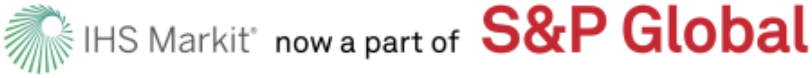
QUE$TOR
by S&P Global



Release Notes

QUE$TOR

2022 Q1 Release

May 2022

Contents

Introduction

We are pleased to provide the 2022 Q1 release of the QUE$TOR cost estimating software. The install files and supporting documentation for the QUE$TOR 2022 Q1 release are available for download here.

All cost databases have been reviewed and updated to incorporate current unit rates, exchange rates and man hour costs for all regions to reflect first quarter (Q1) 2022 prices.

The technical enhancements made to QUE$TOR 2022 Q1 are outlined below. These changes have been made at the request of users and through internal review. We actively encourage feedback from users as a means of improving the functionality, accuracy, and ease of use of the program.

If you are new to QUE$TOR, please read the installation procedure and licensing section in this document prior to installation of the program.

General upgrades in QUE$TOR 2022 Q1

In response to user feedback the following features have been implemented in QUE$TOR 2022 Q1.

- Greenhouse gas emissions
- Onshore flare gas and CO_2 emissions updates
- Manifolding enhancements
- Offshore wind farm component
- Topsides electrification
- Offshore power cable enhancements

Greenhouse gas emissions

The greenhouse gas (GHG) emissions report, accessible from the Project menu, now includes offshore and onshore components in its analysis.

GHG emissions
New offshore project

		Totals	Combustion	Flaring
Production				
Production and surface processing	teCO2	1,752,103	1,428,339	323,765
Operational				
Maintenance	teCO2	167,043	167,043	
Total emissions	teCO2	1,919,146	1,595,381	323,765
Emissions intensity	kgCO2/BOE	7.58	6.30	1.28
Total BOE equivalent production	MMBOE	253.12		

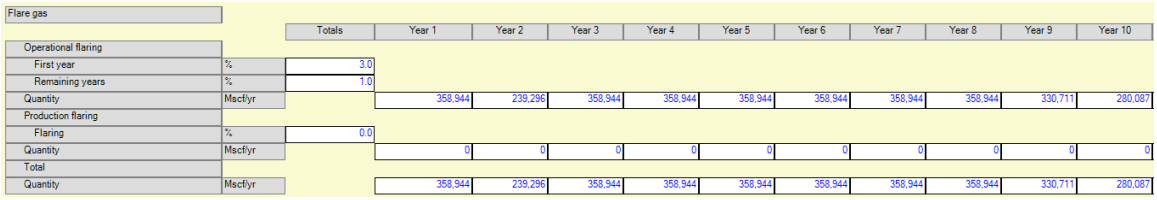
The report includes the CO_2 emissions for the Production and surface processing and Operational maintenance categories. The emissions are calculated at the activity level and summed at the category and project levels. The emissions intensities are estimated at the category and project levels.

The report allows individual activity emissions to be adjusted or removed to accommodate a company's or individual's requirements.

Onshore flare gas and CO_2 emissions updates

A new section for Flare gas volumes has been added to the Logistics and Consumables section of OPEX for onshore projects. Flared gas is a significant contributor to CO_2 emissions and you now have more control over defining the gas volumes going to the flare in any onshore project. The new section is split into two categories:

- Operational flaring occurs at the start-up of production wells, planned shutdown of equipment during production, flaring of gas that does not meet export specification, flared gas volumes due to equipment maintenance and equipment outages. In this category, it also includes any gas flared during an emergency shutdown (which includes process trip of equipment, shut-in of the wells, and all process purges and pilots). An allowance is added for the gas flow keeping the flare ignited.
- Production flaring is the intentional flaring of production gas in a typical no export option. This is manually set by adjusting the flaring percentage input. Production flaring accounts for any produced gas after fuel gas, operational flaring, and processing losses have been accounted for.



Flare gas		Totals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operational flaring												
First year	%	3.0										
Remaining years	%	1.0										
Quantity	Mscf/yr		358,944	239,296	358,944	358,944	358,944	358,944	358,944	358,944	330,711	280,087
Production flaring												
Flaring	%	0.0										
Quantity	Mscf/yr		0	0	0	0	0	0	0	0	0	0
Total												
Quantity	Mscf/yr		358,944	239,296	358,944	358,944	358,944	358,944	358,944	358,944	330,711	280,087

Figure 1 - Flare gas in OPEX Logistics and Consumables

The Flare load line item in the CO_2 emissions section of OPEX is calculated based on this new addition of operational and production flaring. This replaces the previous assumptions, although any user-edited values will remain locked. The calculated CO_2 emissions from flaring assume that the flared stream is primarily methane and that the combustion is complete. Due to the change in assumptions regarding annual gas quantities flared, this could produce a notable increase in the amount of CO_2 emitted.

Manifolding enhancements

Production facilities and topsides have had changes made to manifolding. Manifolding now calculates the weight of the manifolds based upon the number of inlets, flowrate, and design pressure. Previously the weight was calculated based upon the number of remote and platform wells, risers, and flowlines coming from upstream components.

As part of this change to manifolding, inputs have been separated into two tabs on the manifolding form, one for the manifold components and the other for the required accessories. This means that the weight for manifolds and accessories is now calculated separately on each tab with a total weight for each displayed. Both the manifolds and the accessories total weights are reported on the cost sheet as separate line items. These have their own database cost entries and therefore some change in cost can be expected in manifolding when upgrading cases to 22.1.

For topsides the well bay area has been revised to include remote risers. Previously, the number of well bays required was based on the number of platform wells only. As remote risers are now considered as an inlet coming into the platform, this is now included in the well bay calculation. This may result in an increase in the number of well bays/porches that are required.

Offshore wind farm component

Platform electrification is just one of several measures currently being adopted to accelerate the decarbonization of new and existing offshore oil and gas assets. The long-term strategy is to reduce and eliminate the requirement for local gas turbine generators by sourcing power either from subsea power cables from shore or from offshore wind turbines.

A new **Offshore wind farm** component is now available in QUE$TOR Offshore to estimate the capital, operating, and decommissioning costs of an offshore floating wind farm used to provide electricity to new and existing offshore oil and gas production facilities. The reduction on greenhouse gas (GHG) emissions from the connected facility can be seen in OPEX and in the GHG emissions report. The new component can also be used to create a standalone wind farm with the capability to export power to shore.

The wind power is provided by floating wind turbines installed on either semi-submersible or spar substructures. This new component enables you to:

- Provide full or partial power to new or existing offshore facilities
- Provide power to grid
- Lower power generation topsides weight and cost by reducing the size of the power plants (both gas turbines and diesel engines) and their associated fuel consumption
- Reduce the total GHG emissions

The offshore wind farm component can be selected from the offshore component toolbar and connected to other components (i.e. Topsides, Landfall, Sink, and Source) via power cables as shown in Figure 2.

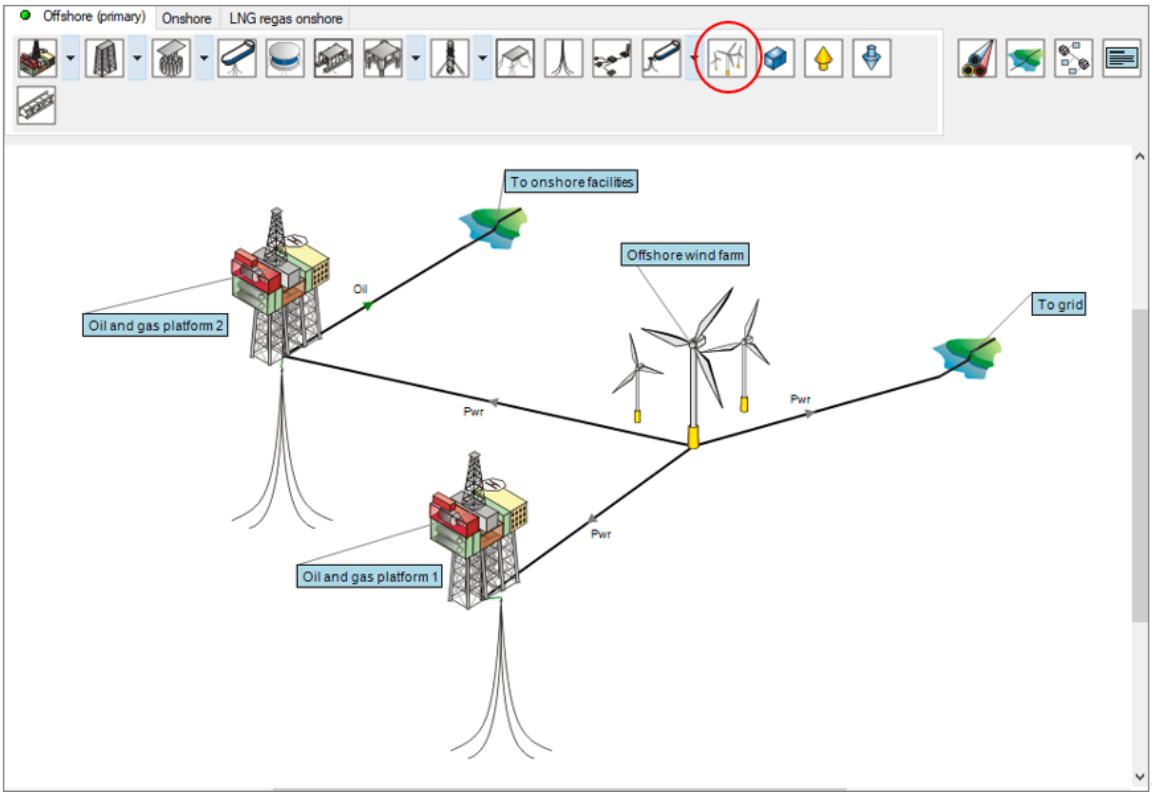


Figure 2 - Field development schematic of a project including the offshore wind farm component

The **Design parameters** in the Primary input tab, shown in Figure 3, allow the primary sizing criteria to be set. The **Topsides power demand** shows the demand from any power cables connected to offshore facilities. The **Other power demand** indicates the power required by other sources, like power sent to the grid. These two

demands ultimately calculate the size and the number of actual turbines to be installed, which in turn determine the wind farm **Rated capacity**. The **Average annual power generated**, which is the estimated power provided by the offshore wind farm over a year, can then be checked against the **Required wind power**. Given the inherent variability of wind, the **Percentage to replace** and **Wind capacity factor** can be adjusted to tailor the design capacity required to achieve the annual power supply needed from the offshore wind farm.

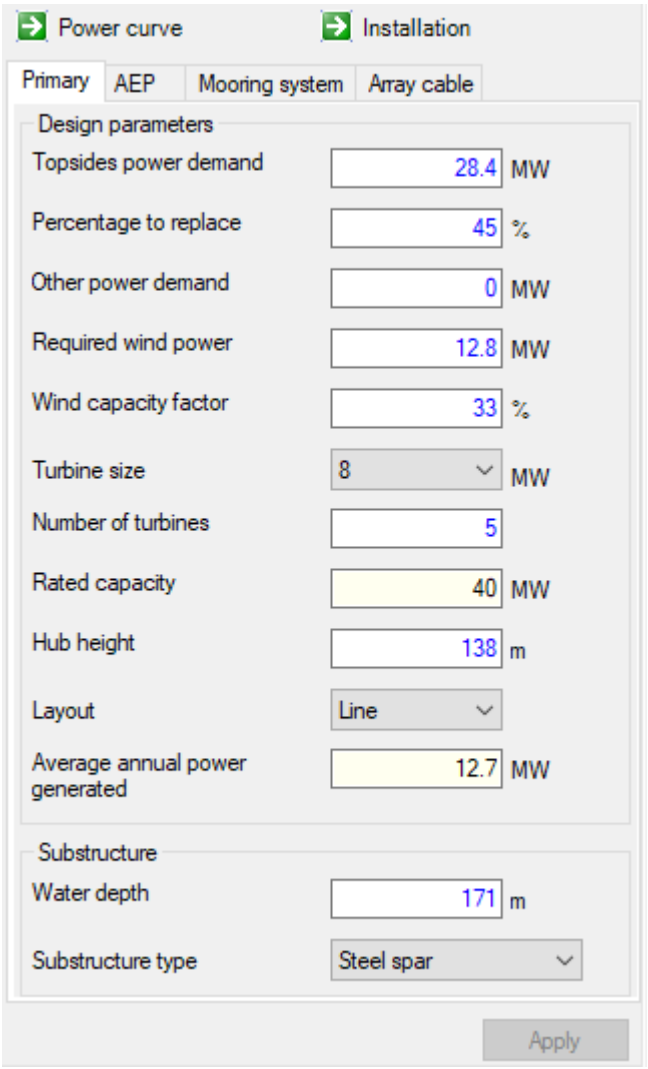


Figure 3 - Steps to design the optimal offshore wind farm configuration

Topsides electrification

With the increase in industry consideration of scenarios powering topsides with offshore wind farms or with power from shore, we have adjusted the default driver options for pumping and compression to electric drive when an Offshore wind farm is connected. This means that all rotating equipment is driven by electric motors and their power demand is shown in the power input form. Power is still expected to be partially produced by gas turbine driven generators given the inherent unpredictability of wind. An electrified topsides allows for the maximum power offset from the wind farm and more flexibility in modelling a reduced number of gas turbine driver trains.

To facilitate electrified topsides we have also extended the maximum electric motor size, including theoretical 40 MW and larger electric motors. The design duty and the number of motors used have been improved to ensure even large power needs are met with multiple trains of smaller and more feasible motors.

Offshore power cable enhancements

You can now select between AC (alternating current) and DC (direct current) power cables for transferring power between components including Topsides, Offshore wind farm, Landfall, Offshore source, Offshore sink, and Offshore loading. AC power cables are selected as default.

Current carrying capacities and unit costs of cables and risers were reviewed as part of this enhancement. As a result, the conductor area and overall cost of any existing power cables has been impacted. The type of power cable, number of conductors (3-core AC or bi-pole DC), and conductor area are shown on the cost sheet.

The topsides power distribution weight calculation was also reviewed and updated to make allowance for converters, transformers, and switchgear when power is either received or transferred via offshore power cable. When you select AC cables, distribution weight includes transformers and switchgear. When you select DC cables, added allowance for converters, transformers, and switchgear are made. This change impacts power distribution weight and cost.

Cost data sources and accuracy

The QUE$TOR cost databases available within the program are regional, and together, in total, provide worldwide coverage. Each regional cost database contains a full set of cost data for that region, from equipment costs to labour rates and operating assumptions. When a new procurement strategy is created, the most appropriate regional database for each cost centre can be selected from the available list.

The costs within each cost database are updated on a six-month basis, with the Spring release representing costs from the first quarter (Q1) and the Autumn release representing costs from the third quarter (Q3) of the year.

Cost data sources

A dedicated team of costs analysts research cost data throughout the year from a large variety of sources.

- A main source of information is regular interaction with vendors, suppliers, manufacturers and contractors. A solid network of equipment manufacturers and service providers has been established to constantly gather Free on Board (FOB) quotations and market trends.
- New information and data are provided quarterly by the IHS Markit Global Insight, Petrodata and CERA teams. These teams are responsible for quarterly reports and indices of the main oil and gas market sectors – such as Offshore Rigs, Offshore Installation Vessels, Land Rigs, Engineering and Project Management, Steel, Yards and Fabrication, Equipment, Bulk Materials, and Labour.
- Information exchange with current users is also crucial to the completeness and accuracy of QUE$TOR cost data. The number of cost estimators and field development engineers who are willing to share cost data and industry insights with the QUE$TOR team is increasing every year. Sharing information ultimately means making QUE$TOR a better tool for project estimates.

- Publications and technical literature are used as additional data sources. These are sometimes oil and gas specific and sometimes more generic and suitable weighting is applied to the most reliable and appropriate sources.
- Government statistics (e.g. US Bureau of Labor Statistics, UK Statistics Authority, Eurostat, Australian Bureau of Statistics, Russian Federal State Statistics Service, etc.).
- Cost indices, e.g. the IHS Markit CERA Upstream Capital Costs Service Index (UCCI), the US Department of Labor Producer Price Index and Consumer Price Index, the IHS Markit Global Insight Price Index and the ENR's Construction Cost Index. These are more aggregate and so are not used directly but can help generally inform the direction other industry analysts see the market moving.
- In-house cost models for more QUE$TOR specific items, e.g. secondary steel and tanker turrets. Models are also used to track the cost movements of the market demand for other items e.g. pressure vessels and heat exchangers.

QUE$TOR cost databases currently have more than 100,000 data points, an amount that is always increasing as new technologies are continuously added to the software. Given the significant number of inputs to be updated every release, budgetary quotations on specific equipment and services are usually gathered periodically and as needed, but then cost data are adjusted on a six-month basis based on market analysis.

Accuracy

QUE$TOR provides an estimate based on the costs within the markets today. No allowance for inflation or deflation of costs is made over the project life.

All costs within QUE$TOR are specific to a particular point in time (depending on the version). No tax, inflation or discounting is applied to the estimate to costs incurred over the project life.

QUE$TOR is designed for use early in the project cycle. Therefore, the accuracy level that can be attained by using the program is typically within the range of +/- 25% to 40%. This corresponds to AACE International Class 5/4.

Cost database update

Substantial effort has gone into reviewing all cost databases to bring them in line with first quarter 2022 costs. The following sections, outlining the market trends seen over the past six months, are the result of IHS Markit research, analysis, and insight. QUE$TOR cost databases aim to provide accurate and reliable data that is representative of current market conditions.

Note: When saving a project, the QUE$TOR 2022 Q1 cost estimates will overwrite earlier costs except where those costs are 'locked' on the cost sheet or in the database. Therefore, if you wish to retain a copy of your original estimate you should first create a duplicate of the project before opening and saving it in QUE$TOR 2022 Q1.

QUE$TOR takes a considered view and tries to avoid any transient cost variations with the aim of providing accurate cost data to be used for cost estimation purposes. Therefore, you may see some differences in trends, especially for commodity prices as compared with the latest available data. Further detail relating to the impacts on the cost database are provided in the Benchmarking Report, available via the download site.

General

The COVID-19 pandemic has shaped global economic activity since 2020 and is anticipated to continue for the foreseeable future with more contagious but less severe forms of COVID displacing previous more severe strains. The global economy is adjusting to the reality of COVID and the fact that it will be present in everyday life for some years to come.

As restrictions eased in the fourth quarter of 2021, the global economy showed strong signs of recovery throughout 2021. This placed significant challenges on the supply chain in the form of availability of raw materials, finished goods, and labour. These challenges were further compounded by low global inventory levels and disruption to elongated global supply chains, which have been recovering after the initial COVID-19 pandemic and the shutdowns that followed.

These issues have, more recently been compounded by conflict in Ukraine, which is a global supplier of commodities and the sanctions

imposed on Russia in response to the conflict. The conflict has provided significant support to global oil and gas prices as well as highlighted energy security as a major issue for Europe.

The rapid increase in oil and gas prices is one of the largest drivers supporting increased inflation rates. Prices are increasing despite the release of significant quantities of oil from strategic oil reserves by some western governments and reassurances from OPEC members that they are increasing oil supply to calm oil markets and meet increased demand.

The conflict in Ukraine, coupled with supply shortages, supply chain interruptions, significant inflation, and newly increased taxation measures introduced by governments in response to the pandemic have contributed to some significant cost increases. These increases are expected to continue throughout 2022 and beyond until such time as oil and gas prices reduce to more sustainable levels and there is some form of conflict resolution in Ukraine.

Russian cost database

The Russian cost database has been updated with available regional and global cost data. However, given the conflict with Ukraine and the recently imposed sanctions, the market situation has been unclear and it has proven difficult to source data. For some of our regionally sourced cost items, previous cost values have been maintained in the cost database. Due to the limited data update, care should be taken when using this database until costs can again be reliably sourced. Should you need any further insight regarding our Russian data please contact us at customercare@ihsmarkit.com.

Oil price trend

Figure 4 - WTI and Brent crude oil prices

The recent conflict in Ukraine has introduced significant uncertainty in the price of oil, and this was preceded by a steady increase in crude oil prices through the start of 2022 following a notable drop toward the end of 2021.

In November 2021, crude oil supply turned from deficit to surplus with the emergence of the COVID- 19 Omicron variant and the announcement by the US of releasing oil, both of which sent prices tumbling. However, crude oil prices rebounded and climbed to new highs as OPEC+ members produced below their monthly quotas and the Omicron variant turned out to be less severe than previous variants, prompting a more rapid 'return- to- normal' than was anticipated.

The war between Ukraine and Russia has introduced uncertainty into the market and has also directly impacted the flow of Russian energy exports. These drivers have caused crude oil prices to exceed the 100

USD/bbl benchmark for the first time since 2014. Prices also surged over 120 USD/bbl in early March due to the ongoing conflict and combined with a decline in crude inventory in the US.

Crude oil prices dropped sharply after experiencing an initial price surge. This was driven by the hopes that Saudi Arabia and the United Arab Emirates could increase production and that demand would decrease in China due to new COVID-19 movement restrictions. Although, as evidenced by a subsequent second price surge, low storage inventories, the ongoing Ukraine-Russia conflict, low spare production capacity, and COVID-19 restrictions in China will likely cause daily price volatility to be high in the near term.

Currency market

The high volatility in the currency market during the first quarter of 2022 was mainly the result of the Russian invasion of Ukraine at the end of February. The uncertainties and fears over the impact of the war and the reaction from Europe, the US, and other allies on the global economy have significantly affected all major markets. Europe's strong dependence on Russian energy supply, Russia and Ukraine's roles as major suppliers of agriculture products, metals, and other key raw materials, as well as the sanctions imposed in response to the Russian invasion, were all crucial factors in the global market's initial reaction to the conflict.

To a certain extent, the war in Ukraine amplified some of the key market trends already developing before the start of hostilities e.g., rising commodity prices, higher interest rates, and a broadly firmer US dollar (USD). In particular, the jump in raw materials and energy prices is reinforcing concerns that inflationary pressures are likely to continue as measures from governments and central banks have taken too long to be implemented.

Those currencies that have received support from active central bank policy making (USD, CAD) have outperformed those where central bank rate hikes have remained more limited. The best performing countries this first quarter of the year have been commodity producers such as Angolan kwanza (AOA) and Brazilian real (BRL), while the worst have been commodity importers with close economic links to Russia, such as the Turkish lira (TRY), Polish zloty (PLN), the euro (EUR), the British pound (GBP), and Korean won (KRW).

The world economy is projected to lose pace this year as inflation rises due to the war and the reinstated Covid-19 lockdowns in China while fiscal and monetary policies tighten. Risks to future global economic growth include China's economic performance, new variants of Covid-19, the evolution of the Russia-Ukraine war, and the impact of further sanctions on Russia.

Table 1 shows the exchange rates of the major local currencies, expressed as equivalent to 1 USD, and the percentage change between Q1 2022 and Q3 2021. The variations are also more clearly summarised in the chart in Figure 5.The exchange rates have been averaged over the last full month of the quarter to mitigate the volatility caused by the significant uncertainty associated with the recent economic fallout caused by the Ukrainian conflict.

Region	Country	Local Currency	Q3 2021	Q1 2022	Percentage change
North America	Canada	CAD	1.266	1.265	-0.08%
South & Central America	Argentina	ARS	98.209	109.305	11.30%
	Brazil	BRL	5.268	4.979	-5.49%
	Chile	CLP	784	798	1.79%
	Colombia	COP	3,818	3,799	-0.50%
	Mexico	MXN	20.015	20.553	2.69%
	Peru	PEN	4.075	3.709	-8.98%
West Europe	Eurozone	EUR	0.849	0.908	6.95%
	Norway	NOK	8.655	8.828	2.00%
	UK	GBP	0.727	0.759	4.40%
East Europe	Czech Republic	CZK	21.558	22.709	5.34%
	Kazakhstan	KZT	424	502	18.40%
	Poland	PLN	3.876	4.315	11.33%
	Russia	RUB	72.854	110.250	51.33%
	Turkey	TRY	8.554	14.591	70.58%
	Ukraine	UAH	26.565	29.396	10.66%
Asia	Australia	AUD	1.365	1.355	-0.73%
	China	CNY	6.456	6.343	-1.75%
	India	INR	73.4	76.1	3.68%
	Indonesia	IDR	14,256	14,341	0.60%
	Japan	JPY	110	119	8.18%
	South Korea	KRW	1,172	1,221	4.18%
	Malaysia	MYR	4.163	4.196	0.79%
	Singapore	SGD	1.347	1.359	0.89%
	Taiwan	TWD	27.700	28.410	2.56%
	Thailand	THB	33.000	33.190	0.58%
	Vietnam	VND	22,727	22,855	0.56%
Africa	Algeria	DZD	135.880	142.160	4.62%
	Nigeria	NGN	411.0	415.5	1.09%
	Angola	AOA	613.7	460.5	-24.96%
	South Africa	ZAR	14.560	14.960	2.75%
Middle East	Saudi Arabia	SAR	3.745	3.745	0.00%
	UAE	AED	3.673	3.672	-0.03%

Table 1 - Exchange rates and fluctuations of major local currencies since Q3 2021

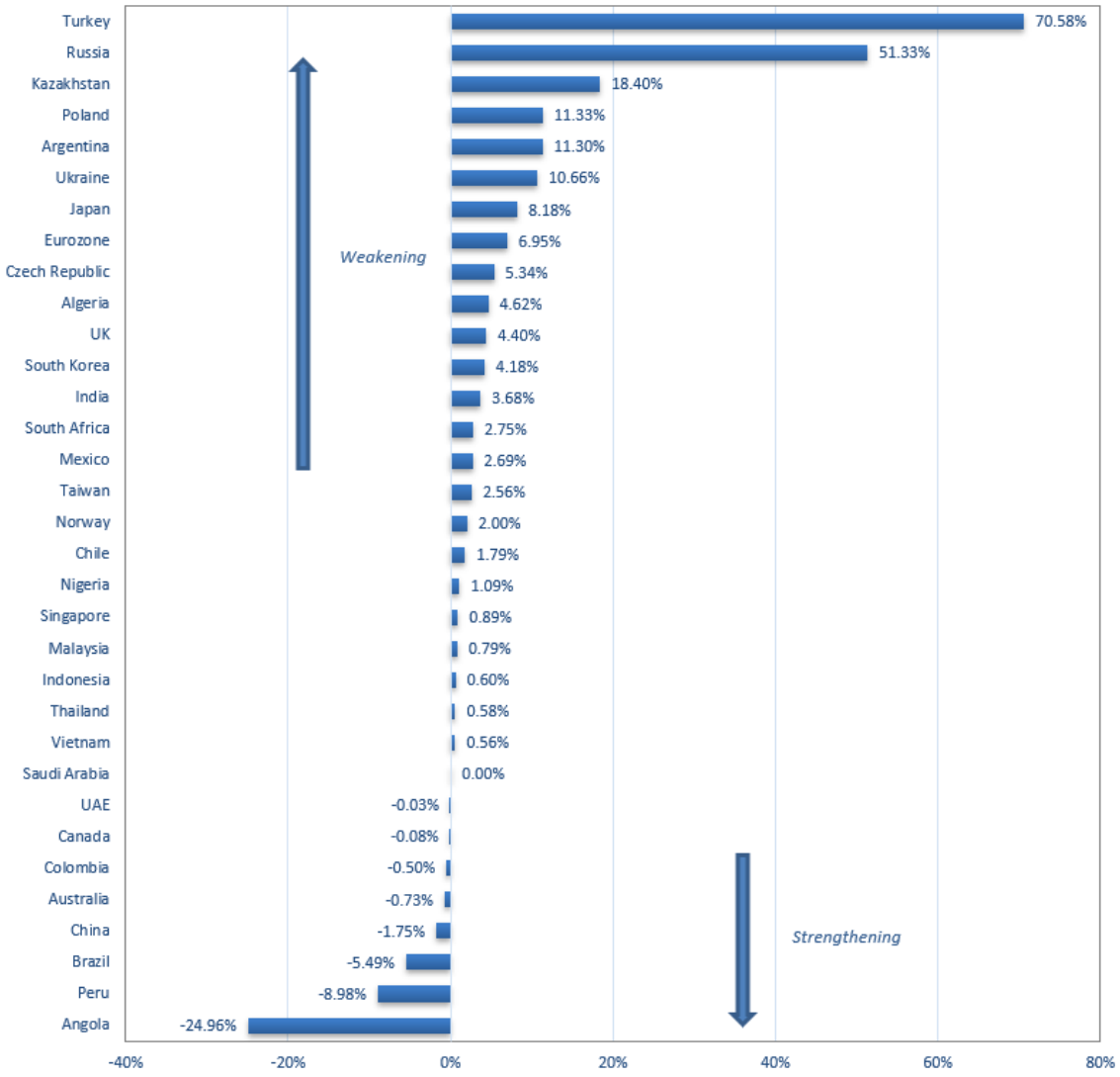


Figure 5 - Exchange rates variations relative to USD

Steel

While steel prices rose considerably in the first half of 2021, the market began to rebalance in the fourth quarter as input costs declined and supply began to meet demand. However, with the Russian invasion of Ukraine in the first quarter of 2022, steel prices once again noted significant increases, particularly in Europe and the Mediterranean. Regionally, demand has remained relatively stable for most products, but massive logistical challenges and rising raw materials costs are negatively impacting the already limited supply. Prices for almost all steel products in most regions are unsustainably high. Given the roughly six-month lead time for procurement, stainless steel and alloy products showed the most notable gains worldwide as high input costs

and supply chain issues affected prices. Linepipe also showed large price increases for all regions, most notably in Europe, the Mediterranean, and North America, as the costs of plate and sheet steel rose considerably due to significant supply restraints for raw materials and the high cost of iron ore. As the conflict in Ukraine continues through 2022, the steel market is expected to rebalance. However, prices remain unpredictable and will continue to be impacted by global events.

Despite an anticipated decline in the fourth quarter of 2021, carbon steel linepipe prices increased globally by 28% in US dollar terms, due mainly to the massive rise in input costs resulting from the conflict in Ukraine. European linepipe marked significant increases in local currency as lower export volumes from Russia and Ukraine affected supply, particularly for seamless products. Additionally, demand has risen as high oil prices incentivize increased drilling activity, putting additional pressure on the supply chain and further tightening the market. North American linepipe also increased considerably. Despite efforts to increase production, inventories remain short, and the high input costs have reduced margins, providing little incentive for mills to further increase production to meet domestic needs. Globally, linepipe prices are expected to increase in most regions through the third quarter of 2022. However, as both Russia and Ukraine are primary suppliers of raw materials and input products for many regions, it remains to be seen how an extended conflict will impact the global market.

Continuing the upward trend that began in the first quarter of 2021, oil country tubular goods (OCTG) experienced some of the largest increases of any steel product, with prices in Europe, the Middle East, and South America rising most notably in the last six months. As oil prices escalated to record levels in the first quarter of 2022, demand for OCTG has increased globally and mills are unable to adequately match production output, particularly affecting inventories in Europe and North America. Additionally, costs for specialty raw materials such as nickel and titanium soared in the first quarter due to supply chain disruptions and shortages. Global consumption of OCTG is anticipated to rise through 2022, most significantly in the United States, while supply delays and elevated input costs tighten an already strained market.

In the last six months, global structural steel and rebar prices rose in US dollar terms by 12% and 13%, respectively. While declining input costs and decreasing construction activity in China due to COVID-19 outbreaks tempered prices in the fourth quarter of 2021, the conflict in

Ukraine significantly impacted prices, forcing large increases. Both Russia and Ukraine are major exporters of iron ore and scrap to Europe and North America. Without Russian iron ore and pig iron, producers have depended heavily on scrap inputs, causing the cost of scrap to rise substantially in 2022, particularly in Europe, North America, and South America. While Brazilian iron ore supply can prevent major shortages, prices for structural steel and rebar are anticipated to remain steady through the third quarter of 2022 as inventories replenish and Russian and Ukrainian raw materials are expected to re-enter the market.

Equipment

Equipment costs have increased moderately in the first quarter of 2022, where the main drivers have been the high costs for inputs like steel and bulk materials. The rise in oil prices and the increase in project activity also contributed to the escalation in equipment price overall. In some cases, like the European market for global equipment, currency fluctuations against the US dollar tempered the impact on equipment costs, causing them to drop slightly. However, overall costs went up for most regions.

Supply chain disruptions continue to affect the equipment market, augmented by the conflict in Ukraine. Impacts of the COVID-19 pandemic are still being felt globally, and recent outbreaks in China are adding uncertainty to the market. This continues to create global supply chain disruptions, in turn affected by sporadic changes to regulations and trade restrictions. Irregular increases in freight costs, particularly shipping and transportation rates, are causing major disruptions to shipping routes, resulting in shortages in some manufacturing and spare parts.

Heat exchanger prices increased slightly in the first quarter of 2022. Similar to last quarter, high input costs are the main driver for this increase, in particular direct material costs such as steel and other metals. Some improvements to the supply conditions have been seen. However, supply chain disruptions, worsened by the conflict in Ukraine, remain a heavy influence on the high costs. Moving toward the end of 2022, the market is expected to begin rebalancing as supply chains stabilize which, in conjunction with solutions like the customization of equipment and off-the-shelf solutions, are expected to dampen the price increases.

Tanks and pressure vessel costs for all regions have seen a moderate increase in local currency in the last quarter, continuing the previous quarter's upward trend. This is also due to the higher input costs for steel products, alloys, and labour, magnified by the conflict in Ukraine.

Gas turbine costs saw a reasonable increase in US dollars in the first quarter of 2022, influenced by the higher input costs. Although some improvements are expected towards 2023, manufacturers are still dealing with mounting backlogs and longer delivery times. The market is now also having to deal with energy transition momentum, and major manufacturers are downsizing their oilfield services to accommodate orders from the renewables industry.

Bulks

Bulk materials consist of various products including steel, concrete and cement, wire and cables, electrical components, instrumentation, valves, paint, asphalt, and insulation. Bulk materials demand is mostly influenced by construction activity in the residential and commercial sectors, which depend on the state of the economy. Therefore, the demand for bulk materials tends to be subject to specific market conditions and local economic development.

In the last six months, bulk material prices were expected to flatten but have continued trending upward in the first quarter of 2022 due to high inflation and the Russian invasion of Ukraine. Globally, increasing steel and raw material costs facilitated a rise in price of bulk materials. Higher oil and natural gas prices are also assisting in the recovery of energy sector project activity, further increasing demand for bulk materials. Due to inflation, rising raw materials costs, and high oil prices, the bulk materials market is expected to tighten further through the third quarter of 2022.

Supply chain disruptions are influencing the bulks market as the effects of the COVID-19 pandemic continue to impact all regions. The outbreak of new COVID-19 cases in China is fuelling uncertainty and causing delays to the supply chain. Regulatory changes and rising transportation tariffs are also contributing to increasing prices of bulk materials.

As global investment in the power and renewables sector grows, demand for wire and cable is rising. While copper prices have continued to remain high through the first quarter of 2022, inventory remains low, causing the potential for unexpected price increases. Prices are expected to flatten by the end of 2022 as construction activity in China

and Southeast Asia slows due to shutdowns. Any additional disruption due to the conflict in Ukraine could add further increases to copper prices.

In the last six months, switchgear and transformer prices experienced steady growth. This is largely due to the significant increases in input costs for steel, other specialty metals, and transportation. Supply chain disruptions and increased investment in the power and renewables sector also placed further upward pressure on the market. While new energy projects have impacted the market for switchgears, modifications to the existing power network in the US have also contributed to price increases in the first quarter of 2022. Moving toward the end of the year, prices could flatten due to COVID-19 lockdowns in Asia.

Cement and concrete prices increased in the first quarter of 2022, due primarily to increased spending in infrastructure. As crude oil prices increase, demand has risen for higher price oil cement used in well construction activity. Cement and concrete prices also rose due to labour shortages and wider adoption of eco-friendly cement and concrete products. The business model has shifted towards net-zero emissions targets. Lower-carbon versions of cement and concrete are more expensive, bringing up the overall average price for cement and concrete. As with other bulk products, lockdowns in Asia may temper demand and offset price increases.

Bulk materials prices are expected to continue rising through the third quarter of 2022. However, the conflict in Ukraine and lockdowns in Asia will be key factors in determining the overall extent of the increase. In addition, the $1.2 trillion Infrastructure Investment and Jobs Act passed in the US, plus increased investment in the power and renewables sector, could escalate the demand and further tighten the market.

Offshore rigs

The offshore rigs market has continued its improvement from 2021, with increasing fixtures, utilization, and day rates. Rising oil demand and conflict in Ukraine support increasing confidence in the market. Early indications show that a significant number of previously cold stacked rigs are either being reactivated or being considered for re-activation. Many of those rigs now being reactivated are for long-term contracts with extensions. However, the offshore rigs market also has short-term issues to manage, specifically the ongoing effects of

COVID-19, crew shortages, and supply chain issues caused by a near collapse in offshore drilling activity over the past 5 years. Longer-term, the offshore rigs market will have to adapt to stricter environmental legislation, emission standards, and the transition to renewable energy.

Early terminations and contract cancellations in 2020 due to the COVID-19 pandemic, along with low crude oil prices, have made it extremely difficult for drilling contractors and the total number of offshore rigs decreased. 2021 saw the highest attrition since 2018, with the jackup market being hit the hardest. Some of the offshore rigs that left the market were scrapped and some were converted for use in the renewable sector.

With recent activity in Southeast Asia, the floater market has seen new rig requirements and new contract fixtures being announced. Indonesia was the only country in the region with a floater requirement until 2022. However, based on recent activity and tendering levels, several other Asian countries are currently considering the use of floaters. In the jackup market, demand has been increasing, with Indonesia and Malaysia driving current and future demand. There will likely be a higher demand for jackup rigs as more activities are anticipated across the region.

In the Indian Ocean, the floater and the jackup markets have started the year quietly compared to Southeast Asia, with only a single award announced for both markets so far in 2022. Demand for semis has decreased whilst jackup demand has been maintained in the first quarter of 2022.

In West Africa, drillship demand continued to increase with more requirements announced. The semis market remained quiet during the first quarter of 2022, with an uptick in the jackup market. Further demand is expected as the year progresses.

In the Middle East region, the demand for jackup rigs increased as NOCs continued to increase production capacity and, in turn, boost overall rig numbers. Future growth is expected to be driven by new requirements from Saudi Arabia and UAE. Jackup supply also decreased in the region, increasing upward pressure on rig rates, which are expected to increase and are being underpinned by increasing operating costs.

The Latin America offshore rig market has handled the COVID-19 pandemic better than most regions and is now in a strong position to benefit from increased demand in 2022 and beyond. Future demand is expected to support current high utilization levels within the region.

In North America, the floater market remains active with multiple new rig requirements and new fixtures announced in the first quarter of 2022. The availability of drillships remains tight; more drillships are expected to enter the region as the year progresses. The demand for semis remains flat as drillships are now the primary regional preference. Jackup demand is at its lowest since 2016.

In Northwest Europe, the floater market remains active with multiple new rig requirements and new fixtures recently announced. However, floater day rates remain relatively unchanged. Northwest Europe also has the highest attrition rate for the semis globally. Jackup demand is expected to remain broadly flat due to an oversupply and lack of long-term drilling programmes.

The spider diagram in Figure Figure 6 shows the percent changes implemented in QUE$TOR 2022 Q1 to the offshore rig day rates.

The shortage of data for recent fixtures in some regions has made the day rate update challenging for some rig specifications. Day rates in QUE$TOR are based on our best understanding of the market at the time. Often it is hard to identify the most representative day rate for every offshore rig class in the current commercial market, where variable transparency makes some rates private and those rates which do become public knowledge do so on a variable timescale.

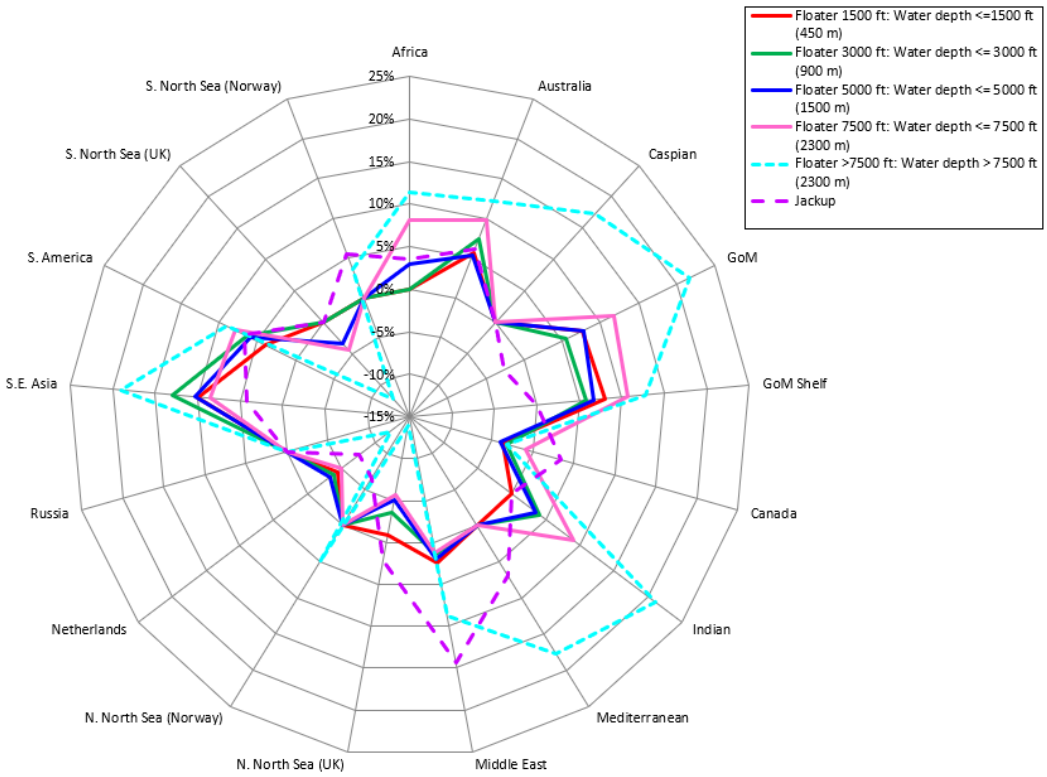


Figure 6 - Regional offshore rig day rate changes since Q1 2022

Offshore vessels

The offshore vessel market has started the new year facing challenging times; however, optimism has increased and there are expectations that offshore vessel owners could get higher day rates as the year progresses. This is supported by increased demand for some vessels in some regions, e.g., construction support vessels in the US Gulf of Mexico.

The recovery in offshore vessel demand has already begun and most market segments and regions are showing increased activity and higher utilization. In addition, the requirement for reduced emissions is increasing in the offshore vessel market to meet tighter environmental legislation. Vessel owners have started to move towards net-zero emissions with conversions of existing vessels, adding battery and hybrid capability to their fleets. These new vessel designs provide an indication of where the market is heading to meet increasing emissions targets and support future sustainability.

In Asia Pacific, the utilization rate remains low, but demand is expected to increase in the next several quarters as countries look to other regions to ensure energy supplies following the conflict in Ukraine. The oil and gas market is also competing with an increased demand in the renewable energy market for higher specification vessels which may put pressure on day rates.

In Latin America, demand in Brazil has been steadily increasing due to a stronger drilling activity and a spate of new discoveries. Higher operating costs are also providing support for increased day rates.

The Middle East saw declining seasonal demand for the offshore vessel market in early 2022. As many clients concluded their annual campaign, the utilization rate fell further from the previous level. At the end of the first quarter of 2022 vessel demand gained momentum, with more fixtures indicating a robust recovery ahead.

In Northwest Europe, vessel demand is expected to increase throughout the year from seasonally adjusted lows. Increasing demand will also provide support for increased vessel day rates, especially on some higher specification vessels. In March, term fixture activity started to increase as several vessels were chartered on new extended deals.

In the Gulf of Mexico, offshore vessel demand has remained strong since the end of 2021. Floating rig programs are the main activity that has underpinned increases in demand and hurricane remedial work. Higher operating costs and the shortage of skilled mariners has resulted in significantly higher day rates on most vessels, with construction support vessels seeing the largest increases. Higher day rates and increased demand are attracting more US flagged vessel to return to the Gulf of Mexico.

With a strong 2022 outlook, further increases in vessel day rates are expected, with the possibility that these extend until the end of 2022 and into 2023. Further increases could be supported by the rise in operating costs and shortages of crews with rates for some categories expected to outpace general rate rises, e.g., construction support vessels. Demand for these vessels is likely to increase due to a rise in activity both in the renewables and in the oil and gas market.

Subsea equipment

Subsea costs have seen a moderate but notable increase in the past six months. This increase has some sub market and regional variation but this is minimal with many subsea equipment items coming from a small group of global companies.

With costs driven more by demand than simple material input, the subsea market has been in a weak position over the last couple of years with low oil prices and weak demand. Oil prices have seen major increases in recent months, which has seen more orders being placed. However, the uncertainty introduced with the Ukraine conflict has taken focus, restraining the demand for subsea equipment and slowing cost increases.

The increases seen in the subsea market have been driven primarily by increases in raw material costs, labour costs, and inflation across the industry, although the contributions of each of these vary between the specific equipment items. Trees and manifolding have seen the largest increase with the rise in cost of labour and a substantial increase in the cost of steel and alloying metals. Flexible pipe and umbilicals have seen less increase with little sign of returning demand.

COVID-19 effects continue to show through, with supply chain and transportation issues impacting cost and timelines, although mitigation strategies are becoming more effective.

While the cost increases are the largest seen in subsea equipment in a while, they are still somewhat restrained. However, there is expectation, with high oil prices, of pent up demand driving up costs due to projects waiting in the wings starting to show up on order books in the coming months.

Labour

Workforce mobility issues during the peak of the pandemic have resulted in significant pressure being placed upon the general labour market rate. The requirement for in-person work was scaled back during the pandemic and now we are seeing a desire to increase that work again. There is now a backlog of work and scheduled projects coming online. In some regions, this is resulting in a tighter market for labour. During the pandemic, there was significant support for furloughed workers as governments tried to maintain industries and

their markets. In some cases, this resulted in a hold on wage increases until the work became available again. Markets now look ready to move forward with an overall general increase in the labour rate.

In the US market, the labour rate has increased by about 1.5%, but there are some differences between the type of labour and the work situation. For example, in the US offshore market there has been an increase of 1.2% for project management and 1.8% for general labour. For onshore projects in the US, the labour rate has increased by about 1.3% for project management and 2.1% for General labour.

Labour rates in other countries have followed this trend except for Russia, which has seen an increase, and Australia, which has seen a decrease. The labour rates in Russia are the result of wage inflation due to the Russian invasion into Ukraine. The decrease in Australia can be attributed to the harder lockdown practices imposed by the Australian government, lack of mobility in the marketplace, and adjustments in the exchange rate.

Growth in labour rates in Europe has picked up its pace from a nominal growth rate at the start of 2021. This can be seen in the construction labour index, which increased by 6% in USD terms and by 2.3% in the local currency in 2021, with most of this happening in the latter part of the year. For the 2022 Q1 release this translates to a labour rate increase of between 1.3% to 2%, with higher rates being seen in markets such as the UK where there is a skills shortage in the oil and gas sector. It is expected that Norway, with its current increase of 1.5%, may follow this higher wage growth as the new government has signed support for offshore exploration work that should create a need for more construction labour in the short term. In Europe, vacancies are also rising due to disruptions in migrant labour flows, which may also compound the skills shortage and wage growth.

In most other regions, project activity was increasing late in 2021 with new FEED awards being announced. This new work is helping to increase employment levels and boost wages. However, wage increases are unbalanced with companies struggling to fill higher wage technical positions (electrical, instrumentation, etc.) compared to general labour rates. This tightening of markets and limited demand availability means that there is wage growth in Africa, India, the Middle East, Asia, and South America in this half year at a rate of 1% to 1.4%.

Land rigs

Continuing the upward trend from 2021, day rates for land rigs increased globally by 2.4%. Rising oil prices and the Russian invasion of Ukraine have strained the energy sector, driving oil prices higher. Tender activity in most regions is growing, but utilization continues to struggle as operators limit the number of rigs online due to labour shortage and supply chain disruptions. While the COVID-19 pandemic forced significant fleet reductions, drilling contractors focused their efforts on negotiating performance-based contracts over the traditional day rate model. As drilling activity continues to increase, super spec rigs will be utilized first over other rig classes. However, as super spec availability tightens, contractors will reactivate idle lower-class rigs to manage the difference. Total rig utilization and day rates are expected to increase through 2022, driven by rising operating costs and demand.

North American high spec day rates increased by approximately 2.5% over the last six months as drilling activity continued to rise due to high oil prices and newly approved drilling budgets. The US rig count declined considerably in 2020 and is still working to recover. However, the North American onshore rigs market is much more reactive than other regions to rising oil prices. Super spec rigs, which experienced higher-than-usual utilization rates beginning in January of 2021, noted a slight decline in the fourth quarter of 2021 as shorter contract terms expired and utilization stagnated. Additionally, rig operators are struggling with insufficient labour and supplies. In all rig classes, North American day rates are expected to further rise through 2022 as drilling activity remains steady and stacked rigs are reactivated.

Day rates in all other regions experienced notable growth. However, South America, Africa, and Eastern Europe increased most significantly by an average of 3% in US dollar terms. Throughout 2020, as low oil prices and COVID- 19 safety restrictions limited drilling activity, operators placed most international rigs on stand-by contracts. While activity has risen in the first quarter of 2022, drilling contractors are anticipating even larger increases as the year progresses. Demand is high, particularly in the Middle East, and tendering activity is strong. Despite this, limited supply is impacting availability. As operating costs grow and the market tightens, day rates for all regions are expected to increase through the end of 2022.

Version compatibility

Projects created in QUE$TOR v8.0 and later are compatible with QUE$TOR 2022 Q1. However, projects created or saved in QUE$TOR 2022 Q1 cannot be opened in earlier versions.

Opening a project created in an earlier version of QUE$TOR will result in the costs and technical calculations automatically being updated, except where unit rates or results have been 'locked' when creating the original project. Changes will be made permanent when the project is saved and the case will no longer open in the earlier version. It is therefore advisable to make a copy of your project file before opening it in the new version.

QUE$TOR allows multiple versions of the program to be installed side by side in order to view projects created using earlier databases.

In order to run the latest version of QUE$TOR alongside older versions that use the previous licensing system, both the new and previous licensing systems will have to be setup on the machine running QUE$TOR.

System requirements

QUE$TOR 2022 Q1	
Operating system	Windows 7 SP1 / Windows 8.1 / Windows 10 [v1607][1]
Application disk space	275 MB
Disk space / project	~1 MB
Disk space / procurement strategy	~3 MB
Minimum monitor resolution	1024 x 768

[1] The 32-bit (x86) and 64-bit (x64) versions of these operating systems are supported.

Note: Windows 8 is no longer a supported OS but Windows 7 SP1 and Windows 8.1 are.

Installation procedure

Note: You need administrator privileges to install the QUE$TOR software.

1. Download the install files from the QUE$TOR download site (https://ihsmarkit.com/Info/0316/questor-software-resources.html).
2. The setup program automatically detects if you have the required Microsoft .NET Framework version already installed and provides a warning if you do not. You can download the correct version from Microsoft's website by selecting **Yes**. You can also download the required .NET Framework files from the QUE$TOR download site.
3. If not already installed, run the VC_redist.x86.exe file, which is also available on the download site. This installs the elements of MS Visual C++ required for QUE$TOR to run.
4. To install QUE$TOR 2022 Q1 , first unzip the downloaded QUE$TOR install files and then run the setup.exe file.
5. The installer places an icon for QUE$TOR 2022 Q1 on your desktop and creates a group on the start menu under All Programs\IHS Markit\ containing QUE$TOR 2022 Q1 shortcuts for the Database editor, the Project editor, the Project viewer, the main QUE$TOR application, and the Unit editor.
6. If you get any warnings during the installation, please contact the QUE$TOR support desk, customercare@ihsmarkit.com.

Note: A valid license is not required to install the software but is required to run the software. You or someone in your organization will receive an email from IHS Markit Customer Care containing an Entitlement ID for activating your QUE$TOR licenses.

Application execution

- Windows 7 SP1

  To run the software click the **Start** menu and follow **All Programs > IHS Markit > QUE$TOR 2022 Q1 > QUE$TOR 2022 Q1** or double-click the **QUE$TOR 2022 Q1** icon created on your desktop.

- Windows 8.1

  To run the software click the **Start** menu and browse the start screen to find **QUE$TOR 2022 Q1** or double-click the **QUE$TOR 2022 Q1** icon created on your desktop.

- Windows 10

  To run the software click the **Start** menu and browse the program list to find **IHS Markit > QUE$TOR 2022 Q1** or double-click the **QUE$TOR 2022 Q1** icon created on your desktop.

Licensing system

In order to run QUE$TOR a valid license will be required. Depending upon the license type that has been purchased this can either be in a standalone or a network configuration. For standalone configurations users will have to obtain a license by using the standalone online activation tool, whilst for a network configuration locate the license server within their own network. Obtaining the license is described in the following sections. For more information about setting up the network server please refer to the licensing guide that is available from the download site as well as in the help file.

Activating standalone licenses

To activate a standalone license you will need to have QUE$TOR installed and you will need to have your Entitlement Id (EID). This EID will be emailed to the primary license contact at each company.

When QUE$TOR is run and a feature is selected, without access to a valid license, as would typically be the case when QUE$TOR is first installed, an error will be shown that is similar to the one shown below (Figure 7).

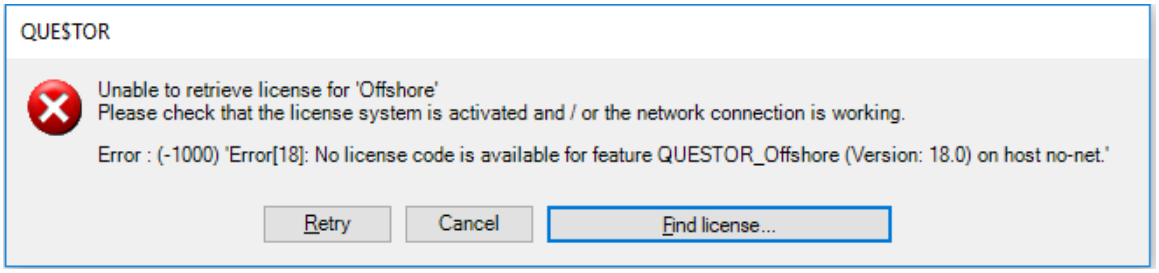


Figure 7 - Unable to retrieve license

To activate a standalone license click on the Find license… button.

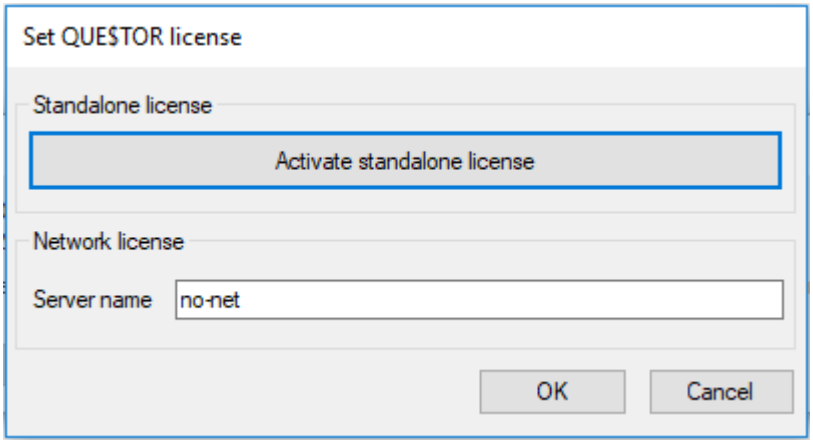


Figure 8 - Set QUE$TOR license

When the Set QUE$TOR license form (Figure 8) appears click on the Activate standalone license button. This will open the IHS Markit Standalone Online Activation tool.

First, you will need to copy / paste or type your EID into the Entitlement Id input at the top of the form (Figure 9) and click Connect.

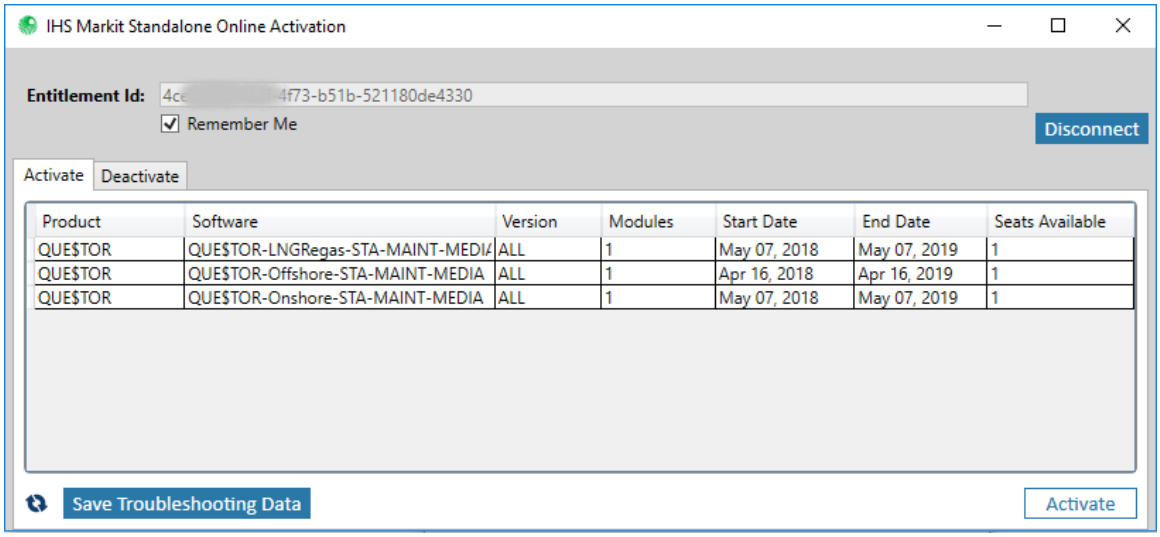


Figure 9 - Standalone Online Activation

Next select the product(s) you would like to activate. Holding the Ctrl key while selecting will allow selection of multiple products. Then click on the Activate button.

Once complete the IHS Markit Standalone Online Activation tool can be closed and OK can be clicked on the Set QUE$TOR license form. QUE$TOR will now run the feature licensed.

Standalone licenses will not allow QUE$TOR to work in a shared use environment such as Remote desktop or Citrix. Shared use environments require network licenses.

Setting network license location

To connect a client machine to a network license service you will need to have QUE$TOR installed, you will also need to have the location of the QUE$TOR license service on your internal network.

When QUE$TOR is run and a feature is selected, without access to a valid license, as would typically be the case when QUE$TOR is first installed, an error will be shown similar to the one shown below (Figure 10).

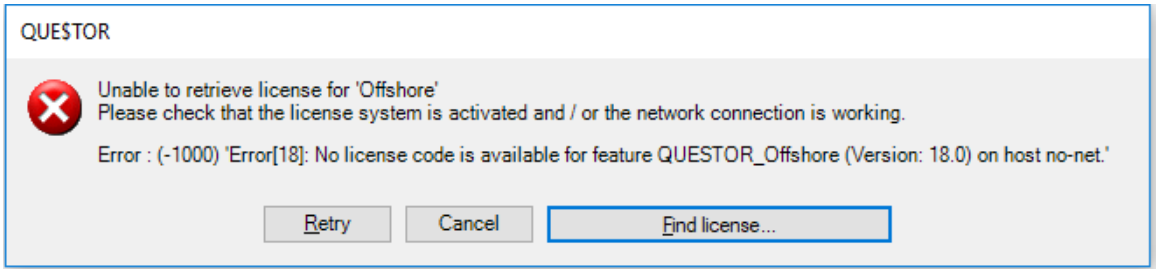


Figure 10 - Unable to retrieve license

To connect to a License Service click on the Find license… button.

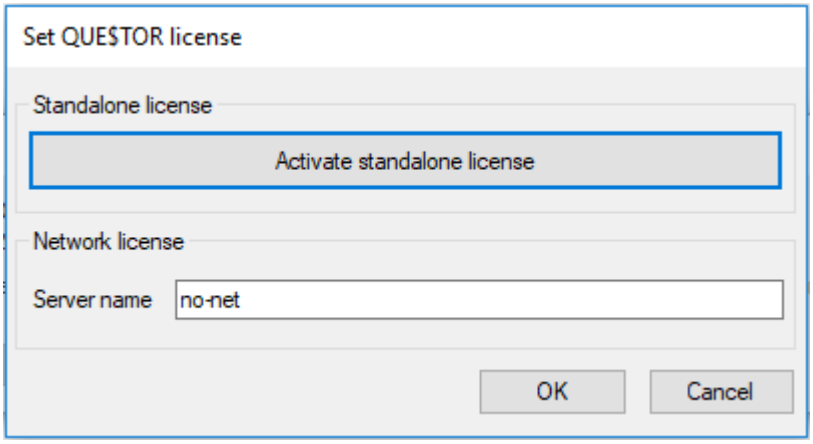


Figure 11 - Set QUE$TOR license

When the Set QUE$TOR license form appears (Figure 11), type the license server name in the Server name input box, then click the OK button.

Once complete, QUE$TOR will be able to run the feature(s) available on the license server if a valid license is available.

Contacting customer support

Requests for support related to the QUE$TOR application should be directed to customercare@ihsmarkit.com.

Requests can also be submitted through the IHS Markit website.

Or by phone
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