

热能工程

洁净燃煤发电技术全生命周期评价

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摘要:

采用全生命周期分析方法, 建立洁净燃煤发电技术的完整性生命周期清单, 提出了一个新的全生命周期综合评价指标。对循环流化床、增压流化床联合循环、整体煤气化联合循环和超超临界洁净燃煤电厂, 从建设、运行、退役3个阶段的能源和资源消耗、环境影响、生命周期成本进行评价, 并对4种电厂进行了生命周期综合评价。结果表明, 超超临界发电的能源回报率高、环境影响较小、资源和成本低, 其综合评价指标较好。最后提出我国发展洁净燃煤发电技术的建议。

关键词: 洁净燃煤发电 生命周期清单 资源与能源消耗 环境影响 生命周期成本 生命周期综合评价

Assessment on Whole Life Cycle of Clean Coal-fired Power Generation Technology

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Abstract:

A whole life cycle inventory of the clean coal-fired power generation technology was produced by life cycle analysis methodology. A new comprehensive assessment index of whole life cycle was put forward. Assessment on the energy and resource consumption, the effects to environment, and the cost of life cycle was carried out at construction, operational and decommissioning phases for power plants in circulating fluidized bed combustion (CFBC), pressurized fluidized bed combustion combined cycle (PFBC-CC), integrated gasification combined cycle (IGCC) and ultra super critical (USC). Comprehensive assessment of the above four power plants was executed. The results show that USC technology has the advantages of higher energy payback ratio, lower effect on environment, lower cost and energy consumption, and the better comprehensive assessment indexes. Finally, suggestions were proposed to develop Chinese clean coal-fired technology.

Keywords: clean coal-fired power generation life cycle inventory energy and resource consumption environment impact life cycle cost comprehensive assessment of the life cycle

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