



# Gas Turbine Power Plants

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# Existing System

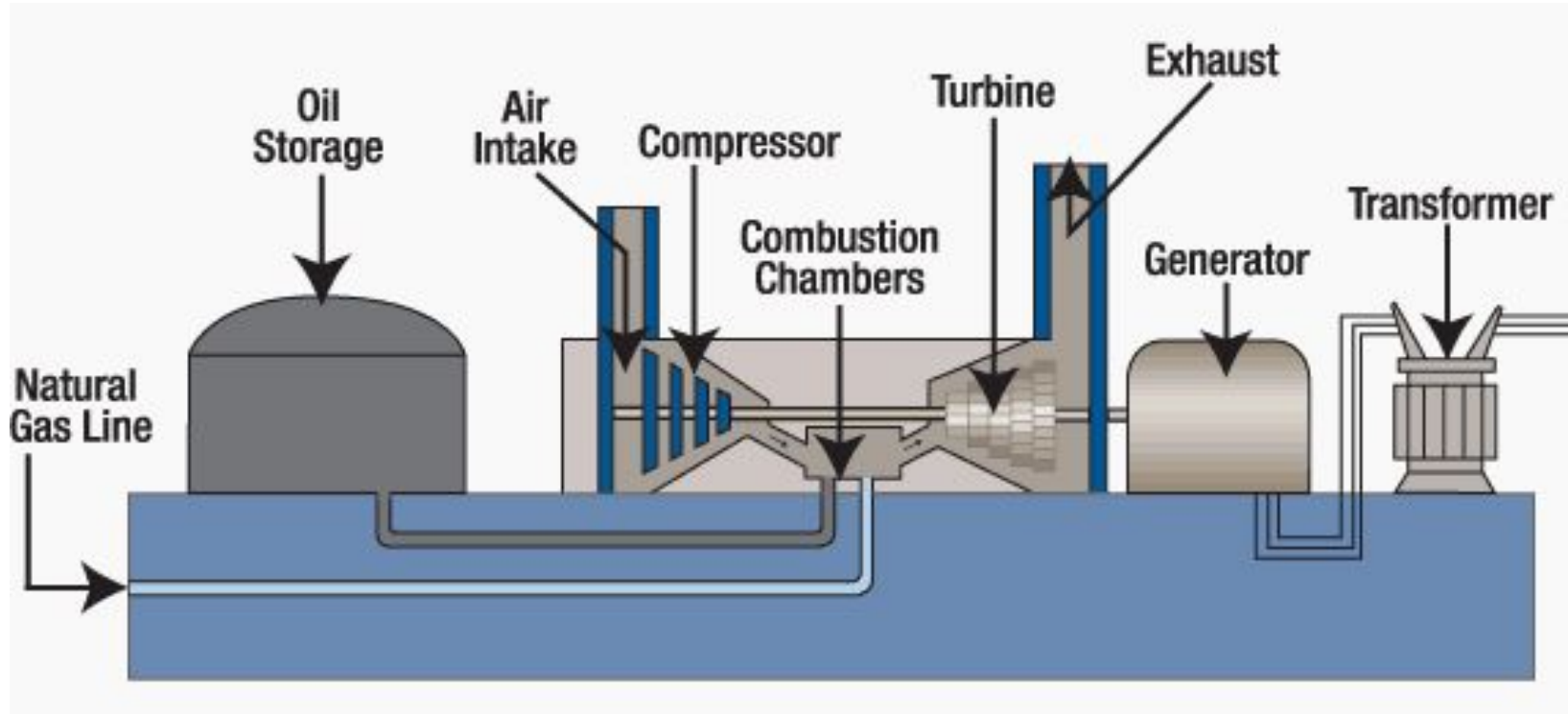
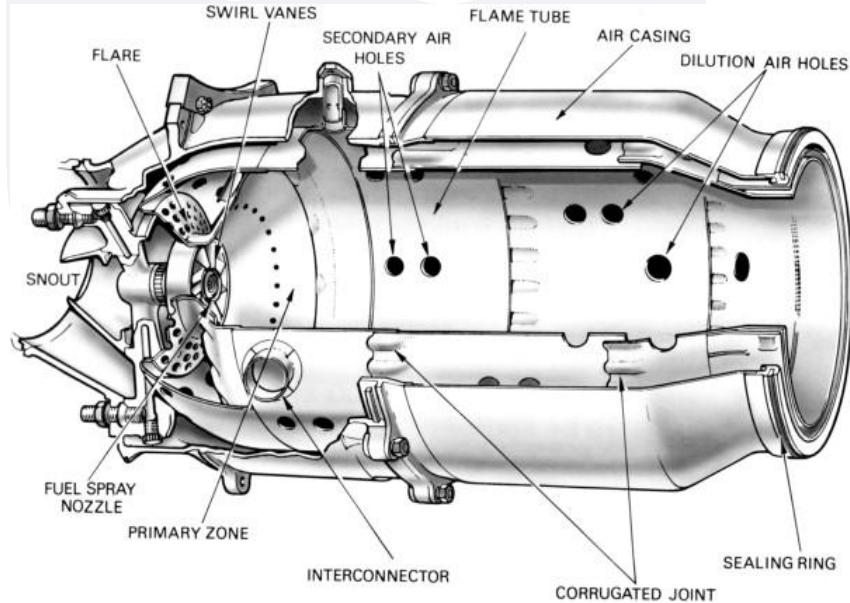


Figure 1. Gas (combustion) turbine power plant. <sup>[1]</sup>

# Combustion Chamber



- **Function:**  
The combustion chamber is the area inside the engine where the fuel/air mixture is compressed and then ignited.

Figure 2. Combustion Chamber. [2]

# Current Problems

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- Low efficiency:
  - 40-45% of fuel energy is converted into a useful work
  - Remaining fuel energy in form of heat losses is transferred to environment.
  - One possible solution to decrease heat losses from the engine is by insulation of combustion.<sup>[3]</sup>
- High reliance on conventional fossil fuel:
  - Decarbonizing efforts worldwide.
  - Global anxiety on the finite fossil fuel reserves.<sup>[4]</sup>
  - Dual-fuel operation with biodiesel and natural gas.<sup>[5]</sup>
- High amount of combustion instability in diesel engines during cold starting.<sup>[6]</sup>
  - Deteriorated vaporization characteristics.
  - Lower flaming luminosity.
  - Lower in-chamber pressure and longer ignition delay.

# Plans

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Study the application of thermal barrier coating on combustion chamber as a major method to reduce the heat loss, and design a system with improved efficiency.

# References

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