

热能工程

热力塔系统用于空冷发电余热利用研究

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摘要: 通过对热力塔系统进行全面的热力学分析, 得出热力塔系统热力学数学描述。计算表明, 对于一定的塔底涡轮进口温度, 热力塔效率随着塔高度的增加而增加, 但达到一定高度后增幅减缓。在有限高度范围内, 当塔底涡轮进口温度达到40 ℃以上时, 涡轮进口温度的增加对提高塔效率贡献不大。分析同时证明, 热力塔系统的涡轮效率以及塔体的保温水平对系统效率的影响较大。当热力塔系统用于600 MW空冷火电机组的余热再发电时, 能够提高约3%的机组效率, 相当于增加约30 MW发电的容量。对热力塔的经济性估算表明, 它在经济上是可行的, 但对于具体的实施项目, 详细的经济性核算是必要的。

关键词: 热力塔 余热利用 空冷电厂 热效率

Research on the Chimney Power Used in the Recuperation of the Power Plant

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Abstract: The thermodynamic analysis of chimney power systems was conducted. And the chimney power model was suggested. The model predictions show that the tower thermal efficiency increases with the tower height increasing if the inlet temperature of the bottom remains constant, while the efficiency increases slowly after the height reaches a critical point. In a limited range of tower height, if the turbine inlet temperature is more than 40 ℃, the efficiency improvement is not obvious by increasing the turbine inlet temperature. It is also found that the system efficiency is determined by the turbine efficiency and thermal retardation of the tower. When the thermal tower system was applied to the air cooling thermal power plant of 600 MW for waste heat regeneration, the efficiency of thermal power plants could increase by about 3%, and the power plant capacity increases about 30 MW. The economical estimation shows that the chimney power is feasible basically. However, as for the specific project, the detailed economic accounting is necessary.

Keywords: chimney power waste heat utilization air cooling thermal power plant thermal efficiency

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