



2º Congreso Internacional del Gas LP Exceptional Energy

Edgardo Oscar Vescovo
South America Sales Manager
2019



La generación eléctrica con Gas LP



CAPSTONE TURBINE CORP.



❑ Capstone Turbine Corp. is the world leader and the only manufacturer of turbine energy systems with "oil-free" technology.

❑ Capstone's special oil-free patented technology allows to develop unique cogeneration systems for combined heat and power production which provide low maintenance, minimum emissions and a significant reduction of energy consumption, reaching an overall efficiency > 85%.

❑ Founded in California in 1988, and listed on NASDAQ, Capstone has to its credit over 100 patents and more than 9,000 installations in over 85 countries.



APPLICATIONS



Energy Efficiency



Generate on-site power capture thermal energy from the clean exhaust in CHP and CCHP applications.

Hotels
Large Residential Complexes
Retail Buildings
Office Buildings



Oil, Gas & Other Natural Resources



Produce on-site power for all phases of oil and gas production in both onshore and offshore applications.

Drilling Operations
Flare Gas Reduction
Gas Compression
Mining
Water Conversion



Renewable Energy



Cleanly and efficiently generate onsite power operating on biogas and other waste products to create high-efficiency renewable power and heat.

Farm Digesters
Landfills
Solid Waste Management
Wastewater Treatment
Food Waste



Critical Power Supply



Mission critical businesses have an uninterruptible power source with the world's only microturbine-powered UPS solution.

Data Centers
Telecom
Power Rentals
Hospitals



Transportation



Operate in conjunction with battery packs to provide onboard battery charging and vehicle range extension.

Commercial Trucks
Heavy-duty Vehicles
Supercars
Transit Buses
Delivery Vehicles



Marine

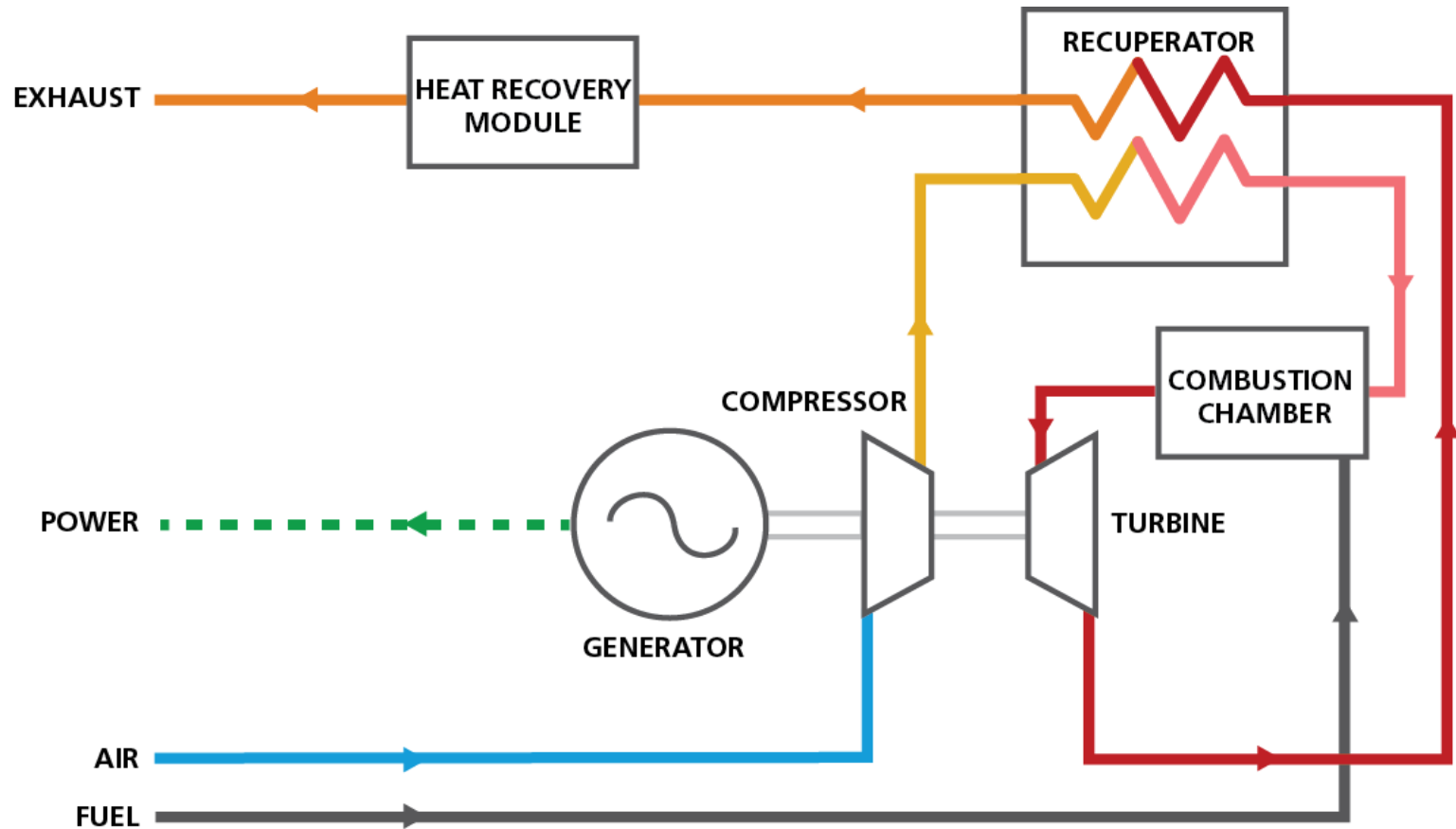


Provide onboard power, vessel range extension and utilize thermal energy for onboard heating and cooling.

Work Boats
Cargo Ships
Commercial Vessels
Tour Boats

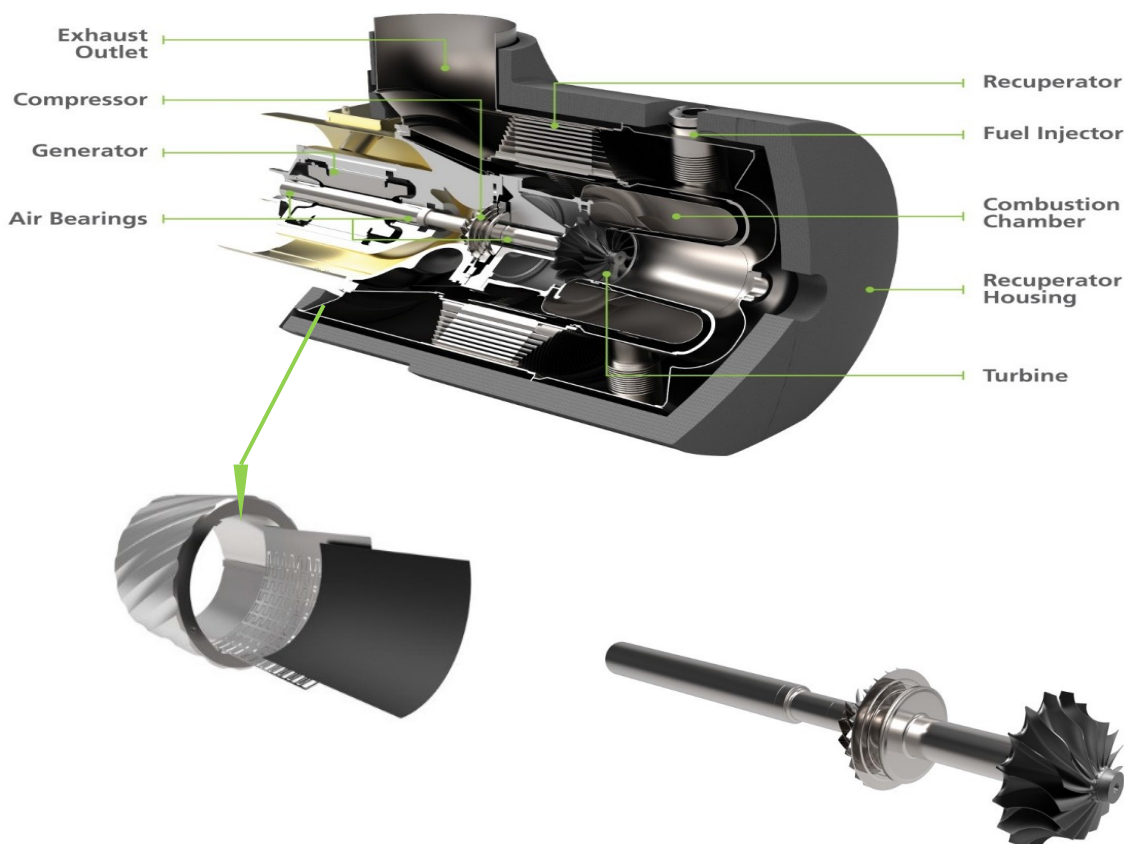


CAPSTONE GAS TURBINE

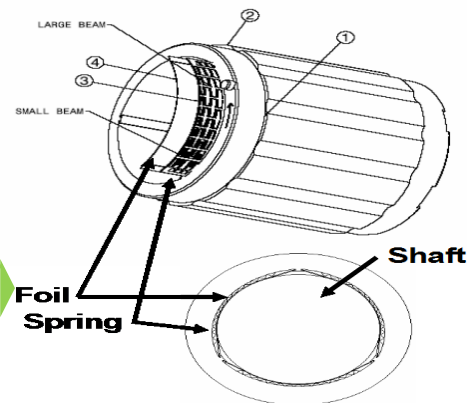
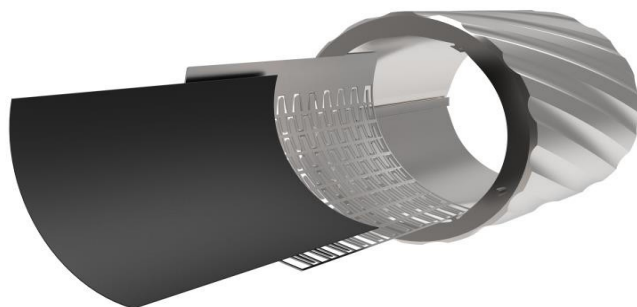


CAPSTONE TURBINE

- ✓ **Simple System:** only one moving part
- ✓ No liquid, oils or coolants needed due to patented **air bearing technology**
- ✓ **No oil** consumption or disposal
- ✓ Air bearings are
 - **maintenance free**
- ✓ **Cleaner** exhaust emissions.
- ✓ Propane, butane, LP, Gas Natural and Biogas



THE OIL-FREE PATENT



- ✓ The "oil-free" technology, deriving from the US **aerospace** R&D, is the result of over ten years of research by Capstone
- ✓ The Capstone patent refers to the complete absence of lubricating oil inside the turbines thanks to the use of **special air bearings** able to support the rotating turbine shaft without mechanical contact
- ✓ The turbine is able to generate energy **modulating** from 0 to 100% of its nominal power by varying the rotation speed from 30,000 to 60,000 revolutions per minute.



ONE MOVING PART



• C200 (61K RPM) C65 (96K RPM) C30 (96K RPM)

• **No Oil – No Coolants – No Friction**

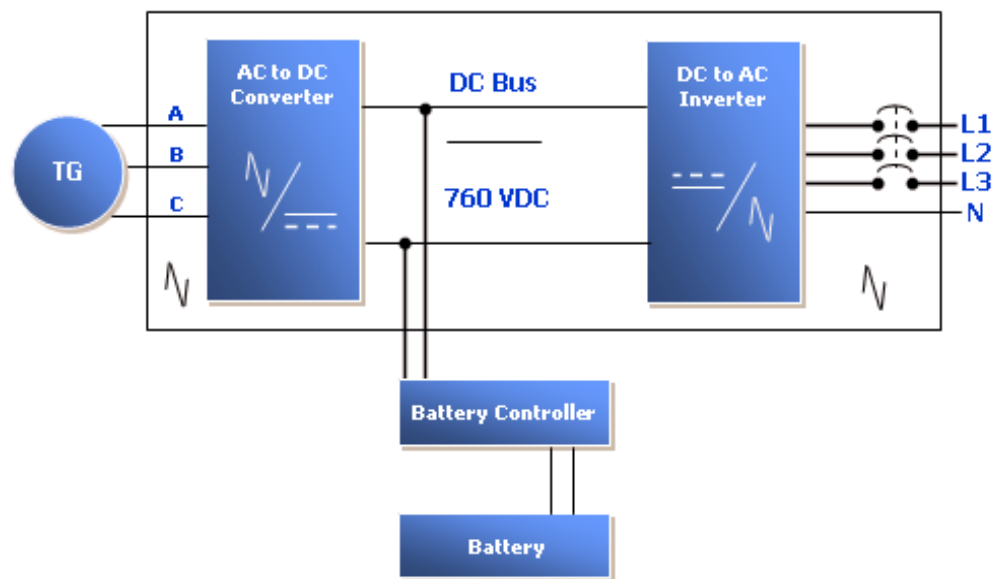


POWER ELECTRONICS



•Inverter-based Power Electronics

- ✓ UPS Quality Power output
- ✓ Output Frequency 50/60 Hz
- ✓ Auto grid synchronization



•Optional integrated battery for Dual Mode

- ✓ Backup during power outages
- ✓ Stand Alone mode



Broad Product Offering



Features



Only one moving part



Patented air bearing technology



Stand alone or grid connect



Wide fuel range



High power density



Advanced combustion controls



Clean waste heat



Remote monitoring

Benefits

Longer service intervals, low operating cost

No lubricants or coolants needed

Multiple applications and industries

Operates on gaseous, renewable and liquid fuels

Compact footprint, small modular design

Low emissions, no exhaust aftertreatment

Thermal energy for cogeneration/trigeneration

View performance and diagnostics 24/7



CAPSTONE SCHEDULE MAINTENANCE



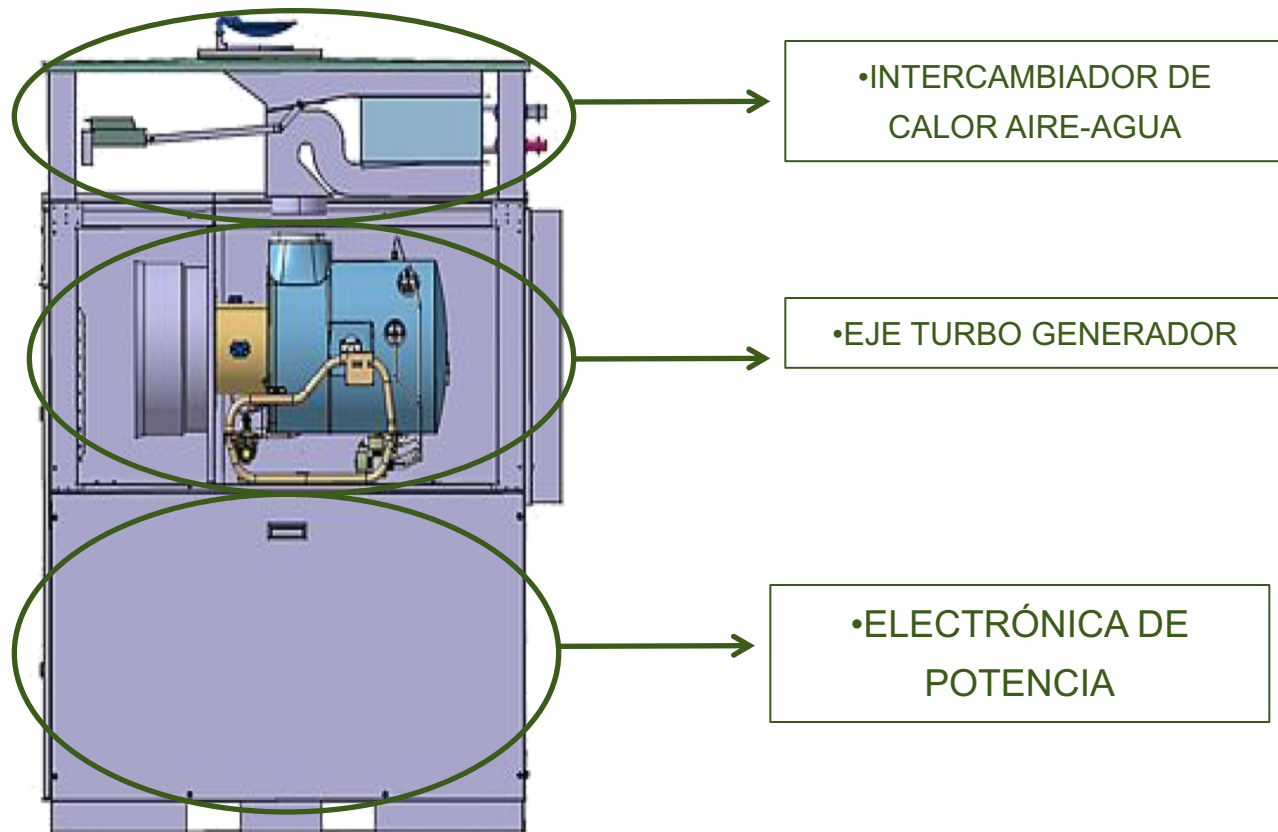
8,000 Hours	Air Filters	Clean/Replace
	Fuel Filter	Replace
	Igniter	Replace
20,000 Hours	Injectors	Replace
	Battery Pack	Replace
	Thermocouple	Replace
40,000 Hours	Engine & <u>Generator</u>	Exchange

- ✓ Average of 20 Hours of Planned Maintenance per year
- ✓ Capstone will guarantee cost of planned and unplanned maintenance through Factory Protection Plan (FPP)
- ✓ MTBF > 14,000 hours
- ✓ 8,600 hours/year guaranteed





C65 Cogeneration



•Microturbina C65 ICHP



C200S ICHP





Microturbines in LP market





Ultragaz, Brazil





Catalina Island, USA



- **Location** : Catalina Island, California, USA

- **Commissioned** : December 2011

- **Fuel** Propane

- **Technologies** : 23 C65 Capstone microturbines

- **Results**

- The C65 microturbines supply approximately 1.5MW supplement electricity produced by the diesel engines to help provide prime power to the island's 25,000 electrical meters

- Power can be dispatched in increments from 65kW up to 1.5MW

- C65 microturbines reduce diesel fuel usage by about 10%, or 200,000 gallons, annually

- The Island's overall emissions profile improved with annual reductions of smog





Tropigas Facilities, Panama



- **Location** : Panama, Panama
- **Commissioned** : December 2016
- **Fuel** Propane
- **Technologies** : 1 C65 ICHP Capstone microturbines
- **Results**
 - The C65 microturbines supply 65 Kw of electricity and 120 Kwt in hot water for internal process





Hotel Corralco, Chile



- **Location** : Temuco, Chile
- **Commissioned** : December 2013
- **Fuel** Propane
- **Technologies** : 4 C65 ICHP Capstone microturbines
- **Results**
 - The 4 C65 ICHP microturbines supply approximately 214 Kw electrical plus 480 Kwt in hot water for Sky Resort with 60 rooms





Hotel Corralco Chile



- Hotel Corralco





Food Industry, Chile

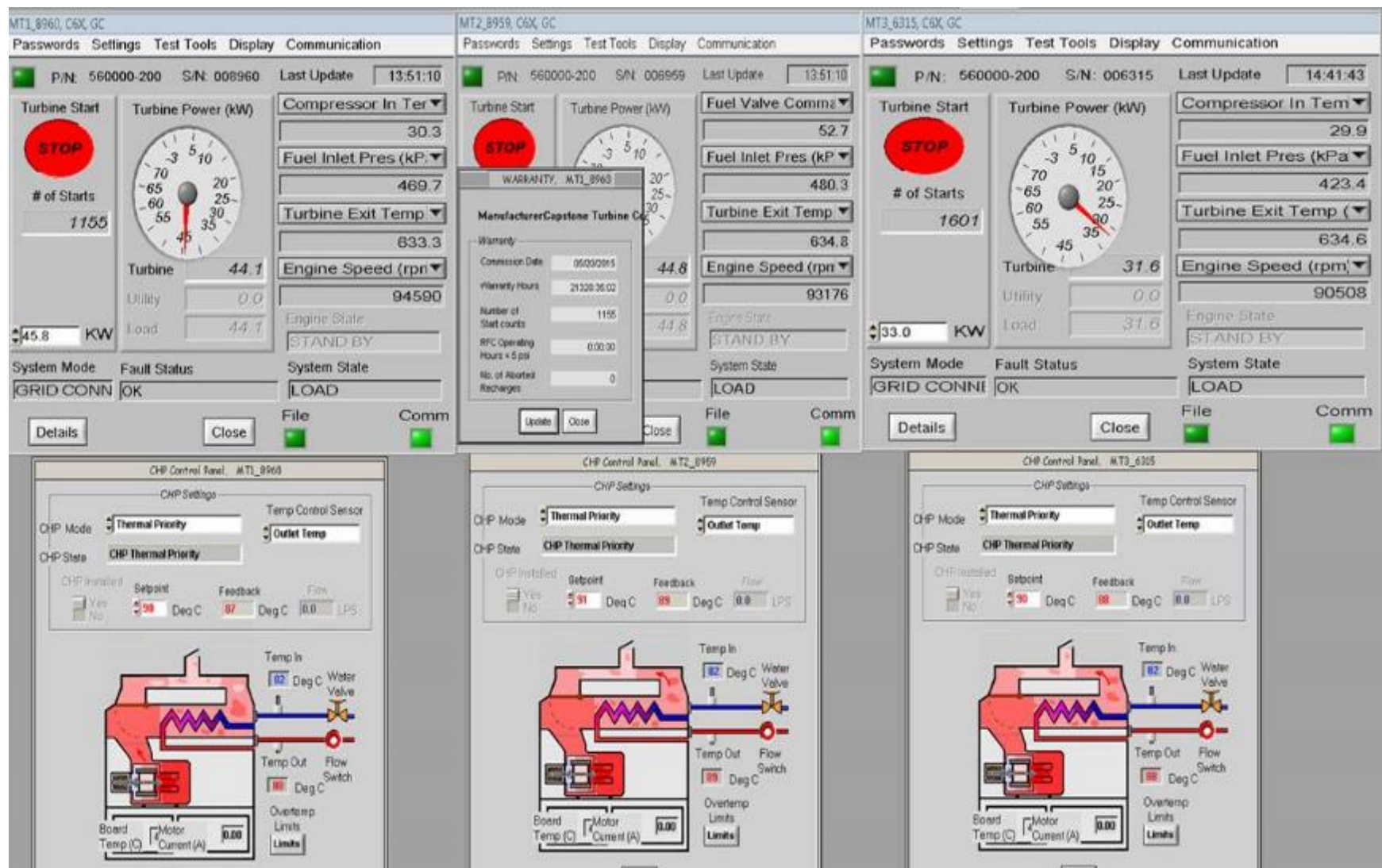


- **Location** : Santiago, Chile
- **Commissioned** : December 2015
- **Fuel** Propane
- **Technologies** : 3 C65 ICHP Capstone microturbines
- **Results**
 - The 3 C65 ICHP microturbines supply approximately 150 Kw electrical plus 230 Kwt in hot water for dry process





Food Industry, Chile





Puerto Rico



- **Location** : Puerto Rico
- **Commissioned** : December 2015
- **Fuel** Propane
- **Technologies** : C65, C800, C1000 Capstone microturbines
- **Results**
 - The microturbines supply power for hotel and restaurants.





Hotel Explora, Chile

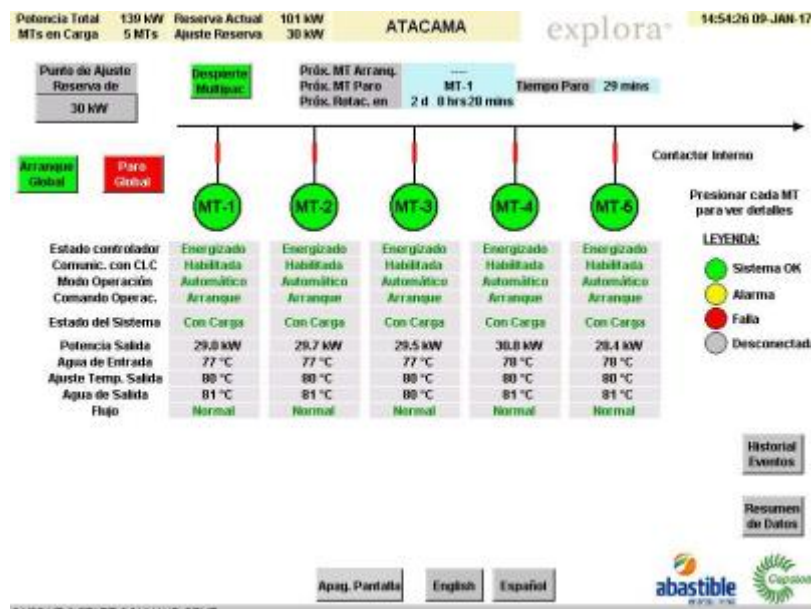


- **Location** : San Pedro de Atacama, Chile
- **Commissioned** : December 2016
- **Fuel** Propane
- **Technologies** : 5 C65 ICHP Capstone microturbines
- **Results**
 - The 5 C65 ICHP microturbines supply approximately 264 Kw electrical plus 400 Kwt in hot water for hotel with 50 rooms



----- Trip in van: 1 hour







Hospitality



USVI Resort – St. Thomas

- C1000 & C800 Turbines
- 1800 kW of Power
- Turbines provide 100% of resorts power
- Onsite Propane Storage



Results

- Customer generates power for less than the utility grid
- Standalone site
- Became safe refuge property afterward Hurricane IRMA
- Customer under 8 year FPP





Microgrid



USVI Microgrid – St. Croix

- C1000 Turbine
- 750kW Solar
- 625kW Tesla Battery Storage
- Onsite Propane Storage



Results

- Microturbines run in parallel with the Solar PV and Tesla batteries
- Utility grid is backup
- Standalone site
- Site “powered” through Hurricane Maria
- Customer under 8 year FPP





Mixed Use Development



Magan's Bay– USVI St. Thomas

- (5) C65 Microturbines
- (2) Turbines used for Combined Heat & Power
- Stand alone site
- Propane Storage onsite

Results

- Provides 100% of the electricity for the multi-family living complex
- The CHP generates 100% of building domestic hot water
- Future expansion calls for (3) addition units
- m-TIM & remote monitoring in place to support 15 year FPP





Confidential Resort – Punta Cana, D.R.

- C1000 Microturbine
- Turbines used to power resort

Results

- Provides 100% of the electricity for the facility
- Utility grid is backup
- Client produces power for a lower price than the grid
- Energy Independent site





The world needs a dependable
and ultra-clean power source
more than ever before.



Oil&Gas

Landfill/Biogas

CHP

HEV

Super low emissions – better than
the toughest global standards.

*Power when and where you need it.
Clean and simple.*

www.capstoneturbine.com