



PV/DIESEL HYBRID SYSTEM WITHOUT  
ENERGY STORAGE

# COMPANY INTRODUCTION

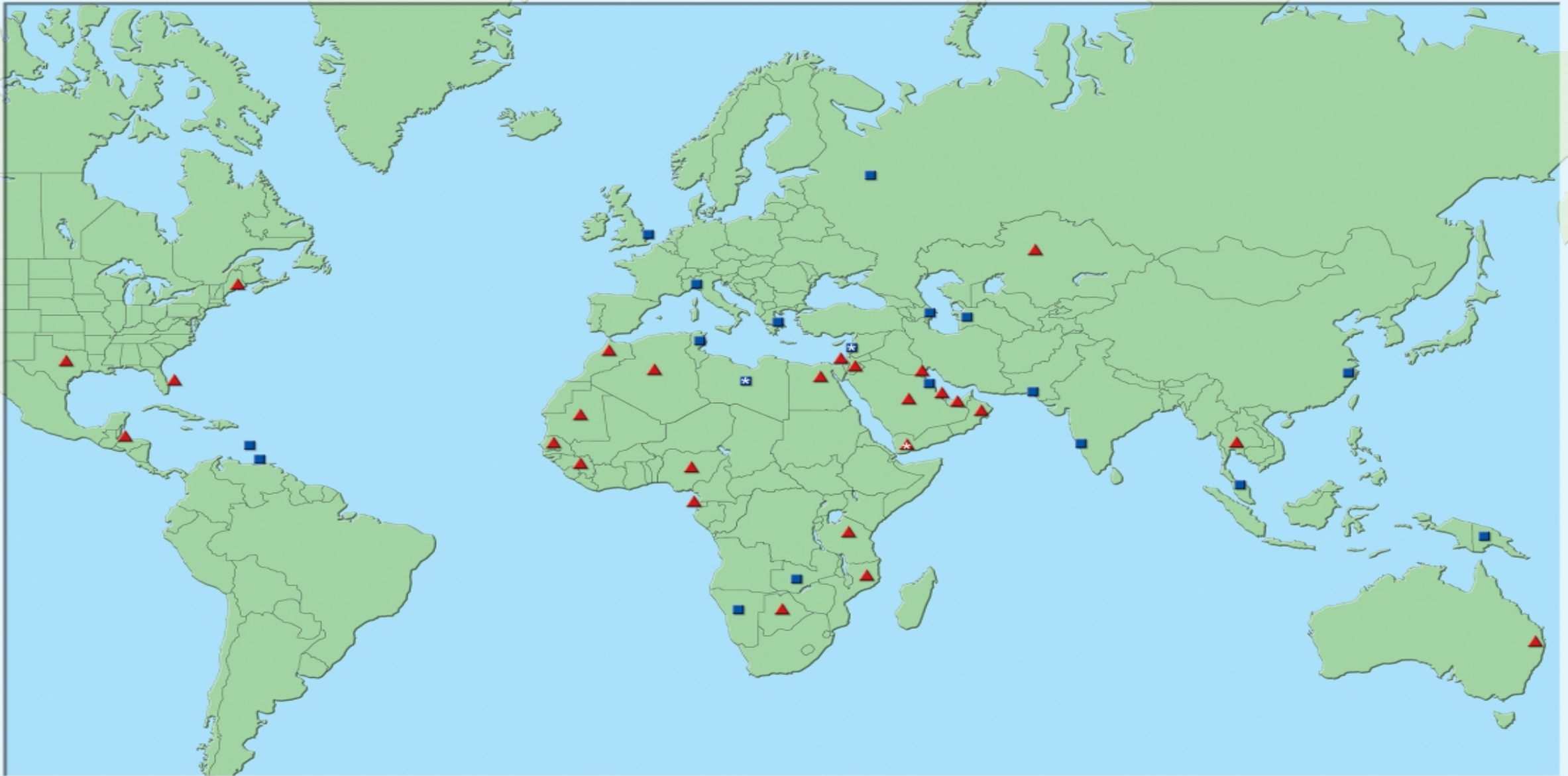
- Consolidated Contractors Company (CCC) established in 1952
- CCC currently employs approximately 120,000 people in its worldwide operations, composed of eighty nationalities.
- CCC is predominately a construction company, providing project management, engineering, procurement and construction services to the industry (oil and gas, petrochemicals, industrial plants, civil and municipal works, and high-quality building).
- Currently, CCC ranked 22<sup>nd</sup> in **ENR Top International Contractors** (2015) and 1<sup>st</sup> in the Middle East.
- While strongly dominant in the Middle East, also expanded to more than 40 countries through Africa, CIS countries, the Caribbean, Australia and Papua New Guinea.



# Consolidated Contractors Company

## CCC AROUND THE WORLD

June 2015



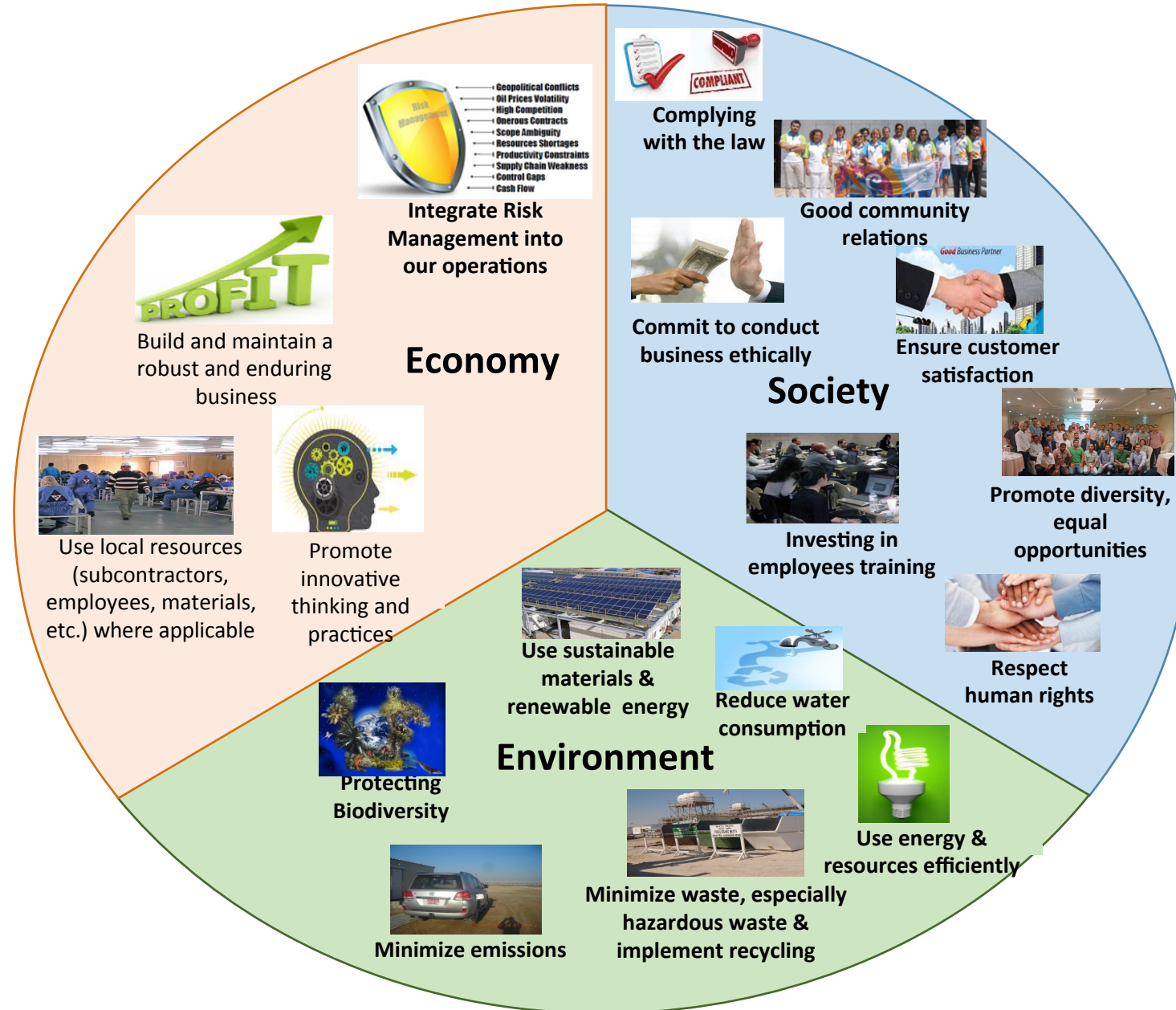
# CCC SUSTAINABILITY MISSION STATEMENT



***“Our mission is to be a leader in sustainability in the engineering and construction business.”***



# CCC SUSTAINABILITY POLICY / OBJECTIVES



# CCC SUSTAINABILITY PROGRAM



Our Sustainability Program comprises of the following:

- Green Building Contractor (Currently, we are managing on-going Green Certified projects with total amount of 5.16\$ billion)
- Sustainability initiatives (Implementing sustainability practices in the fields of energy efficiency, water conservation and renewable energy)
- Sustainability awareness and education (Sustainability Webinars series, Training program, Posters, video and tool box talks. )



# CCC PV/DIESEL HYBRID SYSTEM WITHOUT ENERGY STORAGE

*CASE STUDY*

# PV/DIESEL HYBRID SYSTEM

In order to reduce CCC Carbon footprint and to contribute to the increasing of the Renewable Energy in this region, a Solar PV/Diesel power plant, without battery storage, has been installed at the CCC project camp at Qusahwira, located approximately 260 km south of Abu Dhabi city.

CCC had the first off-grid solar system taken in the United Arab Emirates in operation. The roof system has a total capacity of 368 kWp. It supplies a settlement of workers for an oil field project in the desert, where more than 5000 people live with electricity. The installation includes 1,536 multicrystalline solar modules, each rated at 240 WP from Q-Cells



# PV/DIESEL HYBRID SYSTEM

## System Life Cycle

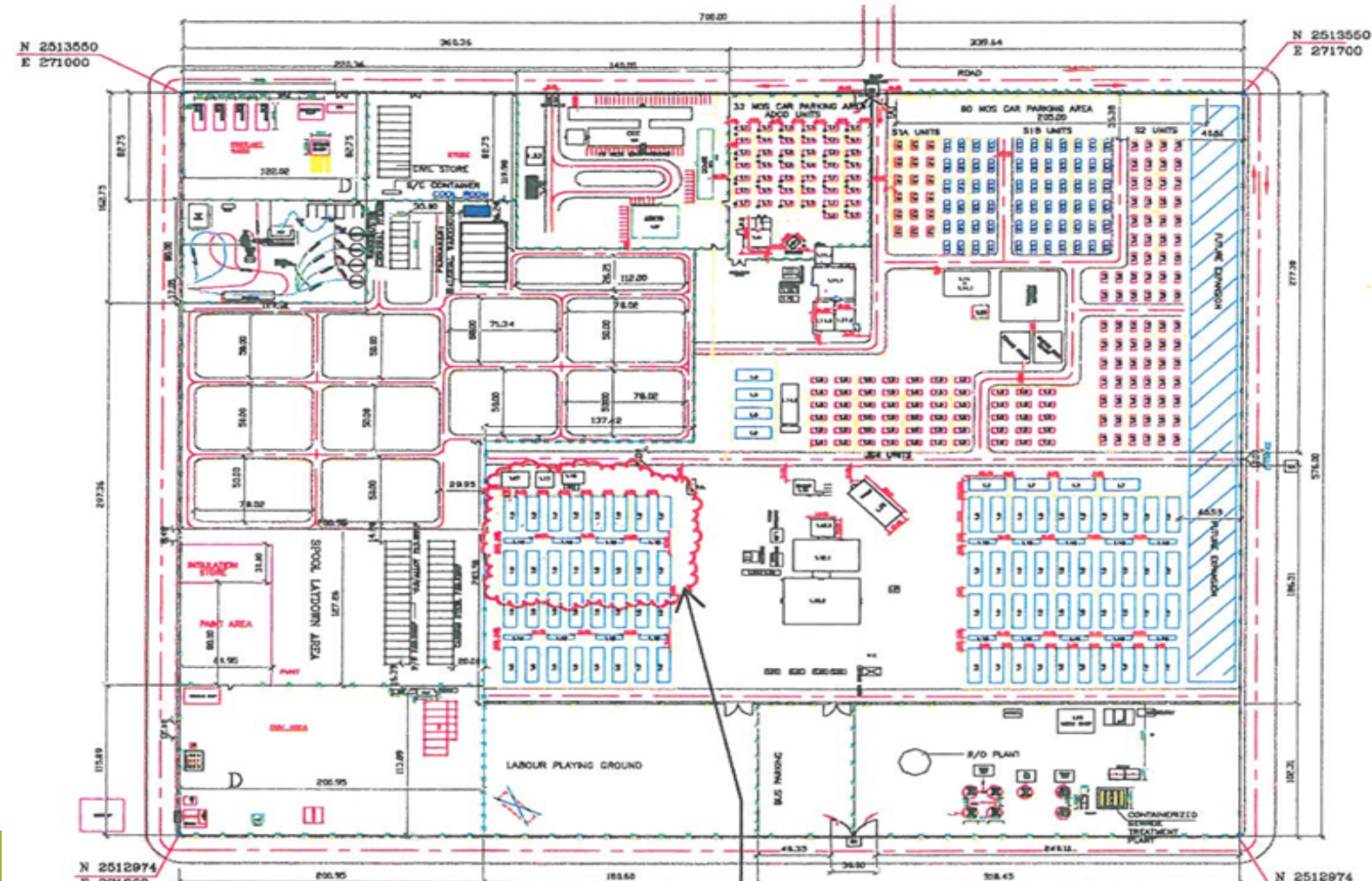
April 2012	The Solar PV plant had been installed (roof top mounted) and commissioned at Qusahwira Camp – Abu Dhabi
November 2013	The PV Plant had been dismantled end on November
January 2014	The Solar PV Plant had been reinstalled (ground mounted) and commissioned at Habshan Site Office – Abu Dhabi
May 2016	The solar PV system will be moved to another project on May 2016 (IGDE Project )



# PV/DIESEL HYBRID SYSTEM

## System Life Cycle

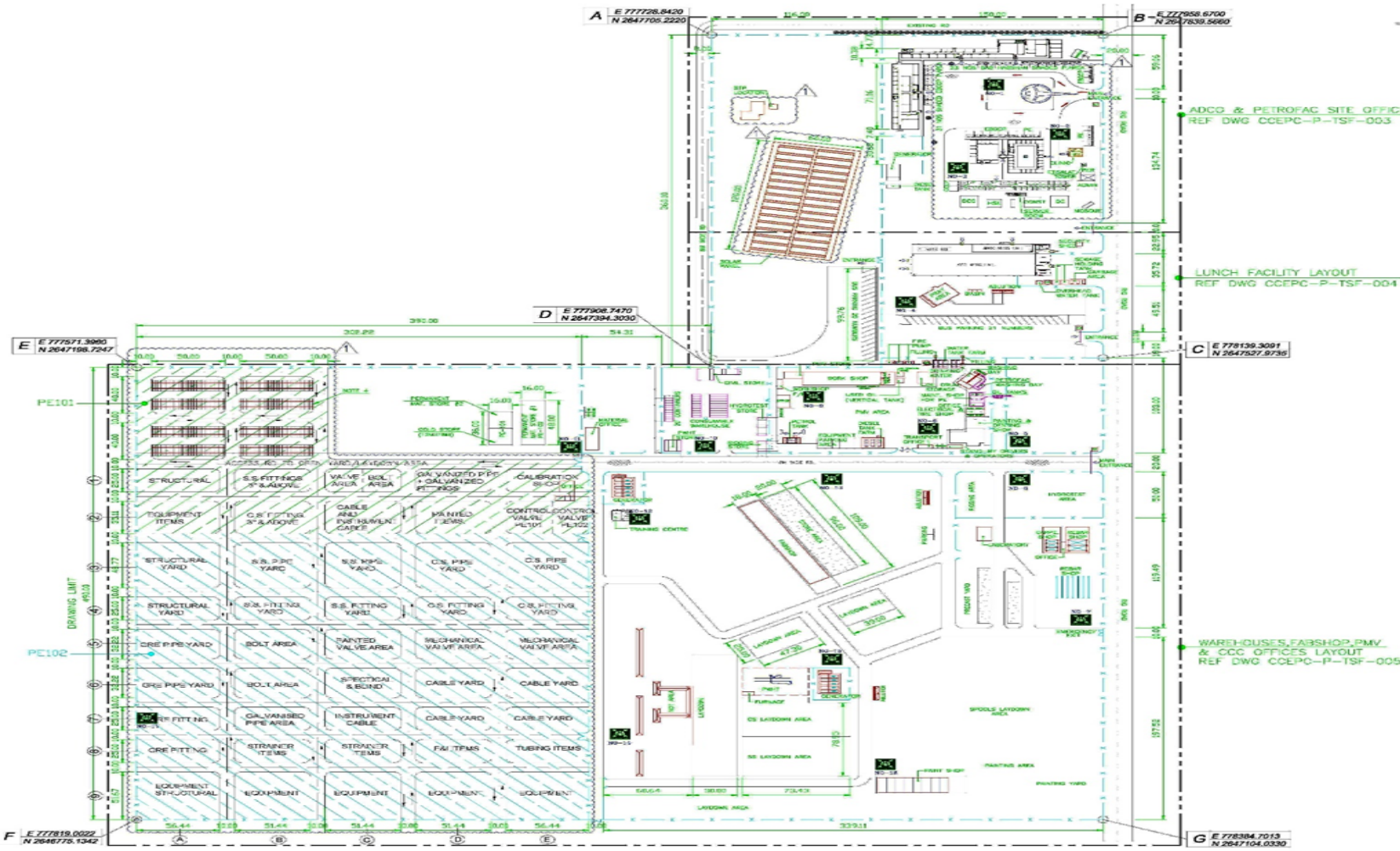
### Qusahwira Camp Layout



# PV/DIESEL HYBRID SYSTEM

## System Life Cycle

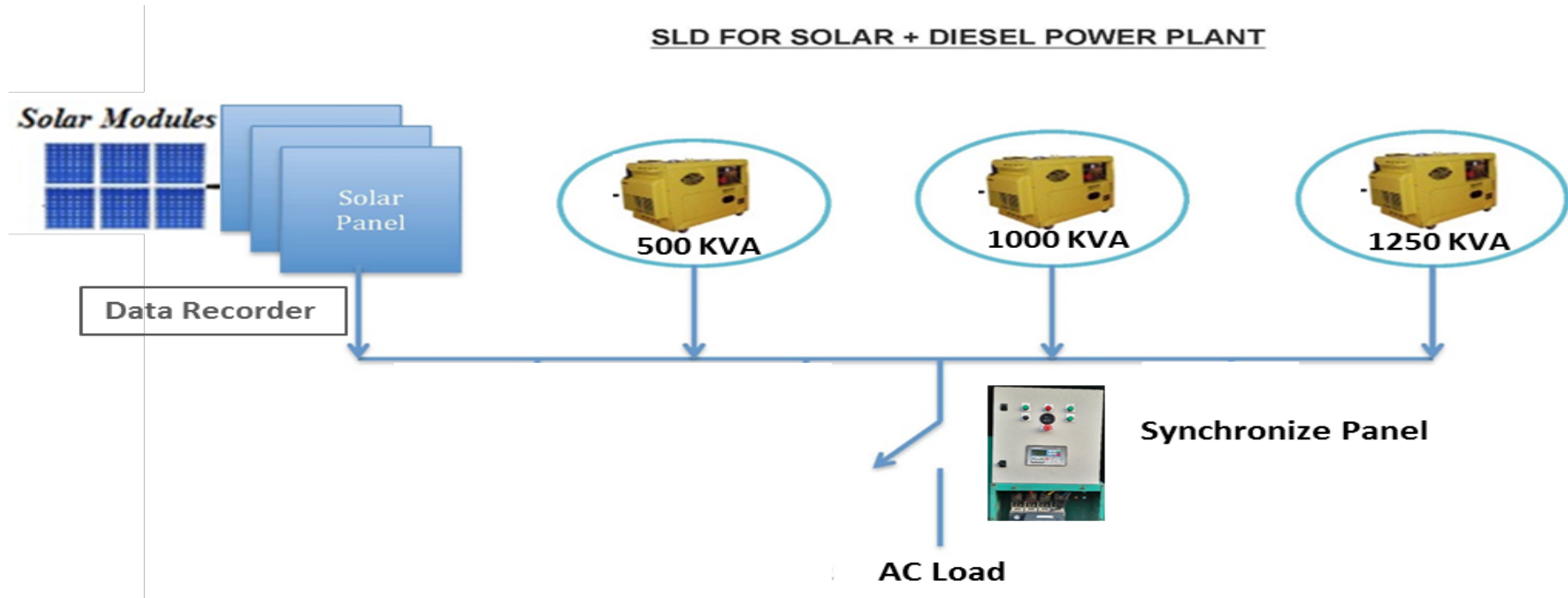
### Habshan Site Office Layout



# PV/DIESEL HYBRID SYSTEM

## Control Scheme

The System consists of a PV array of 368.0 KWp coupled with a 500 & 1000 & 1250 kVA diesel generator.

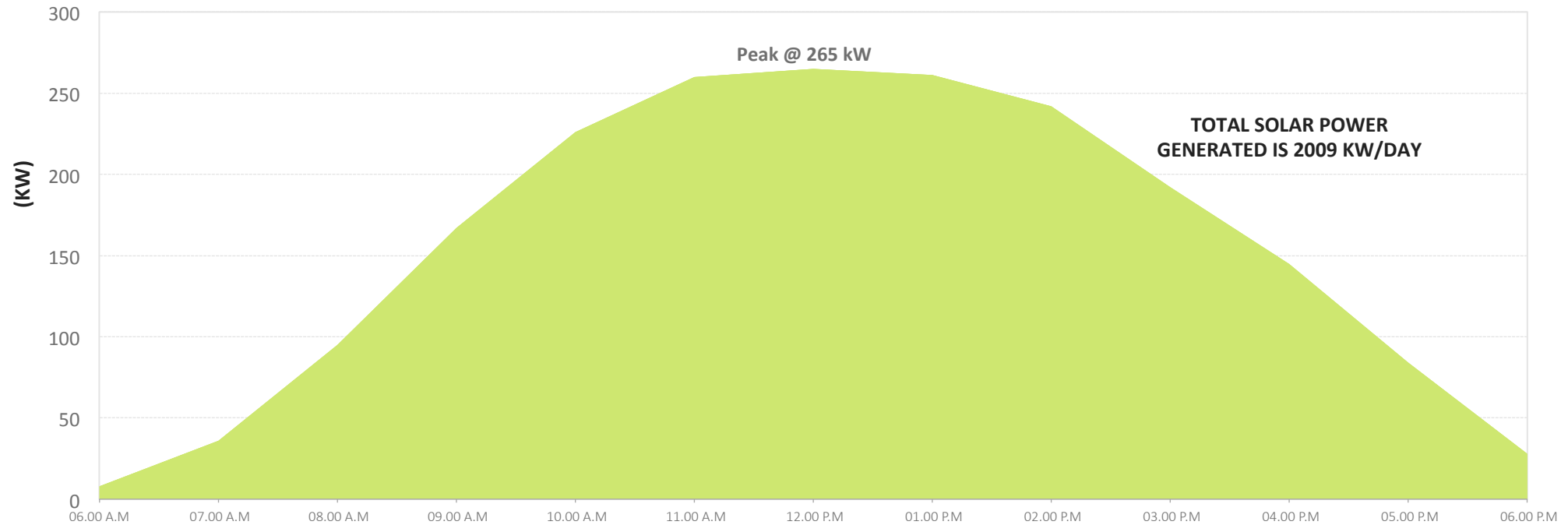


The sequence of solar + diesel Genset operation.

1. Our paralleling controllers work as the main grid for Solar Power and runs based on the load demand.
2. Solar inverters then identifies our Genset power as a grid and exports power to the load.

# PV/DIESEL HYBRID SYSTEM

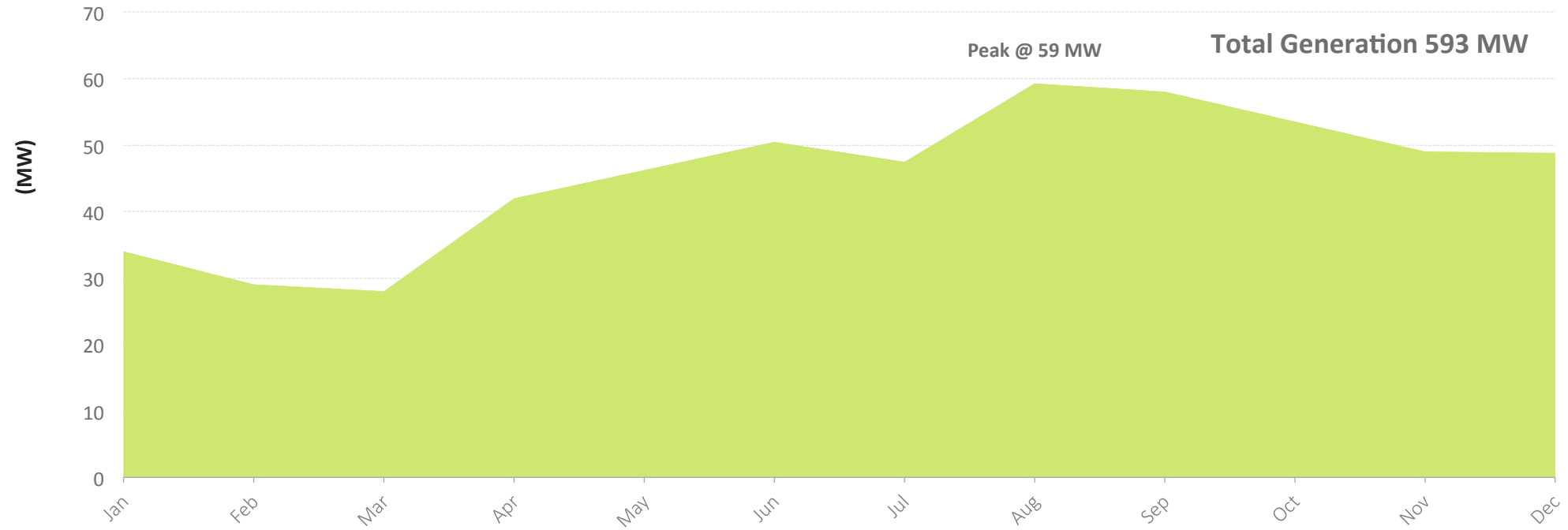
## Results



**SOLAR POWER GENERATED ON 6/09/2014 (KW)**

# PV/DIESEL HYBRID SYSTEM

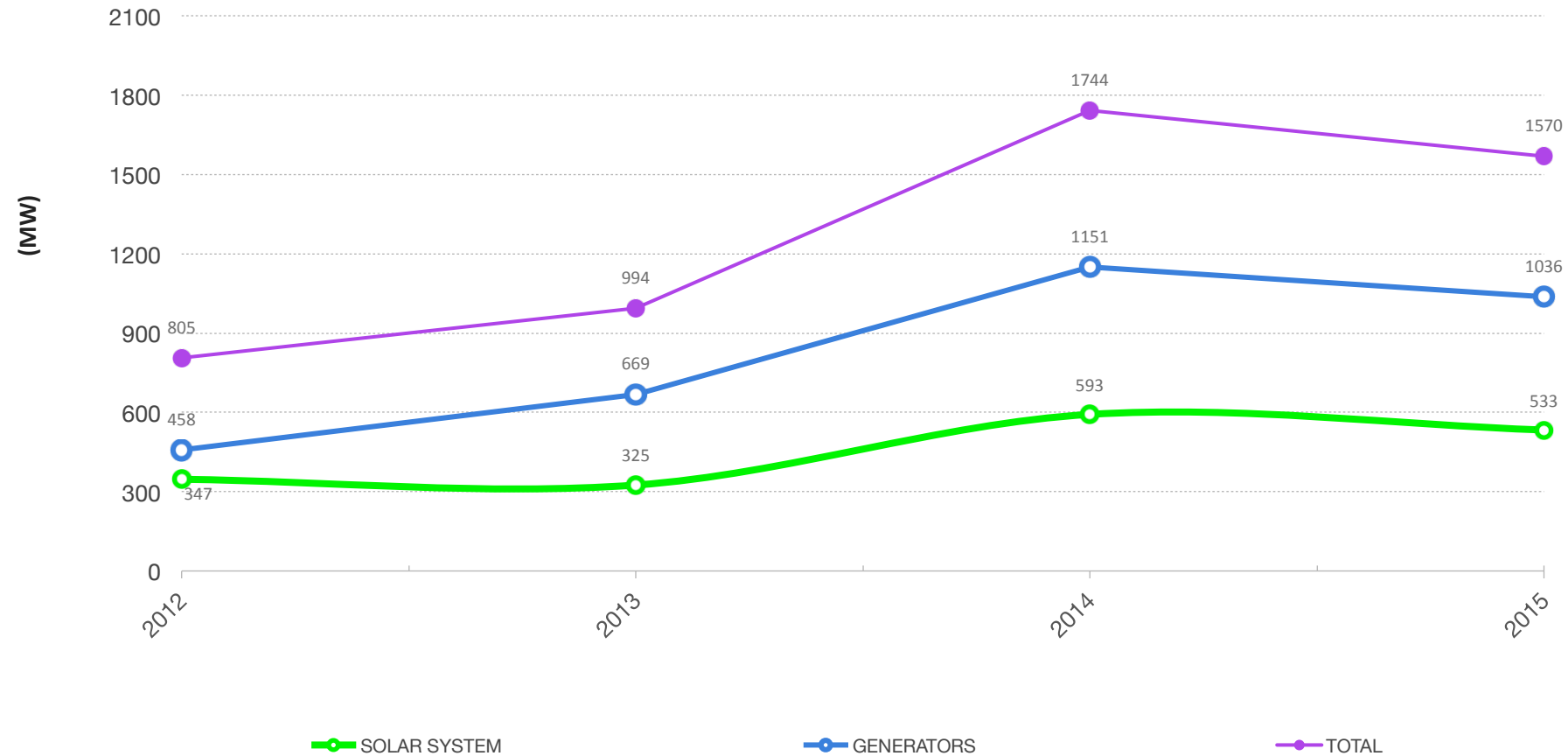
## Results



**SOLAR POWER GENERATED IN 2014 (MW)**

# PV/DIESEL HYBRID SYSTEM

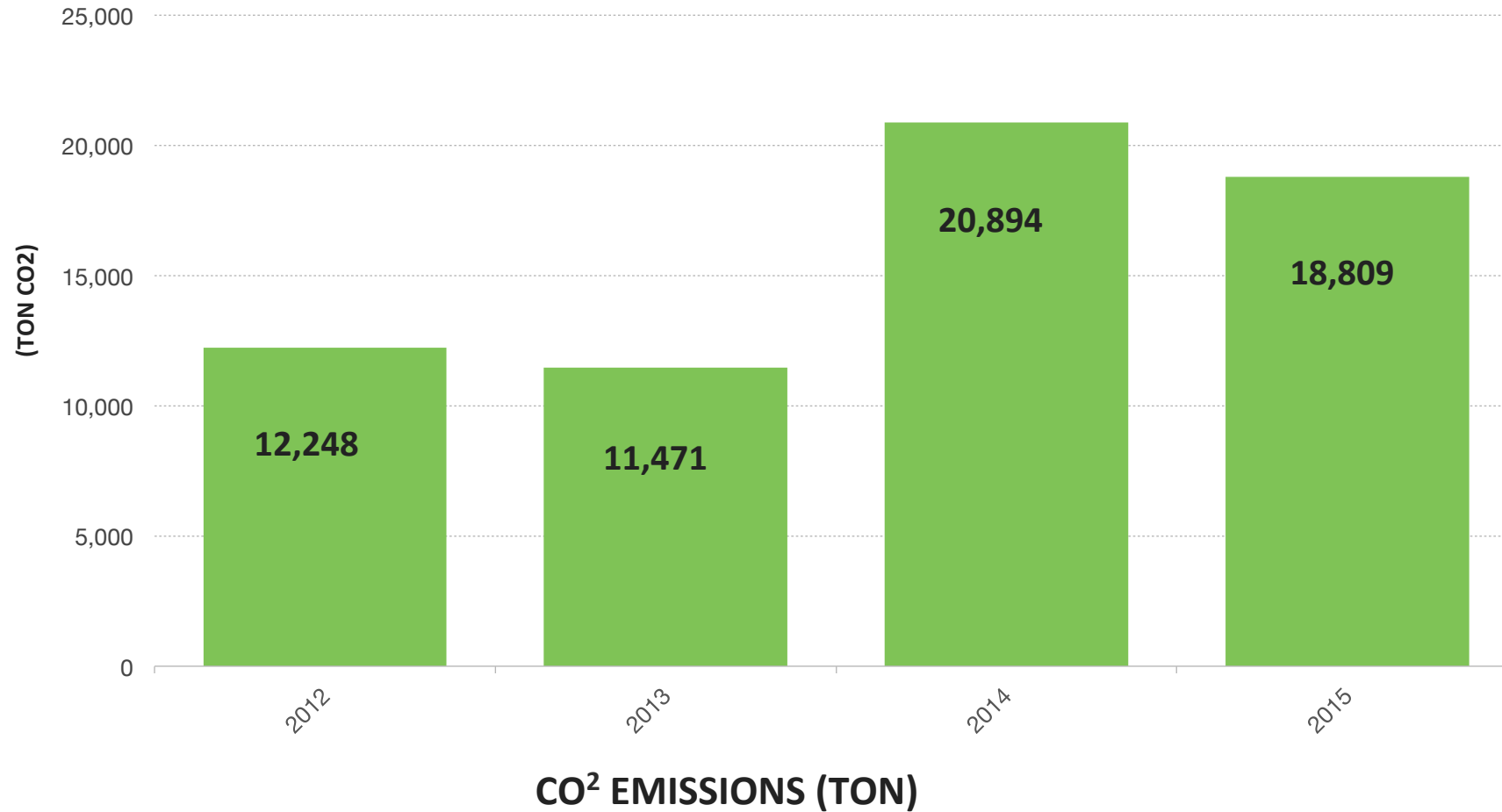
## Results



COMBUSTION VS GREEN POWER (MW)

# PV/DIESEL HYBRID SYSTEM

## Results (*Pollution Saved During Life of PV System*)



This solar PV initiative reduces CCC's carbon footprint by offsetting 15.856 tons of CO<sub>2</sub>e emissions annually.

# PV/DIESEL HYBRID SYSTEM

## Results (Financial Analysis)

COMBUSTION GENERATED POWER	GREEN POWER GENERATED	CO <sup>2</sup> EMISSIONS
<b>3,315 MW</b>	<b>1,798 MW</b>	<b>63,422 TON</b>
INITIAL INVESTMENT	PAYBACK PERIOD (Years)	INTERNAL RATE OF RETURN (IRR)
<b>\$1,441,186</b>	<b>11.2 y</b>	<b>8%</b>

(2014 PRICES)

INITIAL INVESTMENT	PAYBACK PERIOD (Years)	INTERNAL RATE OF RETURN (IRR)
<b>\$839,828</b>	<b>6.5 y</b>	<b>15%</b>

# PV/DIESEL HYBRID SYSTEM

## Conclusion

The solar PV/Diesel Hybrid power systems provide a reduction in Greenhouse gas emissions. Also, incorporating solar into a diesel grid can mean that a smaller diesel generator (operating in parallel with solar) services the load, which result in reduced runtime hours on larger generators, potentially resulting in reduced operational and maintenance costs.

# AWARDS

- CCC received the **Emirates Energy Gold Award 2015**, in recognition of commending Excellence in Energy Efficiency in MENA & North Africa.
- CCC has won the **Best Green Initiative** of the Year at the BGREEN Awards 2014 in GCC.

