Secondary air temperature affects power generation

Can a gas turbine inlet air cooling system increase power generation capacity?
Mohanty et al. investigated the integration of a gas turbine inlet air cooling system for a 100 MW gas turbine in Bangkok. They showed that reducing the intake air temperature from ambient condition to 15 °C can raise the gas turbine power generation capacity by 8%-13%.

How does temperature affect gas turbine output?
The output power and efficiency of gas turbines are profoundly influenced by ambient temperatures,with higher temperatures resulting in a notable decline in power output. This issue becomes particularly critical during periods of heightened power demand in hot climates.

Can reducing air temperature increase gas turbine power generation capacity?
They showed that reducing the intake air temperature from ambient condition to 15 °C can raise the gas turbine power generation capacity by 8%-13%. Consequently,the plant's energy output can increase by 11%.

Does ambient air temperature affect gas turbine efficiency?
Their study showed that for every 1 °C rise in ambient temperature above ISO conditions,the gas turbine thermal efficiency decreases by 0.1%,and 1.47 MW of its gross (useful) power output will be lost. Bies et al. demonstrated that gas turbine output and efficiency are a strong function of the ambient air temperature.

Why do gas turbine engines need a secondary air system?
Consequently,there is a high demand for cooling and sealing to assure safe and sound operation throughout the operational envelope of an engine. Secondary Air Systems (SAS) play a significant role in gas turbine engines to accomplish reliable operation of the individual modules as well as the whole engine.

What are secondary airflow branches in a gas turbine engine?
Different flow elements, which have been developed as independent modules, can be used to build typical secondary airflow branches in a gas turbine engine, such as the turbine blade cooling air, the oil sump pressurization air, the disc cavity ventilation air, the axial bearing load control, etc.

the secondary air velocity at the front wall is 42 m/s and the secondary air velocity at the back wall ranges from 42 ~ 66 m/s, the NOx concentration at the outlet is the lowest at 140.05 mg/m3, ...

When the secondary air distribution reaches more than 2:3, the oil-secondary air starts to become the dominant airflow that influences the whole flow field in the furnace. Based ...

The secondary air system (SAS) of a gas turbine engine ensures that the engine can operate safely and perform efficiently. The air is extracted from the main gas path (therefore, it does ...

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Secondary Air Systems (SAS) play a significant role in gas turbine engines to accomplish reliable operation of the individual modules as well as the whole engine. ... This collection invites papers that address the areas of ...

The primary-secondary air ratio is believed to impact both the combustion process and the overall performance of a power plant. This study aims to investigate how an increase in the primary ...

power and high electricity occur, the inlet air cooling techniques are very useful for reducing the inlet air temperature and thus improving power output and efficiency. It is observed that an ...

Gasification-combustion can decrease pollutants formation in coal-fired boilers during flexible peak-shaving. This study investigates the impact of the ratio of secondary air (a ...

Power generation from low-grade coals has been successfully ... fired burners by providing high primary and secondary air temperature and pressure. ... Ash affects power ...

The air is extracted from the main gas path (therefore, it does not contribute to the thrust or power generation directly) and it is diverted to serve different engine systems (e.g. turbine blade ...

secondary electric power systems. Principal among these are (1) power generation, (2) power conversion, (3) power distribution, (4) power conditioning and utilization, and (5) fault-tolerant ...

Additionally, changes of humidity level and temperature do not significantly affect solar power generation. Furthermore, it was also observed that high temperatures and higher ...

temperature. Only evaporative cooling effect is shown in the graph and not all inlet air cooling methods. Figure 6: Effect of ambient air temperature on power output, efficiency and heat rate ...

(1) At a w s of 0.16, the effect of outer-secondary-air on blocking the diffusion of pulverized-coal particles to the water-wall was enhanced, which reflected in the low particle ...

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