

Abstract

As global demand for energy is expected to increase while fuel supply is depleting, searching for alternative and environmental friendly sources of energy is considered top priority for many governments. Currently, there is also pressure from global community to reduce the greenhouse gas (GHG) emissions by imposing the allowance emissions of GHG for each country, known as a cap-and-trade program. One of several programs aiming at reducing the greenhouse gas is Clean Development Mechanism or CDM by the UN. The amount of greenhouse gas reduction, i.e., carbon credits, produced from CDM projects in developing countries can be sold to developed countries so that they can increase the maximum cap of GHG to be emitted into environment. Investment in green technology to reduce such gas is called carbon finance. It is carbon credits from carbon financing that are of financial value, thus it can be treated as a new type of asset. This could help improve the financial outlook of CDM projects such as renewable energy because not only these projects usually have higher costs of implementing green technology but they also face greater uncertainty from the fluctuation of the market prices of input commodity (e.g., raw materials), output products (e.g., energy), and carbon credits (e.g., the price of CERs).

Valuing CDM projects full of uncertainty by conventional discounted cash flow (DCF) approaches such as net present value (NPV) could underestimate the intrinsic value and inherent risk of these projects, thereby leading to rejecting highly promising projects. Accordingly, the aims of this research are (1) to provide a new perspective on how to invest in CDM projects by incorporating flexibility into the projects to hedge risk and to maximize the profit if favorable conditions arrive in the future, and (2) to propose a new approach for valuing the financial viability of CDM projects that considers risk, flexibility, and carbon credit into the economic analysis, using Real Options Theory (ROT) and Risk Flexibility Theory (RFT). In addition, the research will examine on how governments can involve technically and financially in these projects in order to promote the private investment, thereby bringing the society a step toward economic-cum-environmental sustainability.