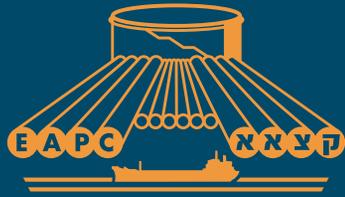


Eilat Ashkelon Pipeline Company Ltd.

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Your Energy Gateway



# Eilat Ashkelon Pipeline Company Ltd.



## Your Energy Gateway

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# INTRODUCTION

Founded in 1968, the Eilat Ashkelon Pipeline Co. Ltd. (EAPC) serves as a land bridge for transporting crude oil from the Red Sea to the Mediterranean and vice versa.

The crude oil pipeline system consists of 3 separate pipelines:  
A 42", 254-km long line links the Red Sea Port of Eilat with the Mediterranean Port of Ashkelon. Two other lines feed the Oil Refineries in Haifa and Ashdod.

The company operates two oil ports and two oil terminals with a total storage capacity of 3.6 million cubic meters for crude oil and oil products.

The services provided by the company, in addition to pipeline transit of crude oil, include long term terminal storage and crude oil blending to customer's requirements.

Besides crude oil activity, EAPC also provides infrastructure services for oil products, liquefied petroleum gas (LPG), fuel oil and coal. In the near future, EAPC will be expanding its activities to the fields of natural gas, power plants, and chemicals. As one of the leading companies in the Israeli energy sector, EAPC remains at the forefront of industrial practices and know-how in the development of future infrastructures. Thus, the company maintains its' capabilities and advantage in providing both its' foreign and domestic customers with solutions for intake from the sea and storage of energy products.

With respect to environmental issues and community responsibilities, it is EAPC's standard working policy to implement the strictest international standards and guidelines.

EAPC's well experienced and professional employees lead the company's development while maintaining the highest level of service to its customers in their routine operations.



- A land bridge from the Red Sea to the Mediterranean Sea and vice versa
- 3.6 million cubic meters for crude oil and oil products
- 750 km pipelines



# THE SYSTEM

## The Pipelines

EAPC operates three separate pipelines for crude oil and one for oil products.

> A 42", 254-km long crude oil pipeline linking the Red Sea port of Eilat with the Mediterranean port of Ashkelon. Three booster stations pump the crude oil at a maximum capacity of 60 million tons per annum. Two additional booster stations pump the crude oil in the opposite direction, namely from the Mediterranean to the Red Sea, at a maximum capacity of 30 million tons per annum.

> A 16"/18", 197-km long crude oil pipeline connecting Ashkelon with the Haifa refinery. Three pumping stations along the line enable an annual throughput capacity of 5.8 million tons.

> A 18"/16", 36-km long crude oil pipeline connecting Ashkelon with the Ashdod refinery, with a maximum throughput capacity of 7 million tons per annum.

> A 16" 260-km long oil products pipeline connecting Ashkelon with Eilat. The

pipeline serves to transport oil products (gasoline, jet fuel and gasoil) from the Mediterranean to the Red Sea and vice versa.



- **Eilat-Ashkelon**  
254 km, 42", Bidirectional
- **Ashkelon-Haifa**  
197 km, 16"/18"
- **Ashkelon-Ashdod**  
36 km, 18"/16"
- **Givati-Eilat (oil products)**  
260 km, 16"



## Oil Ports

### EILAT OIL PORT

EAPC operates a crude oil jetty at the Eilat Oil Port.

The jetty accommodates tankers of up to 500,000 DWT with a water depth of 30 meters alongside the jetty. The maximum discharge rate at this jetty is 20,000 cubic meters per hour. The maximum loading rate is 10,000 cubic meters per hour.

### ASHKELON PORT

The Ashkelon open sea oil port is located south of the city of Ashkelon. The following discharging and loading facilities operate at the port:

- > Berth no. 1 for oil products (multibuoy);
- > Berth no. 2 for oil products and fuel oil (multibuoy);
- > LPG berth (multibuoy);
- > Two SPM berths, no. 3 and no. 4, for crude oil;
- > A coal jetty.

The SPM berths are located 3.2 km offshore at a water depth of 31 meters and have a loading and discharging capacity of 7,500 cubic meters per hour. These berths accommodate tankers of up to 300,000 DWT.

Berths no. 1 and 2 are used to load and unload oil products (gasoline, jet fuel and gasoil). The Berths accommodate tankers of up to 130,000 DWT.

A modern computerized system controls the channelling of different oil products unloaded at these berths. The oil products are transferred to the adjacent Petroleum & Energy Infrastructure Company Ltd. (PEI) tankfarm, where they are pumped into the national oil products network.

The LPG berth accommodates LPG tankers of up to 7,000 DWT.



### Eilat Port

- A jetty up to 500,000 DWT
- Ashkelon Port
- 2 SPM's for crude oil up to 300,000 DWT
- 2 Multibuys for oil products up to 130,000 DWT
- 1 Multibuoy for LPG
- A Coal Jetty

# THE SYSTEM

## Oil Terminals

### EILAT TERMINAL

#### Seashore Site

This site receives oil from tankers calling at the port of Eilat, with an overall storage capacity of 160,000 cubic meters. From this site, the crude oil is pumped into the main tankfarm at Ramat Yotam.

#### Ramat Yotam Tankfarm

This site consists of 16 storage tanks with a total storage capacity of 1.2 million cubic meters.

### ASHKELON TERMINAL

This Mediterranean Sea terminal consists of 23 storage tanks for crude oil with a storage capacity of 1.9 million cubic meters. The terminal is fed both by tankers discharging at the Ashkelon oil port and by the 42" line from Ramat Yotam. From the terminal, the oil is either

pumped to the refineries or loaded onto outbound tankers.

The Ashkelon terminal has an additional 400,000 cubic meter storage facility for oil products. The oil products storage system consists of 7 dedicated storage tanks and is connected to berths no. 1 and 2 for loading and unloading. The system is also connected to EAPC's filling station for tanker lorries and to PEI's tankfarm.

The LPG tankfarm has a capacity of 7,900 tons, in mounded tanks. At this tankfarm, discharging of ocean-going tankers can be carried out simultaneously with the loading of tanker lorries. EAPC also operates a modern filling plant for LPG cylinders which serves Israeli consumers.



### Storage Capacities: Eilat

- 1.36M cubic meters for crude oil

### Ashkelon

- 1.9M cubic meters for crude oil
- 0.4M cubic meters for oil products
- 7,900 metric tons for LPG

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# THE REVERSE FLOW PROJECT

To enhance the activity of the Eilat Ashkelon pipeline, the company created a new transit capability; the pumping of crude oil from the Mediterranean Oil Port of Ashkelon, through the 42" pipeline to Eilat on the Red Sea.

This activity complements the original south-to-north pumping direction, making the system unique in its bidirectional feature. The ability to pump crude oil in both directions has also enabled EAPC to nearly double its operational storage capacity.

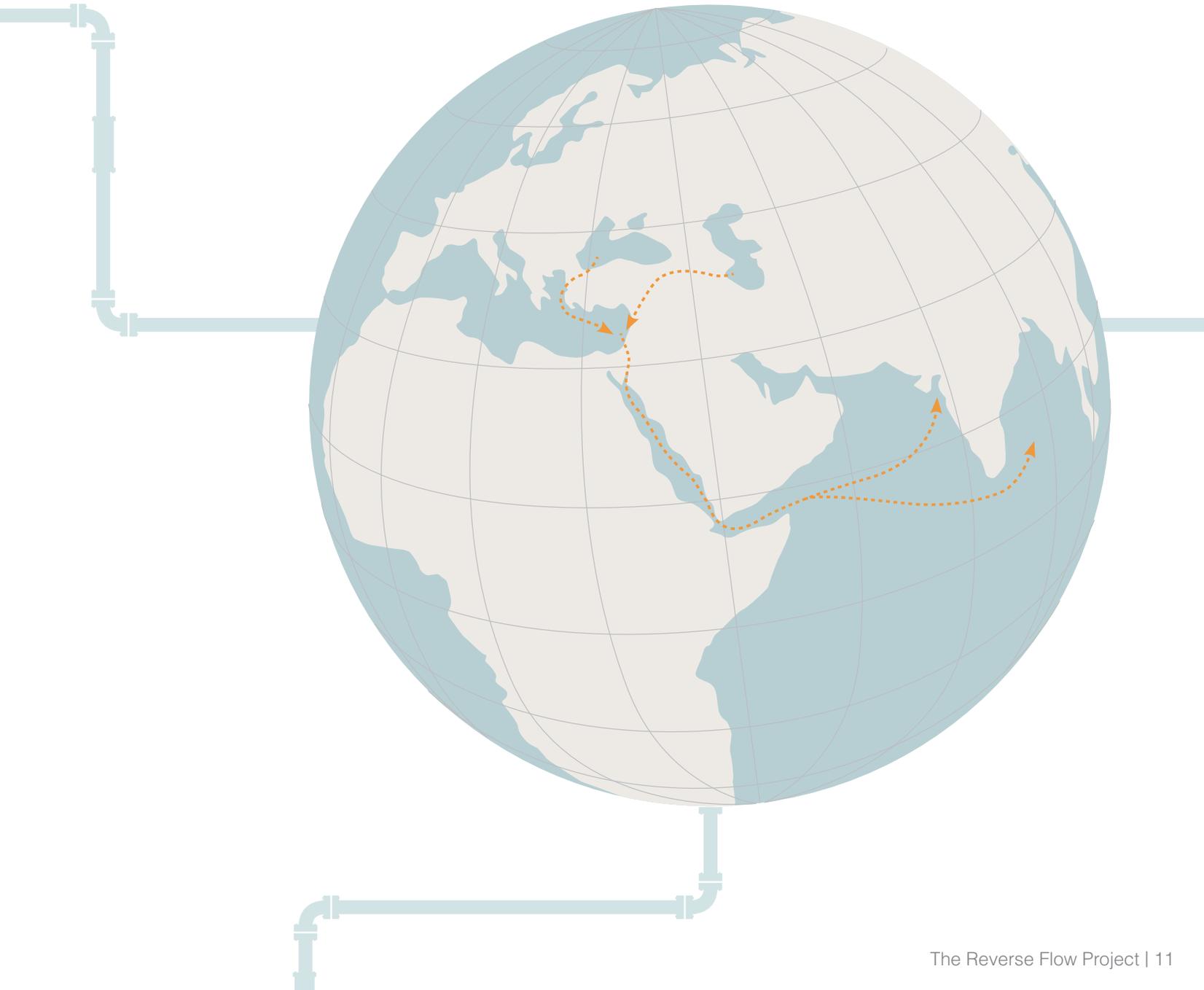
The long route around Africa and the limitations of the Suez Canal (related to the size of tankers), boost the competitive advantage of the Reverse Flow Project. Crude oil produced in Russia and the Central Asian Republics and loaded at Black Sea ports, may now be marketed at competitive prices in Southern Asia and the Far East.

EAPC's range of facilities offers the possibility of collecting several cargoes of 600,000 barrels or 1,000,000 barrels at the company's storage terminals, and then redelivering larger cargoes in Eilat. This flexible system along with other transportation and handling alternatives can produce solutions tailored to the customers' needs.

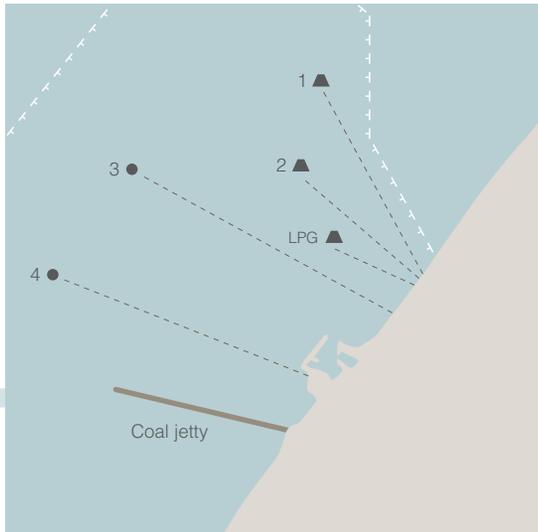


## Throughput Capacity

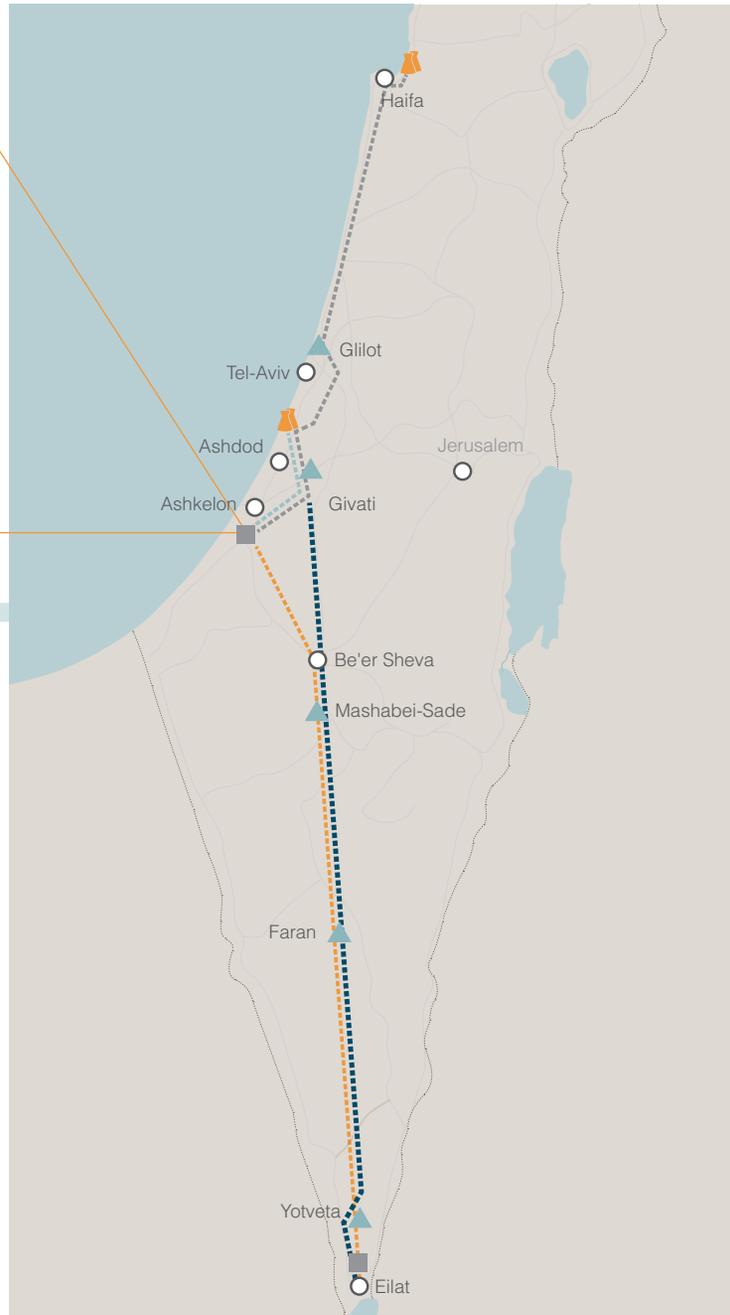
- 600,000 bbls/day
- Storage capacity at both ends enables small cargoes to be combined in Ashkelon and redelivered on board VLCCs in Eilat



# SYSTEM'S MAP



Ashkelon Oil Port



## Legend

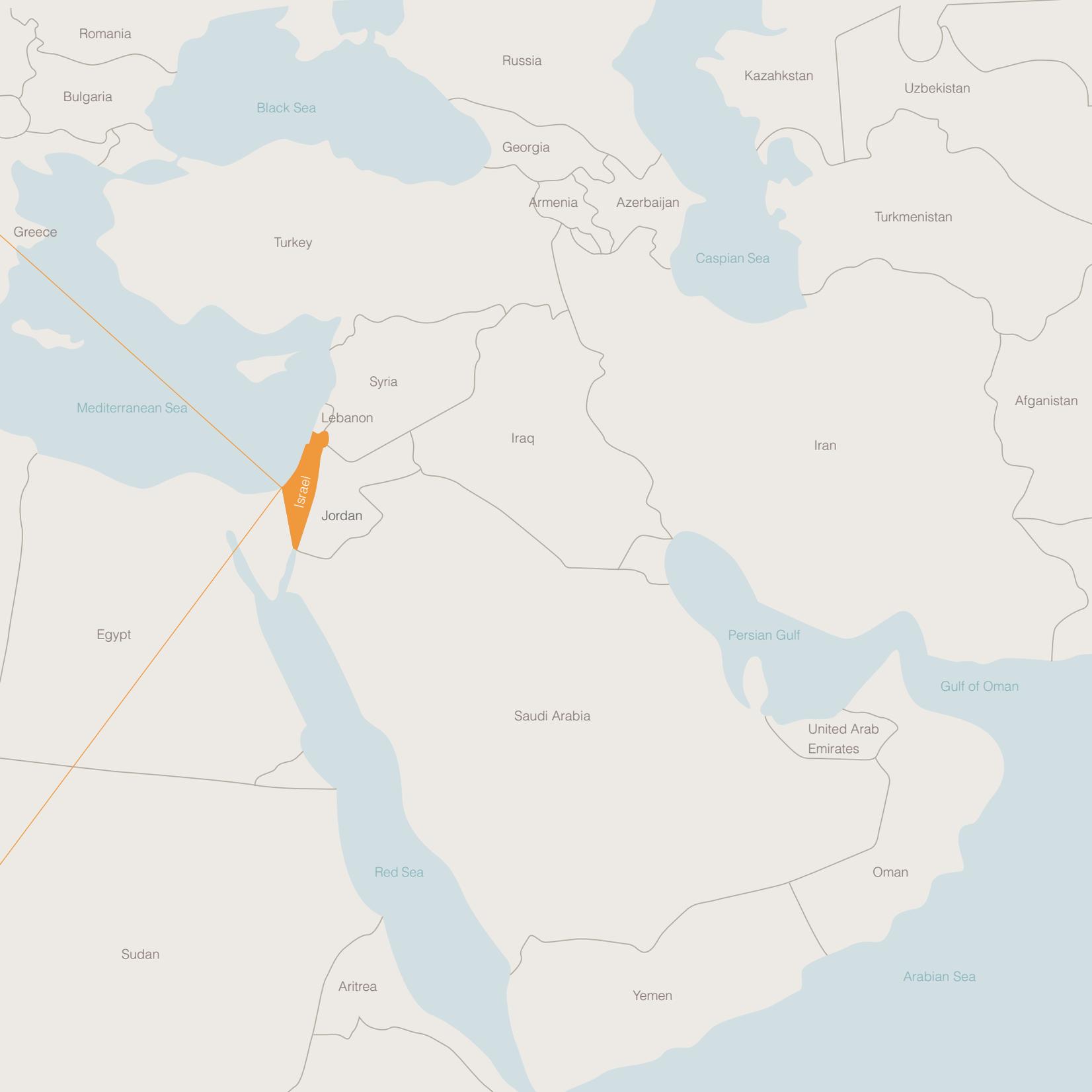
Terminal	■
Pumping Station	▲
Refinery	🏭
City	○
Multibuoy (oil products)	▲
SPM (crude oil)	●
Sub-marine line	- - - -

## Crude Oil Pipelines

Eilat-Ashkelon 42" (bidirectional)	.....
Ashkelon-Haifa 16"/18"	.....
Ashkelon-Ashdod 18"/16"	.....

## Products Pipeline

Givati-Eilat 16"	.....
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Romania

Bulgaria

Greece

Black Sea

Turkey

Russia

Kazakhstan

Uzbekistan

Georgia

Armenia

Azerbaijan

Turkmenistan

Caspian Sea

Syria

Lebanon

Iraq

Iran

Afghanistan

Israel

Jordan

Persian Gulf

Gulf of Oman

Egypt

Saudi Arabia

United Arab Emirates

Red Sea

Oman

Sudan

Aritrea

Yemen

Arabian Sea

# OTHER INFRASTRUCTURE SERVICES

## Oil Products

EAPC has a 400,000 cubic meters oil products storage capacity (gasoline, gasoline components, jet fuel and gasoil) at the Ashkelon terminal. The oil products storage system is connected to berth no. 1 and berth no. 2 for loading and unloading. These berths accommodate tankers of up to 130,000 DWT. In addition, berth no. 2 has fuel-oil loading and unloading capability.

A modern computerized system controls the channeling of different oil products loaded and unloaded at these berths.

The oil product system is connected to Petroleum & Energy Infrastructure Company Ltd. (PEI) tank farm, where the oil products are pumped into the national oil products' network.

This system is also connected to EAPC's filling station for tanker lorries. This station serves as a complementary link in the imported oil products distribution chain to the local market.

To accommodate customers' needs, a doping system for additives was constructed.

## LPG

An LPG tankfarm with a capacity of 7,900 tons in mounded tanks and a berth for handling LPG tankers of up to 7,000 DWT, operate at the Ashkelon terminal. The tankfarm, which was built and operates in compliance with the world's most stringent safety standards, allows for the quick and efficient loading of tanker lorries.

Discharging of ocean-going tankers can be carried out simultaneously with the loading of tanker lorries.

EAPC completed the construction of a modern filling plant for LPG cylinders. The plant serves the local LPG marketing companies which distribute the cylinders to Israeli consumers.

## Coal

A coal jetty operates in the Ashkelon port. This jetty serves the Rutenberg power station of the Israel Electric Co. (IEC). EAPC provides all marine services (pilotage, mooring, etc.) for this jetty. Coal carriers of up to 200,000 DWT are unloaded at this jetty, by means of two cranes at a rate of 1,800 tons per hour each.



- 7,900 metric tons of LPG
- 400,000 cubic meters for oil products
- 2 berths for clean tankers up to 130,000 DWT



# EAPC LOOKS TO THE FUTURE

In response to market demand and expansion trends in Israel and worldwide, EAPC continues to develop the company's infrastructures. The company is expanding its business in a variety of fields including crude oil, oil products and LPG storage and transportation; electricity production; green energy production projects and integrating in the infrastructures related to the natural gas discoveries and its penetration into the market.

One of EAPC's top goals is to establish its status as a commercial and logistic base for energy products in the Mediterranean Basin.

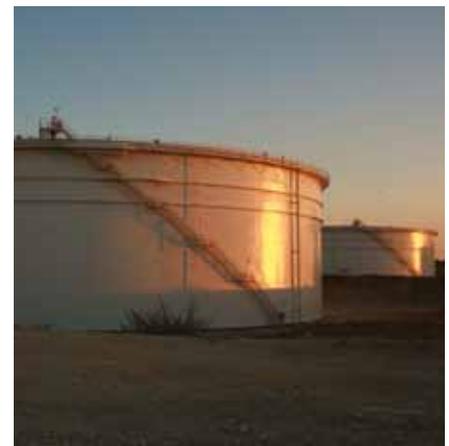
EAPC also aims to expand its activity in the reverse flow project, serving as a land bridge between the Mediterranean Sea and the Red Sea, as an efficient means for accessing the Eastern hemisphere.

## Increasing the Crude Oil & Oil Products Storage Capacity

In response to the increasing demand for crude oil and oil products storage capacities, EAPC is planning to build additional storage facilities for the domestic and international markets.

The expansion of the system's capacity was triggered by the increase in the production capacities of Russia and the Central Asian Republics, fed through new pipelines to the Eastern Mediterranean Basin, along with the increase in the oil consumption and refining capabilities of developing countries in the East.

This growth amplifies the Ashkelon Port's status as a regional distribution center for crude oil and oil products.





## Gateway for Natural Gas from Egypt

EAPC's Ashkelon site was chosen as the reception facility for the natural gas purchased by Israel from Egypt. EAPC operates and maintains the natural gas receiving station at Ashkelon. The natural gas received is then distributed into the Israel Natural Gas Lines Company's system. The entry junction of natural gas in Ashkelon, along with the discovery of significant gas reservoirs opposite the shores of Israel, led the company to explore further possibilities for using natural gas for other industrial purposes.

# EAPC LOOKS TO THE FUTURE

## Private Power Station in Ashkelon

Further to the Israeli Government's decision to increase the electricity production capacity through private electricity producers, EAPC's subsidiary, Eilat Ashkelon Infrastructure Services Ltd. (EAIS), has joined the private consortium Dorad Energy Ltd. as a major partner. The company is building a power station at EAPC's Ashkelon site with a capacity of 820 MW, which will be fed by natural gas and will operate in an integrated combined cycle. Electricity will be sold directly to end consumers through the IEC's existing transmission and distribution grid. The station will be operated and maintained by EAIS's subsidiary; Eilat Ashkelon Power Station Services Ltd.

## Chemicals Terminal

While taking advantage of the Ashkelon port's proximity to the large chemical plants in southern Israel (Ramat Hovav, Mishor Rotem, Nahal Zin and the Dead Sea), EAPC plans to construct a terminal in Ashkelon for loading and unloading liquid chemicals from ocean-going tankers. The tanks will have a nominal volume of 200-10,000 cubic meters. The terminal will have filling stations for loading and unloading chemicals to and from tanker lorries and railway cars.



### Private Power Station

- 820 MW
- Clean energy - Natural Gas
- Combined cycle:
  - > 12 gas turbines
  - > 6 steam turbines



# COMMUNITY & ENVIRONMENT

## Community Involvement and Social Responsibility

EAPC's board, management and staff are committed to environmental, community and social responsibility. EAPC works closely with local authorities and community groups, and takes great pride in contributing and supporting the communities in close proximity to EAPC's facilities. EAPC's recognizes education as an essential factor in shaping future generations and thus generously supports educational programs within the communities. Additionally, EAPC tends to other social needs including, donating funds to charities, medical equipment to those in need, computers to disadvantaged communities and sponsoring outstanding athletes. EAPC strives to leave a lasting impact on generations to come.

## Environmental Protection and Safety

EAPC with its efficient control, prevention and management systems maintains the strictest international ecological, environmental and safety standards on land and at sea. EAPC is highly aware of the need to invest considerable resources in environmental protection and safety, in particular leak detection systems and fire prevention, detection and extinguishing systems.



Underwater life along EAPC's jetty in the Eilat Oil Port





# USEFUL CONVERSION FACTORS AND TABLES

Volume	Barrel (bbl)	US gallon	Kiloliter (kl)
Barrel (bbl)	1	42	0.159
US gallon	0.0238	1	0.0038
Kiloliter (kl)	6.2898	264.17	1

Pressure	atmosphere (atm)	bar	psi
atmosphere (atm)	1	1.01325	14.6959
bar	0.9869	1	14.5038
psi	0.06805	0.0689	1

Length 1	kilometer (km)	mile	sea mile
kilometer (km)	1	0.6214	0.54
mile	1.609	1	0.8690
sea mile	1.852	1.1508	1

Length 2	centimeter (cm)	inch	feet (ft)	meter (m)
centimeter (cm)	1	0.393	0.0328	0.01
inch	2.54	1	0.0833	0.0254
feet (ft)	30.48	12	1	0.3048
meter (m)	100	39.37	3.2808	1

Weight	kilogram (kg)	pounds (lb)	metric ton (mt)	long ton (lt)
kilogram (kg)	1	2.2406	0.001	0.000984
pounds (lb)	0.4536	1	0.000454	0.000446
metric ton (mt)	1,000	2204.62	1	0.9842
long ton (lt)	1,016.047	2240	1.0160	1

## FLOW RATE CONVERSION

- To convert from barrels per day to tons per annum multiply by 50

## API AND SPECIFIC GRAVITY (SG)

- API gravity =  $141.5/SG - 131.5$
- SG at 60°F =  $141.5/(API\ gravity + 131.5)$

API	SG	Bbls per mt
28	0.887	7.10
29	0.882	7.15
30	0.876	7.19
31	0.871	7.24
32	0.865	7.28
33	0.860	7.33
34	0.855	7.37
35	0.850	7.42
36	0.845	7.46
37	0.840	7.51
38	0.835	7.55
39	0.830	7.60
40	0.825	7.64
41	0.820	7.69
42	0.816	7.73

- Approx. figures 60°F

Area	dunam (1,000m <sup>2</sup> )	acres	hectares
dunam (1,000m <sup>2</sup> )	1	0.2471	0.1
acres	4.047	1	0.4047
hectares	10	2.471	1

Natural Gas 1	MM Btu	cbm (m <sup>3</sup> )	cf (ft <sup>3</sup> )
MM Btu	1	27.99	988.56
cbm (m <sup>3</sup> )	0.0357	1	35.315
cf (ft <sup>3</sup> )	0.001012	0.0283	1

Natural Gas 2	bcm	tcf	MM tons of LNG	million boe
bcm	1	0.0353	0.725	6.089
tcf	28.32	1	20.53	172.41
million tons of LNG	1.36	0.048	1	8.97
million boe	0.15	0.005	0.11	1

Energy	kilocalorie (kcal)	kilojoule (kJ)	Btu	kilowatt hour (kV-h)
kilocalorie (kcal)	1	4.187	3.968	0.00116
kilojoule (kJ)	0.239	1	0.948	0.00277
Btu	0.252	1.055	1	0.00029
kilowatt hour kV·h	859.8	3,600	3,412	1

**Where:**

cbm (m<sup>3</sup>) = cubic meter

cf (ft<sup>3</sup>) = cubic feet

boe = barrels oil equivalent

bbbl = barrel

bcm = billion cubic meters natural gas

tcf = trillion cubic feet natural gas

MM Btu = million British thermal units

MM tons of LNG = million tons of

liquefied natural gas

**TEMPERATURE CONVERSION**

• To convert from Fahrenheit to Celsius:

$$C = (F - 32) \times 5/9$$

• To convert from Celsius to Fahrenheit:

$$F = (95/ \times C) + 32$$

**TYPICAL TANKER SIZES**

Type	Size (in '000 DWT)
Handysize	25.0-49.9
Panamax LR1	45-80
Aframax LR2	80-120
Suezmax	120-200
VLCC	200-315
ULCC	320-550

Heat Content of Fuels	MM Btu
1 barrel of crude oil	5.8
1 ton of crude oil	39.68
1 ton of coal	25.18
1000 ft <sup>3</sup> of natural gas	1.000
1 cbm (m <sup>3</sup> ) of natural gas	0.0357
1 bbl of LPG	4.01
1 bbl of gasoline	5.253
1 bbl of gasoil	5.825
1 bbl of residue fuel oil	6.287



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