





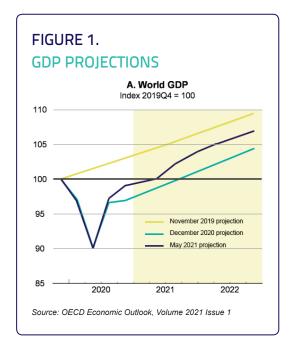
Compiled and published by the International Association of Dredging Companies (IADC), Dredging in Figures presents an overview of the global dredging industry's performance in 2020. This report enables individuals and organisations interested in dredging as well as its related sectors to assess the state of the dredging industry amid a backdrop of the developments the industry's essential business drivers and operations.

All facts, figures and information contained in this report are sourced from reputable international resources and IADC's member companies. IADC only conveys information about the dredging activities conducted in open markets as data from closed markets cannot be verified and is standard practice for every publication released by the organisation.

This report begins with a general overview of the preceding year's economic situation as this indirectly impacted each of the industry's performance indicators. The most recent standpoints regarding the dredging industry's priorities in the areas of corporate social responsibility (CSR), sustainability - such as initiatives to reduce environmental impact and emissions - and safety are then described, followed by the key drivers of dredging activities that continue to be world trade, population growth and urban development, climate change and coastal protection, energy and tourism. The dredging industry's cumulative turnover generated by work performed in the open market concludes this document.

GLOBAL ECONOMIC CONDITIONS THE GREAT LOCKDOWN

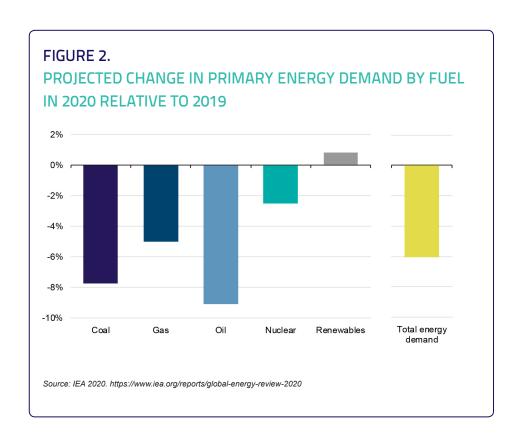
At the beginning of 2020, the onset of the global pandemic caused by the coronavirus resulted in a domino-effect of lockdowns across the globe. People were contained within their homes and/or national borders, bringing global movement and labour to a halt and kicking off the worst recession since the Great Depression according to the International Monetary Fund (IMF). International trade routes were interrupted by travel bans and port logistics upended by lockdowns that forced workers to stay home. While many countries relaxed their restrictions by the end of Q2, most countries entered a 'second wave' in Q3 as variants of the virus emerged.



CHANGED ENERGY DEMANDS AND REDUCED OIL DEMAND

With workers relocating their nine-to-five to their homes, commutes were no longer needed and their cars sat idle, leading to the demand for fuel to drop overnight. With the drop in demand, investment in oil and gas infrastructure plummeted. Lower gas prices saw significant fuel switching away from coal for a global decline of 4%, with coal use for power reduced in the United States by 20% and 21% in the European Union. Declines in the power sector accounted for over 40% of lower global demand in 2020.

These developments are in line with the energy transition; less use of fossil fuels and a larger share in the energy supply by renewables, such as wind and sun energy. The acceleration of the offshore wind market is contributing significantly to the dredging industry in offering offshore services to wind farm projects.



SUSTAINABILITY

First established in 2015, the COP21 Paris Agreement had a total of 197 countries that had signed at the end of 2020, with 11 additional countries ratified since the previous year. This universal, legally binding agreement set goals for preventing global warming and has delegated action to the signatory countries, meaning that many national governments have instigated policies meant to reduce emissions. The return of the USA to the Paris Agreement, the EU-green deal and the IPCC report is an impetus to sustainable behaviour. The IPCC 2021 report makes clear that stringent measures are still required to set the planet on the Paris Agreement's 2°C pathway to limit global warming.

Clients of marine infrastructure projects are ever more keenly aware of the need for sustainability as a priority for their projects and base their collaboration in part and even wholly on contractors' ability to work this way. By far, most IADC dredging companies operate within signatory countries and therefore a policy environment encouraging businesses to make CSR choices aimed at limiting a negative impact on the environment. Human and labour rights are an increasingly important topic for internationally operating companies.

For dredging companies, the UN's Sustainable Development Goals (SDGs) are the reference point for sustainable operations. They present a framework for shaping ambitions and taking responsibility. The interrelated goals expressed in the SDGs are included in all phases of projects, design, preparation and execution, to create shared value and enhance positive impact on the one hand while mitigating negative impact on the other.

ENSURING SAFETY

A measure of risk is inherent for the industry as it performs work with heavy equipment and requires changing of crews all within marine environments. Dredging companies can only perform at their best when daily operations occur without incidents and accidents. The International Labour Organization points out that occupational health and safety problems

at work cause suffering for workers and their families, and additionally lead to colossal costs for enterprises. It cites compensation, lost workdays, interrupted production, training and reconversion as well as health-care expenditure as being a major part of the world's annual GDP.

The global pandemic brought a new obstacle to the safety of crews. With travel bans and quarantines in place, the changing of crews within the intended time frames became impacted, resulting in extended periods on board and longer separation from their families. Organisations such as UNCTAD (United Nations Conference on Trade and Development) issued calls to designate seafarers and other marine personnel, regardless of nationality, as key workers and exempt them from travel restrictions to ensure that crew changes could be carried out. Temporary guidance was developed for flag States, enabling the extension of the validity of seafarers and ship licences and certificates under mandatory instruments of the International Maritime Organization (IMO) and the International Labour Organization.

Most dredging companies have actively developed their own safety programmes and guidelines to emphasise safety awareness amongst all employees, aiming to identify and address potential risks upfront. Most companies invest in in-house safety training programmes for employees. These point out individual employee's roles in maintaining safety standards and strive to give them the tools by which to ensure their own and their colleagues' safety. As of this year, IADC presents two

Safety Awards to encourage the development of safety skills on the job and reward individuals and companies demonstrating diligence in safety awareness in the performance of their profession. One award is granted to a dredging company (also non-IADC members) and one to a supply chain organisation active in the dredging industry. This concerns





subcontractors and suppliers of goods and services.

The consensus amongst every contractor is that safety awareness and training requires constant attention and they actively do so by monitoring safety on a regular basis. To maintain the excellent health and safety results of its members, IADC promotes safety and prevention through its Safety Committee. This committee helps to ensure that the industry standards for safety surpasses national legislation and international regulations. IADC's annual Safety Awards presented to dredging companies and supply chain partners are a means to emphasise the importance of safety in the industry.

OPTIMISING POSITIVE ENVIRONMENTAL AND SOCIAL IMPACT

Projects are carried out not only in accordance with international and national legislation on, for example, reducing CO₂ production and emissions. They also comply with the social and environmental policies and goals of dredging companies, which are in turn formed by regulatory requirements. By building collaborative relationships with local communities through consultation, engagement and participation, dredging companies can better understand local needs and concerns. These can then be addressed in the decision-making process during a project, along with the involvement of clients and other stakeholders. In addition, local employees are frequently employed during project works and in many instances, schools have been built as part of giving back to and supporting the community. IADC promotes the use of models to make a fully inclusive assessment in which all externalities of a project

are included. In August 2021, IADC carried out a study to review several models on their usability in marine infrastructure projects.

The dredging industry is ideally positioned to provide a positive environmental impact because of its close association with and influence on both marine and coastal environments. It has taken a proactive approach towards enhancing environmental value, going far beyond international and national policy and legislation. Research is dedicated to finding more sustainable ways of carrying out projects. Industry efforts to enhance positive environmental impact are reflected in the Dredging for Sustainable Infrastructure publication. IADC's industry journal Terra et Aqua continues to disseminate sector-related sustainability information, dedicating much of its content to the subject. Applying Ecosystems Services to projects offers the dredging industry a structured and analytical way of calculating the impacts of projects on the planet, people and profit. A recurring theme in the industry is the beneficial use of dredged sediments that ensures natural resources contribute to the circular economy.

REDUCING EMISSIONS

While its carbon footprint results primarily from fuel consumption during dredging works, the dredging industry remains committed to reducing its greenhouse gas, SO_x , NO_x and fine particle emissions. Reducing emissions from fuel use is a continual work in progress that permeates technical decision-making, research and education, innovation and knowledge exchange. The use of alternative fuels is another way of achieving lower emissions, specifically fuels that burn cleanly or reduce CO_2 output to be considerably lower or near zero. Alternative fuels, such as liquefied natural gas (LNG) and biofuels as well as biodegradable lubricants, are increasingly prevalent.

Furthermore, the Ultra-Low Emission Vessels (ULEV) being built today are fitted with a highly advanced exhaust gas filtering systems using Selective Catalytic Reduction (SCR) systems and Diesel Particle Filters (DPF), strongly reducing emissions of NO_w and of particulate matter, increasing the sustainability of all used fuels.

DRIVERS OF DREDGING

Assessed in the following sections, five global trends drive the progress of the dredging industry: world trade, population growth and urban development, climate change and coastal protection, energy demand and tourism.

WORLD TRADE

During the first half of the year when the COVID-19 pandemic emerged, UNCTAD data shows all major economies experienced significant downturns in both imports and exports of goods, and even greater declines in the trade of services. Despite COVID-19's impact on the global economy, global trade was resilient in 2020, recovering in Q4 thanks to trade in goods, reducing the year's overall decline to about 9%. This recovery was due to increased exports by East Asian countries thanks to their success in reducing the impact of the pandemic during its early stages and ability to fulfil the global demand for pandemic-related products, and to a lesser extent developing countries. UNCTAD data shows trade in goods originating from the East Asian region grew nearly 12% in the last quarter of 2020 in comparison to Q4 of 2019.

Consumer behaviour changed, with an increase in purchases of healthcare products, digital services, communication and home office equipment. Consumers did not – or could not – make purchases related to transportation equipment, international travel and hospitality services. In addition, the production of goods also shifted to be closer to consumers, changing operations and logistics chains. UNCTAD also expects ongoing container shortages and increasing freight rates to influence reshoring and nearshoring trends.

Seaborne trade is the backbone of international trade and the global economy and an important driver of the dredging industry. In years prior to 2020, approximately 80% of global trade by volume and over 70% of global trade by value are carried by sea and handled by ports worldwide. Due to the pandemic, a sudden slowdown in seaborne trade and increase in blank sailings was observed as well as delays at ports and closures of ports, reductions in working hours, shortages of equipment and labour,

capacity constraints in truck and other inland transport systems.

The global ocean-based economy is estimated at US\$ 3 trillion a year, which is around 5% of global GDP, but due to the global pandemic, global GDP reached -4%. Growth in maritime trade decelerated in line with the decline of global GDP at 4.1% according to UNCTAD.

FIGURE 3. WORLD MERCHANDISE TRADE 2020

	2015	2016	2017	2018	2019	2020	2021
Volume of world merchandise trade ^b	2.3	1.4	4.7	2.9	-0.1	-9.2	7.2
Exports							
North America	2.6	0.7	3.4	3.8	1.0	-14.7	10.7
South and Central America	0.6	1.3	2.9	0.1	-2.2	-7.7	5.4
Europe	2.9	1.1	3.7	2.0	0.1	-11.7	8.2
Asia	1.3	2.3	6.7	3.7	0.9	-4.5	5.7
Other regions ^c	1.8	3.5	0.7	0.7	-2.9	-9.5	6.1
Imports							
North America	5.2	0.3	4.4	5.2	-0.4	-8.7	6.7
South and Central America	-7.6	-9.0	4.3	5.3	-2.1	-13.5	6.5
Europe	3.6	3.0	3.0	1.5	0.5	-10.3	8.7
Asia	2.1	2.2	8.4	4.9	-0.6	-4.4	6.2
Other regions ^c	-3.9	-4.5	3.4	0.3	1.5	-16.0	5.6
Real GDP at market exchange rates	2.8	2.4	3.1	2.8	2.2	-4.8	4.9
North America	2.8	1.7	2.4	2.8	2.1	-4.4	3.9
South and Central America	-0.8	-2.0	0.8	0.6	-0.2	-7.5	3.8
Europe	2.4	2.1	2.8	2.1	1.5	-7.3	5.2
Asia	4.3	4.2	4.8	4.1	3.9	-2.4	5.9
Other regions ^c	1.5	2.4	1.9	2.1	1.4	-5.5	3.5

Source: https://www.wto.org/english/news_e/pres20_e/pr862_e.htm

FIGURE 4. TOTAL MARITIME TRADE DEMAND 2000-2020 70 000 60 000 40 000 20 000 10 000 10 000 Chemicals Containers Gas Main bulke 0 Other dry cargo Source: p.26 https://unctad.org/system/files/official-document/rmt2020_en.pdf

POPULATION GROWTH AND URBAN DEVELOPMENT

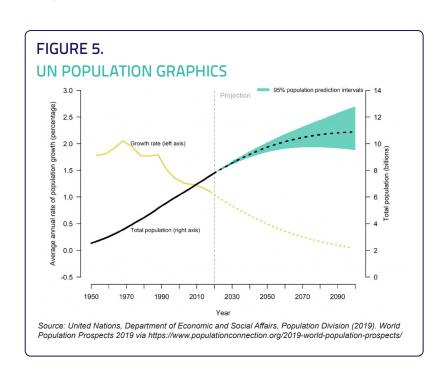
At the start of 2021, global population reached nearly 7.9 billion people. As of 2020, the world's most populous countries, listed from most to least populated, are unchanged from 2019: China, India, United States, Indonesia, Pakistan, Brazil, Nigeria, Bangladesh, Russian Federation and Mexico.

According to the United Nations Department of Economic and Social Affairs (UN DESA), the 47 least developed countries have the world's fastest growing populations and are vulnerable to both climate change and sea-level rise. With the impact on population growth from the ongoing pandemic still unaccounted for in data and predictions, UN DESA predicts the upper limits of world population to be 8.5 billion by 2030, 9.7 billion by 2050 and 10.9 billion by 2100.

Among the least developed countries experiencing rapid population growth are Small Island Developing States (SIDS), which are currently home to 71 million people and by 2050, an estimated 87 million people are expected to call SIDS their home. SIDS also present unique challenges for sustainable development as they are vulnerable to sea-level rise and climate change.

According to the World Bank, 4.35 billion people – or 56.2% of the world population – were concentrated in urban areas in 2020, a slight increase from 55.7% in 2019. By 2045, the number of people living in cities will increase to 6.3 billion, representing an additional 2 billion urban residents. Of the world's population in 2045, over 65% is expected to be urban. Cities are projected to grow and the prevalence of the megacity with a population of more than 10 million inhabitants will increase. To accommodate the projected increases in population and consequent increases in city size, countries will be faced with having to expand their land areas.

As many of these urban agglomerations are located along coastlines or rivers, the dilemma of land scarcity can be alleviated by reclaiming land from the water, adding buildable areas adjoining the coast where needed. Meeting this demand through land reclamation has made urbanisation a major driver for the dredging industry. For decades, dredging companies have regularly executed land reclamation projects to extend the boundaries of existing coastal areas or islands.



CLIMATE CHANGE AND COASTAL PROTECTION

At the 2017 UN Oceans Conference, it was estimated that more than 600 million people live in coastal areas that are less than 10 metres above sea level and nearly 2.4 billion people live within 100 kilometres of the coast. Often this is in urban agglomerations that are vulnerable to storm surges and sea-level rise. In addition, many coastal countries are vulnerable to flooding and must regularly maintain the integrity of their dynamic shorelines. It is projected that more than half of the world's population will reside within 100 kilometres of a coast by 2030.

The side effects of climate change – more extreme weather events and rising sea levels – have direct consequences for increasingly inhabited waterfront or low-lying areas, which have a greater potential for flooding especially resulting from natural disasters. Dredging companies have traditionally contributed to coastal protection projects and maintaining shorelines and have increasingly improved engineering technologies to achieve this.

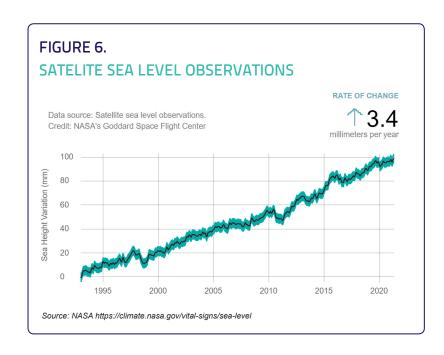
The OECD estimates that floods currently affect 250 million people around the world every year. For example, two-thirds of the Netherlands' inhabitants live in flood-prone areas and nearly half of Japan's population resides in former river and coastal flood plains. In Asia, the megacities

of Ho Chi Minh City, Jakarta and Manila already suffer from subsidence and regular floods.

Around 15% of cities – most of which are situated near coastlines – are at high risk of exposure to two or more types of natural disaster. For many countries, most of their inhabitants live in flood-prone areas.

An increase in extreme weather events is a worldwide phenomenon. Annual average damages from floods reported by the International Disasters Database (EM-DAT) have increased over the decades, from less than US\$ 4 billion per year between 1971-80 to over US\$ 40 billion per year between 2011 and 2015. In 2019, the EM-DAT recorded 396 natural disasters worldwide, with a total of 11,755 fatalities and a cost of US\$ 130 billion. Large floods have grave financial and economic implications for governments, businesses, and households. In the aftermath, agricultural output and tourism revenue may be reduced until recovery efforts are implemented. Upgrades to coastal defences contribute to the protection of these coastal areas and their populations and the dredging industry is well prepared to tackle these engineering challenges.

The need for coastal resilience plans is becoming clearer worldwide and this growing awareness should ideally lead to action via global initiatives. For example, the European



Commission's Directive on Maritime Spatial Planning (MSP) obliges the EU's coastal states to develop national maritime spatial plans by 2021 that address land-sea interactions, follow an ecosystem-based approach and encourage transboundary cooperation between neighboring states. Dredging companies have a clear role to play in protecting coastlines from sea-level rise and extreme weather events. For many decades they have performed coastal protection projects across the world, gaining experience and specialised knowledge in the sector, leading to innovative solutions for the future.

ENERGY

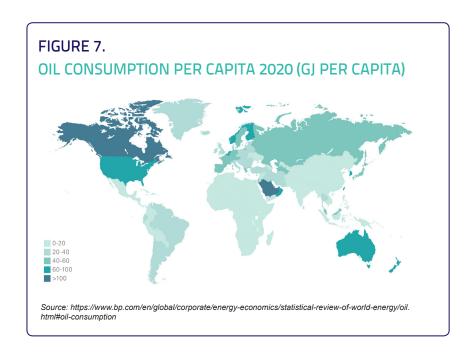
Dredging companies play a significant role in the construction of infrastructure for offshore energy sources, such as oil, gas and wind energy. Wind farms and oil and gas fields are often located offshore and in remote areas. Seabed intervention is therefore required in the form of trenching for cables and pipelines carried out by dredging companies to provide connections with the off-takers on land.

During the pandemic, energy demands were notably impacted for the first time, with global declines of 5%, impacting 8% for oil and 7% for coal. Investments in offshore wind outpaced offshore oil and gas for the first time in 2020. In the first half of 2020 alone, while overall investment in power generation slumped,

offshore wind financing quadrupled compared to the same period in 2019, reaching US\$ 35 billion.

In 2020, installations reached 86 GW of new capacity, representing 53% YoY growth from 2019 and for a global total of 743 GW of wind capacity. Offshore wind capacity reached 35 GW and represents 4.8% of the global total. New commissions in offshore wind reached 6.1 GW in 2020, making it the second-best year for offshore wind commissions. Investment in offshore wind surpassed 2019 levels to reach US\$ 303 billion in 2020, partly due to the sector's longer project development timelines that are more resilient to the pandemic impacts. Steady growth in Europe accounted for most of the remaining new capacity, led by the Netherlands that installed nearly 1.5 GW of new offshore wind in 2020, making it the second-largest market in 2020, followed by Belgium (706 MW).

Stalled during the onset of COVID-19, the sector awarded 30GW of new wind power capacity during Q3 and Q4, of which 1 GW was offshore wind with an additional 7 GW in offshore wind tenders were started in 2020, a promising figure for the sector. To reach global energy transition goals, wind installations must achieve 180 GW per year. With annual installations falling short of the target, the years that follow must install more than 180 GW to reach the long-term target.



TOURISM

Representing a strong growth sector with 1.5 billion international tourist arrivals in 2019, tourism took a nose-dive in 2020. The United Nations World Tourism Organization (UNWTO) reports that almost all countries have implemented travel restrictions of one sort or another, such as travel bans, visa controls and quarantines (UNWTO 2020). Global quarantine measures, travel bans, border closures, halts in travel, such as cruises and flights during COVID-19 led to international tourism's stark decline of 84% between March and December 2020 according to UNWTO's data.

International tourist arrivals declined by about 1 billion or 74% between January and December 2020. Many developing countries saw arrival declines of 80-90%. When factoring in both direct and indirect impacts of this contraction. UNWTO observed international tourism and its closely linked sectors suffered an estimated loss of US\$ 2.4 trillion. The indirect effects of this decline are even more devastating, as labour and capital remain unused and the lack of demand for intermediate goods and services has a negative upstream effect into many sectors. Sales inherently lined with tourism contributed to an average 2.5-fold loss in real GDP. Data from the Global Trade Analysis Project (GTAP), which is based on national accounts, suggests that labour accounts for around 30% of tourist services expenditure in both developed and developing economies. UNWTO (2021a) estimates that 100-120 million direct tourism jobs are at stake while total exports for many small economies particularly Small Islands Developing States (UNCTAD 2020b) approach 50%.

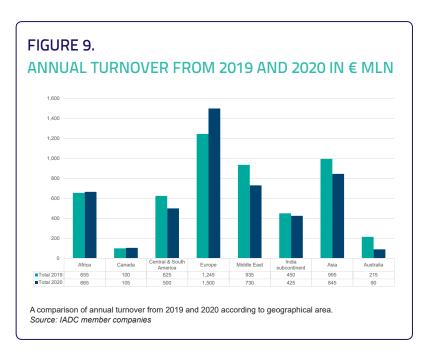
Tourism has adapted, with domestic travel increasing. This does little to help developing countries that are dependent on international travel. Retirees, who tend to spend more per trip, are more likely to stay at home. Younger travellers, such as backpackers, who seem more willing to travel during this pandemic tend to stay longer but spend less than older travellers. Cruise ships, involving extended confinement, are likely to be less popular. Developing countries dependent on cruise ship arrivals may need to diversify their industries.



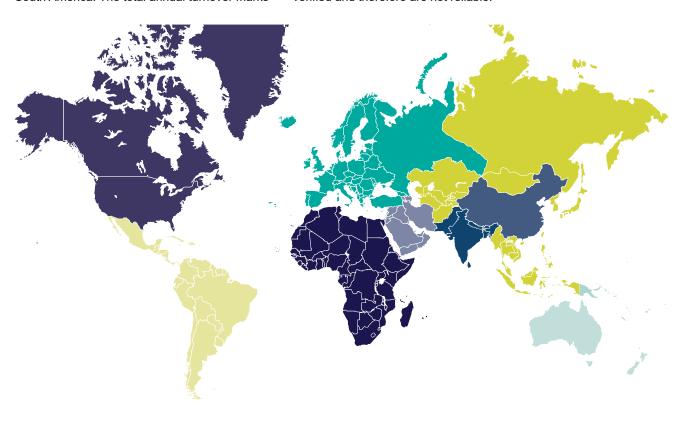
RESULTS 2020 INDUSTRY TURNOVER

While the global economy had slowly lost momentum until 2019, the recession caused by the coronavirus pandemic sent shockwaves through every industry including the dredging industry. Health precautions impacted field operations by slowing crew transfers and slowing permitting processing times due to global lockdowns. With these unexpected obstacles, the dredging industry's total turnover excluding closed markets - compared to 2019 (€ 5.2 billion) decreased in 2020 to € 4.86 billion (US\$ 5.7 billion). This turnover remains relatively stable with the turnover of previous years since a majority of the year's contracts were secured and construction commenced in pre-pandemic times. Regarding the construction of infrastructure for offshore energy, only turnover generated by seabed intervention are included in this figure.

In terms of trade-related development, capital infrastructure projects constituted 39% of the 2020 turnover with most works realised in Europe, followed by Africa, Asia and the Middle East. Maintenance of existing infrastructure constituted 21% of turnover, with the largest shares taking place in Europe and Central and South America. The total annual turnover marks



a decline of nearly 8% from the 2019 figure (EUR 5.2 billion, US\$ 6.17 billion), and aligns with 2017's turnover. The figures in this report exclude turnover from projects that were not available for international tendering in open markets. IADC does not publish information about projects in closed markets, such as China and the United States, as the data cannot be verified and therefore are not reliable.



REFERENCES

BP Statistical Review of World Energy https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil. html#oil-consumption

EM-DAT

https://www.emdat.be/cred-crunch-59-covid-19-and-other-disasters

Global Energy Review 2020 https://www.iea.org/reports/global-energy-review-2020

Global Wind Energy Council

https://gwec.net/gwec-wind-power-industry-to-install-71-3-gw-in-2020-showing-resilience-during-covid-19-crisis/

International Energy Agency
https://www.iea.org/reports/global-energy-review-2020

International Monetary Fund

https://www.imf.org/en/News/Articles/2021/02/24/na022521-how-to-save-travel-and-tourism-in-a-post-pandemic-world

International Trade Center https://www.trademap.org/

United Nations Conference on Trade and Development. SDG Pulse https://sdgpulse.unctad.org/trade-developing-economies/ https://unctad.org/system/files/official-document/wir2020_en.pdf

United Nations World Tourism Organization https://www.unwto.org/news/impact-of-covid-19on-global-tourism-made-clear-as-unwto-countsthe-cost-of-standstill

World Population Review https://worldpopulationreview.com/

World Trade Organization
https://www.wto.org/english/news_e/news21_e/miwi_02sep21_e.htm

METHODS

'Dredging in Figures' has been carefully compiled on the basis of the results of a Delphi survey amongst IADC members, analyses of company reports and other sources, public or otherwise. All information has been verified to the best of IADC's ability. IADC and its members cannot be held accountable for any inaccuracies. The review does not necessarily reflect the opinions of the individual IADC members.

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The International Association of Dredging Companies (IADC) is the global umbrella organisation for companies in the private dredging industry. As such, IADC is dedicated to promoting not only the skills, integrity and reliability of its members, but also the dredging industry in general. The information presented here is part of an on-going effort to communicate with clients, stakeholders and other concerned parties about the fundamental importance of dredging and maritime construction.

