

**Solar Turbines**

*A Caterpillar Company*

# Gas Turbines & Operation on Hydrogen

Solar Turbines' Carbon Reduction  
and Hydrogen Initiatives



# World's Largest Manufacturer of Industrial Gas Turbines

(1 to 25 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

**6,500+**  
Gas Compressors Sold

Global Workforce

 **8,000+**  
Employees

# Sustainability

Sustainability is part of who we are and what we do every single day. Progress involves a balance of environmental stewardship, social responsibility and economic growth.



## COMMUNITY

- People matter
- Corporate social responsibility



## BUSINESS

- Culture of sustainability
- Operational excellence
- Long-term reinvestment



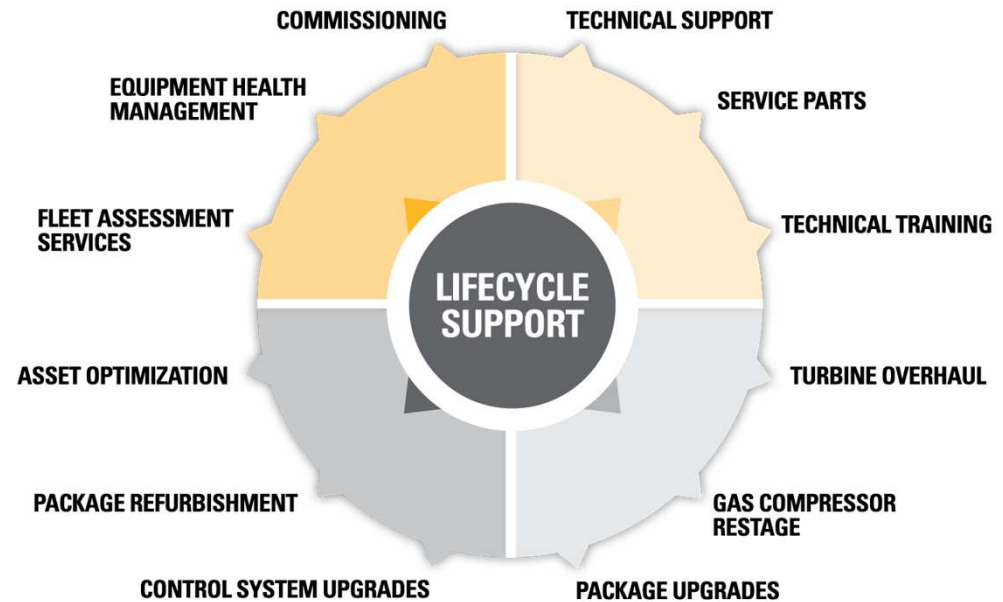
## ENVIRONMENT

- Low impact energy solutions
- Resource management
- Material recovery and reuse solutions

# Considerations for Existing Equipment

Critical elements to ensure proper implementation strategies are in place:

- Safety ?
- Start-Up ?
- Performance ?
- Emissions ?
- Flexibility ?



# Solar's H<sub>2</sub> Support for Existing Equipment

- Minimize commercial impact whenever possible
- Future-Proofing field equipment by Retrofitting
- Focus on re-use of existing infrastructure

Tiered approach to support existing equipment:

## Tier 1 –

- High-level review of existing equipment capabilities
- Recommendation based on vintage, year of commissioning, Upgrades
  - Age Consideration / Configuration / Components
- Informational basis, only





# Solar's H<sub>2</sub> Support for Existing Equipment

- Minimize commercial impact whenever possible
- Future-Proofing field equipment by Retrofitting
- Focus on re-use of existing infrastructure

Tiered approach to support existing equipment:

Tier 2 –

- Review of package Bill of materials to determine suitability
- Existing upgrades considered
- Recommendations based on engineering assumptions
- Budgetary numbers only



# Solar's H<sub>2</sub> Support for Existing Equipment

- Minimize commercial impact whenever possible
- Future-Proofing field equipment by Retrofitting
- Focus on re-use of existing infrastructure

Tiered approach to support existing equipment:

Tier 3 –

- In-Depth Review after Field Assessment of desired units
- Detailed proposal with recommendations / upgrades



Obsolescence  
Study



Safety System  
Review

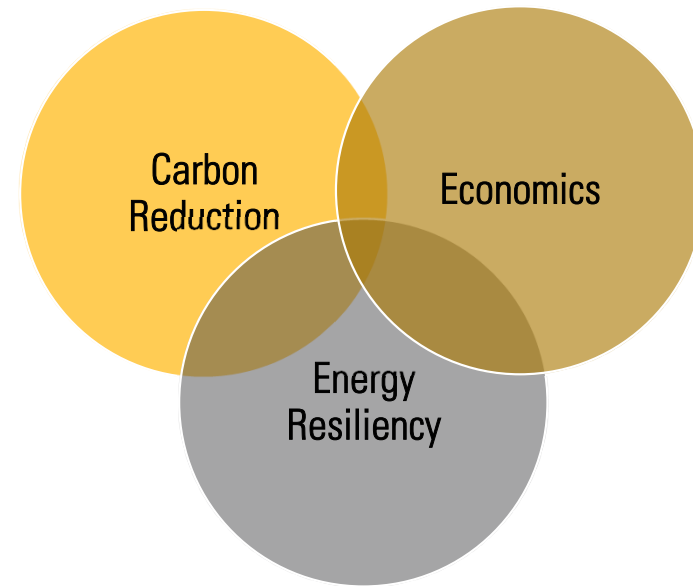


CO2  
Reduction  
Review



# Summary

- Gas Turbines provide stable base load and support increased renewable penetration
- Hydrogen enables carbon reduction opportunities for gas turbine operation
- Increased Hydrogen enables energy storage and transportation opportunities for Gas Turbines and Gas Compressors with natural gas pipelines
- Solar has a large Gas Turbine fleet running on Hydrogen rich fuels
- Solar's Gas Turbines, Packages and Compressors are hydrogen-ready
- Solar is increasing investment in Hydrogen solutions





THANK YOU

---

**Solar Turbines**

*A Caterpillar Company*

*Questions ?*