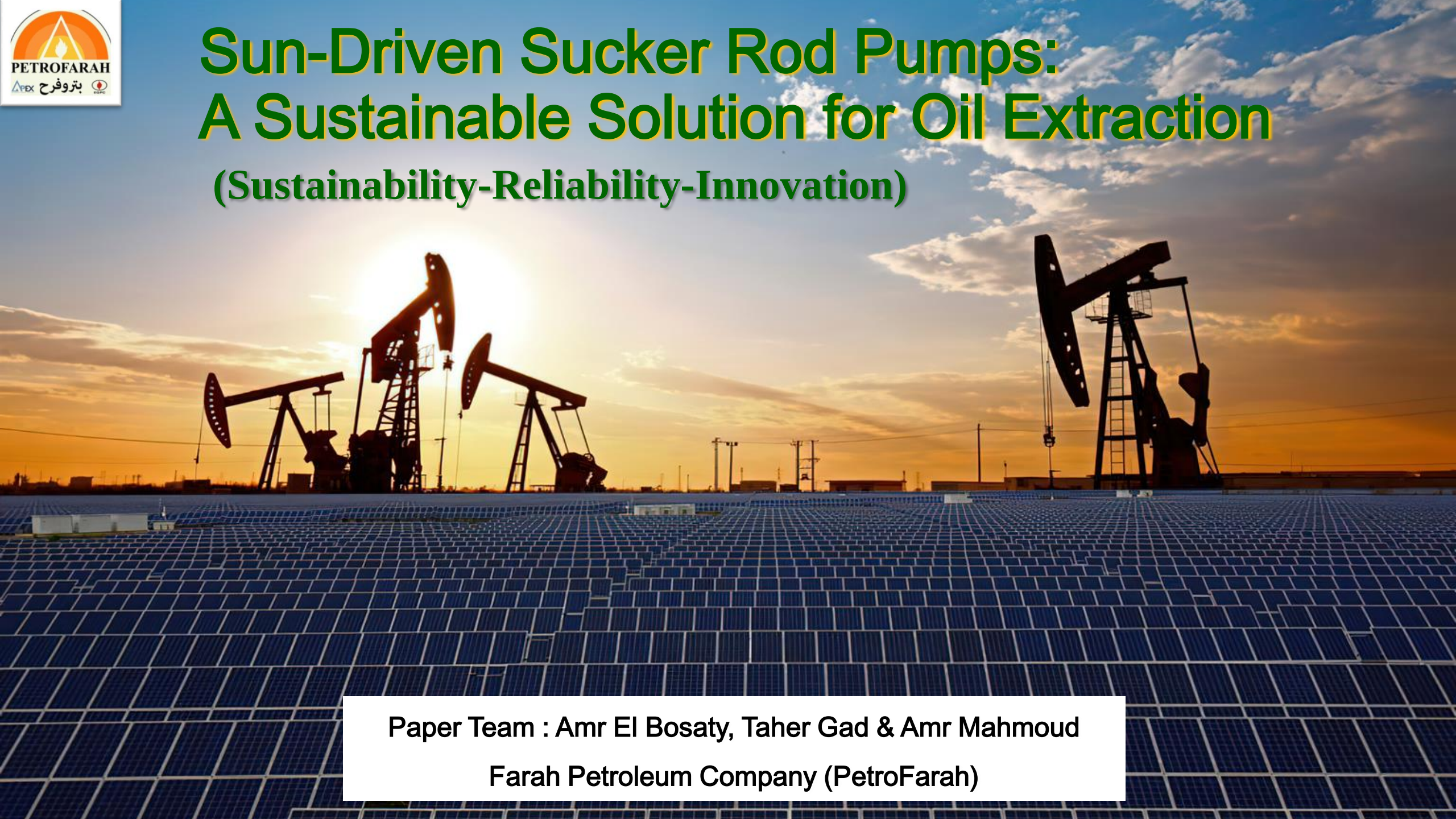
Sun-Driven Sucker Rod Pumps: A Sustainable Solution for Oil Extraction

(Sustainability-Reliability-Innovation)



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Farah Petroleum Company (PetroFarah)

Outline

- Company Overview
- Project Background
- Project Initial Data
- Introducing a sustainable solution
- PV Performance
- UN SDGs
- Results & Achievements

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

PETROFARAH

بتروفرح

APEX

EGPC

Tanmia Petroleum Company

تنمية

Tanmia

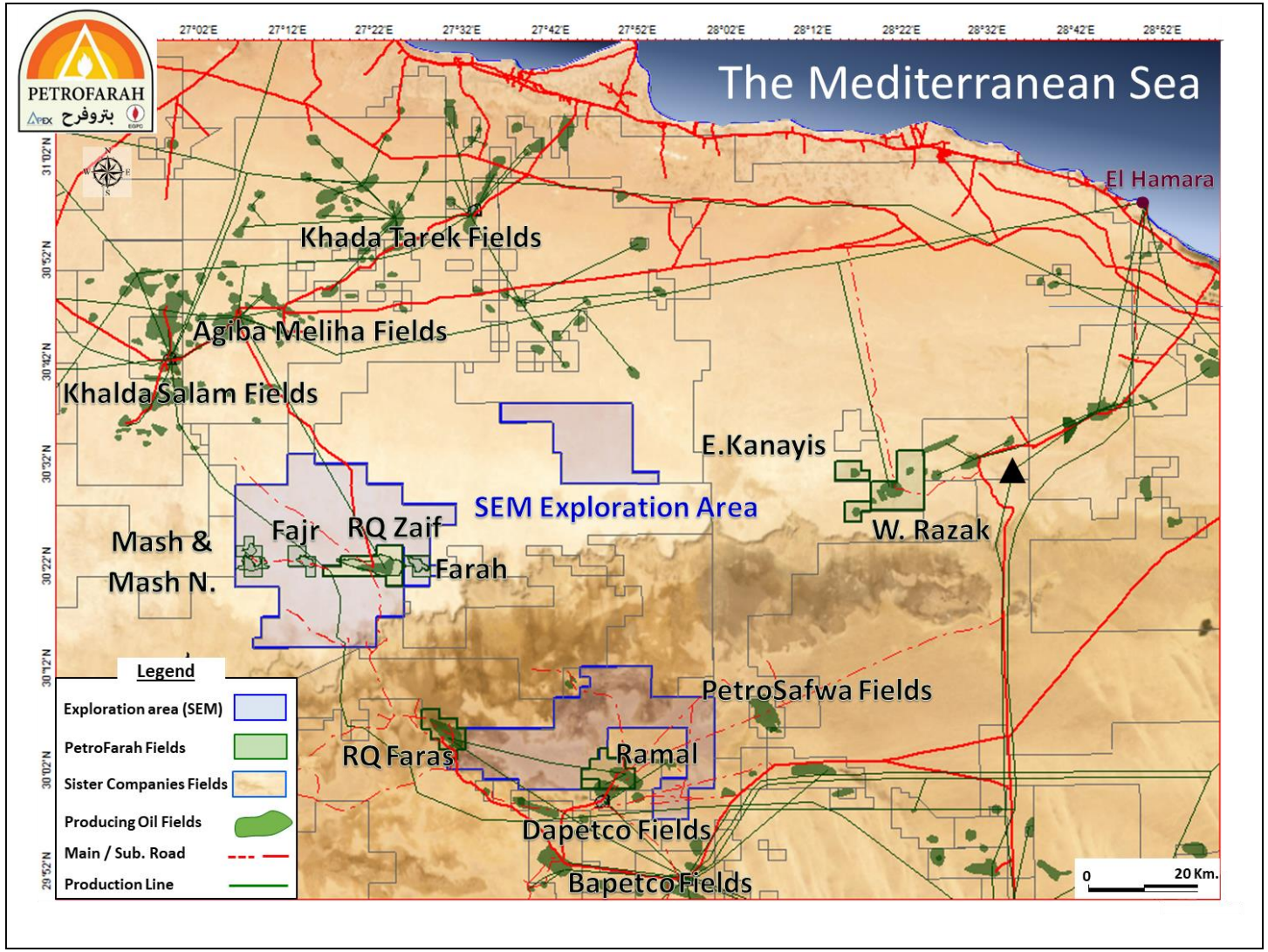
شركة تنمية للبترول

INFINITY

Company Overview

- Farah Petroleum Company "PetroFarah" was established on 20TH April 2021 as a JV on behalf of the EGPC and Apex International Energy.
- The company activities are Exploration in SEM concession and hold 5 producing fields (Fajr, Farah, Mashreq, Mashreq North & RAM) with ~ 6400 BOPD.
- As of acquired deal between Apex and IOEC. PetroFarah was assigned on 29TH Dec. 2023 to conduct full operation responsibilities of these 10 producing fields in addition to SEM fields.
- PetroFarah production from all wells is done using artificial lifting units either (ESP) or (SRP) and (PCP) depending on the production rate from each well.

The production in Oct. 2023 : 10,500 BOPD.



Farah Petroleum Company's areas Map

Project Background

- Solar energy as clean and sustainable energy , In Egypt's Vision 2030 report, the energy sector is ranked as the most critical cornerstone of sustainable development.
- In line with the directive from shareholders to reduce the GHG emissions and optimize the diesel usage .
- PF was actively engaged in technical discussions with Tanmia about the concept and applications of utilizing the Solar Power.

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

Project Background

- PetroFarah initiated a pilot project to install a PV solar unit with a capacity of 72.9 kW to operate (SRP) .
- Farah-8 well is producing around 81 BBL of total fluids, 59 BBL of them are oil.
- The reduction in diesel consumption would, subsequently, reduce the GHG emissions associated with the operation of diesel generator.

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

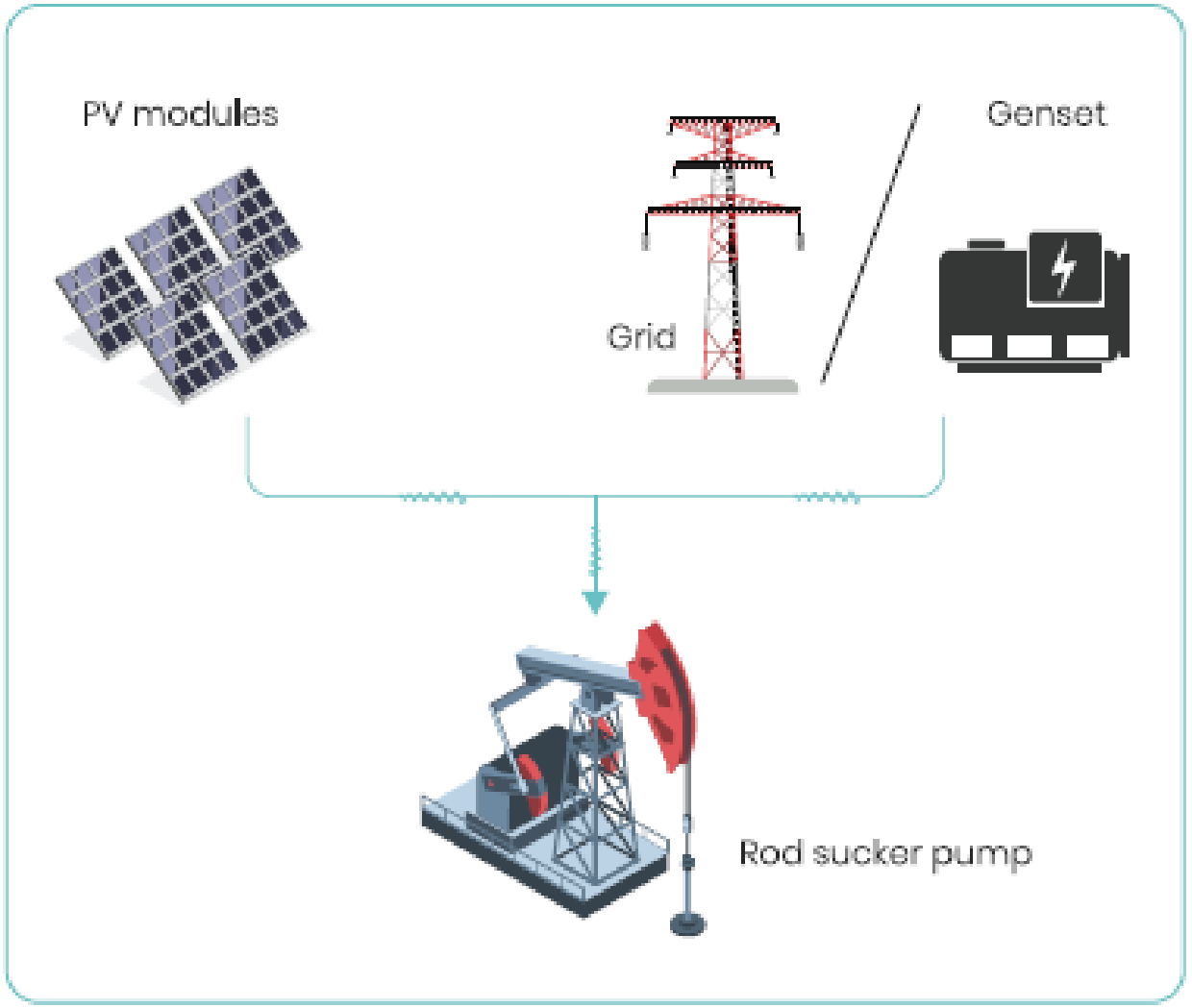
Introducing a Sustainable Solution

Sun-Driven Sucker Rod Pumps

- We are proud to introduce this innovative project that addresses the specific needs of the industry.

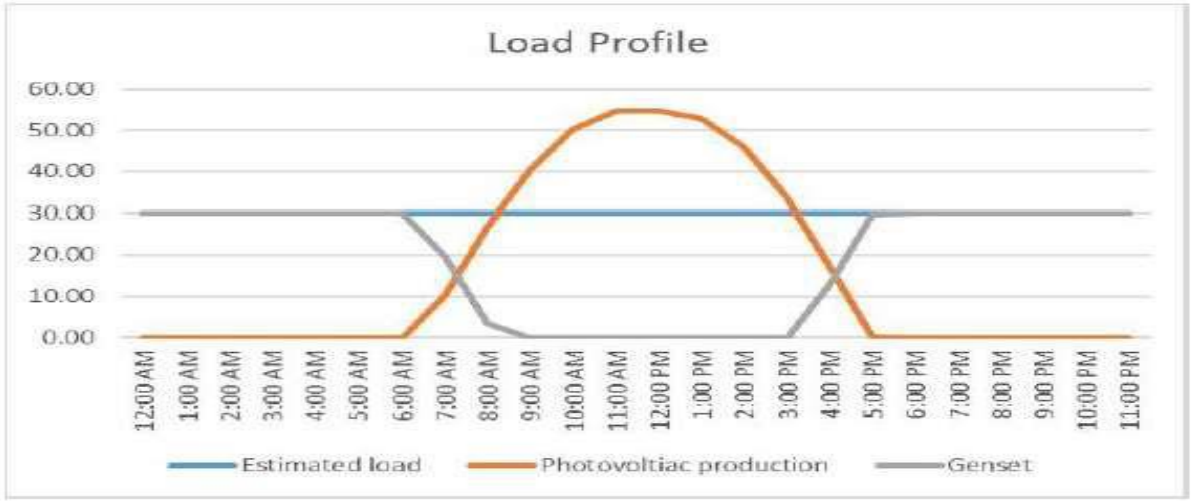
- The project's main objective was to utilize solar energy to operate a sucker rod pump at Farah-8 well in the Farah concession, Western Desert. A major gain of the project is to reduce the Diesel fuel consumption required to operate the well.

- The project represents a collaboration between PetroFarah (a joint venture company and concession owner), Tanmia Petroleum (an O&G services provider), and Infinity Energy Egypt (a major renewable energy developer).



Estimated Load Profile

Time	Estimated load	Photovoltiac production	Genset
12:00 AM	30.00	0	30.00
1:00 AM	30.00	0	30.00
2:00 AM	30.00	0	30.00
3:00 AM	30.00	0	30.00
4:00 AM	30.00	0	30.00
5:00 AM	30.00	0	30.00
6:00 AM	30.00	0	30.00
7:00 AM	30.00	10.387	19.61
8:00 AM	30.00	26.666	3.33
9:00 AM	30.00	40.456	0.00
10:00 AM	30.00	50.211	0.00
11:00 AM	30.00	54.613	0.00
12:00 PM	30.00	54.613	0.00
1:00 PM	30.00	52.936	0.00
2:00 PM	30.00	45.922	0.00
3:00 PM	30.00	33.538	0.00
4:00 PM	30.00	17.102	12.90
5:00 PM	30.00	0.1955	29.80
6:00 PM	30.00	0	30.00
7:00 PM	30.00	0	30.00
8:00 PM	30.00	0	30.00
9:00 PM	30.00	0	30.00
10:00 PM	30.00	0	30.00
11:00 PM	30.00	0	30.00
Total	720.00	386.64	455.65



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Feasibility Study

Feasibility study using hybrid photovoltaic stations	
Conventional solution	
Pump size (HP)	60
Pump power consumption (KWH)	30
Diesel fuel cost (EGP/KWH)	8.4
Hourly fuel cost (EGP/KWH)	252 EGP
Daily working hours (Hrs./day)	24
Daily power consumption (KWH)	720
Total yearly working days	365
Yearly fuel cost (EGP)	2,207,520 EGP
Hybrid solar solution	
Suggested solar station size (KW)	72.9
Daily working hours (Hrs./day)	24
Daily power produced by solar station (Kwh)	264
Daily power used after using hybrid solution (Kwh)	456
Yearly fuel cost after solution	1,398,096 EGP
Total yearly savings	809,424 EGP
Yearly saving percentage	37%
Total project cost	1,550,950 EGP
Payback period (Year)	1.91

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Introducing a Sustainable Solution

Sun-Driven Sucker Rod Pumps

Pillars of Sustainability

Economic:

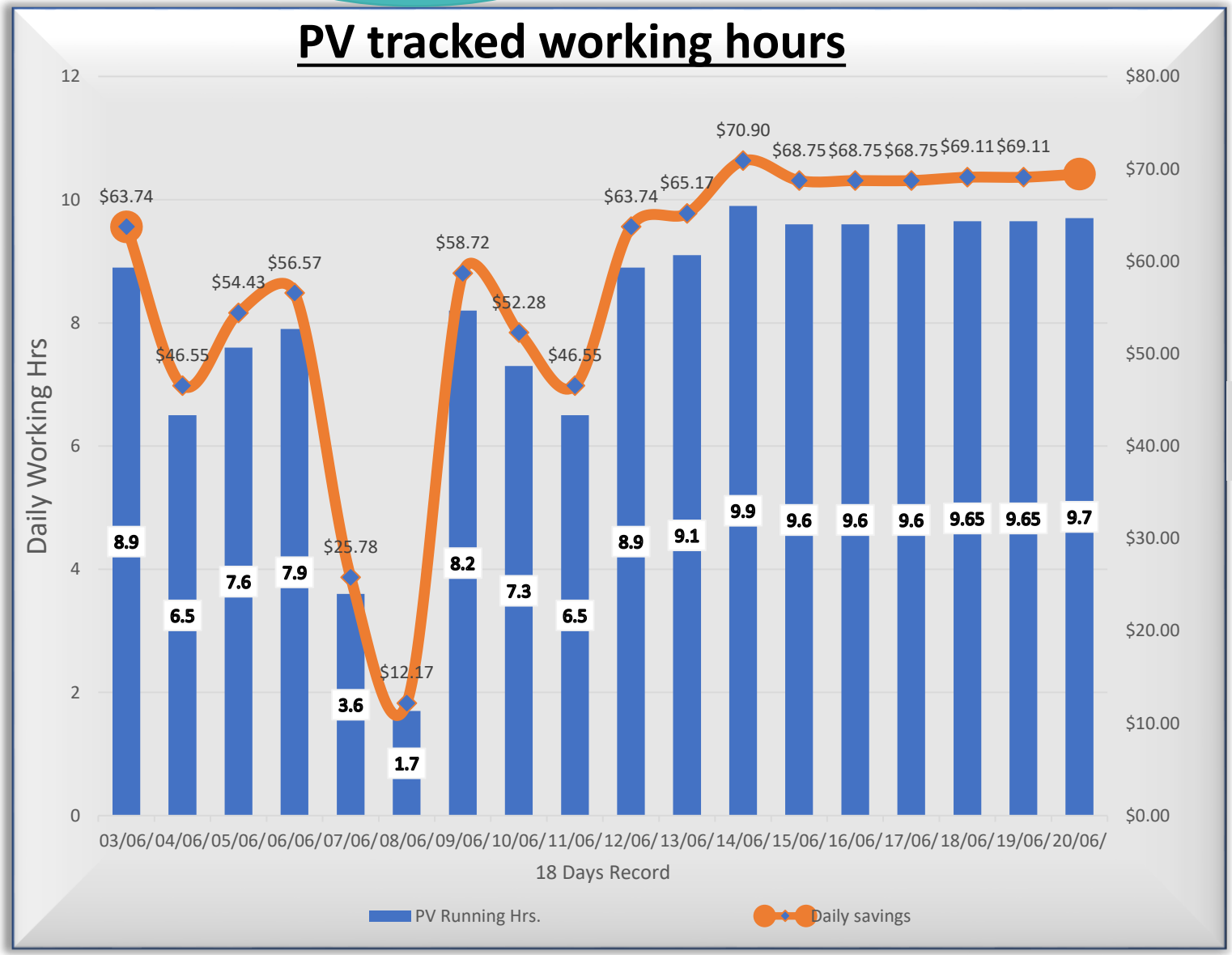
- This pillar is based on maintaining high and stable levels of economic growth .
- For this projects it is reducing total working hrs. of genset by almost 40% thus reducing the fuel consumption and maintenance cycle of the system.
- Increasing the productivity of the project through allowing a continuous operation of the system without disturbance because of doing protective maintenance during peak sun hrs.
- Therefore, by reducing the cost and increasing the revenue, the budget of the project has been optimized.

Yearly Co_2 Saved

137 Tons

Yearly Diesel Saved

50,000 Liters



Diesel Fuel and GHG Calculations

Farah-8 Well

Daily oil production: 59 bop

Annual oil production: 21,535 bop

	Unit	Before	After
Daily fuel Consumption (Farah-8)	Liters	250	140
Annual fuel Consumption (Farah-8)	Liters	91,250	51,100
Annual GHG of Farah-8	t CO_2 eq./Y	245	137
GHG per bbl produced from Farah 8	kg CO_2 eq./bbl	11.4	6.4
Estimated GHG emissions reduction% against original Farah-8 GHG emissions			**44%**

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Sustainable Development Goals

Results & Achievements

- Reduction in The Daily Diesel Consumption
- Reduction in the GHG emissions associated with the operation of diesel generator
- Eliminate the well down time due to genset Preventive Maintenance (PM)

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

Future Plans

Based on the successful delivery of the Solar System Project at Well Farah-8, PF is considering further use of the Solar and Hybrid Systems in other areas. Potential areas of interest are:

1. Performing similar project for other SRP wells with the same terms and conditions.

2. The Possibility of enhancing Farah-8 system by adding power packs.

3. The possibility of applying similar systems for ESP , PCP wells.

4. The possibility of installing a centralized solar power plant to cover all wells at Farah Field.

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

Our Project

Solar Power Plant for well Farah-8

Capacity of (72.9) KW

Thank You