

BUILDING SOLAR POWER CAPABILITIES *in the Middle East*



OUR COMMITMENT *to Solar Energy*

is to reduce energy consumption within our manufacturing group and to partner closely with Middle East and North Africa governments and energy associations to formalize solar power as a political priority



SUSTAINABILITY CONTEXT

INDEVCO has chosen to actively contribute to environmental conditions in the world's Sun Belt, where countries average 300-345 days of sunshine per year. In addition to abundant sunlight, Middle Eastern countries have significant land reserves which support some of the world's largest solar power projects.¹

Member company, Phoenix Energy, works to transition INDEVCO's manufacturing plants and offices in Middle East North Africa (MENA) countries to utilize renewable energy and to serve the national communities in which we operate.

Historically, MENA countries have suffered significant lag, in part due to reliance on oil and gas, regional crises, political gridlock, and corruption. In Lebanon and Egypt, in particular, dilapidated infrastructures have contributed to unreliable electricity supply² due to distribution problems, shortages and frequent black outs that affect INDEVCO headquarters, manufacturing plants, and the daily lives of our employees.

At an April 2017 session of the Arab Ministerial Council for Electricity, however, 14 countries - including Egypt - signed



a Memorandum of Understanding to establish a joint Arab Common Market for Electricity. This political commitment coincided with a discussion of Arab strategy for sustainable energy, including the move to renewable energy systems.³

2017 statistics from the International Renewable Energy Agency (IREA) also signal a substantial increase in solar power capacity in MENA countries, including Egypt by 70.5% and Lebanon by 47%.⁴

In prioritizing renewable energy in our region, Phoenix Energy contributes in part to UN Sustainable Development Goal SDG7 (Target 7.2) to increase renewable energy in the global energy mix and (Target 7.B) to expand infrastructure and upgrade technology for supplying modern and sustainable energy services.⁵ Phoenix Energy's partnerships with governmental entities, ministries, and local and international NGOs align with SDG17 Partnerships.⁶



OUTCOMES

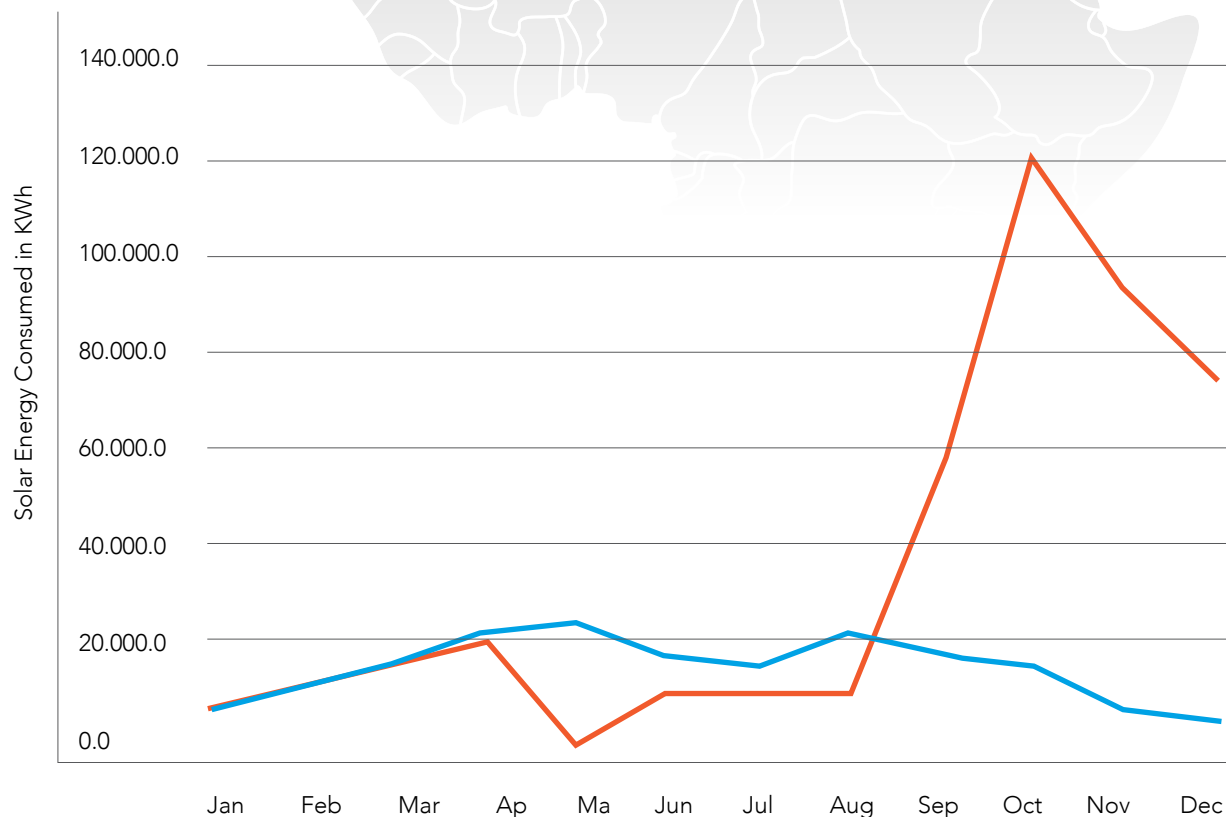
Internal Solar Savings at INDEVCO Companies

Impact

Installed 8,490 polycrystalline photovoltaic (PV) panels at INDEVCO business units in Lebanon as of end 2017:

- With a combined capacity of 2.250 MWp
- Generating 3.249 MWh of energy / year

In 2017, INDEVCO and member companies in Lebanon consumed 3,249 MWh of solar energy through (PV) installations in Ajaltoun, Halat, Hosrayel, and Zouk Mosbeh, Lebanon.



		January	February	March	April	May	June	July	August	September	October	November	December
■	2016	8,945.1	14,225.9	18,325.0	24,116.8	26,260.2	20,225.1	17,632.4	24,628.6	20,192.4	16,672.5	9,576.6	5,247.7
■	2017	9,045.1	13,055.6	18,425.0	22,211.4	858.7	12,371.3	11,389.2	10,620.9	59,515.7	121,593.1	94,693.6	75,055.7

SANITA ZOUK RENEWABLE ENERGY SYSTEM

In March 2017, Phoenix Energy completed the largest privately-owned on-grid rooftop PV project in Lebanon at sister company Sanita's Zouk Industrial Complex. The project transitioned the consumer packaged goods manufacturing facility to operate on renewable energy. Excess power from the system is transferred to the Electricité du Liban (EDL) national grid.

The solar PV system reduces greenhouse gas (GHG) emissions by over 1,200 metric tons of CO₂ (MTCO₂E) per year, equivalent to CO₂ emissions generated from electricity used by nearly 180 homes for one year.⁷

See Sanita's real-time solar savings at www.sanitalb.com/sanita-lebanon-solar-pv-savings



Project Scope

Capacity	1.007 MWp
Energy	1,445 MWh / year
# of PV panels	3,807
Area	7,049 m ²

UNIPAK PLANT SOLAR PV POWER SYSTEM

In September 2017, Phoenix Energy began installing a 565 KWp capacity PV power system at sister company, UNIPAK, in Halat, Lebanon. The solar system, to be completed in January 2018, will power the corrugated packaging plant and offices, saving up to over 820 MWh / year.⁸

See UNIPAK's real-time solar savings at www.unipaklb.com/solar-pv-savings/

Project Scope

Capacity	565 KWp
Energy	821 MWh / year
# of PV panels	2,132
Area	3,600 m ²



Solar Installations in Egypt

Impact

Cooperated with the Egyptian Ministry of Energy's New & Renewable Energy Authority (NREA)

Signed off on Phoenix Power One project to install 193,600 polycrystalline PV panels at Benban Solar Park in Egypt:

- With a capacity of 64 MWp
- Generating 156,000 MWh / year

BENBAN SOLAR PARK: THE WORLD'S LARGEST SOLAR POWER FARM

Following the official signing of the International Finance Corporation's (IFC) Nubian Suns Feed-in-Tariff Financing Program in October 2017 in Cairo, Egypt, Phoenix Energy has partnered with Infinity Solar and BPE Partners of Egypt, and IB Vogt of Germany to develop a 64 MWp solar PV power plant in Benban Solar Park near Aswan, Egypt.⁹

Project partners started construction of the PV power plant in Q1 2018 with target commercial operation date (COD) of January 2019. Once completed, the Phoenix Power One solar project will power

50,000 homes and save up to 74,000 metric tons of CO₂ emissions (MTCO₂E) annually.

Phoenix Power One project adheres to stringent health, safety, and environmental requirements and regulations required by the IFC and in line with Phoenix Energy's Health & Safety Policy. The project will undergo frequent audits on safe transportation of workers, water usage on site, and waste management. Project partners will utilize and train local workforce, educate the public and spread awareness, and set official grievance mechanisms for the community and workers.



When completed, Benban Solar Park will be the largest solar installation in the world, operating with a total capacity of 1,600 MW. The solar farm will remain operational for 25 years and sell electricity to the Egyptian Electricity Transmission Company (EETC) as part of the power purchase agreement.¹⁰⁻¹¹ The solar park will generate the equivalent of 90% of energy generated from the Aswan High Dam.¹² The project is part of Egypt's Feed in Tariff (FiT) program, first introduced in 2014 by Egyptian President Sisi to phase out fuel subsidies over a five-year period.

Project Scope

Capacity	64 MWp
Energy	156,000 MWh / year
# of PV panels	193,600
Area	1.1 million m ²



Solar Installations in Lebanon

Impact

Worked closely with government and non-governmental authorities, including the:

- Chamber of Commerce, Industry and Agriculture of Tripoli and North Lebanon
- Lebanese Solar Energy Society (LSES)
- United Nations Development Programme (UNDP)

Installed 9,505 polycrystalline PV panels at various projects in Lebanon as of end 2017:

- With a combined capacity of 2,519 MWp
- Generating 3,638 MWh / year

Phoenix Energy increased the capacity of solar projects in Lebanon by 95% from 2016 to 2017, working with sister companies, government ministries, energy authorities, universities, social organizations and privately owned projects.

RASHID KARAMEH INTERNATIONAL EXHIBITION CENTER PV PROJECT

Phoenix Energy partnered with Fransabank and signed a Memorandum of Understanding (MoU) with the Chamber of Commerce, Industry & Agriculture of Tripoli and North Lebanon to set up a 5 MWp on-grid PV plant on the roof of the Rashid Karamah International Exhibition Center in Tripoli.¹³⁻¹⁴

The plant will power 2,000 local homes when completed by end 2019. The project targets a total annual savings of 6.53 GWh and an estimated GHG reduction of 4,000 metric tons of CO₂ (MTCO₂E) a year.

Project Scope

Capacity	5 MWp
Energy	6,530 MWh / year
# of PV panels	18,800
Area	40,000 m ²

CENTRE HOSPITALIER UNIVERSITAIRE NOTRE DAME DES SECOURS PV PROJECT

In October 2017, UN Development Programme (UNDP) and Centre Hospitalier Universitaire Notre Dame Des Secours (CHUNDS) awarded Phoenix Energy the bid to install a solar PV system at the hospital in Jbeil, Lebanon. Phoenix Energy began installation in December 2017 with a targeted project completion date of June 2018. The project will produce 780 MWh / year, equivalent to the reduction of 1,000 metric tons of CO₂ (MTCO₂E).

Project Scope

Capacity	600 KWp
Energy	780 MWh / year
# of PV panels	2,270
Area	5,000 m ²

PREVIOUS PROJECTS

Project Name	Location	Country	Year	Capacity	Energy
Beirut River Solar Snake (BRSS) PV Farm ^{15,16,17}	Beirut	Lebanon	2015	1.08 MWp	1,655 MWh / yr
Rafic Hariri University PV Solar Project ¹⁸	Mechref	Lebanon	2016	101 KWp	147 MWh / yr
BIPV Pilot Project at Lebanese University Industrial Research Institute ¹⁹	Hadat	Lebanon	2016	30 KWp	36 MWh / yr

ASSOCIATION LEADERSHIP



Rabih Osta

Area General Manager, Phoenix Companies

Lebanese Order of Engineers & Architects - Beirut Member

Lebanese Solar Energy Society Member

World Energy Council Advisory Board Member

ASSOCIATION MEMBERSHIPS

Association of Lebanese Industrialists

Lebanese Solar Energy Society

World Energy Council

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