

# Solar Turbines – Data Centre Solutions

FEBRUARY 2025

**Powering the Future**

**Solar Turbines**

*A Caterpillar Company*

# World's Largest Manufacturer of Industrial Gas Turbines

(1 to 39 MW)



Subsidiary of Caterpillar Inc.

Since 1981

Installations in  
**100+**  
Countries



Direct  
End-to-End  
Sales and Service

**65**

Sales and Service  
Locations

**16,000+**

Gas Turbines Sold

**6,800+**

Gas Compressors Sold

Global Workforce



**8,000+**  
Employees

# CATERPILLAR®



CONSTRUCTION  
INDUSTRIES



ENERGY &  
TRANSPORTATION



RESOURCE  
INDUSTRIES

# Solar Turbines

A Caterpillar Company



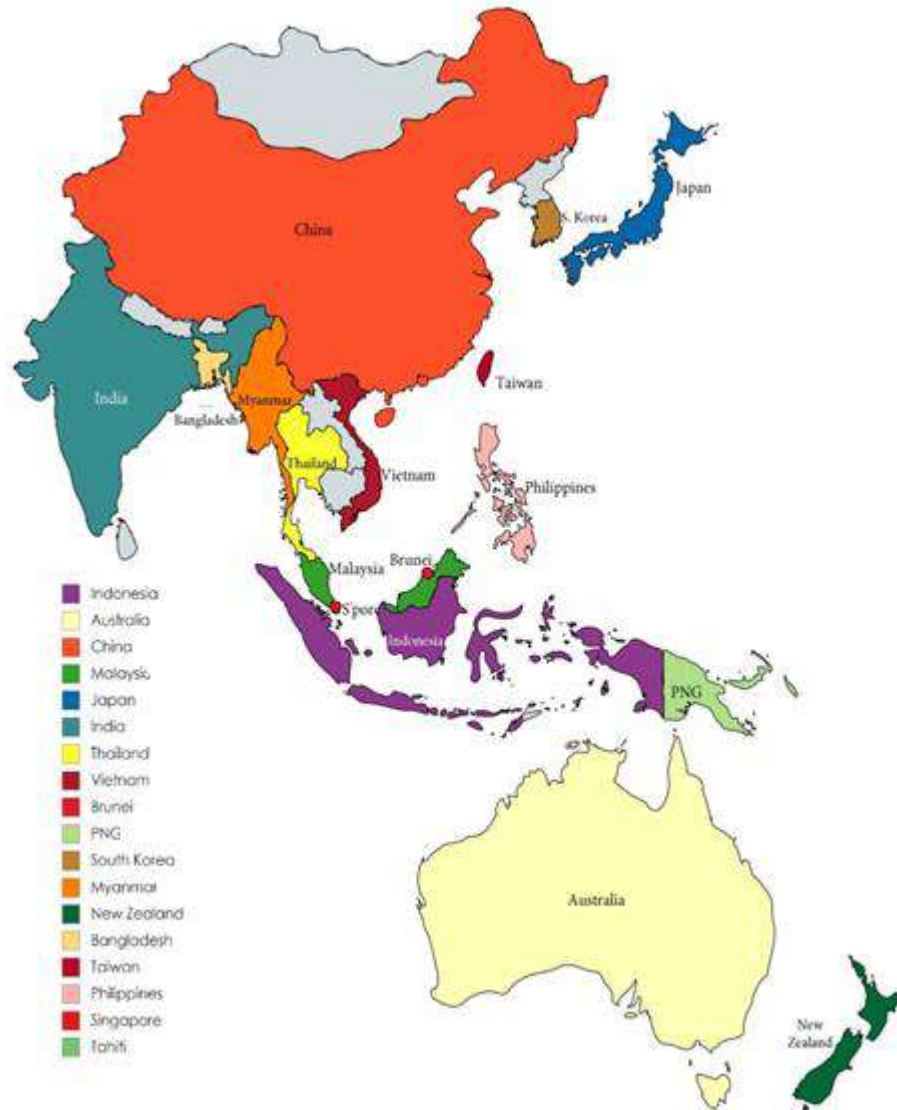
POWER GENERATION



OIL & GAS

SOLAR IS A SUBSIDIARY OF CATERPILLAR INC. SINCE 1981

# Solar Turbines in Asia



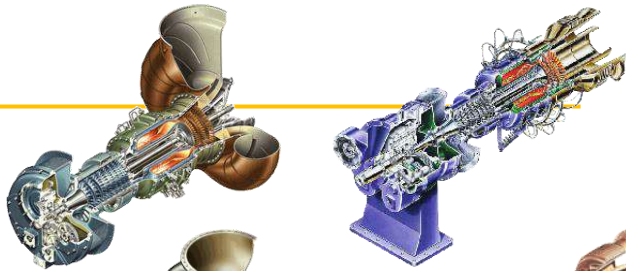
Solar Fleet in Asia Pacific is about 2600 units

- 580 Indonesia
- 452 Australia
- 340 China
- 320 Malaysia
- 236 Japan
- 148 India
- 100 Thailand
- 72 Vietnam
- 54 Brunei
- 43 PNG
- 30 South Korea
- 23 Myanmar
- 17 New Zealand
- 12 Bangladesh
- 11 Taiwan
- 5 Philippines
- 5 Singapore
- 1 Tahiti

# Solar<sup>®</sup> Gas Turbine Family

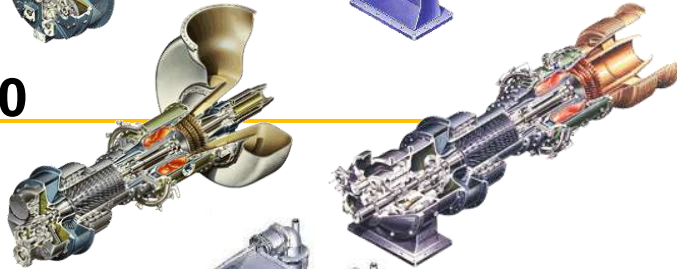
## Saturn 20

1,210 kWe , 24.3% eff.



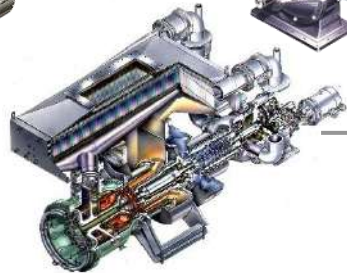
## Centaur 40 & 50

4,600 kWe , 30.0% eff.



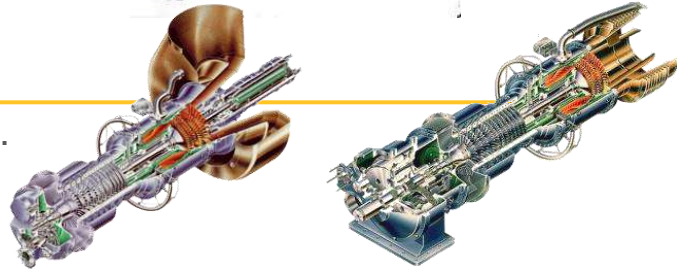
## Mercury 50

4,600 kWe , 38.5% eff.



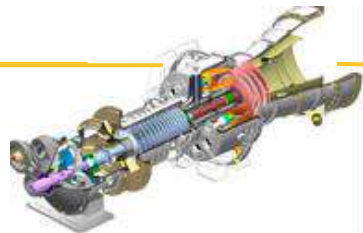
## Taurus 60

5,670 kWe , 31.5% eff.



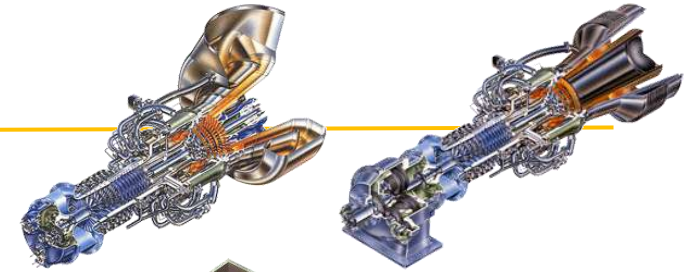
## Taurus 65

6,500 kWe , 33.1% eff.



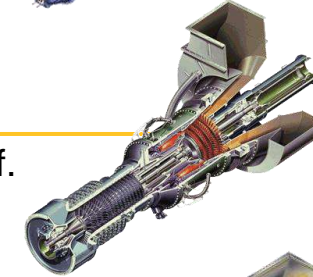
## Taurus 70

8,180 kWe , 34.4% eff.



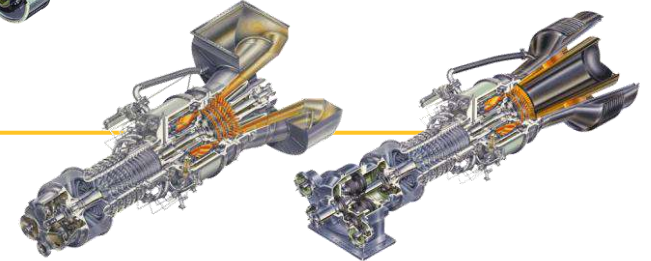
## Mars 90 & 100

11,350 kWe , 32.9% eff.



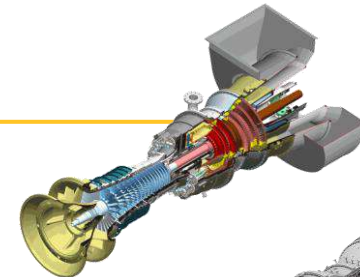
## Titan 130

16,530 kWe , 35.4% eff.



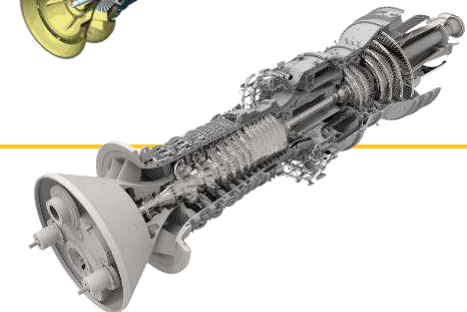
## Titan 250

23,100 kWe , 39.4% eff.

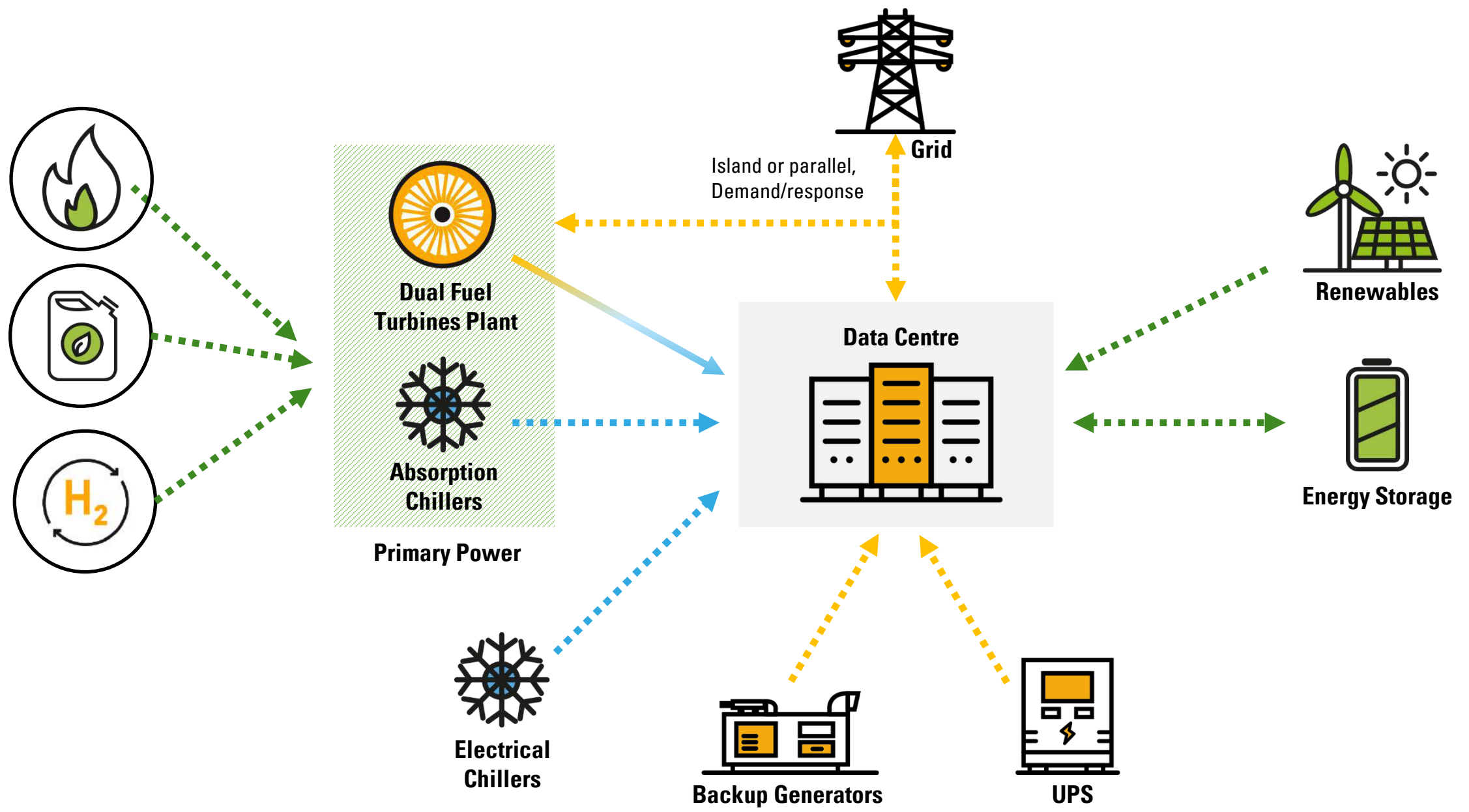


## Titan 350

38,000 kWe , 40.1% eff.



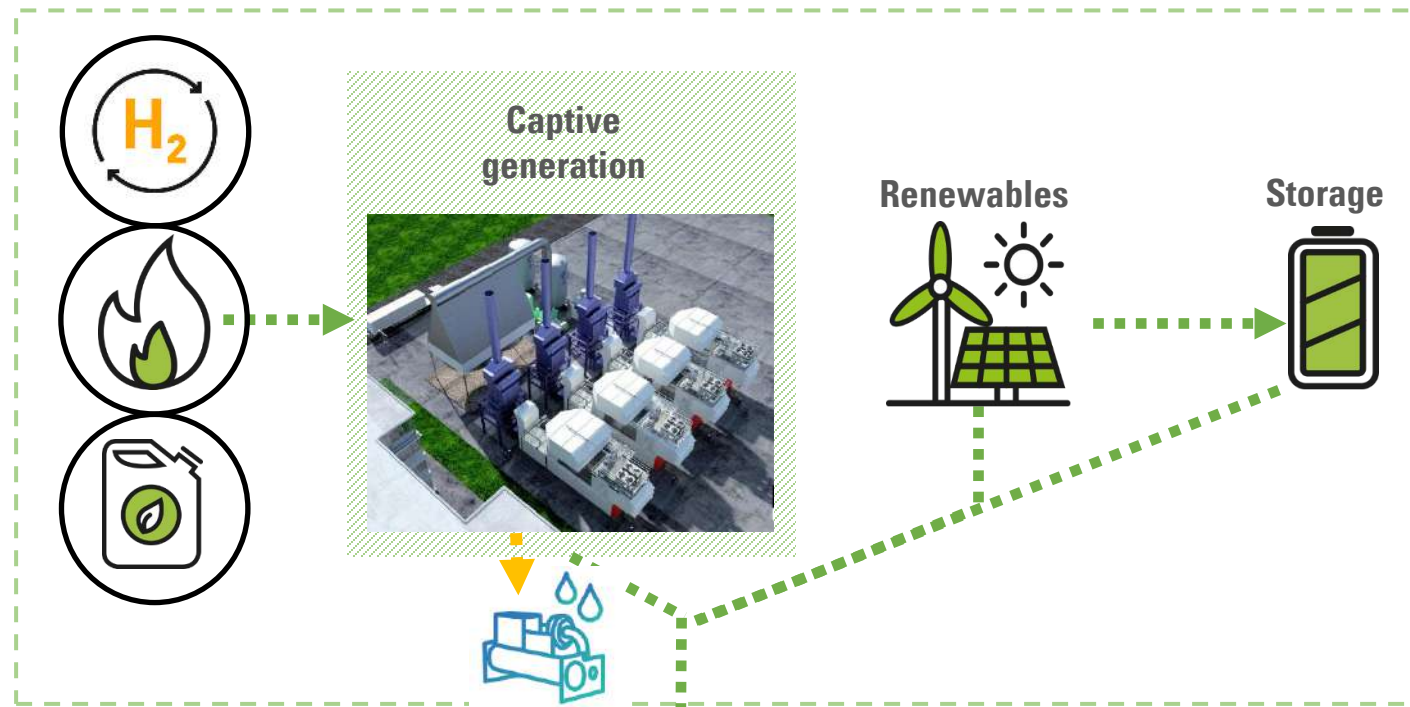
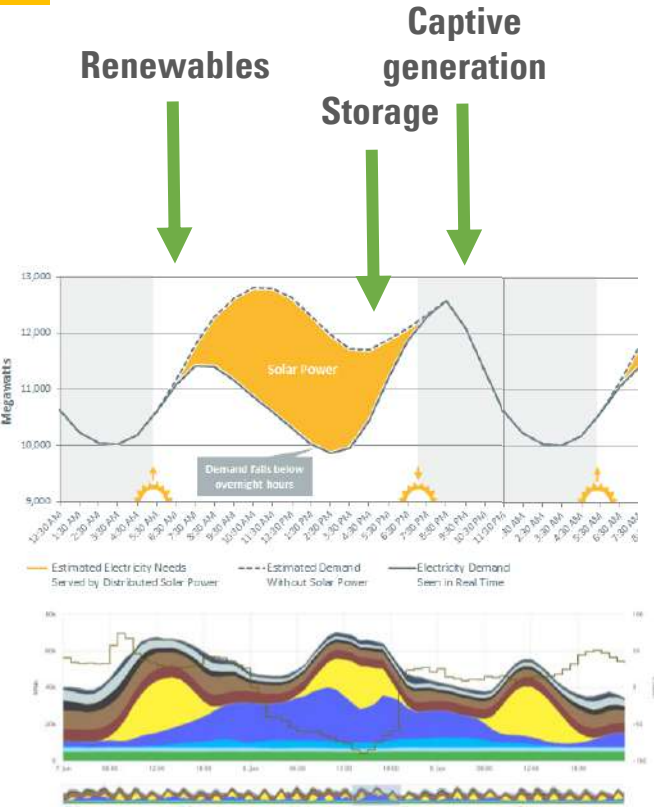
# SMART ENERGY SYSTEM



# What is a **sustainable** microgrid ?

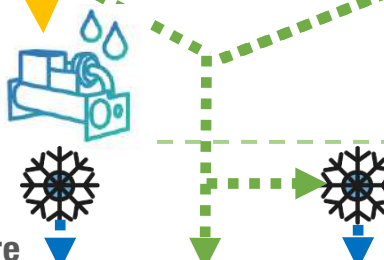
**Solar<sup>®</sup> Turbines**

A Caterpillar Company



**Sustainable** microgrid

Data Centre



IT Load

Enabling 24/7 renewable energy

# Captive generation based on PGM



## Power Generation Module



# Captive generation based on PGM



BUILT and RATED FOR CONTINUOUS OPERATIONS

DUAL FUEL: NG/HYDROGEN/BIOGAS + DIESEL/ HVO

LOWER NOX EMISSIONS – LOW CO2 eq

ISLAND MODE – 100% LOAD BLOCK CAPABLE

HIGH POWER DENSITY - 16.5 MW: 12mx3m

HIGHER AVAILABILITY AND RELIABILITY

MINIMUM SERVICE REQUIRED (1 VISIT PER YEAR)

LOW TCO

## NATURAL GAS SUBSTITUTES



- **Comp. Bio-Methane**
- **Bio-LNG**

## OTHER GASES



- **Hydrogen**
- **Syngas**

## LIQUID BIO-FUELS



- **Bio-Ethanol**
- **Bio-Diesel**
- **Hydrotreated Vegetable Oil**
- **Bio-DME**
- **Methanol**

**Future proof sustainable technology**

# Bridge to Grid Use Cases

## Bridge to Grid

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Plan to use separate back-up design once Grid connected

### Key Criteria

- Available now, Simple, Relocatable, Reliable/Uptime

### Microgrid Solution

- Rental or own, then move to another site/ sell
- Prime likely requires gas units for emissions

### Engine Driver Configuration

- Mobile: [SMT130](#) (16 MW units) Caterpillar Rental Engines
- Relocatable: PGM130 (16 MW)



# Bridge to Grid Use Cases

## Bridge to Grid

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Plan to use separate back-up design once Grid connected

### Key Criteria

- Available now, Simple, Relocatable, Reliable/Uptime

### Microgrid Solution

- Rental or own, then move to another site/ sell
- Prime likely requires gas units for emissions

### Engine Driver Configuration

- Mobile: [SMT130](#) (16 MW units) Caterpillar Rental Engines
- Relocatable: PGM130 (16 MW)

## Bridge to Standby

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Will convert units to standby once Grid arrives

### Key Criteria

- Available now, can convert to Fast Start, Reliable/Uptime

### Microgrid Solution

- Build own and then convert units to standby
- Prime power likely requires gas units for emissions

### Engine Driver Configuration

- PGM130 or Centaur (4 MW) convert to Fast Start in future
- CAT Reciprocating (several opt)



# Bridge to Grid Use Cases

## Bridge to Grid

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Plan to use separate back-up design once Grid connected

### Key Criteria

- Available now, Simple, Relocatable, Reliable/Uptime

### Microgrid Solution

- Rental or own, then move to another site/ sell
- Prime likely requires gas units for emissions

### Engine Driver Configuration

- Mobile: [SMT130](#) (16 MW units) Caterpillar Rental Engines
- Relocatable: PGM130 (16 MW)

## Bridge to Standby

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Will convert units to standby once Grid arrives

### Key Criteria

- Available now, can convert to Fast Start, Reliable/Uptime

### Microgrid Solution

- Build own and then convert units to standby
- Prime power likely requires gas units for emissions

### Engine Driver Configuration

- PGM130 or Centaur (4 MW) convert to Fast Start in future
- CAT Reciprocating (several opt)

## Firming & Standby

- Utility/Grid can provide some/all power, but is interruptible. "Flex contracts"
- DC needs standby for most of year, but prime for significant portion

### Key Criteria

- Fast start, Reliable/ Uptime

### Microgrid Solution

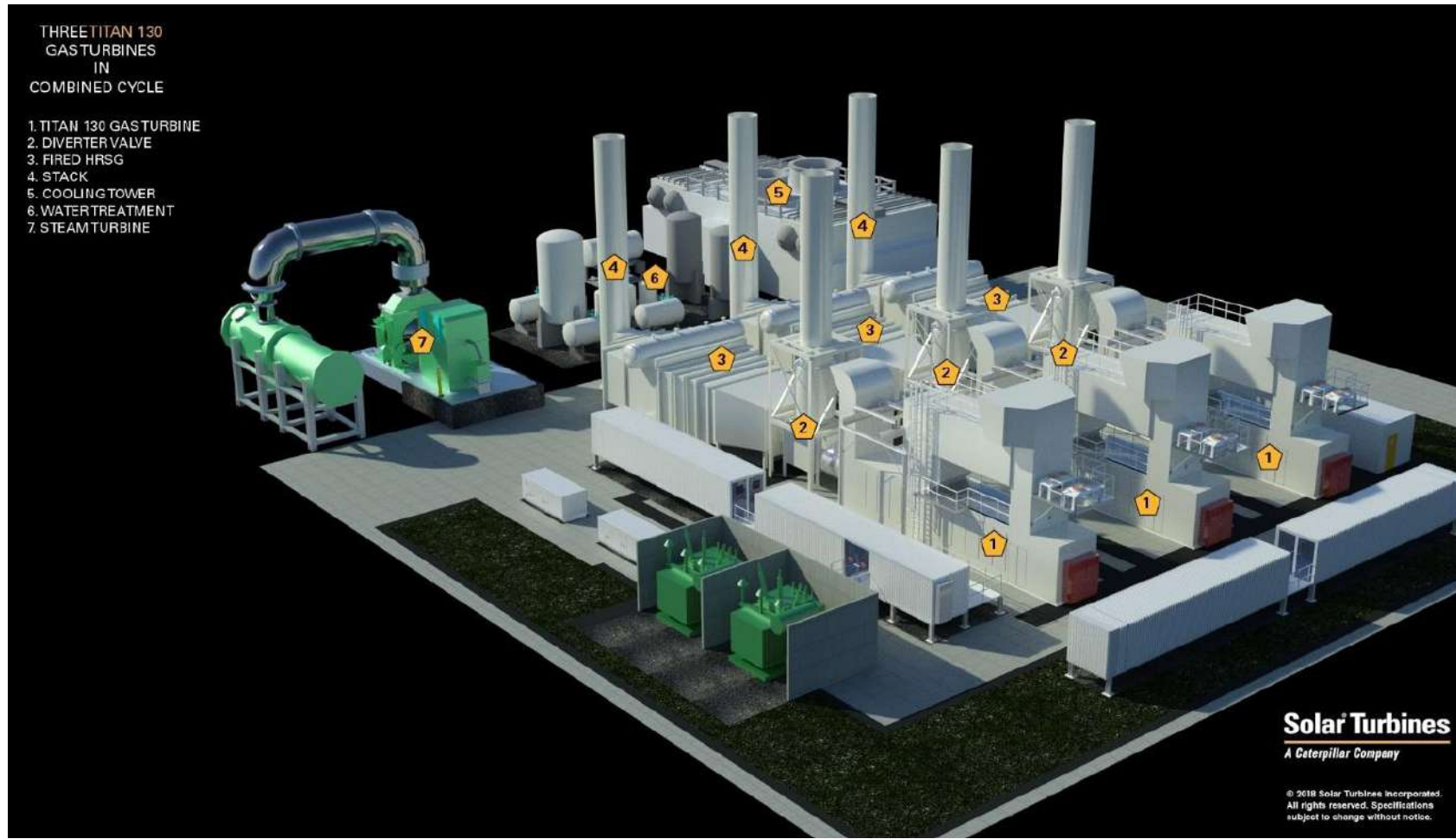
- Build own that is both efficient and has fast start for standby
- Likely reqs gas units for number of hours

### Engine Driver Configuration

- PGM130 with Fast Start
- CAT Reciprocating Engines



# Bridge to Grid Use Cases



## Long Term Bridge

- Grid/ Utility won't connect for many years
- Gov't regulation requires DC to have own power

### Key Criteria

- Efficiency, Reliable/Uptime

### Microgrid Solution

- Build own combined cycle plant that for max efficiency
- Prime movers must be convertible or ready for renewable fuels (ie H<sub>2</sub>)

### Engine Driver Configuration

- [Combined Cycle](#) with Titan family of products:
  - PGM130 (16 MW),
  - Titan 250 (23 MW),
  - Titan 350 (38 MW)

# Bridge to Grid Use Cases

## Bridge to Grid

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Plan to use separate back-up design once Grid connected

### Key Criteria

- Available now, Simple, Relocatable, Reliable/Uptime

### Microgrid Solution

- Rental or own, then move to another site/ sell
- Prime likely requires gas units for emissions

## Bridge to Standby

- Short term electricity need that the DC confidently believes the Utility/ Grid will support in a few years AND
- Will convert units to standby once Grid arrives

### Key Criteria

- Available now, can convert to Fast Start, Reliable/Uptime

### Microgrid Solution

- Build own and then convert units to standby
- Prime power likely requires gas units for emissions

## Firming & Standby

- Utility/Grid can provide some/all power, but is interruptible. "Flex contracts"
- DC needs standby for most of year, but prime for significant portion

### Key Criteria

- Fast start, Reliable/ Uptime

### Microgrid Solution

- Build own that is both efficient and has fast start for standby
- Likely reqs gas units for number of hours

## Long Term Bridge

- Grid/ Utility won't connect for many years
- Gov't regulation requires DC to have own power

### Key Criteria

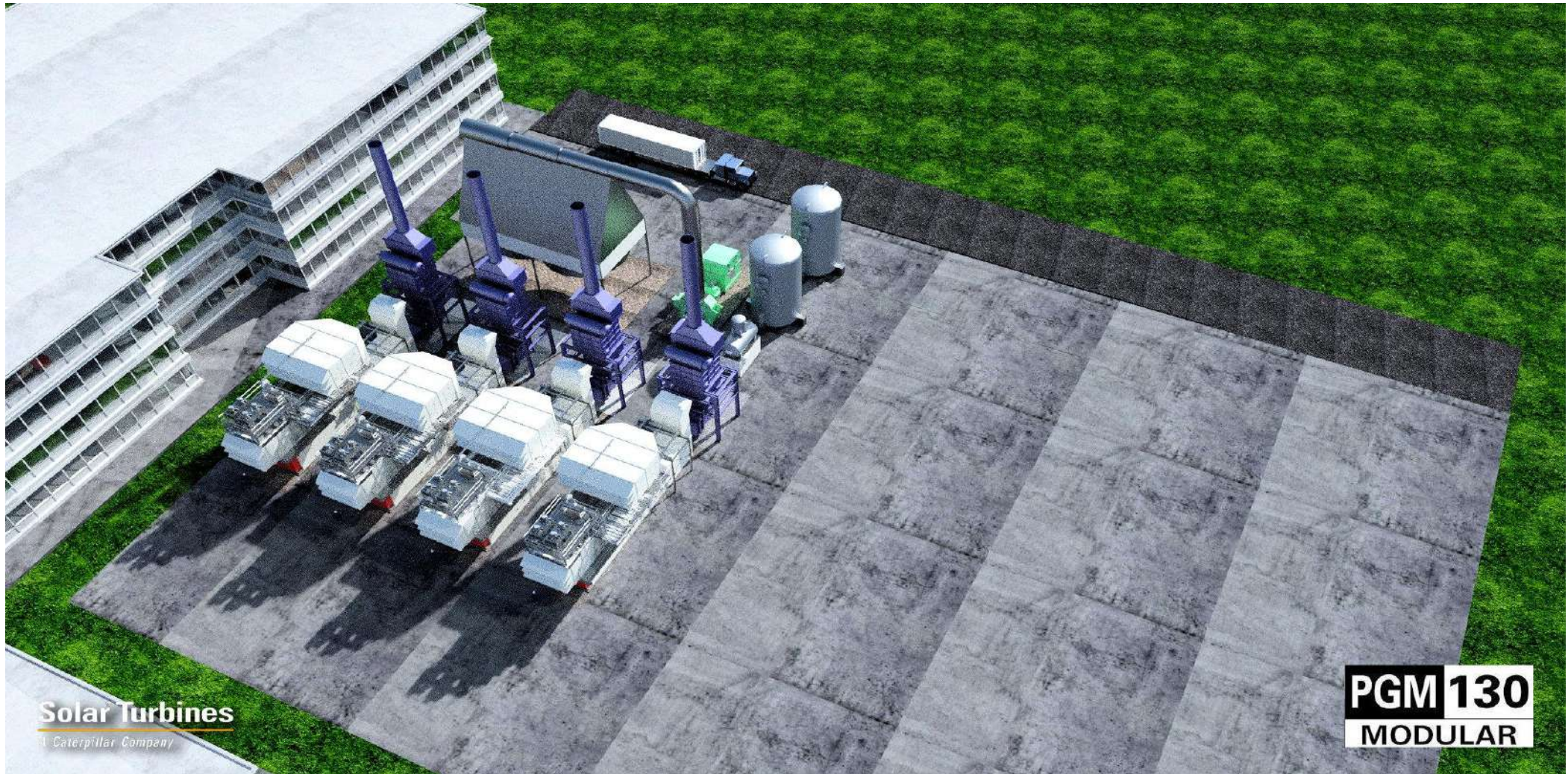
- Efficiency, Reliable/Uptime

### Microgrid Solution

- Build own combined cycle plant that for max efficiency
- Prime movers must be convertible or ready for renewable fuels (ie H<sub>2</sub>)

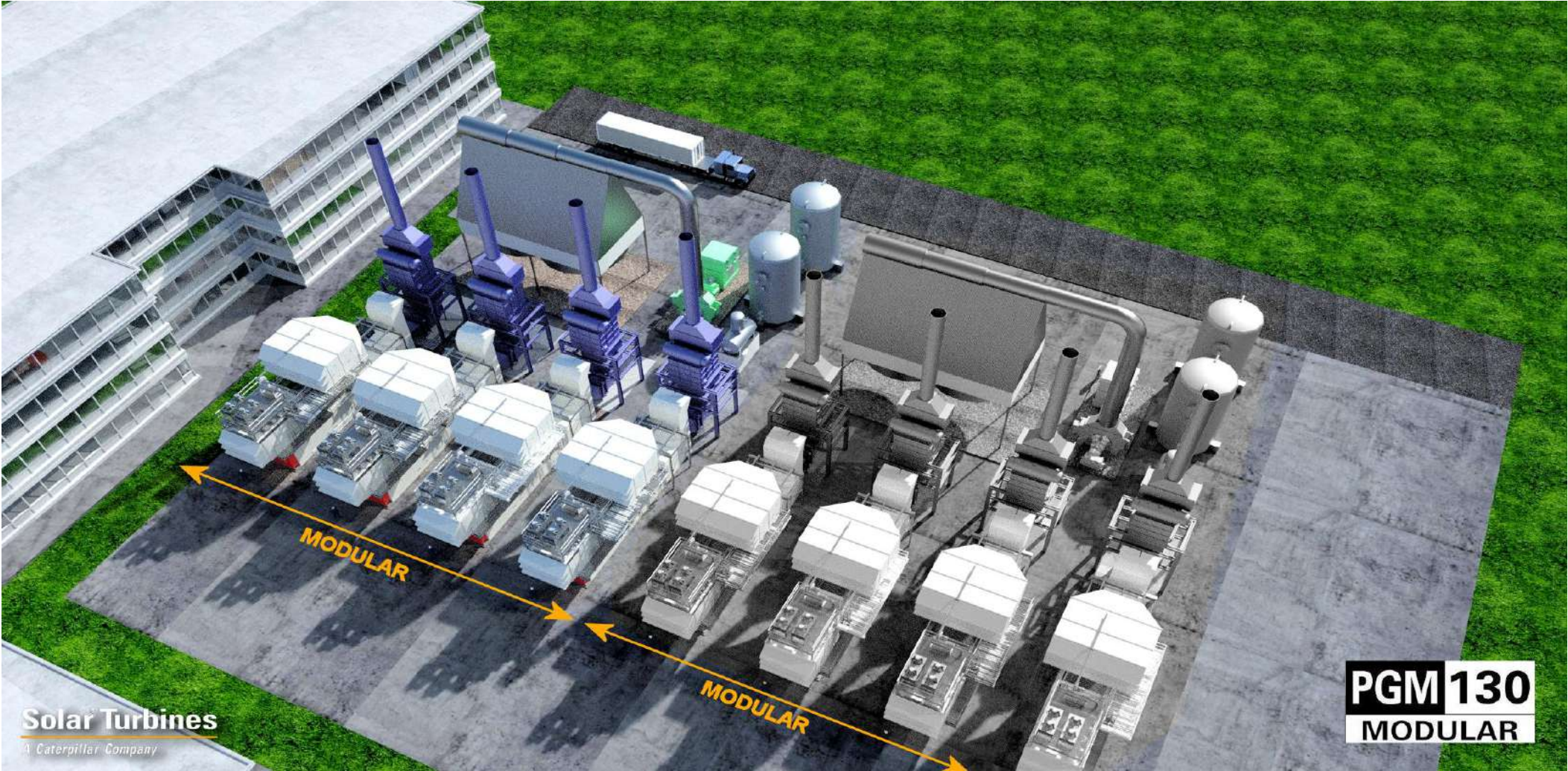
Other Considerations: Dual Fuel required? Ease of Operation? Scalable? Future Equipment Value?

# Captive Generation based on PGM – high efficiency plant





# Captive Generation based on PGM – high efficiency plant



# Captive Generation based on PGM – high efficiency plant



- SCALABLE
- HIGHEST EFFICIENCY
- RENEWABLE FUEL READY (H2, HVO)
- DUAL FUEL
- MICROGRID READY
- HIGH POWER DENSITY
- 100% LOAD BLOCK ABLE
- LOW CH4 SLIP - LOW GHG
- ABSORPTION CHILLER CAPABILITY
- LOW TCO (NO LUBE OIL CONSUMED- NO NH3)

**Solar Turbines**  
A Caterpillar Company

**PGM130**  
MODULAR

# Ireland Datacenter – Case Study



## Project highlights:

- Currently in installation
- 8x PGM130 CCGT
- 2x PGM130 Standby
- 2 x Steam Turbines
- 8 x Vertical HRSGs
- Air Cooled Condensers
- Dual Fuel ^Capability
- 72 Hour Liquid Fuel Storage
- 47% Efficiency
- N+2 Redundancy

# Case Study - Delivery of 8 SMT130 to Data Center



THANK YOU

---

**Solar Turbines**  
*A Caterpillar Company*