Chipping Away Carbon - Go the Solar (Turbines) Way

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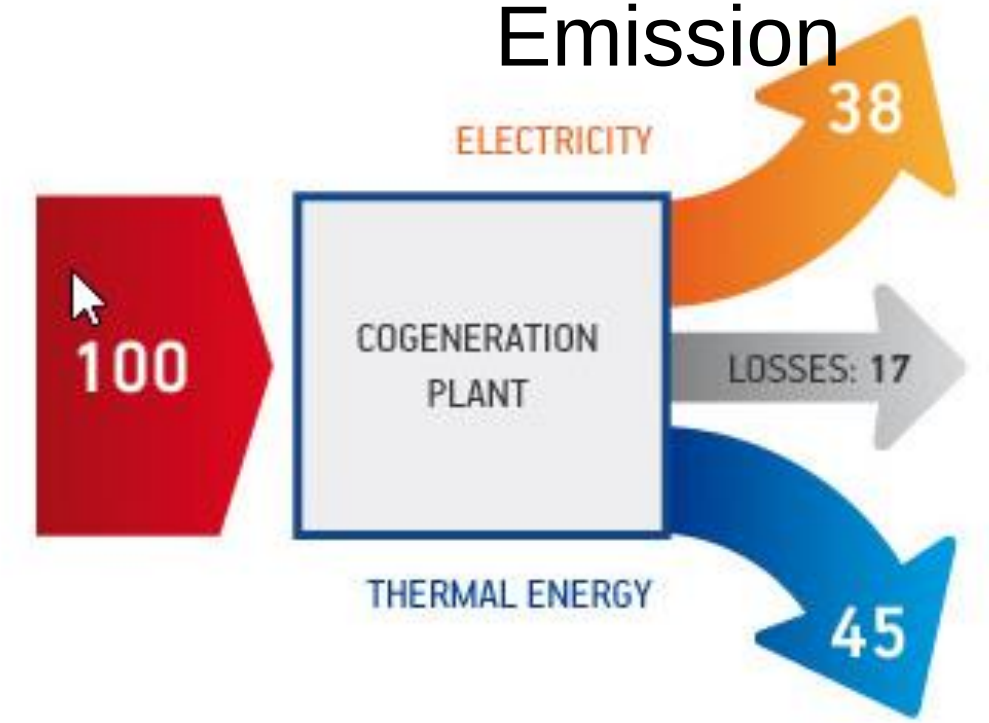
Solar Turbines
IGTC, October 11, 2018

Solar Turbines
A Caterpillar Company

COMBINED HEAT AND POWER - CHP

Efficiency is paramount for low GHG Emission



Solar total installed fleet 15,700 units / 2,400 in CHP Applications

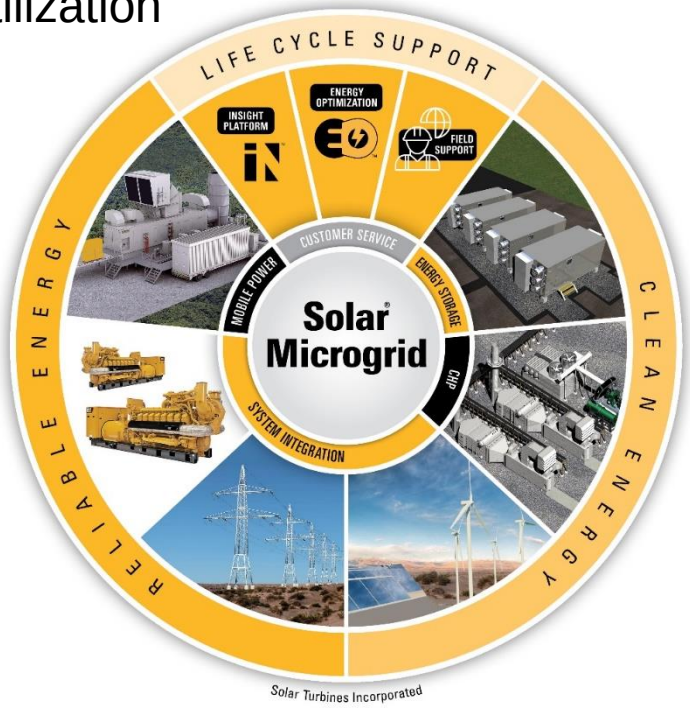
6 x T130 ~ 100MWe Offset

GHG Emission from	CO2 Emission from	Carbon Sequestered by
180’480	922’146’608	992’747
Passenger vehicle driven for 1 year	Pounds of Coal burned	Acres of U.S. Forest in one year

*Results Derived from US EPA Online Greenhouse Gas Equivalence Calculator

MICROGRID

- Distribute energy resources
- Drive efficiency and energy resiliency
- Reduced emissions and improve utilization



InSight Platform

Energy Watch

INSIGHT CONNECT

Turbine remote connectivity and analytics for improved **turbine** availability and reliability

InSight Platform

Plant Watch

PLANT CONNECT

Plant remote connectivity and analytics for improve **plant** availability and reliability

Energy Optimization

Plant efficiency and operating cost optimization; selection of best energy source

ALTERNATIVE FUELS

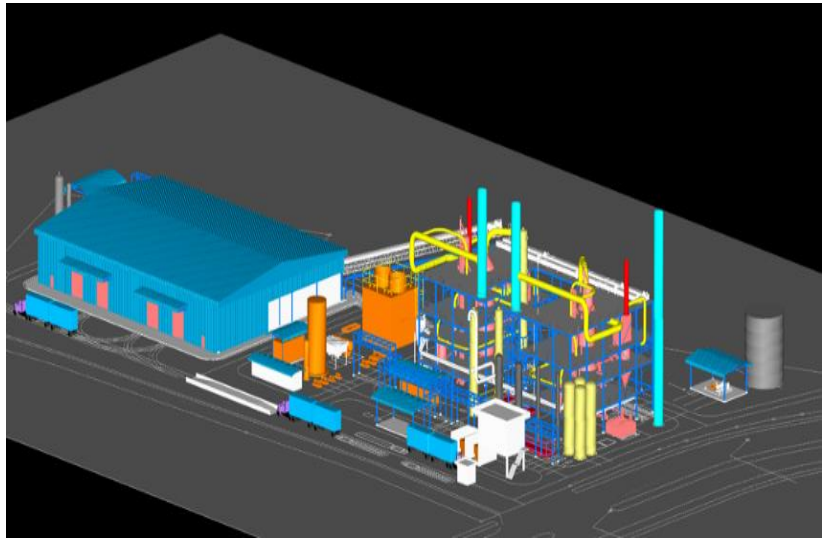
1980s – 90s

143 units in Digester Gas and Landfill Application since the 1980s

2000s – 20s

47 units in Coke Oven Gas in China with over 1.5 million operating hours
8 units in high hydrogen refinery off-gas

Moving Forward



Developing biomass and municipal waste gasification projects for future
Continuing to expand high hydrogen capabilities

TECHNOLOGY FOR HIGH EFFICIENCY

Advanced Technology Platform

Develop new technologies to a level ready for product implementation

CFD for Product Development/ Enhancement

End-to-End aerodynamic optimization

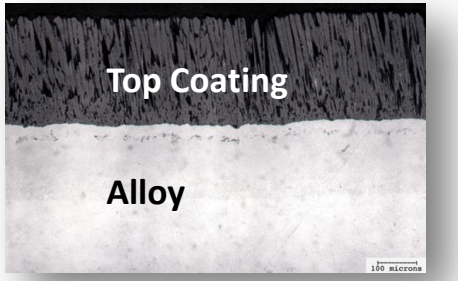
Optimized heat transfer, reduced emissions

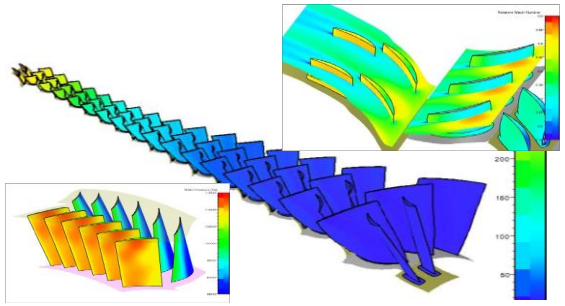
Material Solutions

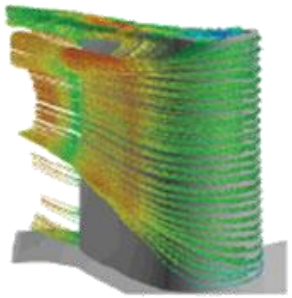
Thermal Barrier Coating – TBC for increased durability at higher firing temperatures

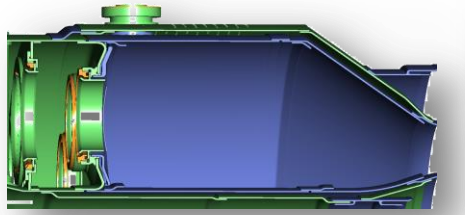
Additive Manufacturing

Paradigm shift in component design and fabrication









Serial cooled liner

Combustor Components