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## **Power Supply Analysis and Coping Strategy in Taiwan**

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### **Abstract**

This paper is to explore solutions which minimize generation cost while controlling  $CO_2$  emission. It used Taiwan Power Company data in 2005. The multiple objective programming models with scenario analysis was applied to simulate cost based on different combinations of generation sources while maintaining the safety of power system operation and load characteristic of the power system.

The energy production reached 189.66 billion kWh to meet load demand in 2005, of this, to simulate it without considering  $CO_2$  emission reduction, results show that 4.4 % came from hydro units (including renewable energy), 20.2 % from nuclear power units, 43.55% from coal units, 5.3% from oil units 19.85% from gas units and 6.7% from cogeneration. However, coal generation produced the highest amount of  $CO_2$  emission out of all power sources. To minimize the amount of  $CO_2$  emission, there must substitute gas generation for coal generation. When it comes to consider  $CO_2$  emission cost, the change of the share of coal generation and gas generation depends on the emission price of  $CO_2$  each ton due to the higher price of unit  $CO_2$  emission of coal generation. That is, when  $CO_2$  emission reduction came into force, energy generation cost goes higher and substitution effect will happen between related generation units.