



*A presentation at
ASME Turbo Expo 2006*

***Product innovations
by the world's leading
microturbine manufacturer***



Capstone Turbine Corporation®





Topics to be Covered

- ✓ **Company overview**
- ✓ **New C65 product**
- ✓ **New CR65 product**
- ✓ **New Class 1 Division 2**
- ✓ **Q&A**

Capstone Introduces the C65 Energy Systems

NEW C65 & C65-ICHP:

- More power & more heat
- Better fuel efficiency too
- Even lower NO_x emissions
- Same compact dimensions

In 2006, Capstone Turbine introduces a significant improvement to the world's most popular line of microturbine energy systems. Replacing the C60 product, the new C65 offers greater electrical output, more heat energy, higher fuel efficiency, heavier-duty power electronics, and < 10-sec. fast transfer on dual-mode units, all with the same dimensions, weights and other advantages of the original:

- Just one moving part, no gearbox, no radiator, etc.
- No oil, lubricants, coolants or other hazards
- Quiet, small footprint, light weight, vibration-free
- 10% federal tax credit; other incentive programs
- Cleaner and more fuel efficient power and heat
- 80% CHP efficiency measured at end-user load
- As easy as a gas furnace to install and air permitting
- Integrated synchro starting & load-sharing
- Built-in capability to array up to 20 units on one indoor, out door or rooftop installation
- Easy integration to energy management systems
- Optional remote monitoring, dispatch, diagnostics
- Made in USA

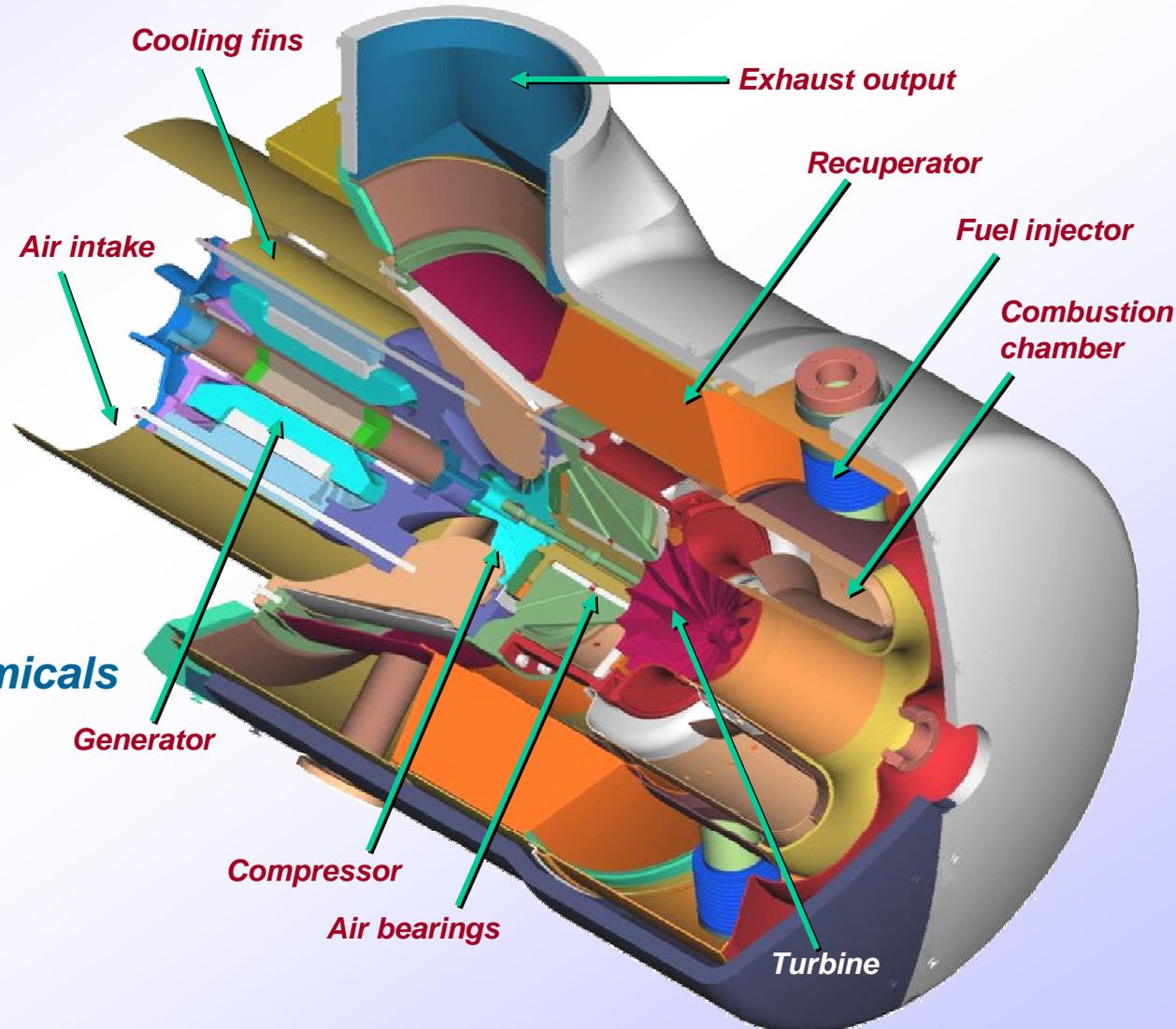
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Inside the Capstone MicroTurbine

- *Has only one moving part*
- *No coolants or lubricants*
- *Contaminate-free exhaust*
- *No gearbox*
- *Compact and lightweight*
- *Ultra-low CO & NO_x*
 - *Without any exhaust treatment devices or chemicals*





C65 Summary

- **Fuel Capability**
 - ✓ Natural gas
 - ✓ New landfill & digester gas fueled models
- **Power Increase**
 - ✓ + 5kW
- **Efficiency Gain**
 - ✓ 29% (+4% over C60)
 - ✓ 80% ICHP
 - ✓ Optional stainless steel HX for pool water or biogas
- **Emissions Improvement**
 - ✓ <5ppm NO_x @ ISO standard

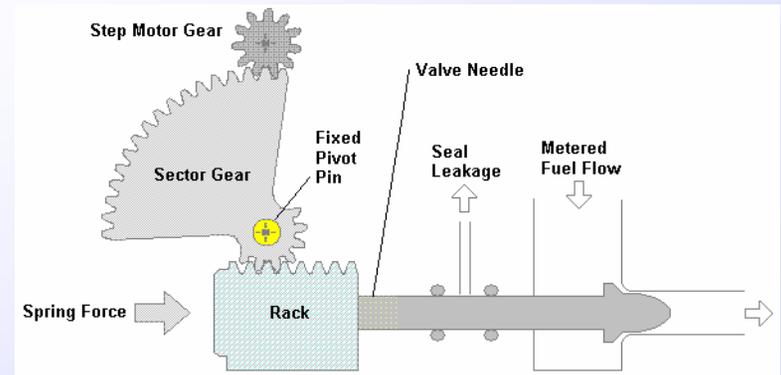


C65 Is a Significant Product Improvement



What's New & Improved?

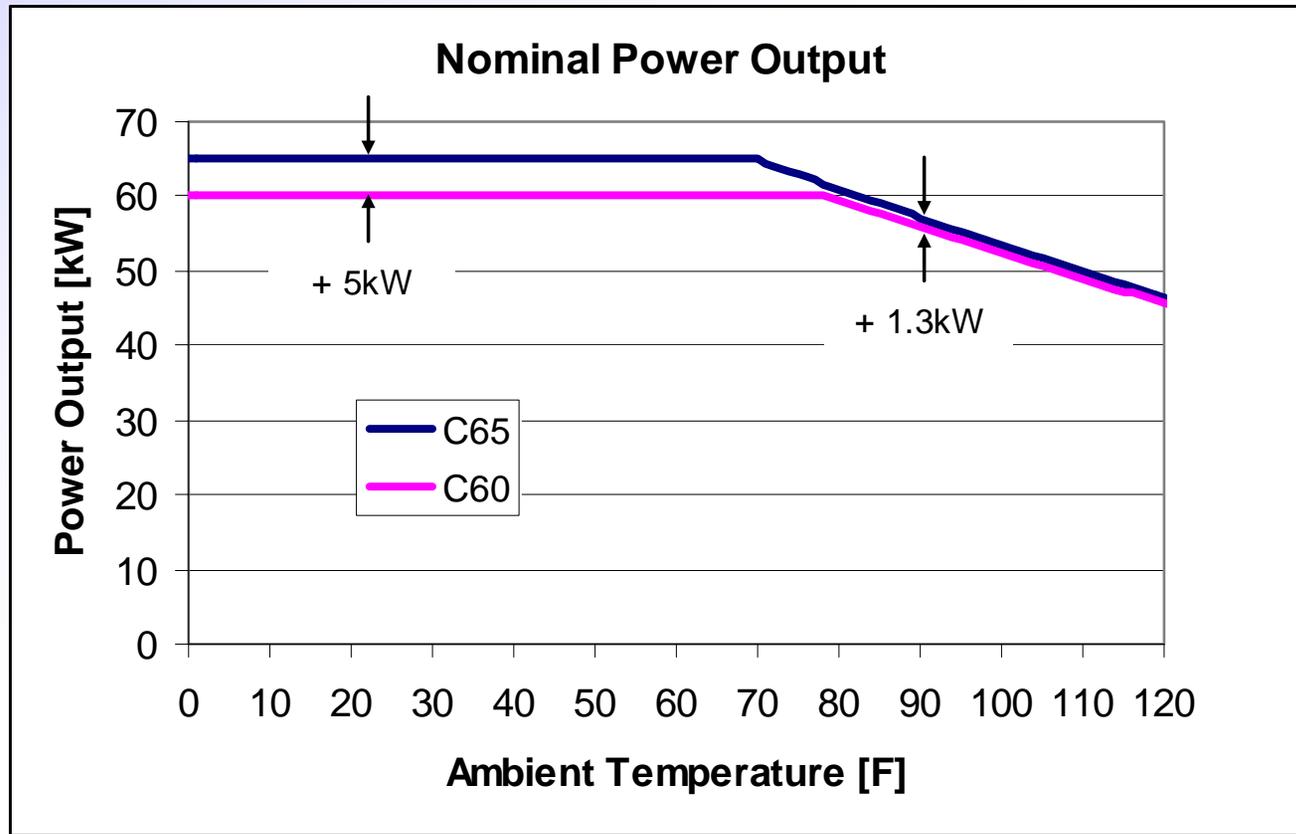
- **New Woodward Fuel Control Valve**
 - ✓ *SPV replaced by family of Woodward valves*
 - ✓ *Natural gas, landfill, & digester gas versions*
 - ✓ *High Btu/propane/LPG versions in process*
- **Software V4.50**
 - ✓ *Enables 65kW performance*
 - ✓ *Dual mode versions have <10s "fast transfer"*
 - ✓ *UL1741 interconnection certified*
 - ✓ *Certified to UL 2200*



C65 Enhancement Driven by Continuous Improvements



C65 Electric Output



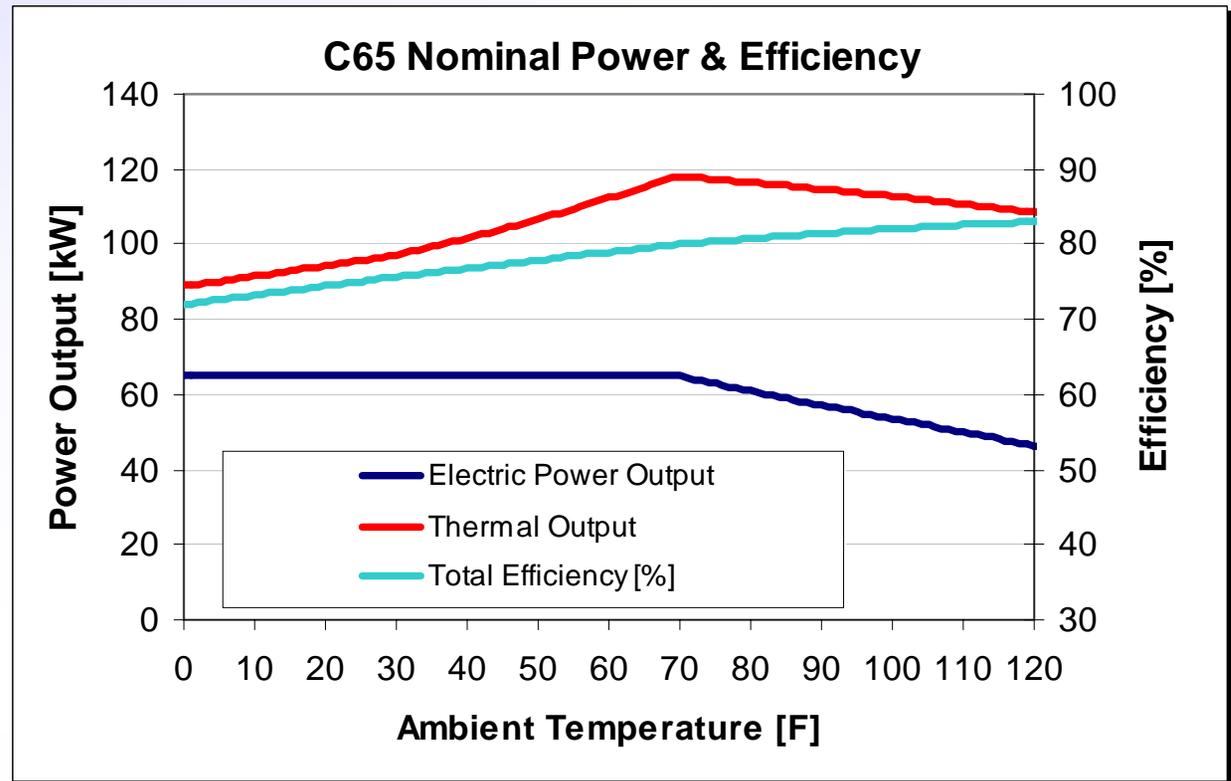
More Net Power Over Entire Temperature Range



C65 ICHP Output & Efficiency

Compared to the C60:

- *More Electric Output*
- *Similar Thermal Output*
- *Same Total Efficiency*



Higher Value Electric Output per Unit of Fuel Input



Less Fuel, Less Waste, Less Smog

230 kW of fuel



80% CHP efficiency



120 kW hot water output



65 kW electricity output



45 kW waste heat
0.15 lb/MWh NO_x
1,540 lb/MWh CO₂

Conventional sources consume 50% more fuel to create the same outputs

345 kW of fuel



150 kW into boiler
195 kW into utility



80% boiler efficiency (national average)



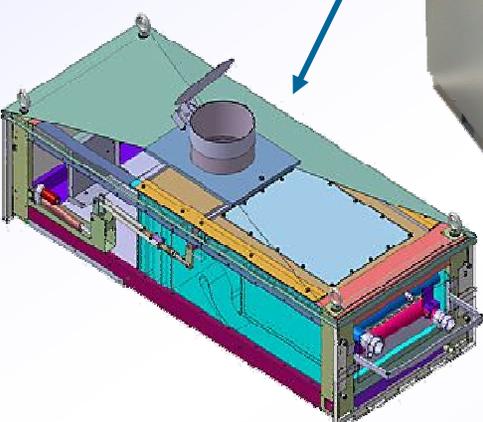
33% utility power plant efficiency (national average)

and have much higher emissions



160 kW waste heat (350% higher)
3.4 lb/MWh NO_x (2,267% higher)
2,320 lb/MWh CO₂ (50% higher)

The Capstone C65-ICHP's integrated HX transfers exhaust heat into the water loop, serving as a 0.4 MMBtu boiler.



Source: US EPA and US DOE, see notes page for specific references



New 65-kW Biogas-Fueled Model

The new biogas-fueled CR65

- *More than twice the power output of our very popular C30 Biogas model*
- *Only 30% larger footprint than the C30*
- *Improvement in electrical efficiency*
- *Same proven-reliable, one-moving-part design*
- *UL1741 nationwide grid interconnect certified*
- *Optional stainless steel integrated HX for exhaust-to-water heating for thermal loads*

First 20 production units shipped to France in March





Offshore: UL[®]-Certified Class I, Div. 2

Features

- *Fuelled by unprocessed wellhead gas*
- *Systems are air cooled*
- *MultiPack capable 2-20 units*
- *C30 up to 70,000ppmV H₂S*
- *ModBus/PLC command capable*
- *Stainless steel enclosed*
- *NEC Class1, Div 2 certified*





1st Platform Construction Using C1D2





...And Onshore Coastal Models

Benefits

- *30kWe and 65kWe output*
- *Manned or unmanned coastal and platform operation*
- *Non hazardous and hazardous models*
- *Compact footprint*
- *Vibration free*





Questions & Answers

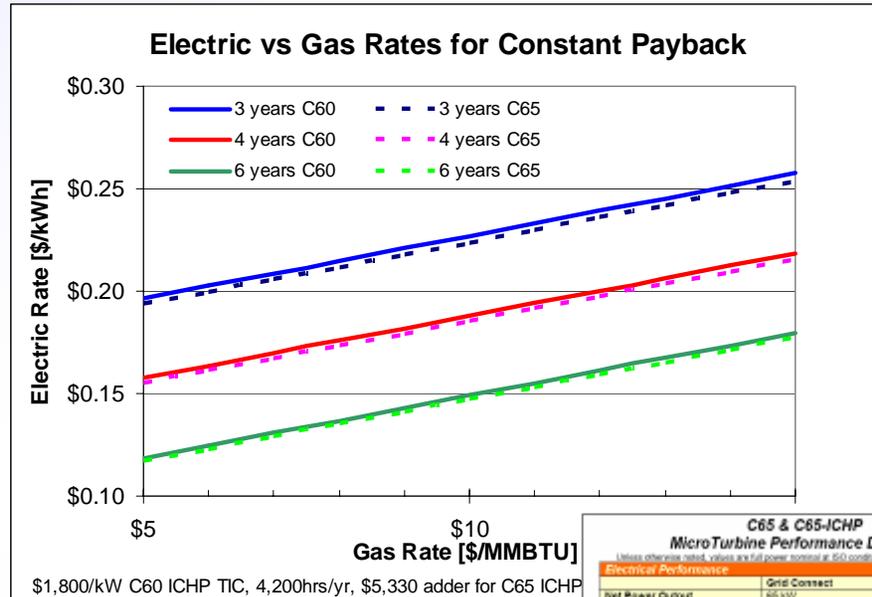
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- Just one moving part, no gearbox, no rotator, etc.
- No oil, lubricants, coolants or other hazards
- Quiet, small footprint, light weight, vibration-free
- 1.0% federal tax credit / other incentives programs
- Cleaner and more fuel efficient power and heat
- 80% CHP efficiency measured at end-user loads
- As easy as it gets to connect and start emitting
- Integrated system control & load-sharing
- Built-in capabilities to operate on one or two fuels, out of the box
- Easy to install



C65 & C65-ICHP MicroTurbine Performance Datasheet

Unless otherwise noted, values are full power nominal at ISO conditions of 50°F (10°C) at sea level.

Electrical Performance	Grid Connect	Stand Alone
Net Power Output	66 kW	66 kW
Net Electrical Efficiency	29% LHV	29% LHV
Net kVA Output	66 kVA	83 kVA (max of 48V)
Voltage	380 to 480 VAC	380 to 480 VAC
Voltage Output Connection	3 phase	3 phase
Frequency	50 or 60 Hz	10-50 Hz (programmable)
Current	100A max, steady state	125A max, steady state
Electrical Output Type	Inverter	Inverter
TIC standard	IEEE 519 for Current	IEEE 519 for Voltage

Fuel Input Requirements	
Natural Gas	875 to 1,275 BTU/scf (HHV)
Fuel Inlet Pressure	75 psig
Fuel Flow at Full Power	158,000 BTU/hr (LHV), 842,000 BTU/hr (HHV)
Net Heat Rate	11,800 BTU/kWh (LHV)
Generator Heat Rate	11,000 BTU/kWh (LHV)

Exhaust Output	
NOx Emissions	<3ppm @ 15% O ₂
Exhaust Temperature	568°F (300°C)
Exhaust Mass Flow Rate	1.38 lbm (0.49 kg/s)
Exhaust Energy Output	561,000 BTU/hr

C65-ICHP Thermal Output***	
Copper Core Integrated Heat Recovery Module	Hot Water Output: 388,000 BTU/hr (112kW)
Stainless Steel Core Integrated Heat Recovery Module	Hot Water Output: 388,000 BTU/hr (112kW)
Total System Efficiency	64%

Dimensions & Weights	C65	C65-ICHP
Width x Depth x Height	35 x 17 x 83 inches	35 x 17 x 84 inches
Weight: Grid Connect Model	1,971 lbs (893 kg)	2,200 lbs (1,000 kg)
Stand Alone Model	2,471 lbs (1,121 kg)	3,000 lbs (1,364 kg)

Certifications
 Built in accordance with UL 2200 and UL1741 (listing pending), and meets statewide utility interconnection requirements of California Rule 21 and the New York State Public Utility Commission.
 Models are available with optional CE Marking. Certification to California Air Resources Board Emissions requirements is in process.