GHG Monitoring from Space – A Systematic Mapping of Public, Private, and Hybrid Missions

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Denver, CO. US 2022

WattTime™

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WGIC

World Geospatial Industry Council

An environmental tech nonprofit that empowers all people, companies, policymakers, and countries to slash emissions and choose cleaner energy.

A global coalition created to make meaningful climate action faster and easier by independently tracking greenhouse gas (GHG) emissions with unprecedented detail and speed.

World Geospatial Industry Council

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

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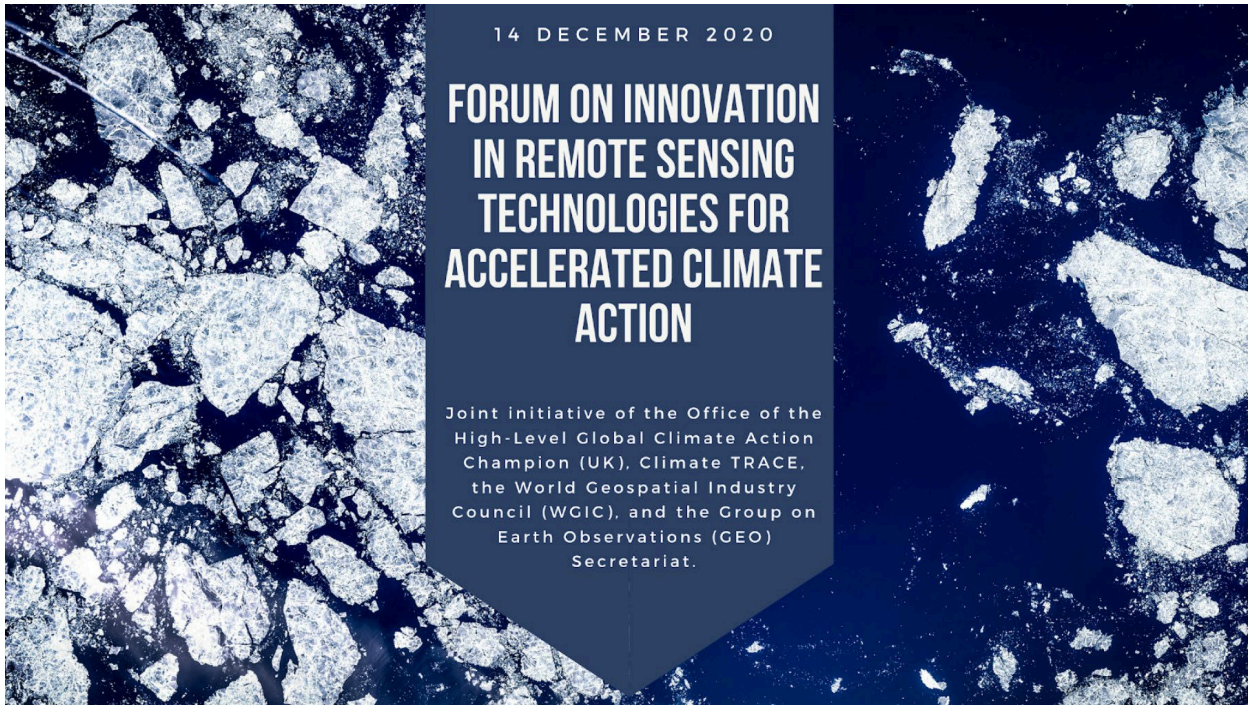
The catalyst of this partnership and the report

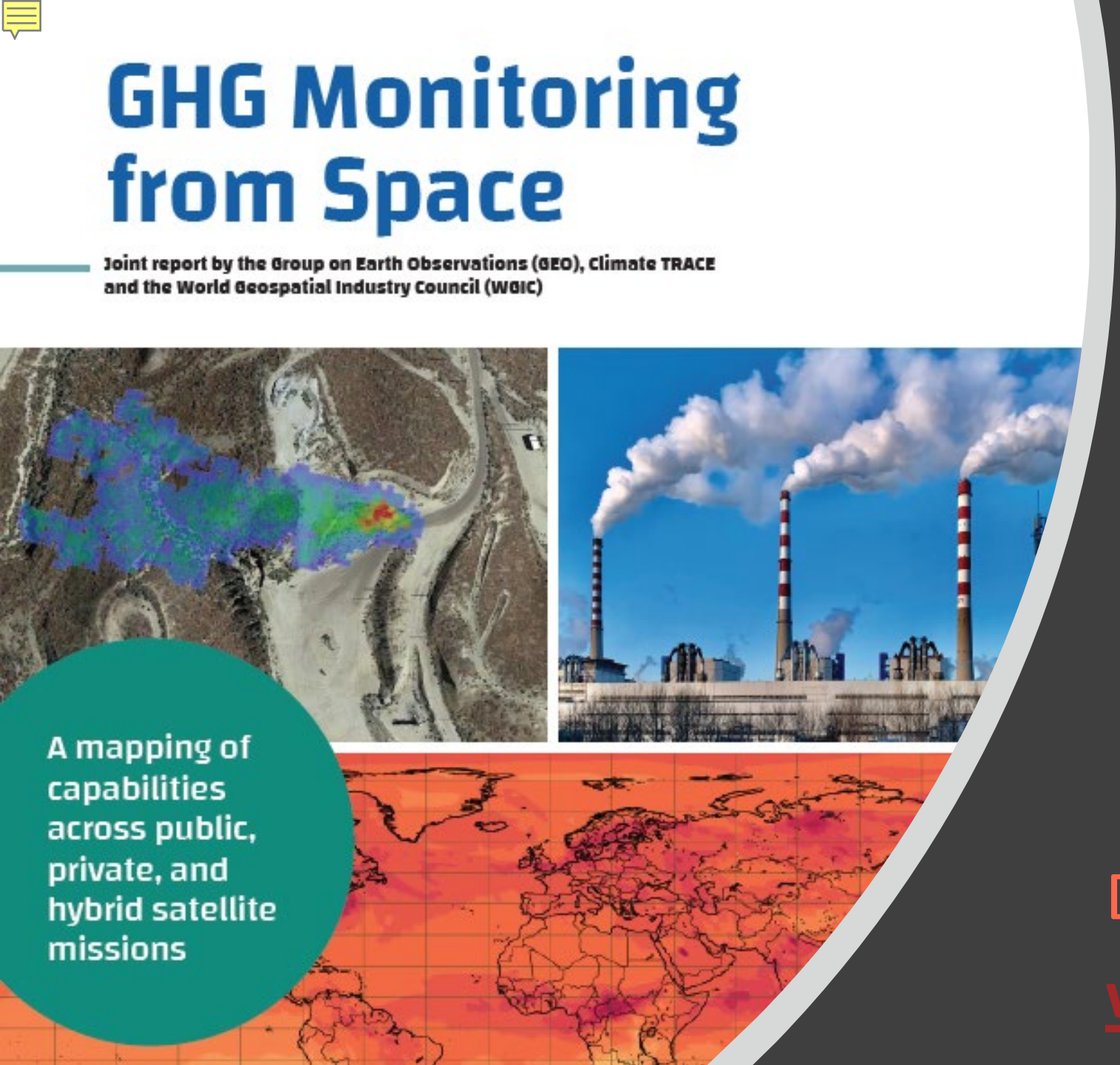


Topics discussed at the forum:

- **New Opportunities**
- **What Governments Need**
- **New Models of Collaboration**
- **Incentivizing Data Sharing**

A major outcome from this forum:

- **Mapping**



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

Download from:

www.WGICouncil.org

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

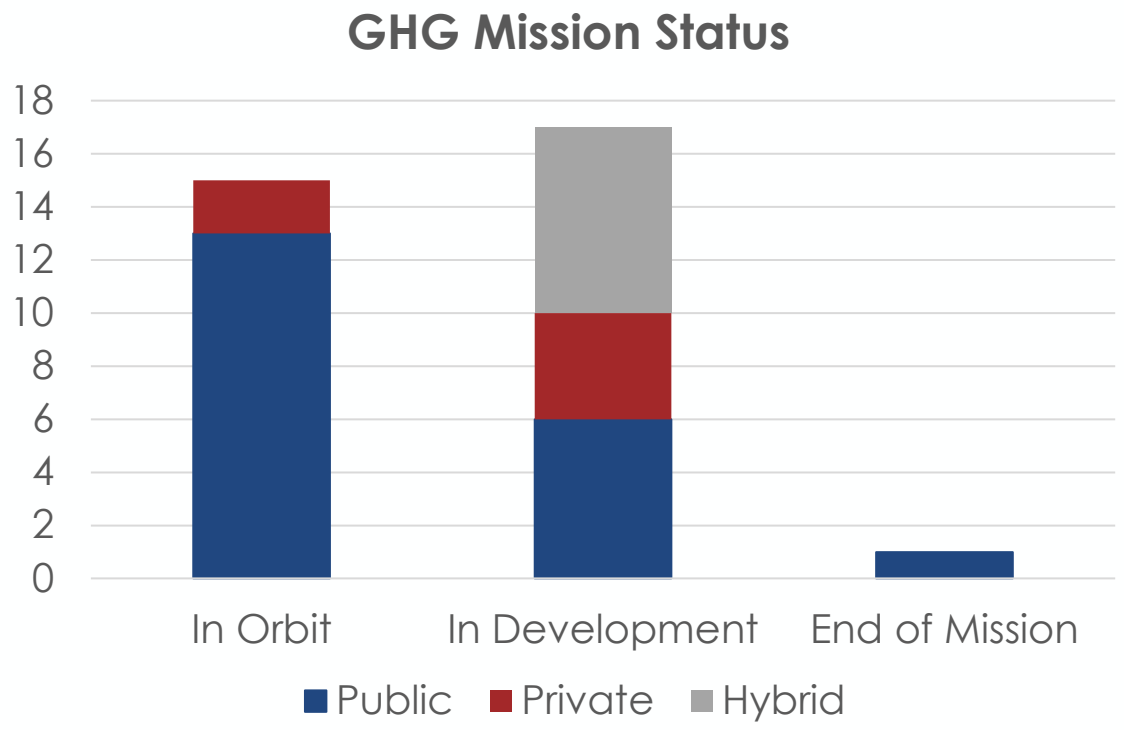
COUNTRY/REGION, ORGANIZATION, MISSION AND INSTRUMENT					GHG MONITORED DIRECTLY			POTENTIAL POLICY-RELEVANT APPLICATION			DATA ACCESS
Country/ Region	Organization	Mission (Instrument)	Status	Mission Goal and Application	CO_2	CH_4	N_2O	Point-Source level	National level	Global level	Open access / Limited 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.	CO_2	CH_4	N_2O				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.	CO_2	CH_4	N_2O				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.	CO_2	CH_4					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.	CO_2	CH_4					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.	CO_2	CH_4					Open access

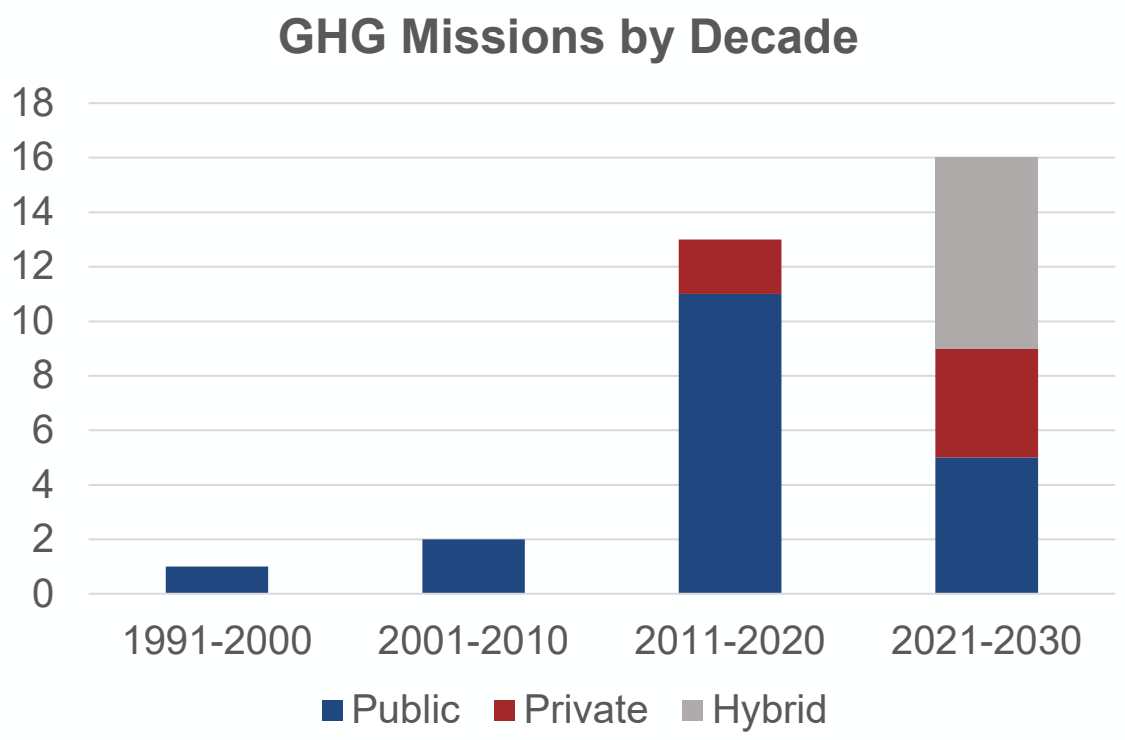
Three GHGs are generally recognized as the critical drivers of climate change: **carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).**

33 identified missions:

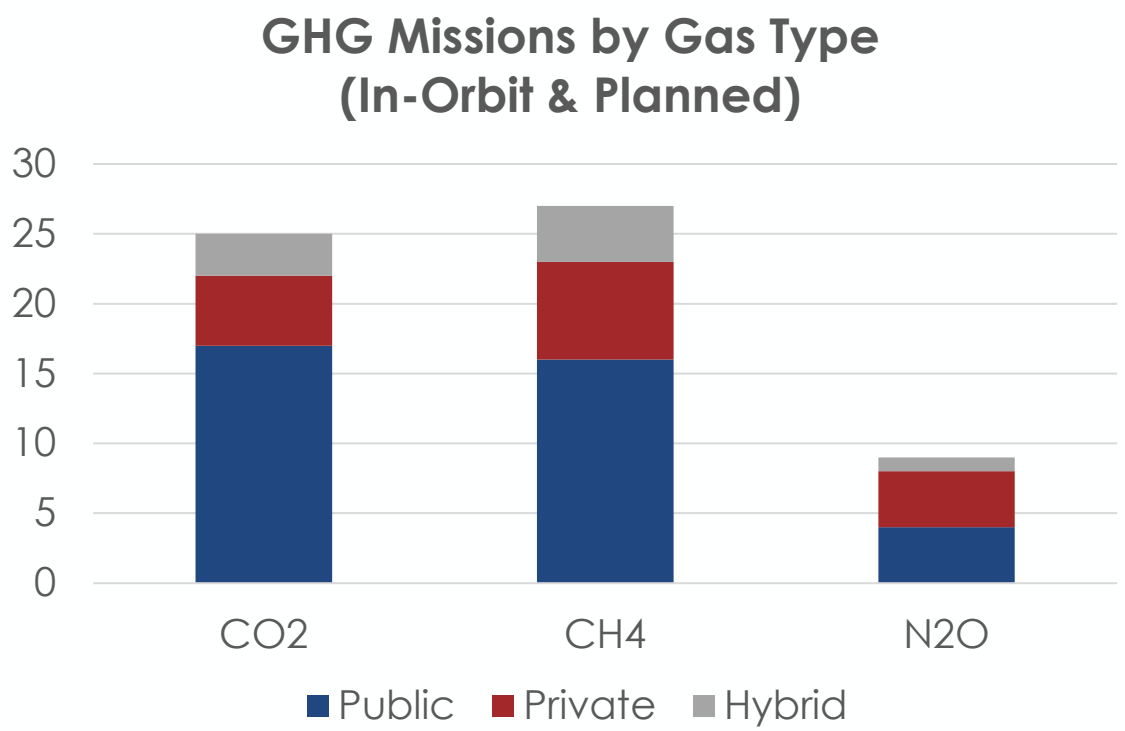
- **Public:** 21 total, 13 in orbit, 7 in development, 1 end of mission;
- **Private:** 7 total, 1 in orbit and operational, 1 in its final trial period, and 5 in development;
- **Hybrid:** 5 missions (all in development) with proposed launch dates until the 2040s.

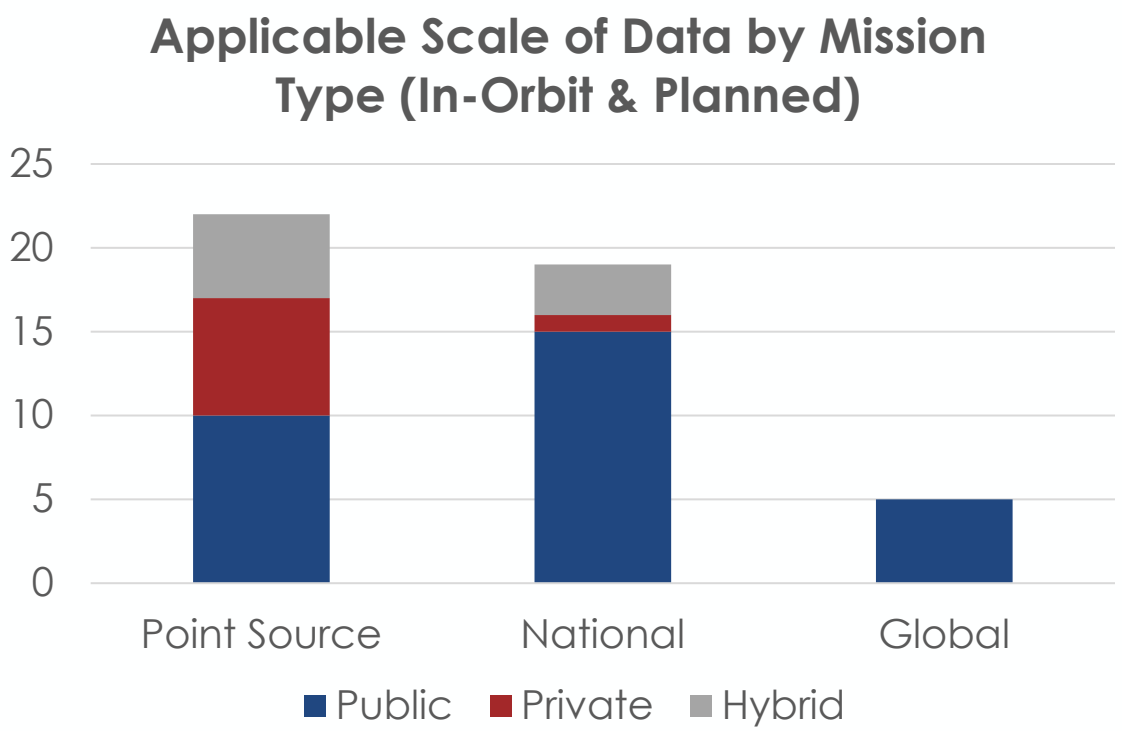
GHG Mission Status and Missions by Decade



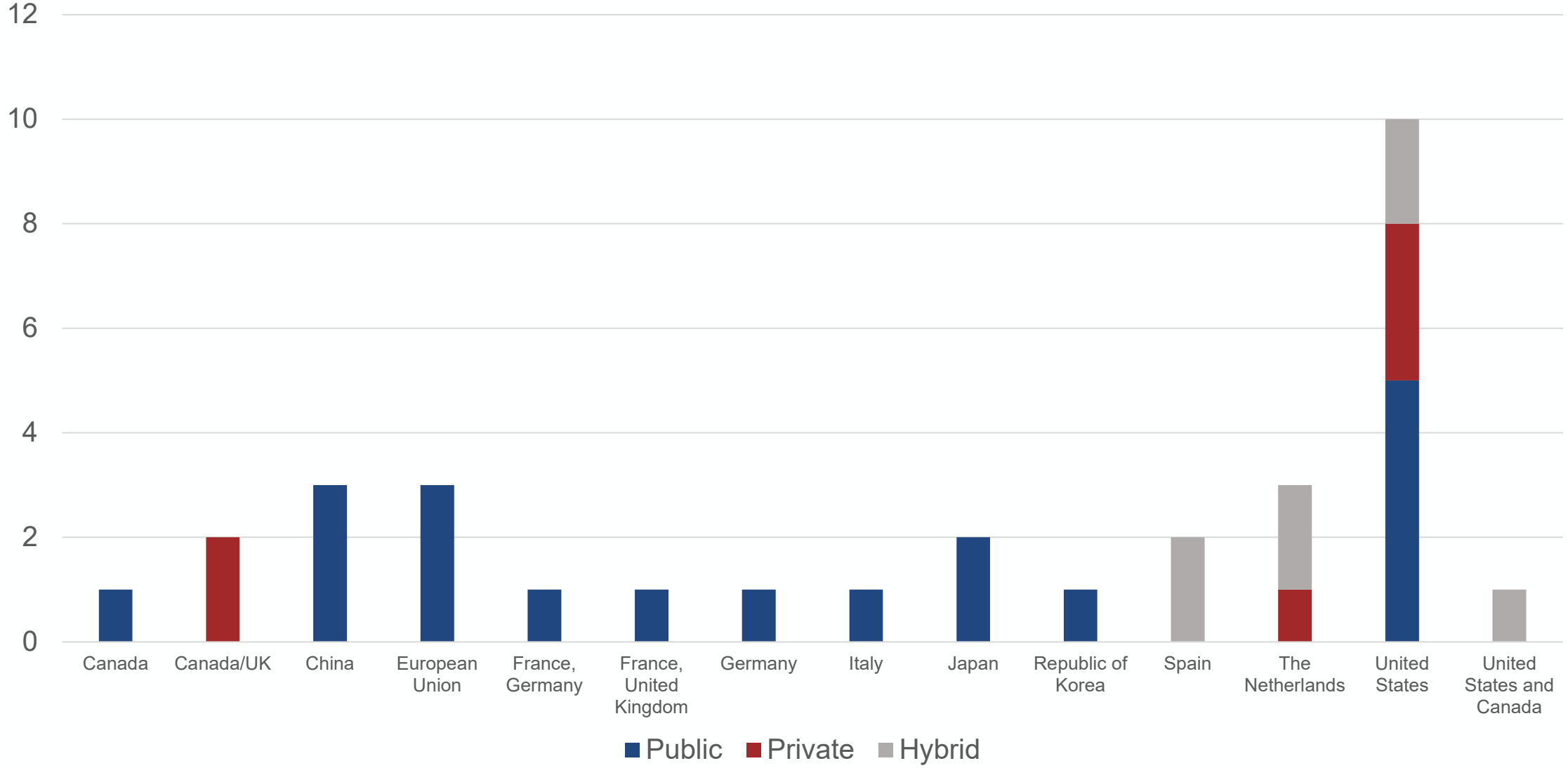


GHG Missions by Gas and Scale





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.

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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

In conclusion:
This report provides a comprehensive and objective overview of capabilities, and, in doing so, highlights the growing availability and accessibility of GHG data from space that have a potential to support national and global reporting underpinning climate mitigation policy.

Please look at the report and let us know what you think.

Contact us
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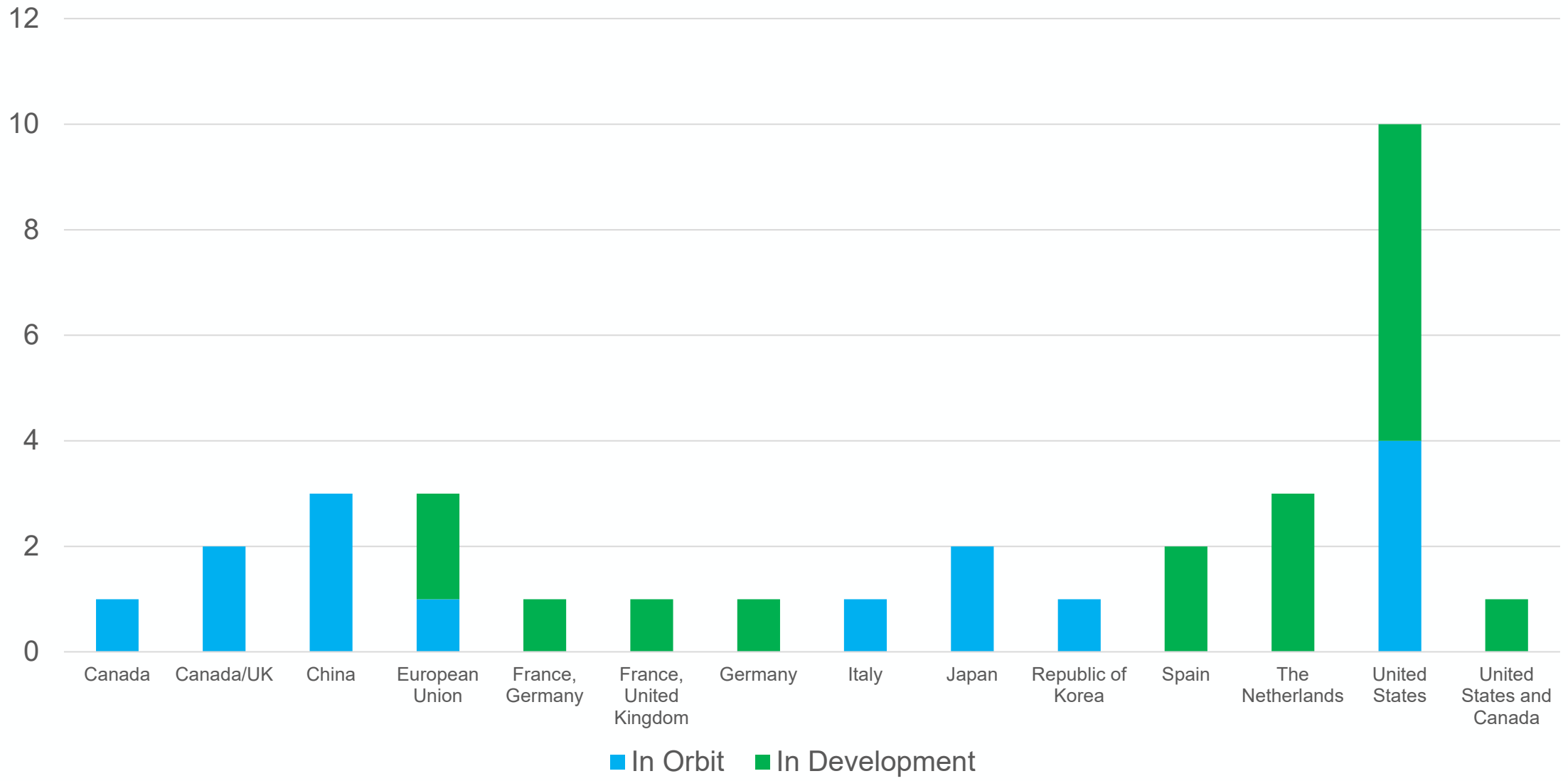
Barbara.Ryan@WGICouncil.org

Extra slides


12
10
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Canada
Canada/UK
China
European Union
France, Germany
France, United Kingdom
Germany
Italy
Japan
Republic of Korea
Spain
The Netherlands
United States
United States and Canada
In Orbit
In Development

Linkages to Global Policy Mandates

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

UN World Conference on
Disaster Risk Reduction
2015 Sendai Japan

SUSTAINABLE DEVELOPMENT GOALS

SPACE & GEOSPATIAL

VIRTUAL PAVILION FOR COP 26

Greenhouse Gas (GHG) Monitoring from Space

2 November, 14:00 -15:30 GMT

Joint report launch mapping the capabilities aross public, private and hybrid missions.

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