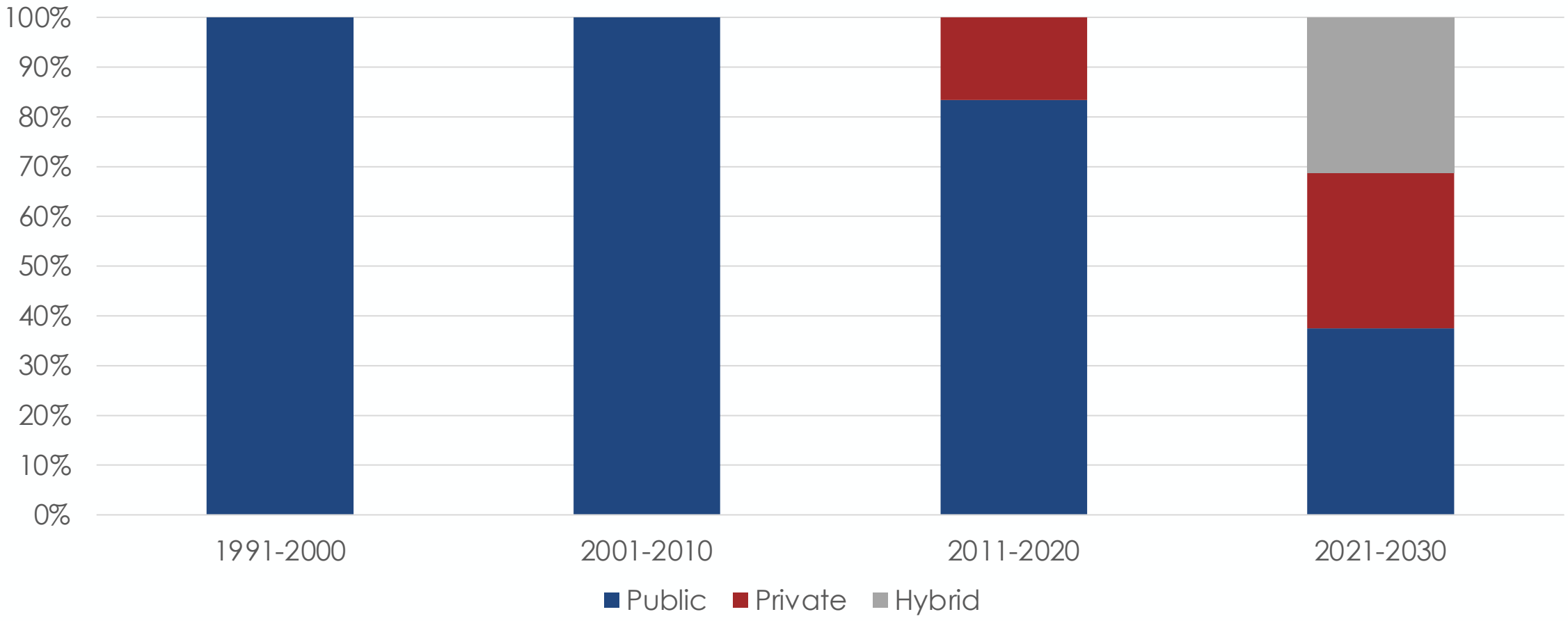
- **Public:** 21 total, 13 in orbit, 7 in development, 1 end of life;
- **Private:** 7 total, 1 in orbit and operational, 1 in its final trial period, and 5 in development;
- **Hybrid:** 5 missions (all in development) with proposed launch dates until the 2040s.

GHG Mission Status and Missions by Decade

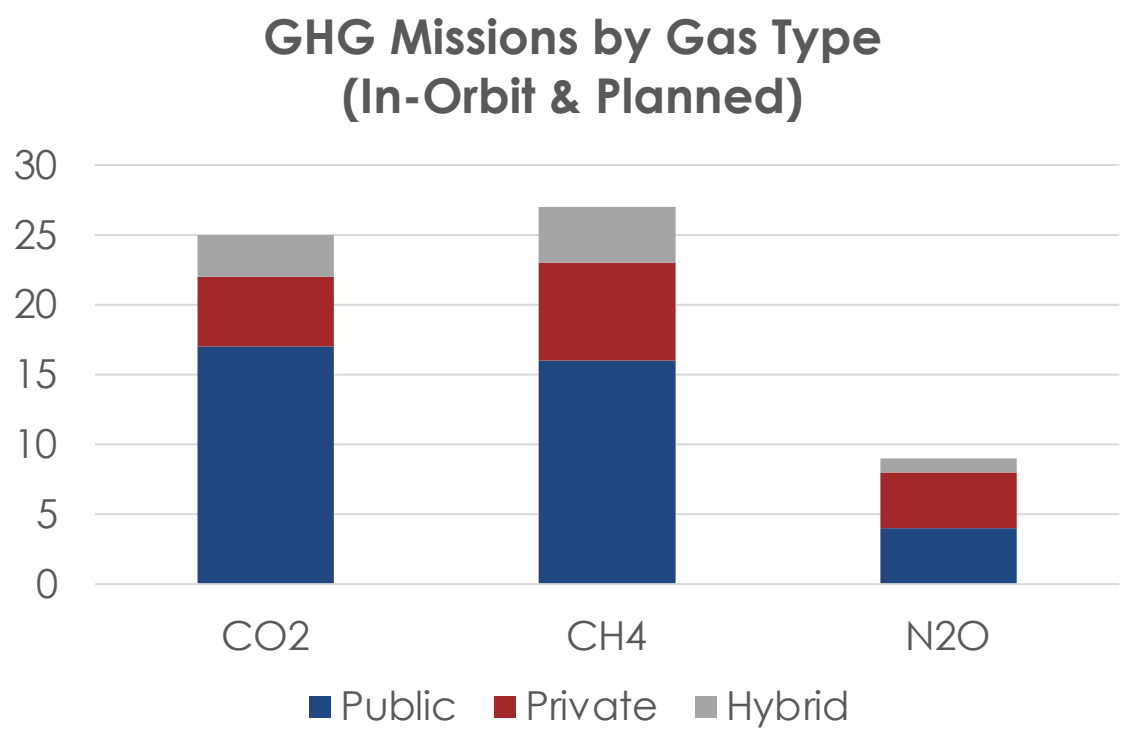


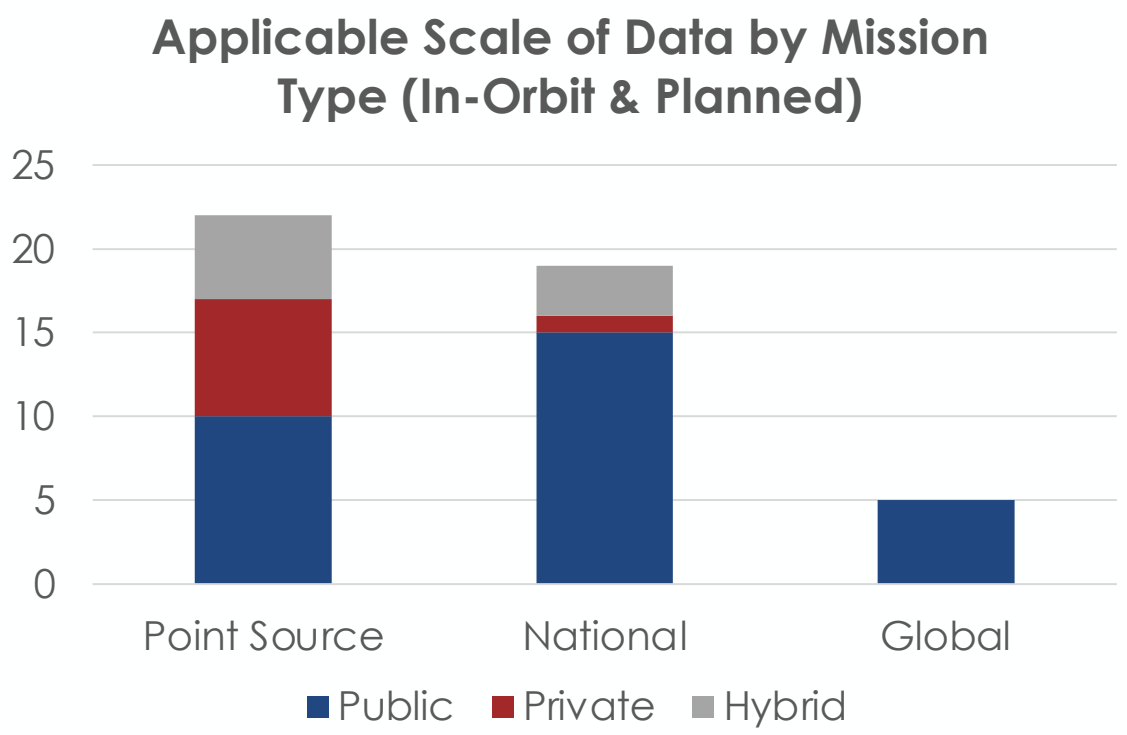


GHG Missions by Decade

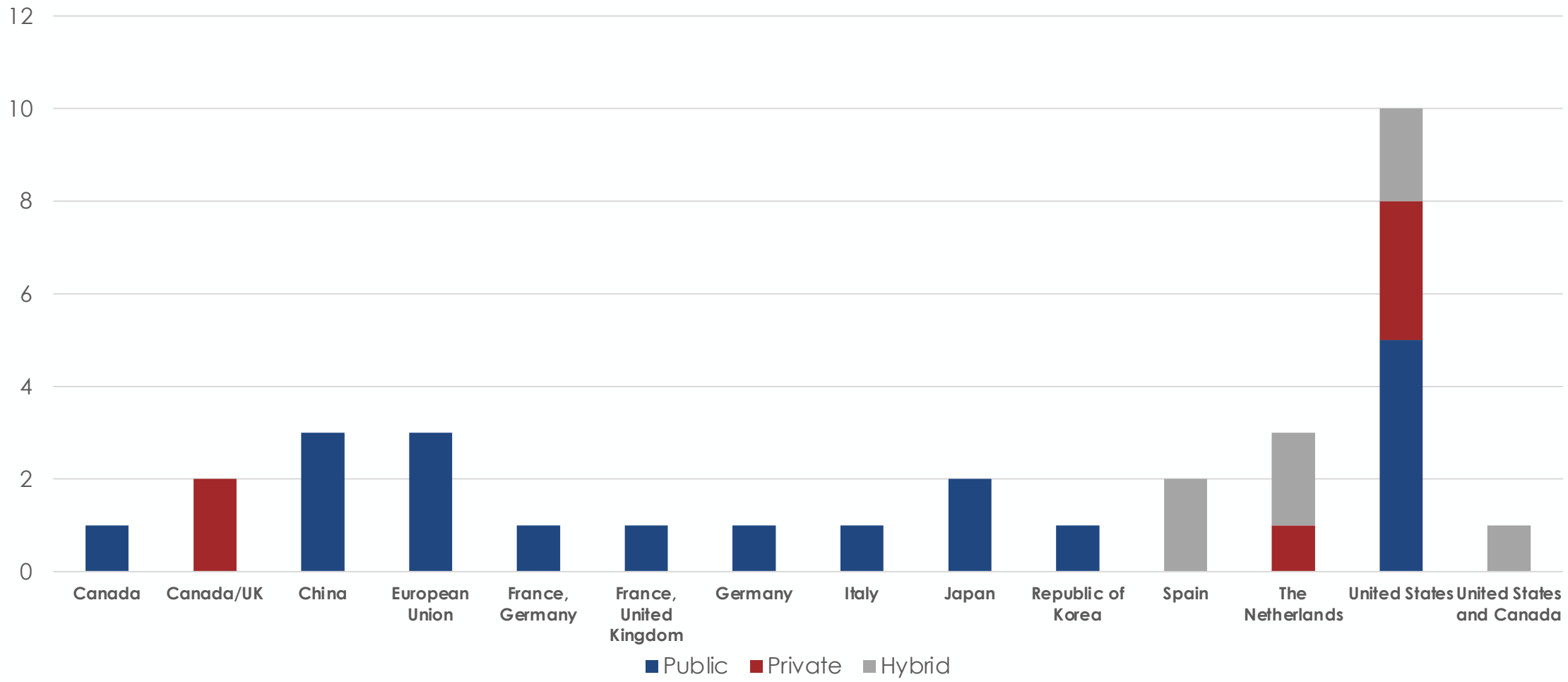


GHG Missions by Gas and Scale

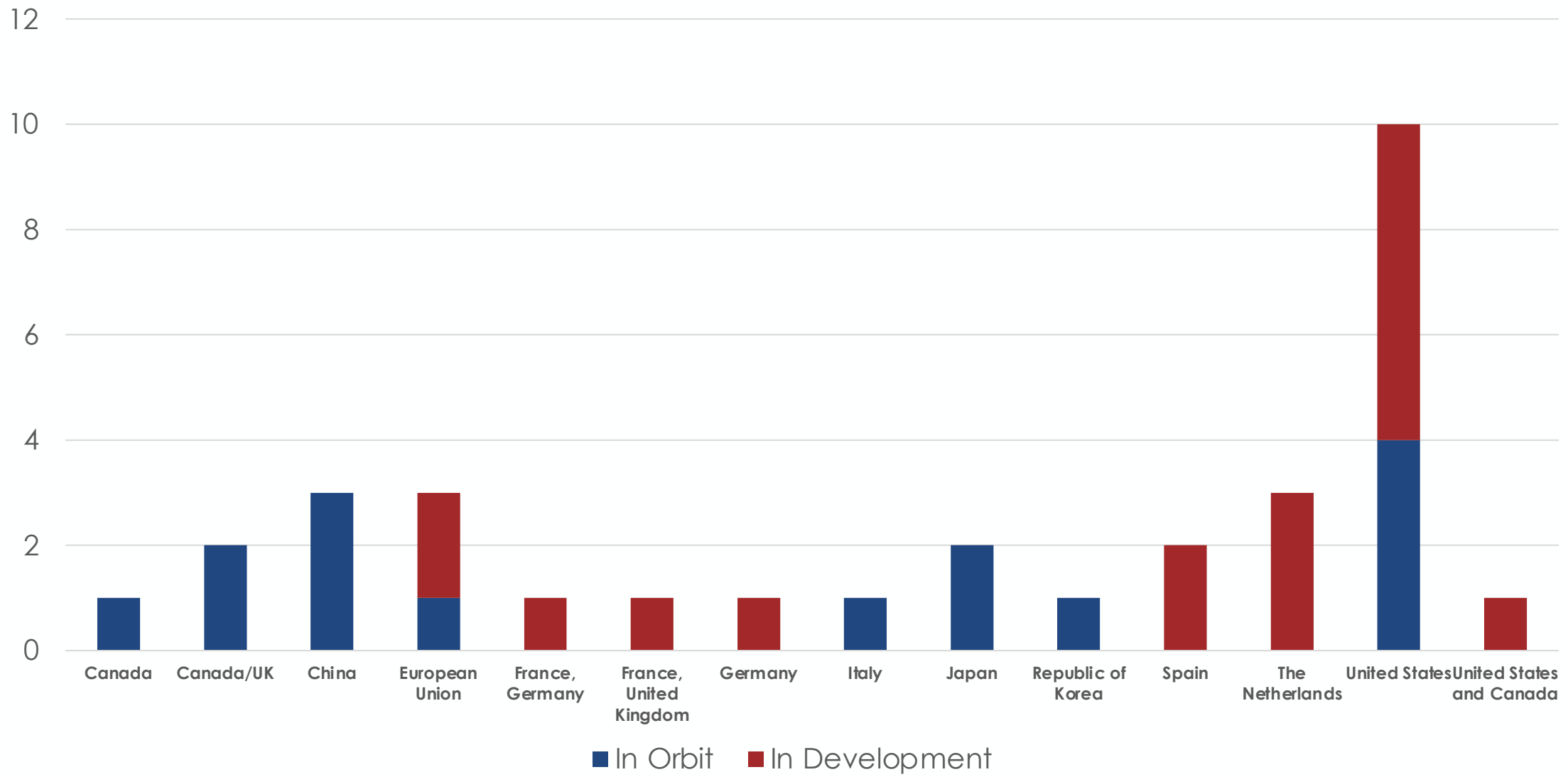




GHG Missions by Country



GHG Mission Status 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.

GEO GROUP ON EARTH OBSERVATIONS

CLIMATE TRACE

WGIC World Geospatial Industry Council

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**

Thank you

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