

2.2.2 Scope 1 and 2 Emissions

TGS leases office space for our 443 employees in the United States, United Kingdom, Norway, Brazil, Australia and Canada, and does not operate or own vessels, manufacturing plants or factories. TGS' Scope 1 emissions are not material to our overall emissions and are solely related to two vehicles maintained by the company for local deliveries in Houston and Oslo. TGS does not consider the impact of either our water usage or waste from our office operations to be material; however, recycling bins for paper and cardboard, glass, plastic, batteries and print toner cartridges are available in TGS offices, and employees are encouraged to follow proper recycling procedures. In 2021, TGS' Houston Operational Headquarters (which is the Company's largest office with approximately two-thirds of the workforce) composted 3.4 tons of waste and recycled 4 tons of trash, diverting a total of 7.4 tons of waste (29% of total waste) from being deposited in a landfill.

Scope 1 Emissions

	CO ₂ e (mt)	CO ₂ (mt)	CH ₄ (kg)	N ₂ O (kg)
2020 (Baseline)	337.75	337.12	.45	.18
2021	.67	.66	0	0

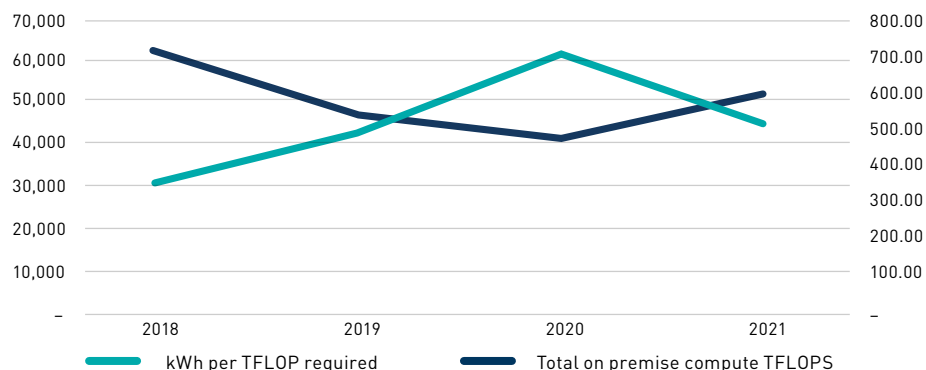
Energy usage in our offices and data centers make up TGS' Scope 2 emissions. Energy consumption for data processing and high-performance computing are responsible for the bulk of the emissions related to the generation of purchased energy (Scope 2), with our Houston data centers comprising 93% of Scope 2 emissions and 92% of kwh usage. As a result of this, over 99% of TGS emissions and 98% of kwh usage occurs in TGS' US offices and data centers.

Scope 2 Emissions

	kwh	CO ₂ e (mt)	CO ₂ (mt)	CH ₄ (kg)	N ₂ O (kg)
2020 Total (Baseline)	33,634,278	12,558.61	12,501.23	845.98	121.58
- Offices	3,645,301	1,378.58	1,373.02	89.77	12.04
- Data Centers	29,988,977	11,517.51	11,465.33	774.28	110.16
2021 Total	28,564,309	11,215.16	11,166.7	614.43	111.08
- Offices	2,420,961	769.67	766.21	43.38	7.97
- Data Centers	26,143,348	10,466.16	10,401.16	571.05	103.12

As the above chart shows, there was a 15% decrease in kwh usage between 2020 and 2021 and an 11% decrease in CO₂e emissions. Office emissions dropped by 44% while data center emissions dropped by 9%. The data center emissions decrease is notable because our on-premise compute actually increased in 2021. The chart below illustrates the growth in on-premise compute capability measured in teraflops (TFLOPS) from 2018-2021 (left axis). The right axis shows a decrease in the amount of kWh required to run 1 teraflop for a year. As the graph portrays, TGS is becoming more energy efficient in our compute capabilities at our on-premise data centers.

Efficiency in compute over time



2.2.3 Scope 3 Emissions - Operations

TGS tracks emissions generated through our seismic operations, which are classified as Scope 3 emissions (purchased goods and services) since TGS' field operations are acquired by geophysical contractors that specialize in land, marine and airborne geophysical operations. Tracking, reporting and developing a strategy to reduce and/or offset these emissions is a critical part of both TGS' and the industry's sustainability strategy. As one of the largest buyers of seismic acquisition capacity, TGS has a unique opportunity to influence and contribute to ongoing industry efforts to standardize GHG emission tracking and reporting, but our strategy requires coordination with our contractors who own or operate the equipment and field crews.

Industry Collaboration. TGS participates in and contributes to EnerGeo's marine emissions working group, which is a collective effort supported by several marine seismic contractors and E&P companies to define industry standards and guidance for the seismic industry on carbon emissions recording and reporting. This working group published an EnerGeo factsheet in September 2021 that outlines the industry's strategy towards understanding and defining emissions in marine geophysical operations, including our ambitions towards successfully managing, tracking and reporting on GHG emissions. In 2022, EnerGeo's working group will provide a comprehensive guidance document that sets the standards for collecting, tracking and calculating emissions in marine geophysical industry, and in future years TGS will look to adopt these standards in our emissions reporting for geophysical operations.

Marine Operations. TGS contractually requires all marine seismic contractors to report their carbon emissions and the factors used to derive emissions from fuel consumption. As illustrated in the following charts, the type of survey and field operations directly impact the carbon emissions of a project. The majority of TGS' 2021 Scope 3 emissions are from marine seismic projects, which are categorized as either 2D, 3D or nodal (OBC/OBN). 2D surveys use smaller vessels that tow less in-sea equipment, resulting in a lower carbon footprint (.63 mt CO₂e/km). 3D or

nodal seismic surveys require a combination of larger vessels and additional in-sea equipment, which accounts for a higher emissions output per square kilometer [2.82 mt CO₂e/km² for 3D and 6.34 mt CO₂e/km² for nodal surveys]. The other factors that impact the fuel consumption of a marine survey include weather and sea state, ocean currents, fuel type, survey design, transit time during mobilization periods, and the type and amount of in-sea seismic equipment being towed.

Onshore and Airborne Operations. For onshore and airborne seismic programs, TGS' field contractors track their fuel consumption data based upon the fuel types and field equipment, which may include helicopters, seismic vibrators, ATV/UTVs, passenger vehicles, etc. A 3D land survey involves laying out a patch of data recording nodes in the ground and using seismic vibrators or other conventional seismic sources to generate a 3D cube of subsurface data. For airborne acquisition, gravity imaging equipment installed aboard the aircraft records enhanced gravity, magnetics and LiDAR data acquired over a predefined grid of flight lines by using a dual propeller aircraft. In these types of surveys, fuel consumption and emissions are impacted by the size of the survey, the equipment and vehicles used, the local environment and geography, and use of helicopters for equipment transport, scouting or portable heli-drilling. In 2021, TGS' plans to continue the 2020 Horus I eFTG program did not materialize; however, emissions were generated while the crew was on standby and those are reported in the following chart.

2021 Scope 3 Emissions - Summary by Project Type

	CO ₂ e (mt)	CO ₂ (mt)	CH ₄ (mt)	N ₂ O (mt)	SO _x (mt)	NO _x (mt)
2D Marine Seismic	10,367.92	10,242.87	0.48	0.37	15.20	161.27
3D Marine Seismic	95,568.07	94,492.38	5.12	3.13	79.95	1,516.77
OBN/OBC Marine Seismic	27,145.28	26,791.01	0.65	1.13	66.22	393.55
Subtotal Marine Seismic	133,081.26	131,526.26	6.26	4.63	161.37	2,071.59
Subtotal 3D Land Seismic	406.20	399.77	0.02	0.02	-	-
Subtotal Airborne Surveys	1.40	1.34	0.00	0.00	-	-
TOTAL SCOPE 3 EMISSIONS	133,488.86	131,927.37	6.27	4.65	161.37	2,071.59

- Included in the emissions reported for marine survey above are those emissions related to mobilization as well as the support vessels used in the survey. Emission calculations were done in MultiSeis by deriving daily fuel consumption figures into emissions. Calculations and factors are based on the European Commission's "Quantification of Emissions from Ships Associated with Ship Movements between Ports in the European Community," July 2002; Econometrica "Greenhouse Gases, CO₂, CO₂e, and Carbon: What do all these Terms Mean?," August 2012; "Excise Duty on Emissions of NO_x," 2015 no. 14/2015S; The Greenhouse Gas Protocol; and the EPA's "Greenhouse Gas Inventory Guidance: Direct Emissions from Stationary Combustion Sources," December 2020.
- Land and airborne seismic emissions were calculated by converting fuel consumption figures to emissions using the EPA Simplified GHG Emissions Calculator (SGEC) version 3.2 June 2014. Fuel and vehicle type, as well as mileage and fuel usage, were calculated within the "Mobile Sources" tab.

2021 Scope 3 Survey Emissions - Intensity Figures

	Distance Area Acquired	Unit	CO ₂ e (mt/unit)	CO ₂ (mt/unit)	CH ₄ (kg/unit)	N ₂ O (mt)	SO _x (mt)	NO _x (mt)
2D Marine Seismic	16,557.51	km	0.63	0.62	0.03	0.02	0.92	9.74
3D Marine Seismic	33,856.03	sq km	2.82	2.79	0.15	0.09	2.36	44.80
OBN/OBC Marine Seismic	4,280.28	sq km	6.34	6.26	0.15	0.26	15.47	91.94
3D Land Seismic	184.72	sq km	2.20	2.16	0.08	0.11	NA	NA

2.3 Marine Operations

TGS is committed to protecting marine and coastal ecosystems and ensuring that our marine seismic contractors share this commitment. As noted above in our materiality chart, this issue is material to both TGS and to our stakeholders. TGS recognizes that if proper mitigation measures are not imposed or enforced, seismic operations and the towing of acoustic arrays through the marine environment has the potential to disrupt or impact the marine environment through possible unplanned spills, pollution or disruption of marine mammal migration paths, spawning groups or other ecologically sensitive locations. Both the geophysical industry and TGS impose stringent measures to lessen or negate these potential impacts to the environment.

Project Management. When planning and designing surveys, TGS commissions environmental impact assessments (EIAs) to identify marine mammal migration paths, spawning grounds, sanctuary areas or other ecologically sensitive locations that may be present in and around the survey area. TGS engages with stakeholders, such as fisheries and local communities, to understand their concerns and ensure ongoing communication throughout the duration of the seismic surveys. During the acquisition phase of a survey, TGS employs protected species observers (PSOs) and utilizes passive acoustic monitoring (PAM) to ensure that our field operations do not have a negative effect on cetaceans, turtles, marine mammals, etc. When operating in environmentally sensitive areas, such as Brazil and Argentina, TGS employs third-party HSE advisors who are tasked with managing all aspects of health, safety and the environment onboard their respective vessels, ensuring that full compliance with all environmental regulations and permit stipulations is achieved.

Audits and Reporting. To ensure compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL), the Company requires all vessel contractors to report all spills, regardless of quantity and substance, and whether the spill entered the marine environment or was contained onboard a vessel. TGS has consistently met its goal of zero recordable spills and unplanned releases to the marine environment in our offshore operations since 2014, with 2021 being no exception. TGS requires all vessel contractors to comply with all applicable environmental laws and regulations and undergo audits from the International Marine Contractors Association or Offshore Vessel Inspection Database (IMCA or