

# CNG: AN ECONOMICALLY VIABLE ALTERNATIVE TO CONVENTIONAL FUEL?





# EDITOR'S LETTER

## CNG: Towards A Cleaner Future

In January, President Abdel Fattah El Sisi inaugurated Egypt's first exhibition for vehicle conversion to run on compressed natural gas (CNG) Go Green. The Ministry of petroleum and Mineral Resources and the Ministry of Trade and Industry are currently working on achieving the targets of the presidential initiative.

CNG is not new to the Egyptian market. It is being used by the transportation sector in Egypt since 1995 as a partial solution to heavy pollution problems affecting Cairo, to reduce dependence on gasoline and to utilize Egypt's abundant natural gas, according to the UN Habitat. Thus, our August issue is dedicated to discuss the CNG potential in the Egyptian market.

In our industry insights section, we discussed the hybrid transportation potential in CNG and renewables. Our Research and Analysis team prepared a full report reviewing the changes took place in Egypt's petroleum transportation market in fiscal year (FY) 2019/20 compared to FY2018/19. Our overview is tackling Egypt's presidential CNG initiative and its latest updates.

In addition, our energy economics section discusses the current argument about the real economic benefits of CNG and the possibility of being an alternative to conventional fuel in the near future.

*Wish you all informative read!*

### MAHINAZ EL BAZ

Acting Editor-In-Chief  
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PROUDLY  
THE OFFICIAL  
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## CONTENTS

### EGYPT'S ANNUAL REVIEW FOR PETROLEUM TRANSPORTATION



- 16** HYBRID TRANSPORTATION POTENTIAL: CNG & RENEWABLES
- 18** EGYPT'S CNG INITIATIVE DAWNS A BRIGHT FUTURE
- 20** CNG: AN ECONOMICALLY VIABLE ALTERNATIVE TO CONVENTIONAL FUEL?
- 24** REGULATING PETROLEUM INDUSTRY: PURPOSE, KEY FORMS AND INTERNATIONAL LAW
- 25** THE HYDROGEN ECONOMY: HOW IS THE GLOBAL ENERGY INDUSTRY RISING TO THE CHALLENGE?
- 26** GROWING ECONOMIC RIVALRY PUTS SAUDI-UAE ALLIANCE TO TEST

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UNDER THE HIGH PATRONAGE OF  
**HE. ENG. TAREK EL MOLLA**  
 MINISTER OF PETROLEUM & MINERAL RESOURCES - ARAB REPUBLIC OF EGYPT



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## TOP 5

**EGYPT'S PETROLEUM EXPORTS GROW BY 33.8% IN Q1 2021**

Egypt's petroleum exports have gone up by 33.8% in Q1 2021, recording \$1.819 billion against \$1.359 billion in Q1 2020.

Crude oil exports increased and accounted for \$399 million, natural gas exports recorded \$564 million, and mazut exports recorded \$522 million.

Egypt's petroleum exports have gained interest from several countries as they accounted for \$421 million in Malta, \$272 million in India, \$226 million in Greece, \$201 million in China, and \$105 million in Italy.

On the other hand, Egypt's petroleum imports declined during Q1 2021 by 11.4%, to reach \$1.879 billion compared to \$2.121 billion in the same period last year. Crude oil imports declined and recorded \$643 million compared to \$1.32 billion in the same period in 2020. Additionally, petroleum imports from Saudi Arabia fell to \$720 million, followed by Kuwait with \$290 million, the US with \$82 million, Algeria with \$12 million, and Iraq with \$2 million.

**OAPEC: EGYPT MOST GROWING ARAB LNG EXPORTER IN Q1 2021**

The Organization of Arab Petroleum Exporting Countries (OAPEC) has announced that Egypt topped the list of the most growing Arab exporters of liquefied natural gas (LNG) during Q1 2021.

Egypt exported about 2 million tons of LNG in comparison to 0.4 million tons during Q1 2020, which reflects an increase of 400% on annual basis. This growth rate is the highest during the last period after Egypt had been affected by the covid 19 repercussions due to low oil prices.

The increase was achieved thanks to the operation of IDKU plant with its full capacity of 7.2 million tons per year, in addition to the reoperation of Damietta LNG plant after an eight year-halt.

Damietta plant is expected to contribute to the growth of Egypt's exports during Q2 2021, but this is subject to the dynamics of oil prices.

**AL-SISI ISSUES NEW DECREE FOR E&P ACTIVITIES IN RED SEA**

President Abdel Fattah Al-Sisi issued Law No. 160 of 2020 empowering the Minister of Petroleum and Mineral Resources, Tarek El Molla, to contract

with international oil companies (IOCs) for exploration and production (E&P) activities in the Red Sea.

Accordingly, the minister will contract with Ganoub El Wadi Petroleum Holding Company (Ganope), Shell E&P B.V., and Mubadala Petroleum, and Tharwa Petroleum Company for E&P activities in Block 4 of the Red Sea.

**PARLIAMENT APPROVES BILLS OF E&P IN SOUTH GHAREB, EASTERN DESERT**

The House of Representatives has approved two draft laws, submitted by the government, authorizing the Minister of Petroleum and Mineral Resources to contract for exploration and production (E&P) activities in South Ghareb and the Eastern Desert.

The first draft law allows the Petroleum Minister to contract with General Egyptian Petroleum Corporation (EGPC) and BP Egypt company for petroleum E&P operations in A and B blocks, at a space of about 40 kilometer square in the South Offshore Ghareb, at the Gulf of Suez.

The second draft law enables the Petroleum Minister to contract with Ganoub El Wadi Petroleum Holding Company (Ganope) and the Egyptian National Petroleum for Exploration and Development (ENPEDCO) to conduct E&P activities in Wadi Deb area in the Eastern Desert.

**MOP AWARDS UOG NEW DEVELOPMENT LEASE IN ABU SENNAN**

Minister of Petroleum and Mineral Resources, Tarek El Molla, awarded United Oil and Gas (UOG) Company a development lease that covers the ASD-1X discovery in Abu Sennan.

This is the eighth development lease in the Abu Sennan concession. Production from the ASD-1X well shows a combined initial gross rate of 1,295 barrels of oil per day (bbl/d) from the Abu Roash C (ARC) and Lower Bahariya reservoirs. As a result of the fast turnaround within less than two months, UOG expects the well would pay for itself within less than two months. The ASD-1X exploration well safely reached a total depth (TD) of 3,750m measured depth (MD) on March 30, several days ahead of schedule and under budget. The well encountered 22 meters net pay, and on preliminary testing flowed at gross rates of 1,619 bbl/d from the Lower Bahariya reservoir and 1,215 bbl/d from the ARC reservoir.

## A BLAST FROM THE PAST



In August 2015, the giant natural gas discovery "Zohr" field was made in Egypt's deepwater of the Mediterranean at Shorouk Concession. 50% of the block is held by Eni company, which is also the operator, while the remaining stakes are held by Rosneft with a share of 30%, BP with a share of 10%, and Mubadala Petroleum with a share of 10%. The field started production in December 2017 at production rates of 8 million cubic meters per day (mmcm/d). In 2020, the field production capacity reached more than 3 billion cubic feet per day (bcf/d) of gas. The estimated reserves of the field are 30 trillion cubic feet (tcf).

This discovery has caused a boom in Egyptian natural gas production. When it started, it increased Egypt's annual production rates from 1,800 bcf in the fiscal year (FY) 2016/17 to 2,100 bcf in FY 2017/18. Currently, Zohr production represents 40% of Egypt's total production of natural gas. It helped Egypt to achieve self-sufficiency of natural gas as well as to turn from importing natural gas to exporting it. Egypt's exports of natural gas after Zohr discovery reached 53 bcf in FY 2018/19. Now, Egypt on the doorstep to become an energy hub for exporting and trading oil and gas thanks to Zohr discovery.

<https://www.eni.com/en-IT/operations/egypt-zohr.html>

## NUMBER OF THE MONTH



Cars Converted to CNG Fuel in FY 2020/21

**51,000**

The total number of cars converted to run with compressed natural gas (CNG) recorded **370,000** by the end of fiscal year (FY) **2020/21**. The annual rate of cars converted to run with CNG significantly increased compared to previous years where the rate did not exceed **10,000**. This remarkable achievement comes as part of the presidential initiative to replace old cars which targets replacing and converting **350,000** cars to be fueled by natural gas.

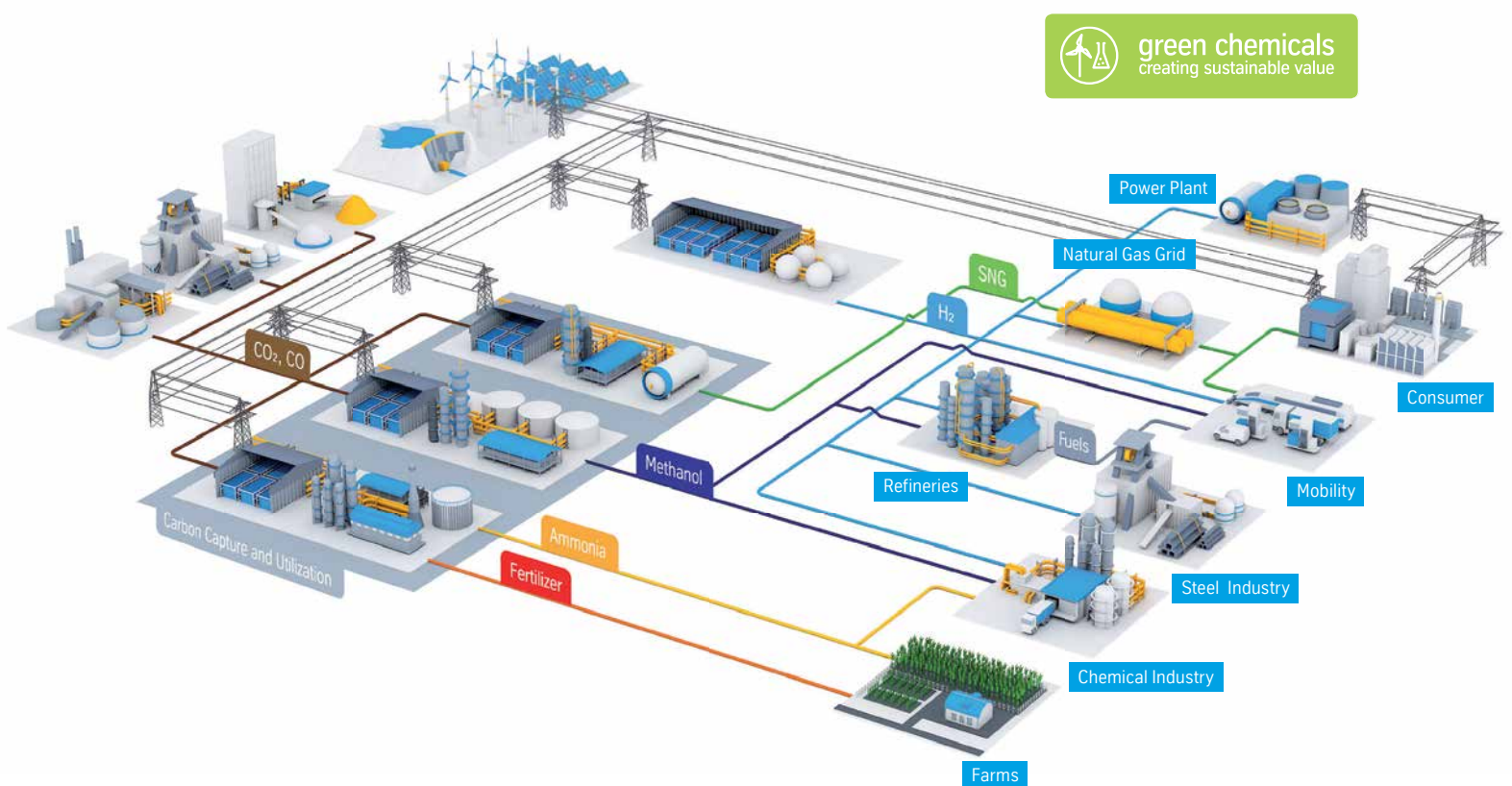
Within the same context, the number of conversion centers increased from seven in FY **2019/20** to 27 in FY **2020/21** to record a total of 105 centers nationwide.



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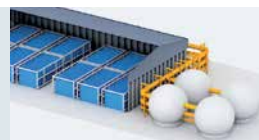
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Green hydrogen

Chemical plants



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## EXPLORATION

**PETRODISOUQ TO DRILL IBN YOUNES 2 WELL**

Petrodisouq Petroleum Company plans to drill Ibn Younes 2 well soon, Nasr Yassien, Operations General Manager and Board Member, stated.

The announcement was made during his inspection tour to the company's worksites and fields. While inspecting the Sino Tharwa 2 drilling rig, Yassien mentioned that the rig will

be put to work in the coming days to dig the development well Ibn Younes 2.

He also stressed that it is absolutely necessary to adhere to all procedures that ensure efficient workflow and achieve the highest safety rates. He emphasized the achieving production strategic goals should be done in line with health, safety, and environmental (HSE) measures.

## DOWNSTREAM

**SISI CALLS FOR EXPANDING NATURAL GAS UTILIZATION**

President Abdel Fattah Al-Sisi has directed to continue with the plan of connecting natural gas to households and new cities and to expand on establishing natural gas supply stations across the country.

This came during the President's meeting with Prime Minister Mostafa Madbouly, Tarek El-Molla, Minister of Petroleum and Mineral

Resources, and other senior officials involved with the implementation of strategic projects. The meeting delved into several topics and followed up on a number of projects in the petroleum sector and plans to expand the use of natural gas, whether for housing units, for industrial and production use or transportation.

**EL MOLLA INAUGURATES NEW NATURAL GAS STATION ON CAIRO-ALEXANDRIA ROAD**

Tarek El Molla, Minister of Petroleum and Mineral Resources, inaugurated a new natural gas supply station on the Cairo-Alexandria Desert Road.

The new station is co-operated between the Natural Gas Vehicles Company (Cargas) and Chillout. It is built on an area of 600 square meters and includes 12 supply points to serve 1,300 vehicles per day, with an operating capacity of 1,800 cubic meters of gas per



hour. The station is also equipped to double its supply points in the future to 24 points to serve more than 3,000 vehicles per day.

**EL MOLLA INAUGURATES NEW INTEGRATED FUELING STATION IN CAIRO**

Minister of Petroleum and Mineral resources, Tarek El Molla, has inaugurated the integrated fueling station in Abbasiya, Cairo. The station was developed to provide compressed natural gas (CNG) fuel, both 92-octanes and 95-octanes Benzene, as well as electrical fuel-recharging. The fueling station carries the logos of GASTEC and Eni.

Egypt targets expansion in CNG usage as vehicles fuel under the umbrella of a presidential initiative launched by President, Abdel Fattah El Sisi, to provide citizens with excellent services, while achieving full economic benefit and easing the burdens shouldered by them, El Molla stated during the inauguration ceremony.

**EL MOLLA INSPECTS MIDOR REFINERY EXPANSION**

Minister of Petroleum and Mineral Resources, Tarek El Molla, has inspected the Midor refinery project which is being carried out in Alexandria, at a cost of \$2.4 billion.

This project is as a part of a strategy targets updating the refineries in order to meet the domestic market needs of petroleum products, and achieve self-sufficiency by 2023. These expansions will increase operation capacity by 60%, which currently amounts to 100,000 barrels.



Gamal El Kareish, Chairman of Midor, showcased the expansion project which aims to improve refining and to get high standard products with full coordination with health, safety and environment (HSE) measurements.

**EGYPT SPENT EGP 56.5 M ON VEHICLES' CONVERSION SINCE APRIL: MAAIT**

Egypt has spent around EGP 56.5 million as green stimulus, shouldered by the state's public treasury, on the implementation of the initiative of converting the petrol-powered vehicles to run on natural gas since April.

Upon presidential directions, the Egyptian government works on accelerating the

initiative to expand the cars' conversion beneficiaries. Hence, Egypt has eased the procedures for citizens to replace their old cars with new ones, with unprecedented credit facilities. The new cars have the facility to be fueled with compressed natural gas (CNG).

## NOCS UPDATES

**PETROJET'S FLOATING ROOF TANK SETS GUINNESS WORLD RECORD**

Petrojet has set a Guinness World Record for manufacturing and establishing the world's largest floating roof tank located in Ras Badran, South Sinai.

The capacity of the floating roof tank is 175,000 cubic meters and can hold more than one million barrels (bbl) of crude oil.

The tank's diameter is 115 meters and its weight exceeds 3000 tons. Petrojet utilized the unprecedented method of double-deck floating system to construct the tank using more than 240 hydraulic jacks.

**GPC'S INVESTMENTS RECORD \$30 MM IN Q4 OF FY2020/21**

The General Petroleum Company (GPC) total investments amounted to \$30 million in the Q4 FY 2020/2021. The company drilled 14 wells during that period, including 11 development wells, two exploration wells, and one water injection well in order to maintain tank pressures.

The company's discovery SE Al Hamd was also put on production and four wells were connected, in addition to constructing two four-kilometers (km) production lines. GPC allocated a budget ranges from EGP 4.6 billion to EGP 5 billion to increase its drilling program and other projects.

**MOP COULD OFFER ENPPI SHARES ON EGX**

The Minister of Petroleum and Mineral Resources, Tarek El-Molla, told CNBC that the ministry could potentially offer a share of Enppi on the Egyptian Stock Exchange (EGX).

El Molla added that the ministry currently awaits the decision of the Higher Ministerial Committee and the Director of the offering. He also stated that Egypt currently exports between 800 million cubic feet to one billion cubic feet (bcf) of natural gas per day, and annually import about 3 million tons (mmt) of gasoline and diesel, and about 1.8 million butane gas.



## AGREEMENTS

**EGYPT SIGNS 4 GOLD MINING CONTRACTS**

Minister of Petroleum and Mineral Resources, Tarek El Molla, witnessed the signing of four gold mining contracts.

The contracts were inked with companies that won the excavation and exploration rights of the 15 gold concessions offered in the Eastern Desert under tender no.1 for 2020.

Upon signing the four contracts, the tender's signed contracts reached 20 –signed by 10 companies– with



investments worth \$47 million. They were inked by the Egyptian Mineral Resources Authority (EMRA) with both Australia's Centamin and Canadian B2Gold.

**EGPC, EEHC SIGN PROTOCOL FOR PURCHASING 20 MOBILE ELECTRIC GENERATORS**

The Egyptian General Petroleum Corporation (EGPC) and the Egyptian Electricity Holding Company (EEHC) have signed a cooperation protocol targets selling 20 mobile electric generators of model "+TM2500" at a capacity of 25 megawatts each.

Per the protocol, the 20 generators' value will be part of a settlement agreement between petroleum

and electricity sectors. Thus, EEHC and its affiliated companies' debts due to the petroleum sector will decrease.

The agreement is a part of the state's efforts to settle the financial entanglements between the ministries and the governmental bodies which were accumulated over the years.

**PETROMAINT, CARGAS SIGN TECHNICAL SUPPORT PROTOCOL**

The Chairman of the Board of Directors and Managing Director of Petromaint Company, Ahmed Foad, has signed a protocol for technical support with the Chairman of Board of Directors and Managing Director of Cargas Company, Hassanen Mohamed.

The signing, which took place at the Cargas headquarter in Cairo,

came as a part of Petromaint's policy to enhance the cooperation with other sister companies in the petroleum sector through seeking their technical support. After the signature of the protocol, Foad expressed his interest for further cooperation with Cargas going forward.

**PETROLEUM, EDUCATION SIGN TECHNICAL EDUCATION COOPERATION PROTOCOL**

Tarek El Molla, Minister of Petroleum and Mineral Resources, has signed a cooperation protocol with Tarek Shawki, Minister of Education, and Adel Al-Ghadban, Governor of Port Said, to implement technical education projects in Port Said as part of the community development initiative allocated by the Zohr field project.

The agreement requires the renovation of buildings and the development of curricula for a number of technical schools in addition to designing the curricula of the School of Applied Technology. For his part, El Molla highlighted the cooperation between the two ministries in developing technical education.

**PETROLEUM SECTOR, SUEZ UNIVERSITY COOPERATE IN SCIENTIFIC RESEARCH**

The petroleum sector and Suez University have signed a protocol to support and enrich joint scientific research and academic cooperation in engineering, environmental consultancy, and training fields.

President of Suez University, El Sayed El Sharkawy, stated that the protocol stems from the university's keenness to achieve two main

goals. The first goal is to provide actual opportunities for university students and to have direct contact with institutions in the industry market. The second goal is to provide advisory and academic expertise to serve community institutions in supporting industry and quality control as well as providing training by university faculty members.

## COOPERATION

**EGYPT, GREECE TO BOOST TIES IN ENERGY FIELD**

Egypt is working to strengthen bilateral relations with Greece in the energy field through a proposed electricity interconnection project through Crete Island, and working with the Greek government to export natural gas to Europe.

This was discussed during a meeting between Prime Minister Mostafa Madbouly and Greek Prime Minister Kyriakos Mitsotakis who affirmed his country's interest in boosting joint cooperation in the energy field.

Mohamed Shaker, Minister of Electricity and Renewable Energy, stated that he is working in coordination with the Ministry of Petroleum and Mineral Resources to finalize a proposed memorandum of understanding (MoU) for cooperation with Greece in electricity interconnection project.

**EL MOLLA, AL KOSAIR SEARCH FOR WAYS OF COOPERATION IN FERTILIZER INDUSTRY**

Minister of Petroleum and Mineral Resources, Tarek El Molla, met with the Minister of Agriculture, Al-Sayed Al Kosair, to discuss ways to collaborate on supporting the fertilizers industry system and the Nitrogenous fertilizers.

The two ministers tackled the situation of fertilizers market and applied mechanism in the companies to meet commitments to supply their determined shares to the Ministry of Agriculture

They, also, conferred the support of Misr Fertilizers Production Company (MOPO) to the petroleum sector.

**EL MOLLA, FOUAD DISCUSS MINING ENVIRONMENTAL MEASURES**

Minister of Petroleum and Mineral Resources, Tarek El Molla, and Minister of Environment, Yasmine Fouad, have agreed to formulate a cooperation protocol between the Egyptian Environmental Affairs Agency (EEAA) and the Egyptian Mineral Resources Authority (EMRA) to set environmental measures for mineral exploitation and extraction.

The agreement aims to discuss ways to enhance environmental compatibility and sustainability in mining operations and to reach a model of environmental compatibility in mining similar to the successful model that was applied to the petroleum operations in the Gulf of Suez.

El Molla affirmed that this period will witness cooperation between the two ministries through agreements on plans and programs to achieve right and sustainable practices in the light of the sustainable strategy adopted by the government.

## AXENS



### EGYPT, FRENCH AXENS INK CONTRACT FOR RED SEA PETROCHEMICALS COMPLEX

Minister of Petroleum and Mineral Resources, Tarek El Molla, and the French Ambassador to Egypt, Stéphane Romatet, have witnessed the signing of engineering works contract relating to manufacturing licenses of the Red Sea petrochemical complex.

The contract was signed by the Chairman of the Red Sea National Company for Refining and Petrochemicals, Mohamed Abady, and the CEO of the French Axens company, Jean Sentenac.

According to the inked contract, Axens will provide the technology for a total of seven licenses, representing 50 percent of the whole project's licenses.

Minister El Molla stated that the construction of Red Sea Petrochemicals Complex will place Egypt on top of the countries producing high-quality petrochemicals.

He also noted that Axens has a track record in technology expertise, adding that it has been collaborating with the Egyptian oil sector for years in executing major projects.

On his side, Axens' Sentenac asserted the company's commitment to provide the cutting-edge technologies for the project and to execute it according to schedule.

## ENAP SIPETROL



### ENAP SIPETROL EYES PORTFOLIO EXPANSION IN EGYPT

Minister of Petroleum Tarek El-Molla met with H.E. Ambassador of Chile in Egypt – Pablo Arriaran and CEO of ENAP Sipetrol and new General Manager of Egypt branch – Denisse Abudinén Butto. Attended the meeting EGPC CEO – Abed Ezz El Regal and First Undersecretary for Agreements and Exploration at Ministry of Petroleum and Mineral Resources – Ashraf Farag.

Enap Sipetrol is a Chilean state oil company which has been investing in Egypt since 1998 and currently has operations in the Western Desert in East Ras Qattara concession.

During the meeting, Abudinén highlighted Enap Strategic Plan where one of its main objectives is to expand the company portfolio in Egypt due

to the good results that the company has had in the country.

Also, it was noted that Enap Sipetrol plans to increase its investments in drilling activity in East Ras Qattara, considering the results of the seismic acquisition carried out by the company in its concession areas late 2020.

## BECHTEL

### EGYPT, BECHTEL INK TWO AGREEMENTS FOR LARGEST PETROCHEMICALS COMPLEX IN AFRICA



Minister of Petroleum and Mineral Resources, Tarek El Molla, witnessed the signing of two agreements between Egypt's oil and gas sector and the US company Bechtel.

The agreements were signed by the Chairman and Chief Executive Officer of Bechtel Group, Brendan Bechtel, Bechtel Egypt Country Manager, Karim El-Desouky, Head of the Red Sea National Refining and Petrochemical Company, Mohamed

Abadi, Head of Engineering for Petroleum and Process Industries (Enppi), Ashraf Bahaa, and the Petrojet's Head, Walid Lutfi.

The two agreements focused on the basic engineering and designing works as well as forming the coalition that will be responsible for executing the Red Sea petrochemical complex, located in Ain Sokhna's economic zone. The complex will be the biggest petrochemical

project in Egypt and Africa with total investments of \$7.5 billion.

The project includes a complex for producing added-value petroleum and petrochemical products, such as polyethylene, polypropylene, Polyester, and ship fuel as well as other products that will meet the demands of the local and export markets.

## ENOC

### ENOC, MISR PETROLEUM REACH AGREEMENT TO BLEND LUBRICANTS IN EGYPT



ENOC Misr, the joint venture between Emirates National Oil Company (ENOC) and Proserv, Egypt Group, and Misr Petroleum Company signed an agreement for filling and blending lubricants in Egypt.

Under the 3-years agreement, ENOC will blend lubricant in Egypt at Misr Petroleum's plant. This will guarantee continuous production and ensure operational efficiency.

The signing ceremony was attended by Chairman of the Board of Directors of Misr Petroleum, Mohamed Shaaban, and Vice Chairman of the Board of Directors & Managing Director, delegate of ENOC Misr, Ahmed Hashem Abouelamaim.

"The Egyptian economy has been able to mitigate the negative implications of the COVID-19 pandemic; demonstrating its agility and resilience as the country continues to drive

investments in critical infrastructure and employment opportunities. These factors instil confidence to invest in projects that serve the manufacturing and industrial sectors in Egypt and bolster our presence," ENOC Group CEO, Saif Humaid Al-Falasi, said.

## TRANSGLOBE

### TRANSGLOBE PRODUCTION IN EGYPT RECORDS 10,904 BBLOE/D



TransGlobe's Production has amounted on June 21 to 10,904 barrels of oil equivalent per day (bbloe/d) from its Egypt concessions.

The company drilled two wells in the Eastern Desert at West Bakr after the mobilization of the EDC-64 rig from the Western Desert. HW-8

development well, was drilled to a total depth of 1,640.5 meters and encountered oil-bearing sands in the Yusr-C and Bakr formations. This is the company's first well in its 12-well development program for 2021 that is designed to grow oil production and increase reserves in the Eastern Desert. The second development well K-64 was drilled to a total depth of 1,538 meters, and

encountered oil-bearing sands in the Asl-A, Asl-B, and Asl-D formations. Per the statement, the reservoir section has been fully logged and evaluated, with an internally estimated 20.9 meters of net oil pay in the Asl-A sand, 17.8 meters, and 9.7 meters of net oil pay across the Asl-B sand, and the Asl-D sand, respectively.



## ENI



### ENI'S IEOC, EGAS, EEHC SIGN HYDROGEN MOU

Chairman of Egyptian Natural Gas Holding Company (EGAS) Magdy Galal and the Chairman of the Egyptian Electricity Holding Company (EEHC) Gaber Dessouki, have signed a memorandum of understanding (MoU) with the Managing Director of Eni's International Egyptian Oil company (IEOC), Marco Rotondi, to cooperate in green and blue hydrogen production projects.

The MoU also targets estimating the technical and commercial feasibility of such projects in Egypt.

Minister of Petroleum and Mineral Resources, Tarek El Molla, Minister of Electricity and Renewable Resources, Mohamed Shaker and Chief Operating Officer Natural Resources of Eni, Alessandro Puliti have witnessed the MoU signing.

According to the MoU, the three companies will collaborate in exploring joint projects for green hydrogen production by using electricity generated from the renewable resources, in addition to blue hydrogen production by storing carbon dioxide in the natural gas brown fields.

They will also work on defining the probable markets for domestic consumption of hydrogen and the available export opportunities.

## GALILEO



### GALILEO TO PROVIDE EGYPT WITH CNG EQUIPMENT

Galileo Technologies company announced it has won an international tender for providing Egypt with 500 CNG dispensers and 200 Microbox Core™ MX200 packages.

This equipment will be supplied to the service stations of Natural Gas Vehicles Company (NGVC) and Egyptian International Gas Technology (GASTEC) company.

This came as a part of the Egyptian Ministry of Petroleum and mineral Resources initiative to increase the number of CNG stations from 306 to 1,000 by the end of 2021 in line with its strategy to replace liquid fuels with natural gas as a cheaper alternative to reduce polluting emissions. The agreement between Galileo and the Egyptian

companies is part of that initiative and was closed in January 2021.

Galileo said that the first deliveries of equipment were made in May and will continue until the end of 2021, adding that the maximum production peak will be reached in July and, according to the plan, 220 dispensers and 50 compressors will be manufactured in one month.

## APACHE



### EL MOLLA DISCUSSES APACHE E&P EXPANSION PLANS IN EGYPT

Tarek El Molla, Minister of Petroleum and Mineral Resources, discussed Apache's exploration and production (E&P) expansion plan with the company's Chief Executive Officer John Christmann.

During the meeting, Christmann noted that Apache plans to pour more investments to increase the drilling activity and production,

considering the optimistic results of the seismic survey carried out by the company in its concession areas.

For his part, El Molla remarked that Apache's interest is a sign that the Western Desert still enjoys promising petroleum prospects, especially in light of the technological advances in the deep layers E&P.

The minister added that Egypt is committed to reducing carbon emissions and implementing the health, safety, and environment (HSE) protocols at all times.

Over the course of 25 years, Apache has pumped investments exceeding \$20 billion in Egypt to produce more than 2 billion barrels of oil.

## SDX



### SDX COMMENCES DRILLING CAMPAIGN IN SOUTH DISOUQ

SDX Company announced the commencement of the South Disouq drilling campaign which comprising two wells during the next few months.

The first well is the one-step development well which targets the high porosity and permeability Basal Kafr El Sheikh reservoir, at approximately 6,600 feet (ft) in the Ibn Yunus Field.

The production from the well is expected to start in late Q3 2021, and will help keep gross production levels of "c.45mmscfe/d at the South Disouq Central Processing Facility".

The second exploration well is the HA- 1X which is expected to spud after the completion of IY-2 in early August. It targets recoverable volumes of 139 billion cubic feet (bcf).

"After our previous highly successful campaigns at South Disouq where we have achieved five discoveries from seven wells drilled, I am excited to announce the commencement of our next phase of drilling," Mark Reid, CEO of SDX, commented on the announcement.

## EXXONMOBIL



### EXXONMOBIL SIGNS PROTOCOL WITH MAGDI YACOUB HEART FOUNDATION

ExxonMobil Egypt announced that it has signed a cooperation protocol with Magdi Yacoub Heart Foundation. According to the agreement, ExxonMobil will support the foundation to qualify and prepare a competent nursing staff, providing exceptional training opportunities complying with the latest global health care methods.

On this occasion, Youssef Hafez, Public and Government Affairs Manager of ExxonMobil Egypt

expressed his pleasure with this cooperation which affirms ExxonMobil Egypt's corporate social responsibility, stating "Hand in hand with Magdi Yacoub Heart Foundation, we promote nursing staff's qualifications, reinforcing the foundation's noble mission to provide free state-of-the-art service.

"Through this esteemed initiative, we hope to see a new generation of Egyptian health care providers who thrive with medicine, curing more

children with heart diseases in Egypt and the Arab World," Hafez added.

Additionally, Dina El-Gazzar, Vice President for Development and Fundraising at Magdi Yacoub Heart Foundation, appreciated such action from ExxonMobil to help in qualifying nursing staff, elaborating "The center employs 80% of participants in the training course."



# Egypt's Annual Review for PETROLEUM TRANSPORTATION

\*THIS REPORT COVERS THE DATA OVER FYS (2018/19-2019/20)

BY: AMINA HUSSEIN, REHAM GAMAL, AND TASNEEM MADI

## MAIN TRANSPORTATION CHANNELS

### 1. RAILWAYS

#### NUMBER OF RAILWAYS TANKS PER TYPE

| FY                 | Available for Operation | Under Construction | Total |
|--------------------|-------------------------|--------------------|-------|
| 2018/19            | 408                     | 606                | 1,014 |
| 2019/20            | 480                     | 524                | 1,004 |
| Rate of Change (%) | 17.65                   | -13.5              | -1    |

#### TOTAL NUMBER OF RAILWAYS TANKS PER PRODUCT

| FY                 | Jet Fuel | Diesel | Gasoline | Mazut |
|--------------------|----------|--------|----------|-------|
| 2018/19            | 313      | 480    | 122      | 99    |
| 2019/20            | 311      | 472    | 122      | 99    |
| Rate of Change (%) | -0.6     | -1.7   | 0        | 0     |

#### AVERAGE SHARE OF PETROLEUM PRODUCTS IN TANKS (%)



#### TRANSPORTATION CAPACITY OF TANKS (MMT)

| FY                 | Estimated Quantity | Actual Quantity |
|--------------------|--------------------|-----------------|
| 2018/19            | 0.526              | 0.282           |
| 2019/20            | 0.525              | 0.277           |
| Rate of Change (%) | -0.1               | -1.98           |



### QUANTITIES TRANSPORTED BY TANKS PER PRODUCT (MMT)

| FY                 | Jet Fuel | Diesel | Gasoline | Mazut |
|--------------------|----------|--------|----------|-------|
| 2018/19            | 0.079    | 0.177  | 0.026    | 0     |
| 2019/20            | 0.083    | 0.175  | 0.016    | 0.004 |
| Rate of Change (%) | 4.5      | -1.3   | -41      | -     |

### AVERAGE SHARE OF PETROLEUM PRODUCTS IN TANKS' CAPACITY



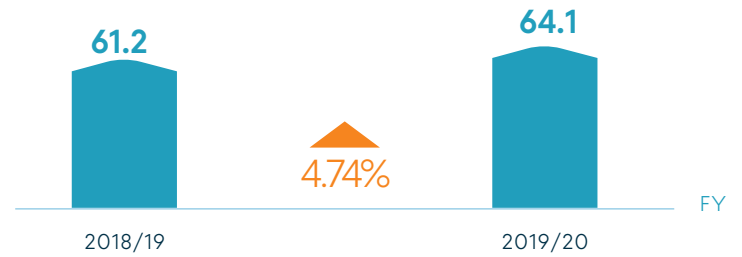
## 2. PETROLEUM PIPELINES

### TYPES OF PETROLEUM PIPELINES



### A. SUMED PIPELINE

#### QUANTITIES TRANSPORTED BY SUMED PIPELINE (MMT)



### B. MAIN AND INTERNAL PIPELINES

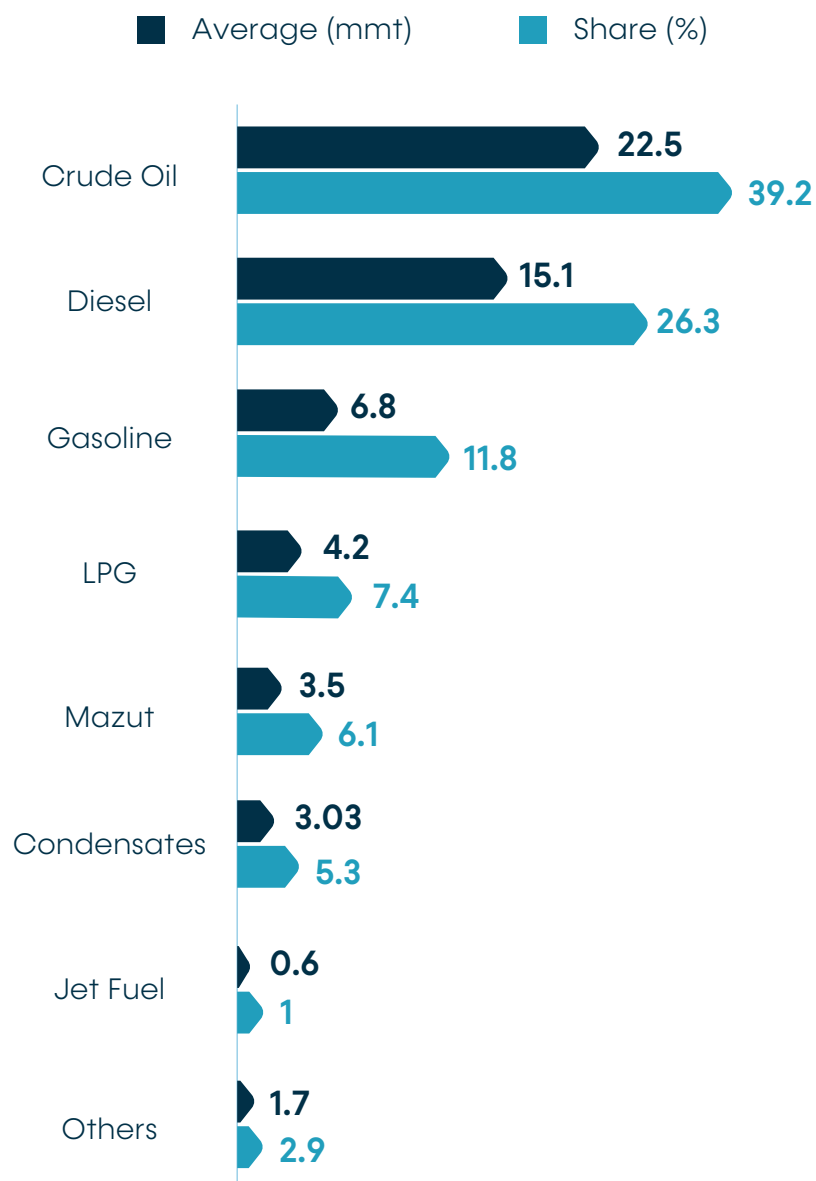
#### DEVELOPMENT OF MAIN PIPELINES UNTIL THE END OF FY 2019/20



#### QUANTITIES TRANSPORTED BY PIPELINES (MMT)



### SHARE OF PETROLEUM PRODUCTS IN QUANTITIES TRANSPORTED BY PIPELINES



### 3. TRUCKS

#### QUANTITIES TRANSPORTED BY TRUCKS (MMT)



#### SHARE OF PETROLEUM PRODUCTS IN QUANTITIES TRANSPORTED BY TRUCKS

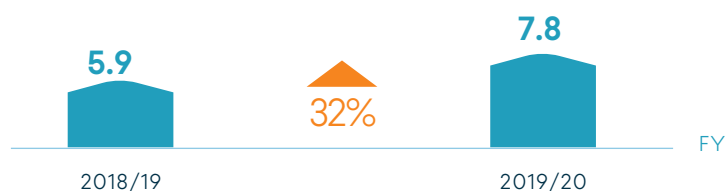
| Product  | Average (mmt) | Share (%) |
|----------|---------------|-----------|
| Diesel   | 12.16         | 52.68     |
| Gasoline | 6.57          | 28.45     |
| Mazut    | 2.79          | 12.1      |
| LPG      | 1.56          | 6.77      |





## 4. COASTAL TANKERS

### QUANTITIES TRANSPORTED BY COASTAL TANKERS (MMT)



### COASTAL TANKERS CHARACTERISTICS

| Characteristics   | Alnabila (5)           | Alsharifa (4) | Alexia (3) | Album     | Chris     |
|-------------------|------------------------|---------------|------------|-----------|-----------|
| Year Built        | 1994                   | 1995          | 1999       | 2003      | 2004      |
| Vessel Type       | Oil Products           | Crude Oil     | Crude Oil  | Crude Oil | Crude Oil |
| Length (m)        | 175                    | 244.06        | 248        | 244       | 239.1     |
| Breadth (m)       | 26.03                  | 42.04         | 43.04      | 42        | 42.03     |
| Gross Tonnage (t) | 18,106                 | 52,875        | 56,841     | 57,190    | 56,172    |
| Current Status    | Decommissioned or Lost | Active        | Active     | Active    | Active    |

### QUANTITIES TRANSPORTED PER COASTAL TANKER (MMT)

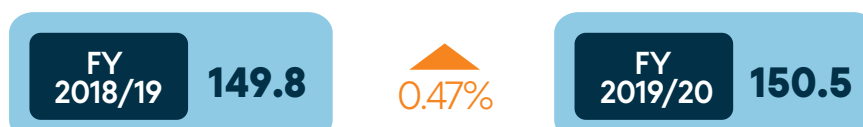
| FY                 | Alnabila (5) | Alsharifa (4) | Alexia (3) | Album | Chris |
|--------------------|--------------|---------------|------------|-------|-------|
| 2018/19            | 0.932        | 2.247         | 2.287      | 0.432 | 0     |
| 2019/20            | 0.871        | 1.997         | 2.206      | 2.499 | 0.222 |
| Rate of Change (%) | -7           | -11           | -4         | 478   | -     |

### AVERAGE SHARE OF COASTAL TANKERS IN QUANTITIES TRANSPORTED (%)



## I. LEADING INDICATORS

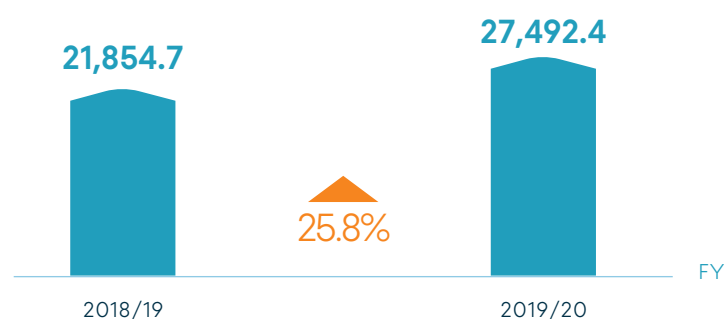
### TOTAL QUANTITIES TRANSPORTED (MMT)



**AVERAGE SHARES OF QUANTITIES TRANSPORTED THROUGH TRANSPORTATION CHANNELS**



**TOTAL TRANSPORTATION COSTS FOR PETROLEUM PRODUCTS (EGP MILLION)**

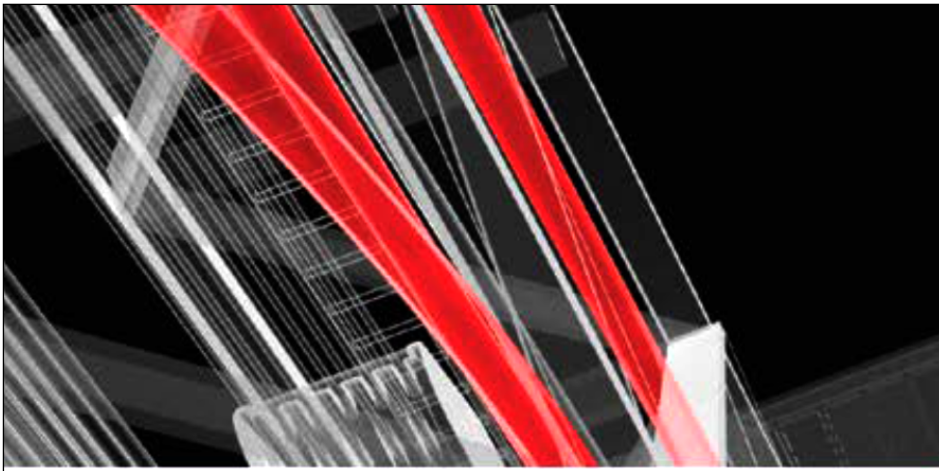


**TRANSPORTATION COSTS PER CHANNEL (EGP MILLION)**

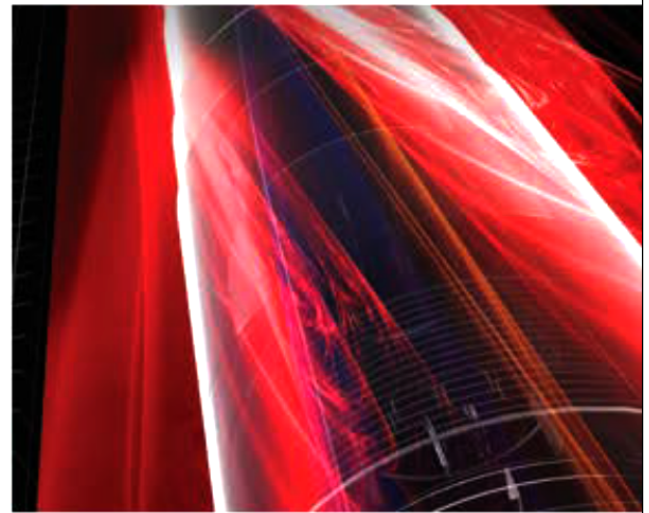
| FY                 | Railway Tankers | Trucks  | Pipelines | Coastal Tankers |
|--------------------|-----------------|---------|-----------|-----------------|
| 2018/19            | 33.9            | 1,429.1 | 19,648.5  | 743.1           |
| 2019/20            | 20.5            | 1,036.3 | 25,399.2  | 1,036.7         |
| Average Shares (%) | 0.115           | 5.15    | 91.16     | 3.6             |







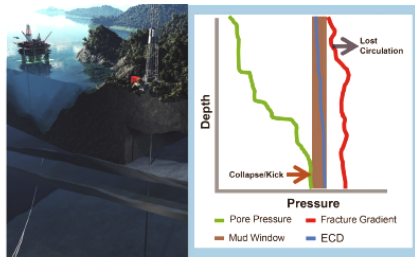
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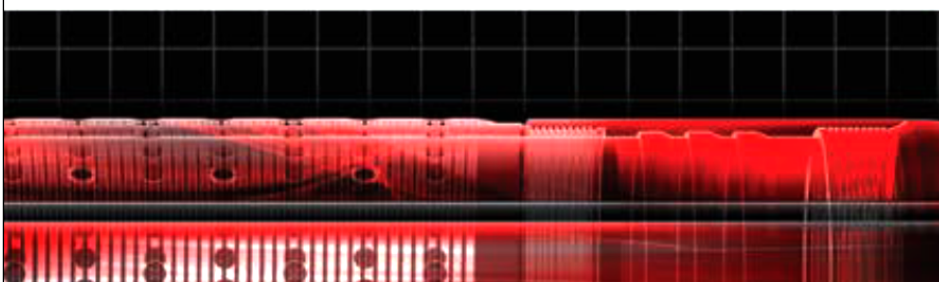
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  - » Improve HSE through pressure control
  - » Reduce risk of stuck pipe and pack off
- ▶ **Increase Access to Reserves**
- ▶ **Faster Completions**
  - » Improve cementing
  - » Applicable for screen installation

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**Medhat Gamal**  
Baroid Egypt, Libya and Iraq Senior Area Manager

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# HYBRID TRANSPORTATION POTENTIAL: CNG & RENEWABLES

BY RANA AL KADY

Natural gas and renewable energy are important components of a strong national energy market in order of energy security. Nevertheless, there are significant, although not overwhelming, obstacles to using natural gas and renewable energy to lessen our country's dependency on imported oil for transportation applications.

New investors are implementing renewable energies to the test and gaining important knowledge, but widespread adoption of one or more alternative fuels will necessitate larger systemic changes. Natural gas and renewable energy have also increased dramatically over the past few years. In many ways, the two energy sources seem to be synergistic: natural gas fuel production has low capital expenditure and fluctuating fuel prices, whereas renewable energy providers, with the exception of bioenergy, feature greater capital expenditure but typically negligible fuel prices.

## GENERAL OVERVIEW

Firstly, it is important to note the barriers of market penetration that are considered significant; there are both immediate opportunities and long-term prospects for significantly reducing emissions and petroleum use in the transportation sector. According to a CNG Expert, who opted for anonymity, "Egypt is now looking for the ways to fix the country's severe air pollution and public health problems, so one way to do this is by using CNG for a fuel source to mitigate the air pollution and improve the health of everyone in all of the communities as part of the country's government policy to transition from oil to natural gas."

Natural gas is copious and cheap, which opens up chances for alternative fuels as well as CNG to gain market share. The many alternative usage paths have their own features, deployment obstacles, and economic repercussions. Additionally, natural gas as an energy source is one of the cheapest production alternatives, which enables electric vehicles save money if compared with gasoline. Natural gas generation's strong dispatchability leads to an increased renewable energy saturation, which might assist decrease battery car life cycle emissions in the coming years.

RNG refers to anaerobically produced biogas that has been purified to be used as a substitute for fossil natural gas. Raw biogas has a methane concentration approximately 60%, depending on the source of the biogas, and should be transformed into RNG through a series of processes. RNG offers a wide range of applications as a fossil natural gas replacement. In fact, RNG can be used as a motor fuel, a source of power, a heat source, or a feedstock for bio-products.

Furthermore, RNG can be utilized regionally or pumped into natural gas transportation or distribution pipes. As a matter of fact, RNG could be used as a source of energy in a number of vehicles, either as CNG or LNG. In fact, it was found that nearly 90% of RNG pipeline injection operations were supplying a small fraction of the RNG to a car fuel industry down the supply chain as of Q2 2020. In such situation, RNG was delivered to fuelling stations located distant from the biogas supply through a pipeline network.

## CHALLENGES AND BENEFITS

Consequently, it is essential to weigh the various challenges and benefits associated with the potential of CNG in the Renewable Energy, electrical power, and transportation sector. This includes challenges on an economical and technical levels. For example, RNG resource development is one approach to expand fuel supply and boost fuel stability, as well as give financial opportunities to communities and users, enhance quality of the air, and cut greenhouse gas (GHG) emissions. Also, local industries might profit from establishing RNG initiatives by building infrastructure and selling cars that could run on such energy. It is also worth noting that introducing a renewable supply of car fuel to a region has the potential to attract outside vehicle fleets, since biogas-derived CNG may be offered at a



cheaper price than conventional fossil-fuel-based vehicle fuel, and businesses may be searching for methods to green their ships or enhance corporate sustainability.

On the other hand, RNG is largely made up of methane, but when burnt produces carbon dioxide. Other advantages generally offset the emission of CO<sub>2</sub>. Nevertheless, since methane is 85 times stronger than CO<sub>2</sub> as a GHG on over the course of a 20-year time frame, any methane leakage along the RNG supply chain before to burning might negate any possible climate advantages. Moreover, the uses of RNG are those of the same infrastructure as conventional natural gas (including pipelines and refuelling stations), there is a danger of extending infrastructure that allows for increased fossil fuel use. Furthermore, some people believe that other applications for some organic matter might be more helpful.

The expansion of RNG projects is hampered by two sorts of obstacles: economic and technological. Consequently, because of the quantity and long-term cheap cost of conventional natural gas, project development economics might be tough to achieve. In terms of technical aspects, converting raw biogas to RNG necessitates fulfilling a slew of gas performance standards, which differs by region or network system and can be challenging to achieve financial stability based on the biogas resource.

## THE WAY FORWARD

Both forms of energy have been known to be key elements of a transition to a cleaner and more secure energy future, but much of the current discourse considers each in isolation or concentrates on the competitive impacts of one on the other. Natural gas and renewable energy usage has increased exponentially. These types of energy have been hailed as essential components of a shift to a greener, more stable and reliable future economy, but most of the present debate treats them separately or focuses on their competitive effects on one another.

Future paths might include the utilization of natural gas, sustainably sourced, next stage bio-based fuels, and electric cars, among other things. Existing and prospective alternative fuel choices have different market points of entry and pricing strategies, which might vary geographically depending on specific transportation demands and infrastructure facilities. To fully comprehend the potential consequences of these fuel alternatives, additional studies and further evaluations are required.

Although there are some substantial hurdles to market penetration, there are both current and long-term potential in the transport industry to reduce pollution and fuel usage. Combining biofuels with fuel has been a significant avenue to achieving this objective during the last couple of decades.





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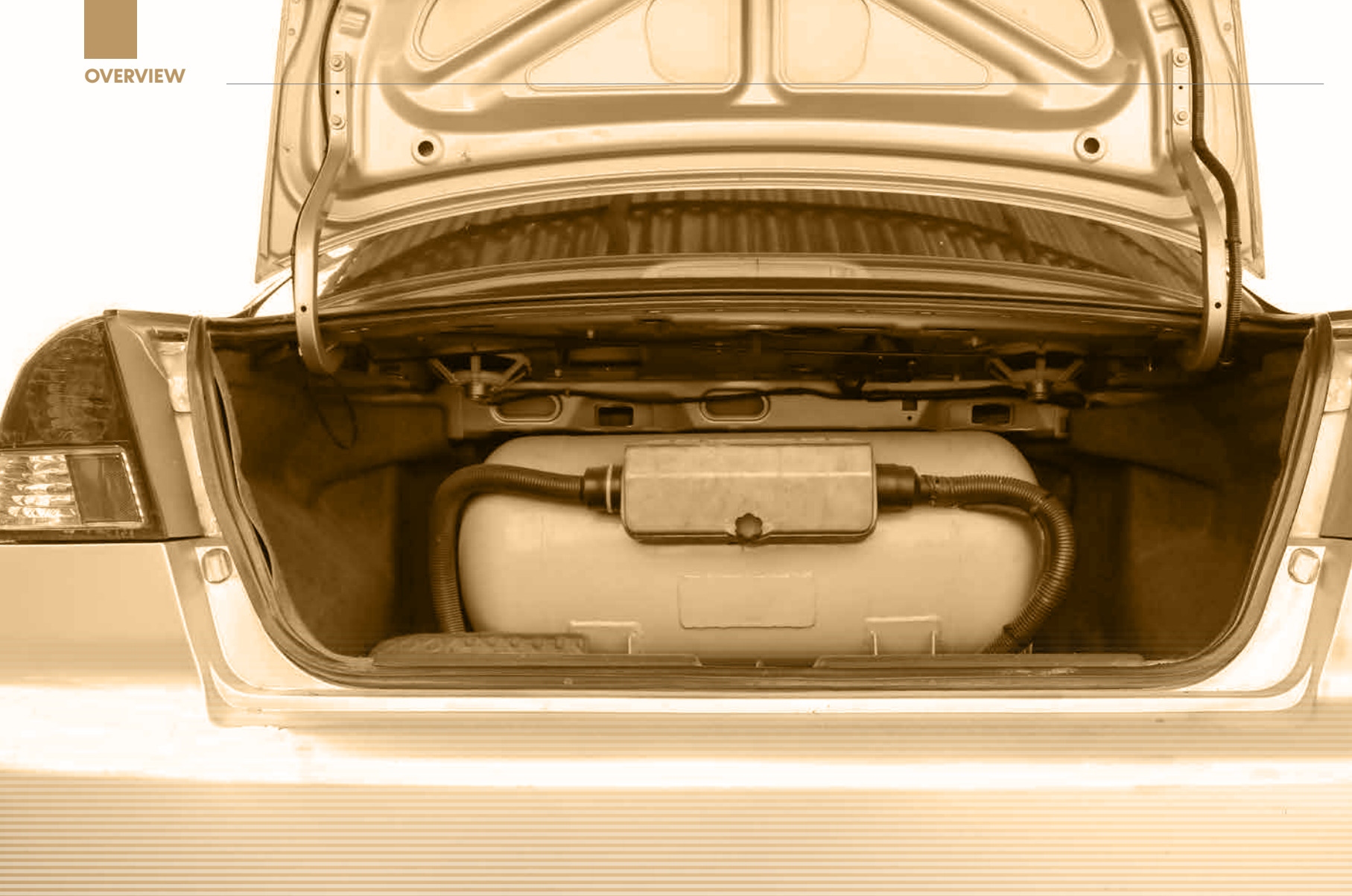
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# EGYPT'S CNG INITIATIVE DAWNS A BRIGHT FUTURE

BY SARAH SAMIR

Egypt has taken prominent measures to convert vehicles into compressed natural gas (CNG) ones. These steps include the timely presidential initiative launched in January 2021 to increase the number of vehicles using CNG as fuel. The country provides CNG through compressing natural gas to be lower than its standard atmosphere volume pressure by less than 1%. Afterward, the produced CNG is stored at a pressure of 24,821 Kilopascals (kPa), according to the Alternative Fuels Data Center (AFDC). Through the pressuring process, Egypt provides its people with an alternative fuel that will enhance the economy and surrounding environment.

## ECONOMIC, ENVIRONMENT FRIENDLY FUTURE

Egypt is now self-sufficient in natural gas production. The country's natural gas production capacity reached 7 billion cubic feet per day (7bcf/d). Hence, using CNG will save the cost of importing petroleum. Using CNG to fuel cars reduces fuel cost by 50%, the Egyptian Cabinet reported. In addition, fueling cars with gasoline costs twice as much as CNG. Therefore, UN-Habitat estimated that commercial cars, like taxis, could recover the cost of converting to CNG within approximately six months.

Meanwhile, using CNG to fuel vehicles is more financially convenient as the new fuel is better for engines, which reduces the money spent on maintenance. Moreover, CNG engines have a 90% lower sound pressure compared to diesel fuel engines, in addition to "less odorant and evaporative emissions," according to SoCalGas.

CNG is an environmental-friendly fuel alternative that reduces air pollution. "Compared with petroleum-based fuels, it reduces nitrogen oxide emissions by 30-60% and carbon-monoxide emissions by up to 97%," Abdelaziz Khlaifat, Professor of Petroleum Engineering, told the American University in Cairo (AUC). Moreover, using

CNG-fueled cars emits 10% fewer greenhouse emissions and almost cuts 50% of other harmful emissions, according to Fuel Economy.

Among the 49 countries implementing strategies for cleaner fuel, Egypt ranks number 8, according to UN-Habitat. The government is cooperating with the private sector to boost the number of bi-fueled cars as well as CNG fueled cars.

## EGYPT CNG-FUELED VEHICLES INITIATIVE

The idea of using CNG in transportation is not new for Egypt. The North African country embraced the idea of fuelling vehicles with the use of natural gas in 1992. At the end of 1994, the first company to work in vehicles conversion was established. Accordingly, 30 CNG-fueled busses and 150 bi-fuel vehicles were introduced, according to UN-Habitat.

In recent years, Egypt started to exert effort to encourage CNG usage as fuel. Therefore, it is establishing CNG conversion and fuelling stations to serve the gas-fueled cars. An Egyptian Natural Gas Holding Company (EGAS)'s report showed that in the fiscal year 2019/20, the number of vehicles fueled by

CNG reached 318,300, and the number of conversion centers reached 78, while the country successfully had a total of 206 gas fueling stations across the governorates.

Egypt lays great importance on the CNG initiative. The country plans to further raise CNG-fueled cars numbers in Egypt by 260,000 in the next three years, from the current 330,000 vehicles Tarek El Molla, Minister of Petroleum and Mineral Resources, said during ADIPEC 2020. Accordingly, the public treasury spent around EGP 56.6 million since April, on the implementation of the initiative of converting the vehicles to run on natural gas, Minister of Finance, Mohamed Maait, declared.

Thanks to the establishment of many fueling stations, and the credit facilities provided by the country, the people are encouraged to apply for the conversion of their automobiles and taxis. Hence, the number of personal cars and taxis meeting the CNG initiative standards reached 44,094 vehicles, Maait pointed out.

With the efforts exerted to avail CNG for all citizens, the converted cars will face no problems in finding fuel. Accordingly, the Egyptian environment will have fewer CO2 emissions. The CNG-fueled cars will further have a positive economic impact on both the country and its citizens, thanks to the self-sufficiency in natural gas production.





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# CNG: AN ECONOMICALLY VIABLE ALTERNATIVE TO CONVENTIONAL FUEL?

BY JASMINE SHAHEEN & TASNEEM MADI

The call to decrease carbon emissions has been growing stronger over the past few years and a plan for energy transition is underway. The oil and gas industry has been repeatedly targeted for its immense carbon footprint and as a result, the industry has been trying to keep up with the world environmental trends and laws to decrease its emissions. Compressed natural gas (CNG) emerges as one of the best solutions for the emission problem. However, one of the important questions that remains is whether natural gas can be the economically viable solution for the energy transition or not?

## ENVIRONMENT'S FAVORITE

To top that off, NGVs prices and vehicle conversions costs are in a gradual decrease and with innovations in CNG fuel tanks, these costs are even getting lower. Not to mention that NGVs are gaining hype as environment-friendly vehicles. On a well-to-wheels basis, NGVs emit about 11%–17% fewer greenhouse gas (GHG) emissions compared to vehicles that run on gasoline or diesel.

With new technologies on the rise, today's natural gas engines emit significantly less particulate matter and nitrogen oxides (NOx) than engines produced just a few years ago. New low-NOx natural gas engines reduce ozone-forming NOx emissions by 90% than the current Environmental Protection Agency (EPA) standard.

Dejene Assefa Hagos, Researcher at Norwegian University of Science and Technology (NTNU), and Erik Ahlgren, Professor at the Department of Space, Earth, and Environment, and Energy Technology, at the Chalmers University of Technology, published research on well-to-wheel assessment of NGV and their fuel supply infrastructures in Denmark. The research shows that the use of CNG and liquefied natural gas (LNG) fuel in both road and marine transport can reduce GHG emissions for all types of vehicles by 15% to 27% per kilometer.

## A STEP INTO GREEN ECONOMY

To encourage using CNG and NGVs, European countries implemented tax incentive schemes. For instance, Italy has increased its NGV market share to 5.42% only a year after it introduced purchase incentives ranging from EUR 1,500 to EUR 3,500 for new LPG and CNG vehicle registrations. The French government meanwhile allowed companies specific tax breaks if a company invested in CNG or LNG trucks. There is also a tax exemption on the registration document of up to 100% for CNG and LNG vehicles, depending on the French region.

In 2016, the UK imposed the highest tax rate for cars and trucks using diesel amounting to EUR 18.83/ Gigajoule (GJ). Likewise, Italy imposed a tax rate at EUR 22.91/GJ for vehicles using petrol and at the same time, Italy offered CNG at prices as low as EUR 0.96 /Kg, putting CNG at an advantage with the consumers.

As European governments foster an economically favorable environment for CNG, the demand for it has risen. It is evident, as the number of CNG fueling stations reached 3,642 in 2020 compared to 3,490 and 3,219 stations in 2019 and 2018, respectively. Italy comes on top with 1,393 CNG fueling stations, followed by Germany with 837 stations, and the Czech Republic with 210 stations.

The effect of natural gas as a bridge towards a low-carbon future seems promising especially as demand for CNG grows. Given the advantages of CNG as an alternative fuel to reduce GHG emissions, it seems that CNG is an economically and environmentally viable choice for the time being.

It is important to understand the natural gas market before answering such a question. Looking at the data, according to BP's Statistical Review Report (2020), natural gas has had the second-growing share in the energy mix after renewables in 2019. The impact of the COVID-19 pandemic has had a significant impact on energy consumption in 2020 as global primary energy consumption and carbon emissions declined by 4.5% and 6.3%, respectively; the largest decline since 1945. Having said that, the natural gas share rose to high records of 24.7% in 2020, according to BP's Statistical Review Report (2021).

## CNG VS. CONVENTIONAL FUELS

CNG has been adopted as a bridge to clean energy especially in the area of automobiles. With the expansion of urbanization, almost everyone has access to private cars. As a result, urban transportation has become a significant element of energy consumption and greenhouse gas emissions (GHG). The disproportionate reliance of urban transportation on high-emission fuels has caused a hurdle in the route to develop a low-carbon transportation system.

Over the past few years, however, CNG has widely become an alternative clean fuel to conventional fuels. According to worldwide natural gas vehicles (NGV) statistics, NGVs have reached more than 28,540,819 in 2019 and natural gas fueling stations have reached 33,383 in the same period. The Asia-Pacific region dominates the game with a sweeping 20,473,673 NGVs and 20,275 fueling stations. Africa comes next with 295,349 NGVs and 210 stations, and Europe follows with 2,062,621 NGVs and 5,194 stations.

The shift from conventional fuels to CNG is becoming more popular than ever largely because it is financially appealing to individuals. Looking at the US, the prices for CNG is not only cheaper than gasoline and diesel, but it is more stable as well. In January 2021, the average CNG prices recorded \$2.19 per gasoline-equivalent gallon (GGE), while the average price for gasoline and diesel reached \$2.32 and \$2.64 per gallon, respectively. According to the US Department of Energy, CNG prices have been relatively stable since October 2018, unlike gasoline and diesel prices which fluctuate with the oil market.





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# REGULATING PETROLEUM INDUSTRY: PURPOSE, KEY FORMS AND INTERNATIONAL LAW

BY MOHSEN AHMED FARHAN - DRILLING DEPARTMENT HEAD, GENERAL PETROLEUM COMPANY (GPC)

**P**etroleum sector projects are complicated and high-risk investments, which need further care when it comes to drafting a regulatory framework that combines sustainable economic development for the host countries as owners of the resources with warranties and incentives to investors who are willing to invest their capital in this kind of projects.

Here, we will explain the hierarchy of petroleum law in exploration and production stages, as well as how the national legislations react with international law tools.

This article highlights the purpose of regulating the petroleum industry, key forms of upstream phase legislation and commonly regulated activities and international law.

Usually, governments invite international exploration and production oil and gas companies to take the risk to invest and –if successful– to profit from the oil and gas production process on the basis of a long-term contract, determining detailed terms and conditions.

Ownership of oil and gas fields is always controlled by the host state rather than foreign partners or investors.

In the case of established oil and gas industry existence, as in Canada or Algeria, public or mixed-owned organizations may play a leading role in developing the resources.

The host country typically regulates all of the petroleum industry activities through a series of laws and regulations based on political visions, contract forms and financial tools in a distinct structure or framework.

Petroleum legislation aims to regulate petroleum industry operations and set out the sharing of the petroleum production revenues and income between the country or government and the investor or partner who is authorized to carry out these operations.

It also targets maximization and preservation of monetary or economic benefits over the long term, as well as encouraging new exploration activities.

In practical terms, good awareness or realization of what the basic investment rules allows a prospective foreign partner to model business operations in advance of establishing the project or investment.

There are two key forms of petroleum legislation; a basic law which deals with the petroleum industry upstream phase's activities to set out the roles and responsibilities of key stakeholders, and the subsidiary laws or and specific ministerial decisions that may deal with a variety of more detailed subjects, such as the award of licenses or approval of contracts.

The regulations are more easily and more frequently changed than basic laws.

The key actors in oil and gas industry include the government authorities –such as a ministry of petroleum or a petroleum corporation– National oil companies (NOCs) –e.g. the General Petroleum Company of the Arab Republic of Egypt– the international oil companies (IOCs) –e.g. Exxon Mobil, ENI, or BP), independent companies and service enterprises.

The resource-owner country needs to regulate and control oil and gas activities, as well as creating proper strategic policies to develop its resources.

This often involves special legislations; i.e. a petroleum or natural gas law, which cope with other relevant legislations such as fiscal and investment laws.

The special legislation also needs to comply with the country's constitution, which may contain provisions or rules related to oil and gas industry operations. For instance, the constitution of resource-rich country may contain principles for expropriation in the public interest and compensation (i.e. Norwegian constitution), or set up rules on ownership.

Other examples are the constitutions of both Ghana and Bolivia, which give ownership of their natural resources to their people.

There are three typical approaches used to design a petroleum legal framework or petroleum legislation to regulate the upstream sector.

This includes the comprehensive or highly detailed approach to legislation, which relies on individually legislated contracts or agreements, and a mixed approach that combines less comprehensive or framework legislation with detailed regulations and flexibility in contracts or agreement requirements.

Some of the key areas of consideration when drafting an upstream petroleum phase law usually include; ownership of resources, the organizational structure of the sector, procedures for granting permits and awarding of licenses, requirements for qualification, contractual schemes, fiscal & taxation principles, HSE measures, the role of national oil companies, competent authorities, reconnaissance, local content, emergency plan and supplies, right to construct installations and pipelines, land access, stability provisions, dispute settlement; and decommissioning and abandonment.

Most of the above commonly are governed by special legislation based on the social and economic characteristics and political attitude of each country and the legislative framework or legal approach that has been chosen for application.

Anyhow, licenses are generally awarded via competitive bids or auctions. There will also be interactions with investment law and foreign partnership control laws.

International law recognizes the state's sovereignty over its natural resources under the organized international agreements.

Permanent sovereignty emphasizes that a host country owns and controls petroleum resources entirely under its jurisdiction.

Acknowledgement of permanent sovereignty means that the host countries could nationalize or expropriate foreign company assets. However, they could only do so for purpose of public utility, security or national interests and –if it happened– they would have to pay a compensation in accordance with the host country's laws and international law.

Based on the international laws and agreements, expropriation is only allowed when it is undertaken for the purpose of the public interest, due process of law and it is accompanied by prompt, adequate and effective compensation.

Also, comprehensive rules have been developed for investment protection and a model intergovernmental and host-government cross-border pipeline agreement for natural gas has been created.

With regards to off-shore exploration and laying of subsea pipelines, the international law of the Sea provides both fundamental and international rules, including rules on obligations for the removal and disposal of offshore installations and structures.

One of the major considerations for the petroleum sector in creating and applying of oil and gas law is the potential for conflicts between national interests and the interests of the international petroleum industry.

It is important to ensure there is sufficient competition amongst oil companies and within the supply industry to serve the interest of national and international industry participants, by opening up the sector and building dialogue within the authorities and the petroleum industry on the direction of legislative development.

This interaction should aim for capacity and trust-building among the industry stakeholders, on one side, and between them and policymakers, on the other side, as well as enhancing

transparency when deciding on approvals for each important activity such as drilling, field development, pipeline transportation, and disposal.

For the foreign partner or investor, it is often preferable that the general framework for exploration and production to be legislated under a generic petroleum law, so there is room for negotiations of the details under the contract.



# MONTHLY MONITOR



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DECISIONS

- Monthly Oil and Gas News Summary.
- Monthly Production, Rigs and Drilling Updates.
- Monthly International Overview.
- Monthly Investors Insight.
- Monthly Security Brief.
- Monthly Political Review.
- Government Measures and Policies to combat Covid-19.
- Monthly Covid-19 National & International Updates.
- Monthly Economic Summary
- Survey of the Month



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# BIOCNG: THE LOCOMOTIVE OF FUTURE NATURAL GAS VEHICLES

BY FATMA AHMED

**G**reat interest is headed towards maximizing the use of natural gas for fueling vehicles around the world. This is due to its clean properties as well as its ability to limit harmful emissions. Compressed natural gas (CNG) is the fuel dedicated for natural gas vehicles (NGVs) that is widely used in the world. By the end of 2021, it is expected for NGVs to reach 30 million worldwide, according to NGV Global. For this reason, new technologies are emerging to help accelerate this transition efficiently. BioCNG technology is a simple, effective and innovative way that was developed to produce CNG vehicle fuels.

## BIOCNG: AN ALTERNATIVE FUEL

BioCNG technology simply uses biogas in producing CNG. It's more efficient than other options as it allows for the production of CNG at a lower cost. A research paper entitled "Bio-CNG: A Technology for Green House Gas Mitigation and Revenue Generation from Agro Waste" explained that BioCNG enables governments to efficiently manipulate solid wastes as well as tackling the problem of carbon emissions produced from burning agriculture wastes. This makes BioCNG a clean and low carbon technology. Additionally, the process of BioCNG produces enriched organic manure that can be used as fertilizer. The study stated, also, that BioCNG is similar to conventional natural gas in its composition and energy potential as it has a great potential to replace the CNG in the upcoming years.

## PRODUCTION PHASES

According to the research paper, BioCNG is produced through four steps: The first step is the extraction in which biogas is produced naturally through a process called anaerobic digestion. An article published by Biogas and Biomethane website elaborated that this process is a biochemical conversion that occurs in biological substances such as agriculture residue, cattle dung, sugarcane press mud, municipal solid waste, sewage treatment plant waste; this process is carried out without the presence of oxygen at a certain temperature and with the continual mixing of the substances being used. The biogas usually consists of about 50-60% natural gas while the remaining part is composed of a combination of carbon dioxide and hydrogen sulfide.

The second step is the purification of biogas, generated from the anaerobic decomposition to get highly purified natural gas, which is environment friendly. This can be done by removing carbon dioxide and hydrogen sulfide. An article entitled "BioCNG Equipment and Technology- 4<sup>th</sup> in Series" stated that there are different purification technologies. The scrubbing method is cheaper than other technologies, but it requires constant freshwater supply so it has a high cost in the long term. The Molecular Sieve method is moderate in its cost and beneficial in the long term. Membrane Based-Catching Up technology is similar somehow to the Sieve. Another method is the Cryogenic-Based method in which methane is liquefied before other impurities so that biogas can be cooled to 170 – 180 degrees Celsius to separate them.

The third step is pressurizing the produced biogas and filling the product in high-pressure cylinders. The last step is dispersion, where the BioCNG is ready to be distributed to be used in the vehicles.

## ECONOMIC SOLUTION

According to the study, BioCNG production is cheaper than the production of the CNG and other fuels by 20-50%. In addition, a new system is developed by BioCNG LLC company related to this technology which is BioCNG™ units. These units are capable of lowering the expenses of cleaning the biogas and produce a low-cost renewable natural vehicle fuel. These units, also, have minimal maintenance issues. So, BioCNG represents an economic offer for fueling cars with natural gas.



# THE HYDROGEN ECONOMY: HOW IS THE GLOBAL ENERGY INDUSTRY RISING TO THE CHALLENGE?

BY HISHAM EL-GRAWANY, EGYPT MARKET MANAGER, ENERGY SYSTEMS, DNV

As recently as three years ago, clean hydrogen energy was on the fringes of the energy-transition conversation – an outlier solution, at least for the short or medium term. Today, it is rapidly moving into the mainstream, and for many, it is essential to a net-zero energy future. As the world is heading for hydrogen, the route is uncertain and many questions remain.

To meet the targets of the Paris Agreement, the world needs to transition faster to a deeply decarbonized energy system. In addition to energy efficiency gains, this will require greater renewable power generation and electrification, and the scaling of technologies to remove the carbon from fossil fuels. Hydrogen will be needed to connect and enable these paths.

DNV’s recently released a new research report- Rising to the challenge of a hydrogen economy, which explores the outlook for emerging hydrogen value chains, from production to consumption. The research found that the challenge is not in the ambition, but in changing the timeline: from hydrogen on the horizon to hydrogen in our homes, businesses, and transport systems.

Findings from the research, based on a survey of more than 1,000 senior energy professionals and in depth interviews, indicate that some energy professionals identify a lack of investment in infrastructure as the joint-highest risk their organizations face in relation to hydrogen – and a significant majority (78%) say repurposing existing infrastructure will be crucial to developing a large-scale hydrogen economy.

Some 84% of senior energy professionals who responded to the survey believe that hydrogen has the potential to be a major component of a global, low-carbon, energy system, while 73% say Paris Agreement targets will not be possible without a large-scale hydrogen economy.

Profitable business opportunities are the biggest driver of involvement in hydrogen, while infrastructure and costs are two of the biggest hurdles. Repurposing existing infrastructure has a key role to play, and the right regulations are deemed to be the most powerful enabler, followed by carbon pricing specifically.

The research also revealed the following:

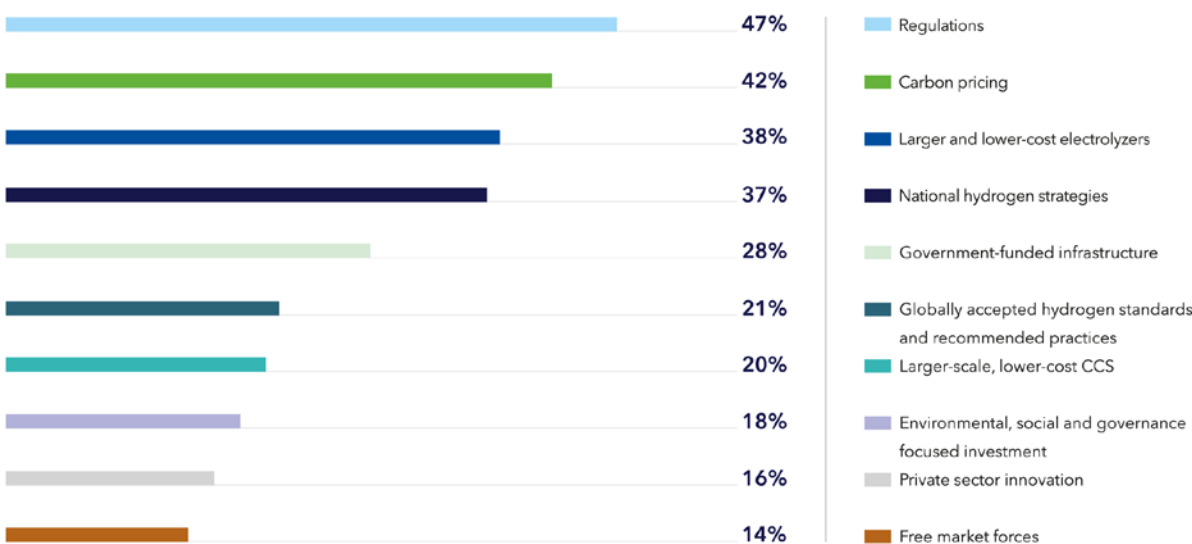
- » By 2025, 44% of energy companies globally involved in hydrogen expect it to account for more than a tenth of their revenue, rising to 73% of companies by 2030. This is up significantly from just 8% of companies today.
- » On the other side of this new energy value chain, 33% of hydrogen consumers expect hydrogen to represent more than a tenth of their organization’s energy or feedstock spending by 2025, rising to 57% by 2030. This is up from just 9% today.
- » Profitable business opportunities are the biggest driver for those involved in the hydrogen economy, while infrastructure and cost are two of the biggest hurdles.

- » 73% say Paris Agreement targets will not be possible without a large-scale hydrogen economy. Some 80% say the hydrogen economy needs effective carbon-pricing regulations before it can scale-up.

Hydrogen has a new status in 2021 as an important, viable and rapidly developing pillar of the energy transition. Yet ambitions and the rate of change in the hydrogen economy are demanding, and the industry needs to prepare. Read the complete finding here.



Most important enablers of a hydrogen economy to 2030



**CONTACT US TO LEARN MORE:**

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Vice President & Area Manager North Africa, DNV

Email: [hisham.el-grawany@dnv.com](mailto:hisham.el-grawany@dnv.com)

# GROWING ECONOMIC RIVALRY PUTS SAUDI-UAE ALLIANCE TO TEST

IHAB SHAARAWY

The OPEC this month was on the verge of a new crisis similar to the one that jeopardized oil markets a year ago when a disagreement between Russia and Saudi Arabia over proposed oil-production cuts amid the COVID-19 pandemic led to a war of prices where oil value fell more than 60%.

This time, a disagreement between the United Arab Emirates (UAE) and Saudi Arabia over OPEC policy and the desire of UAE to increase its production limits left energy markets in limbo. The disagreement between the two traditional Gulf allies caused talks between the world's biggest oil-producing nations to be abandoned and pushed oil prices to a six-year high.

Luckily, behind-the-scenes diplomacy took only two weeks to resolve the standoff and clinched a deal to raise the production limits imposed on Iraq, Kuwait, Russia, Saudi Arabia and the UAE next year. This resolution is expected to boost their production by 2 million barrels per day by the end of this year, ending a dispute that roiled oil markets.

The rare public disagreement between the two large economies points to a growing economic rivalry, which only looks set to intensify. Several regional analysts highlight, at the same time, a growing political gap between the two allies, that may have dire consequences on the regional political and economic scenes.

## ALLIANCE BORN IN HEAVEN

For a long time, the two countries united their stance to push back what they saw as common threats. Their alliance has been one of the most durable alliances in Middle East politics in the last years. The alliance was more consolidated to become a strategic one when Saudi Arabia's King Salman bin Abdulaziz came to power with his son Mohamed bin Salman, who became along with the Crown Prince of Abu Dhabi Mohammed bin Zayed the major players in this alliance.

The alliance was the core of a political axis that was joined by Egypt and Bahrain to deter what they perceived to be hostile behaviors of Iran, Turkey and Qatar.

The UAE was the most prominent member in the military coalition of several Arab nations that was led by Riyadh to intervene in Yemen in 2015 against the Iran-aligned Houthis who ousted the government from the capital, Sanaa.

The coalition, which was supported by the US and other western nations, has imposed a blockade of Houthi territory, but at the same time has pushed around half of the Yemeni population to the brink of starvation and faced rebuke of international humanitarian watchdogs.

The two countries also led a blockade against Qatar in 2017 to curb Doha's ambitious foreign policies that included supporting Islamist groups such as Muslim Brotherhood and its friendly relations with Iran.

The blockade led Doha to consolidate cooperation with Turkey, which rushed to its aid with food and medical supplies that had been in short supply during the embargo.

The rivalry with Turkey and Iran were the main drivers of Saudi-Emirati policies on many other fronts including Syria, Iraq, Lebanon, and Libya. The two countries also maximized joint pressure on United States Administration for adopting a harsher stance on Iran.

However, the growing divergence between the two countries on the conduct of regional affairs, economic diversification, or even oil policy in the last couple of years forms a strong contrast to the close bilateral coordination seen at the beginning of the Yemen campaign in 2015.

The amounting criticism and Houthis counterattacks on several fronts pushed Saudis and Emiratis to seek a way out of the conflict. However, everyone tried to do so in his own way.

Today, we can see a rising competition between the two allies in Yemen where the UAE supports a separatist movement that wants renewed independence for South Yemen, while Saudi Arabia still supports the Yemeni Government and seeks a peace agreement with Houthis.



Riyadh's recent reach to Qatar and Turkey also became a deteriorating factor between Saudi Arabia and the UAE, who recently took a solo decision to normalize relations with Israel.

Therefore, Saudi Arabia has amended its rules on imports from other Gulf Cooperation Council (GCC) countries to exclude goods made in free zones or using Israeli input from preferential tariff concessions; a move that is seen as a challenge for the UAE's status as the regional trade and business hub. Saudi Arabia has been increasing pressure on international firms to shift their Middle East hubs to the kingdom.

In the latest round of deterioration between the two countries, Saudi Arabia moved to ban its citizens from the UAE, citing pandemic concerns.

Some can see the increasing economic competition between Saudi Arabia and the UAE as a reflection of the growing political differences. However, others see that the Kingdom is seriously trying to challenge its smaller neighbor's dominance as the region's business, trade and tourism hub.

Despite being close allies, Saudi Arabia, which is trying to diversify its economy and reduce its dependence on oil, finds no option other than competing with the neighboring UAE to attract investors and businesses.

## A RIVALRY NO ONE CAN AFFORD

The rivalry between the two neighbors is putting the future of the GCC under threat. It may have consequences that can be felt across the wider Middle East and international markets.

Despite this, many indicators can soothe these fears. One of these important indicators is the fact that the two Gulf countries still have many common interests, especially in the geopolitics and security spheres. Both of them are still threatened by Iran and its proxies. They still need to stop Turkey's growing influence in the region and deter the influence of Islamic political movements.

As the Biden administration shows its keenness to make a new deal with Tehran that would loosen the restraints on Iran, the two Gulf allies may find themselves in the same boat again.

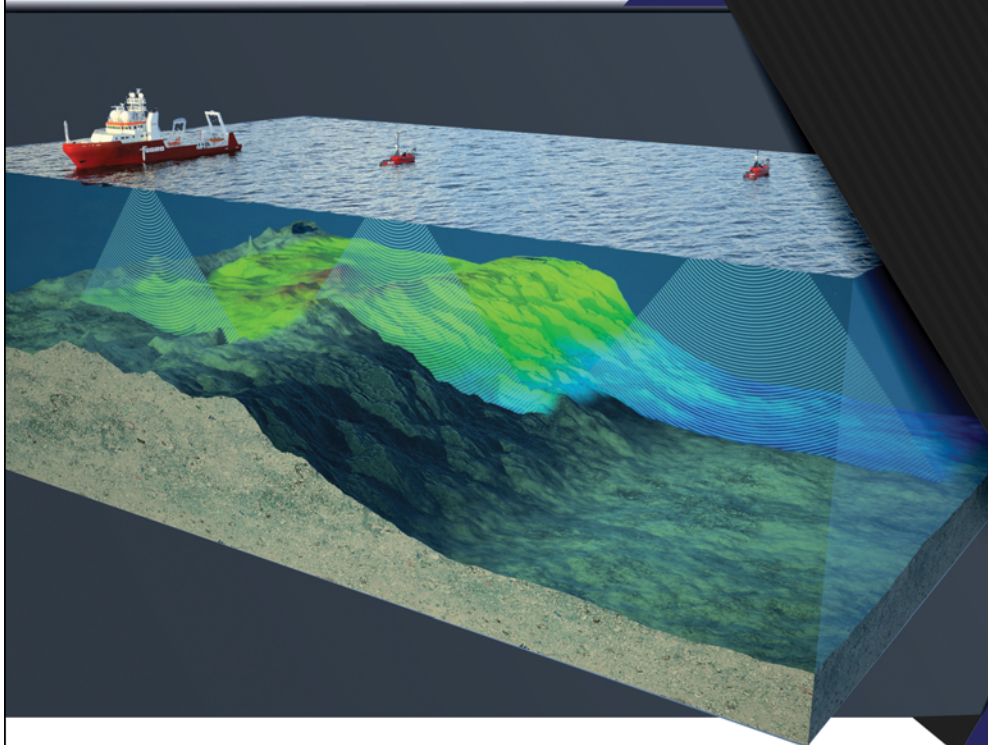
Such a deal should have its economic sequences on the two Gulf countries too as the Islamic Republic is not only their geopolitical archfoe, but also a major competitor oil producer.



Both countries also still need to contemplate together how to deal with the ramifications of the US retrenchment from the region. A recent meeting between the UAE de facto ruler Bin Zayed and the Saudi Crown Prince in Riyadh following the OPEC tension indicates that the two countries are still keen to keep their political alliance intact.

However, their diversification plans and need for foreign investment while eyeing the same sectors such as tourism and transportation will only lead their economic rivalry to intensify.

The latest OPEC standoff also indicates that the rivalry between the two big oil-producing countries may lead them to weaponize oil from time to time as every one of them has a different oil policy.



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“The East Mediterranean Gas Forum’s (EMGF) is redefining the concept of energy through cooperation and commitment. The forum could ensure the prosperity of the EMGF’s member countries and everyone in the region.”

**TAREK EL MOLLA**

Minister of Petroleum and Mineral Resources

As part of the fifth ministerial meeting of the forum.



“Apache plans to pour more investments to increase the drilling activity and production, considering the optimistic results of the seismic survey carried out by the company in its concession areas.”

**JOHN CHRISTMANN**

CEO and President of APA Corporation.

Expressing Apache’s E&P expansion plans.



“The Egyptian economy has been able to mitigate the negative implications of the COVID-19 pandemic; demonstrating its agility and resilience as the country continues to drive investments in critical infrastructure and employment opportunities. These factors instil confidence to invest in projects that serve the manufacturing and industrial sectors in Egypt and bolster our presence.”

**SAIF HUMAID AL-FALASI**

Group CEO of Emirates National Oil Company (ENOC)

This came during the signing ceremony of the agreement with Proserv, Egypt Group, and Misr Petroleum Company



**TransGlobe Energy**  
CORPORATION



“The company is encouraged by our operating results to date both in Egypt and Canada. Utilization of a top-drive rig in Egypt has improved our overall drilling performance as we build experience towards our horizontal program kicking off early in 2022.”

**RANDY NEELY**

President and CEO of TransGlobe Energy Corporation

TransGlobe announced the company’s production updates.



## PETROLEUM MINISTRY'S PROGRAM TO QUALIFY YOUNG, MIDDLE CADRES SERVES NATIONAL ECONOMY



Ministry of Petroleum and Mineral Resources, under the patronage of the Minister Tarek El Molla, has achieved significant fulfillments over the last six years, including coakiness of natural gas and exporting excess, Egypt's transformation into a regional energy hub, paying off the debts of the side partners, attracting investments by several major international companies, digital transformation, developing of production and refinery activities, conducting structural reform, developing petrochemicals industry and targeting liquid fuel sufficiency.

However, one of the ministry's most important achievements is the modernization of the petroleum sector through concentrating on human element development.

In 2017, the ministry of petroleum announced its young and middle leadership program, which witnessed the competition of 3,000 candidates.

With a very modern and fair process, 450 employees were qualified for very strong training courses inside and outside Egypt in cooperation with joint venture companies. This achievement encouraged all employees in the petroleum sector to develop their skills to be able to compete for joining the second batch.

In 2020, more than 25,000 employees registered for this program, exerting themselves to develop self-skills and qualifications.

Exams are still underway to choose the best candidates for the second batch to continue with the process of developing human elements in the petroleum sector.

The importance of developing human resources is to enhance their skills in most areas and activities of the oil, gas and petrochemical industries. Uplifting the skill levels of employees, through short and long-term training programs, serves the needs of the oil and gas industry to meet the challenges it is likely to face and continues to achieve positive results that support the national economy.

Moreover, raising awareness and the ability to implement the rules of security, safety, occupational health and environmental protection is one of the most important skills that should be acquired by young leaders in this vital field.

This modernization and development program created a new spirit in the petroleum sector and moved the stagnant water.

Raising the level of experience, skills and motivation will be reflected on the economic side in the near future. This program is very clear evidence of development that is taking place in all fields in Egypt under the leadership of Egyptian President Abdel Fattah El-Sisi.

### MOHAMED ABDELRAOUF

*Production Assistant General Manager  
Qarun Petroleum Company*

## THE PHILOSOPHY OF EXPLORING FOR OIL, GAS ACCUMULATIONS



Understanding and predicting hydrocarbon accumulations in an exploration program is not an easy process. It involves the interplay of different science disciplines, as we deal with unseen objects in the subsurface through different tools and measurements.

This process involves the assessment of source, reservoir and seal rocks, in addition to the time of expulsion, migration and trapping system. These factors determine, to high extent, the possibility of finding oil and gas in sedimentary basins.

The term "basin" has various meanings according to each discipline. Structural geologists, for example, define the basin as a container that can receive sediments and it is created due to the tectonic process. Stratigraphers consider it as the place of sedimentary full deposited during time interval in the geologic past under certain conditions.

The first step in opening up a frontier basin is to acquire potential and seismic data to define the basin margins and structural styles, then the drilling comes with valuable data about different types of rocks in the subsurface.

A basin may have several phases of tectonic evolution, sediment accumulation, and deformation style. Each phase may have a slightly different geographic extent. Thus, the area of the basin in present-day terms may have a different context at specific times in the geologic past.

One of the biggest challenges facing geoscientists in the prospective evaluation of petroleum basin is the subsurface imaging, since small parts of the basin covered by seismic data and segmented between different companies. So, understanding of the regional distribution of reservoirs and other petroleum elements within a basin remains ambiguous until significant collaboration between companies is sorted.

For instance, the idea of merging several seismic volumes into one big volume can help significantly in adding new discoveries in a basin due to revealing the inclusive picture of petroleum elements in the subsurface. So, the philosophy of exploration is to develop the oil and gas prospect scientifically and efficiently, as the core objective of the petroleum industry is to find economic hydrocarbon accumulations.

One of the most prominent applications of regional-scale studies is the analogs, which are used to define the under-explored areas. Petroleum system studies can be used as analogs for undocumented petroleum systems in prospective petroleum areas.

Because a petroleum system study describes both elements and processes, we can use them as both look-alike and work-alike analogs. This method involves studying the geologic history of sediment influx and accumulation within the basin and the tectonic events that create the basin margins and depocenters and their influence on the distribution of reservoirs. Reconstructing a basin's history from a regional tectonic setting to a single local basin provides the geologic framework for defining exploration plays and prospects.

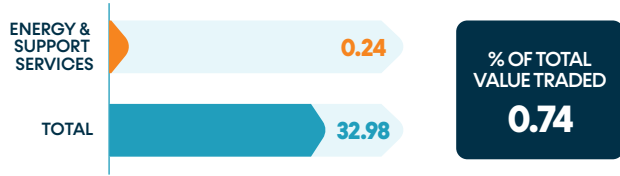
### AHMAD MOSTAFA

*Exploration Department Head  
South Valley Egyptian Petroleum Holding Company (GANOPE)*

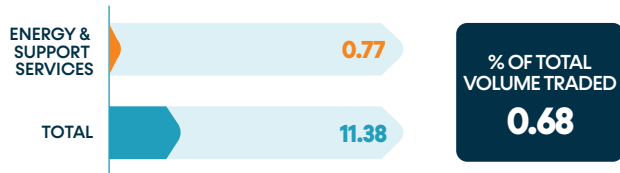


VALUE AND VOLUME OF SHARES TRADED FOR OIL & GAS SECTOR IN JUNE 2021

VALUE TRADED (EGP BILLION)



VOLUME TRADED (BILLION SHARES)



NATIONAL DRILLING

|          |             |                      |
|----------|-------------|----------------------|
| CURRENCY | CLOSE PRICE | YTD PRICE CHANGE (%) |
| USD      | 4.69        | -                    |



ALEXANDRIA MINERAL OILS CO.

|          |             |                      |
|----------|-------------|----------------------|
| CURRENCY | CLOSE PRICE | YTD PRICE CHANGE (%) |
| EGP      | 3.16        | ▲ 1.28               |



EGYPT GAS

|          |             |                      |
|----------|-------------|----------------------|
| CURRENCY | CLOSE PRICE | YTD PRICE CHANGE (%) |
| EGP      | 33.24       | ▼ 23.71              |



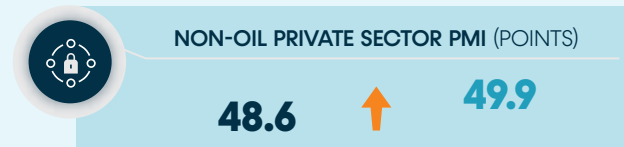
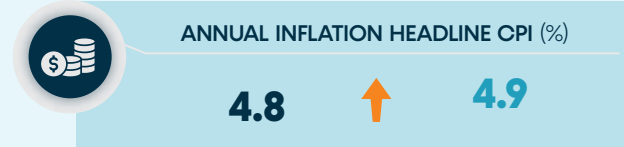
SIDI KERIR PETROCHEMICALS

|          |             |                      |
|----------|-------------|----------------------|
| CURRENCY | CLOSE PRICE | YTD PRICE CHANGE (%) |
| EGP      | 11.94       | ▲ 28.25              |

EGYPT'S MONTHLY UPDATES ON PRODUCTION, RIGS, AND DRILLING ARE AVAILABLE NOW IN OUR MONTHLY MONITOR. PLEASE CONTACT US VIA MONITOR@EGYPTOIL-GAS.COM TO SUBSCRIBE FOR YOUR MONTHLY COPY.

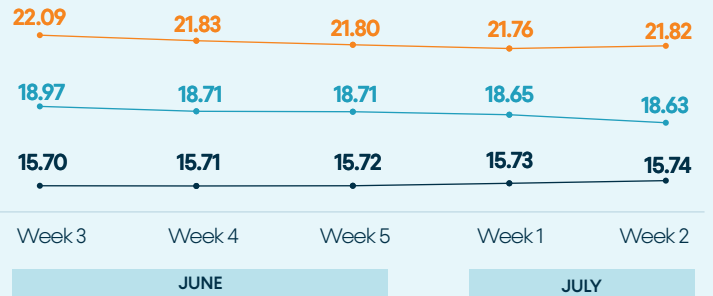
MAIN ECONOMIC INDICATORS

May 2021 June 2021



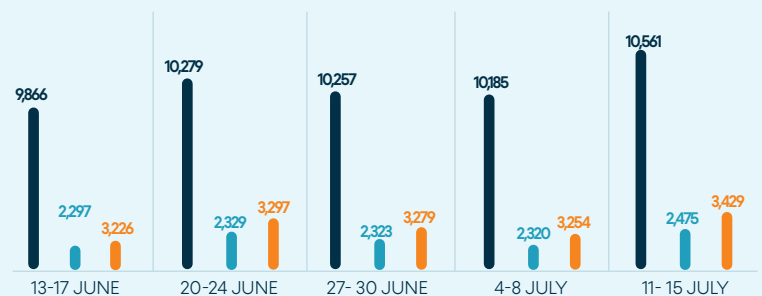
EXCHANGE RATES

British Pound EUR USD



CAPITAL MARKET INDICATORS

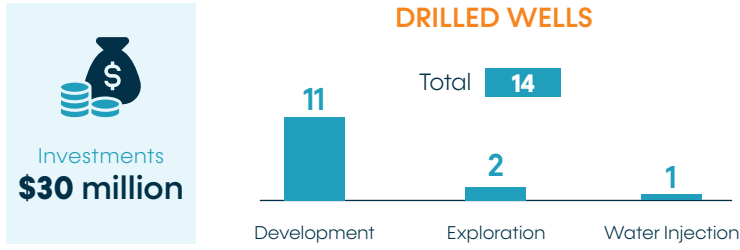
EGX 30 EGX 70 EWI EGX 100 EWI



Source of Raw Data: CBE, CAPMAS, Egyptian Exchange, IHS Markit

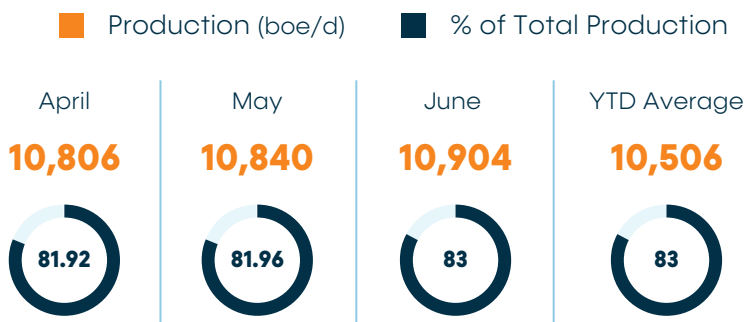


**GPC'S PERFORMANCE IN Q4 2020/21**



**TRANSGLOBE EGYPT PERFORMANCE IN 2021**

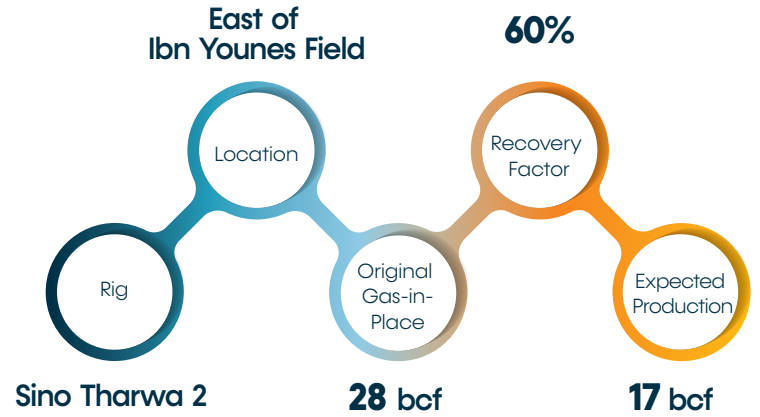
**PRODUCTION UPDATES**



**THE 12-WELL DEVELOPMENT PROGRAM UPDATES**

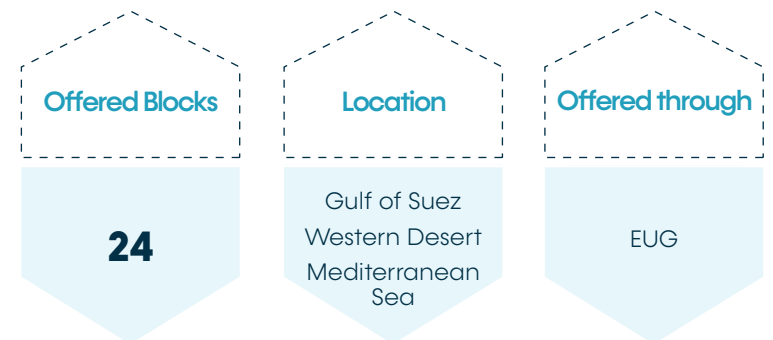
| Drilled Well | Name | Depth (m) | Oil-Bearing Sands | Concession |
|--------------|------|-----------|-------------------|------------|
| 1st          | HW-8 | 1,640.5   | Yusr-C & Bakr     | West Bakr  |
| 2nd          | K-64 | 1,538     | Asl-A,B & D       |            |

**PETRODISOUQ TO DRILL IBN YOUNES 2 WELL**



**CLOSING DATE FOR THE 1ST BID ROUND IN 2021 POSTPONED**

**BID ROUND CLOSING DATE**



**INTERNATIONAL OIL PRICES**

|         | <b>BRENT PRICES (\$/BBL)</b> | <b>OPEC BASKET PRICES (\$/BBL)</b> | <b>NATURAL GAS PRICES (\$/MMBTU)</b> |
|---------|------------------------------|------------------------------------|--------------------------------------|
| 07 May  | 68.28                        | 66.57                              | 296                                  |
| 20 May  | 65.11                        | 65.29                              | 293                                  |
| 15 June | 73.99                        | 72.05                              | 3.24                                 |
| 25 June | 76.18                        | 74.19                              | 3.50                                 |
| 08 July | 74.12                        | 71.97                              | 3.69                                 |
| 22 July | 73.79                        | 72.09                              | 4                                    |

# Baker Hughes Remote Operations Services: At a glance

2019

Executed  
**HALF**  
of the company's  
total drilling jobs

Drilled or logged  
**3,350**  
onshore wells  
in North America alone

Drilled  
**42 MIL**  
feet globally

5.15

2020

Executes  
**55%**  
of the company's  
total drilling jobs

Delivers  
services in  
**30+**  
countries

Deploys from  
**20+**  
centers and  
customer offices

# TODAY

Baker Hughes can support

# 100%

of our Directional Drilling and  
MWD/LWD portfolio using  
Remote Operations Services

Remote drilling and evaluation

## BY THE NUMBERS:

### 360+

engineers and geologists  
supporting operations worldwide

### 100%

connectivity with every  
Baker Hughes drilling operation

### 300+

shifts-per-day  
delivered remotely