Valuation of Energy Projects using DNPV

David Espinoza Javier Rojo
Principal Director
Geosyntec Consultants ***Sustainability Strategic Advisors***

Because of its simplicity, the net present value (NPV) technique (or its close relative, the internal rate of return) remains the valuation method most widely used to assess capital allocation and infrastructure investment projects, despite its limitations. In the NPV method, all risks associated with a project are lumped into a single parameter (i.e., the risk premium) that is added to the risk-free interest rate to obtain the discount rate: that is, the time value of money is adjusted to account for risk. However, because the NPV results are very sensitive to the selection of the discount rate, the current practice of selecting a discount rate based on heuristic arguments and rules of thumb can lead to significantly under- or over-valuing future assets and/or liabilities. Moreover, because risk and time are indeed independent variables, accounting for risk in this manner makes it difficult to take advantage of experts' experience on a particular industry.

A complementary valuation method that decouples the time value of money from the risk associated with a project is proposed. The proposed method, termed decoupled net present value (DNPV), is simple and intuitive yet flexible, consistent, and robust. The concept of synthetic insurance is introduced to price the risk associated with obtaining lower revenues or incurring higher costs than originally expected. These synthetic insurance products are treated as "real" costs to the project and are subtracted from net cash flows. Because the risks associated with the project are accounted for by these synthetic insurance products, the decoupled net cash flows can be discounted using the risk free rate. DNPV allows integration of risk management (i.e., risk identification and quantification) with valuation as once all project risks are identified, probability density functions (PDFs) for each of these risks developed, and synthetic insurance premiums calculated, an implied risk adjusted discount rate (RADR) that is consistent with the PDFs of the project can be calculated (Figure 1). The implied RADR can then be used as a proxy for the project risk and compared to the project internal rate of return (IRR). Because the implied RADR is calculated rather than inferred, financial practitioners are able to work collaboratively with technical experts and risk management practitioners to evaluate the influence of different risk management techniques (e.g., avoidance, reduction, mitigation, transfer, and retention) on the implied RADR and select risk management techniques that are deemed optimal for the project.

Although some risks are common to all wind energy projects (e.g., amount of wind, energy prices), not all such projects face the same risks. For instance, offshore wind energy projects face unique foundation and tidal load risks not found on similar inland projects. Current valuation methods do not have a consistent procedure to capture the changing technical conditions of the investment.

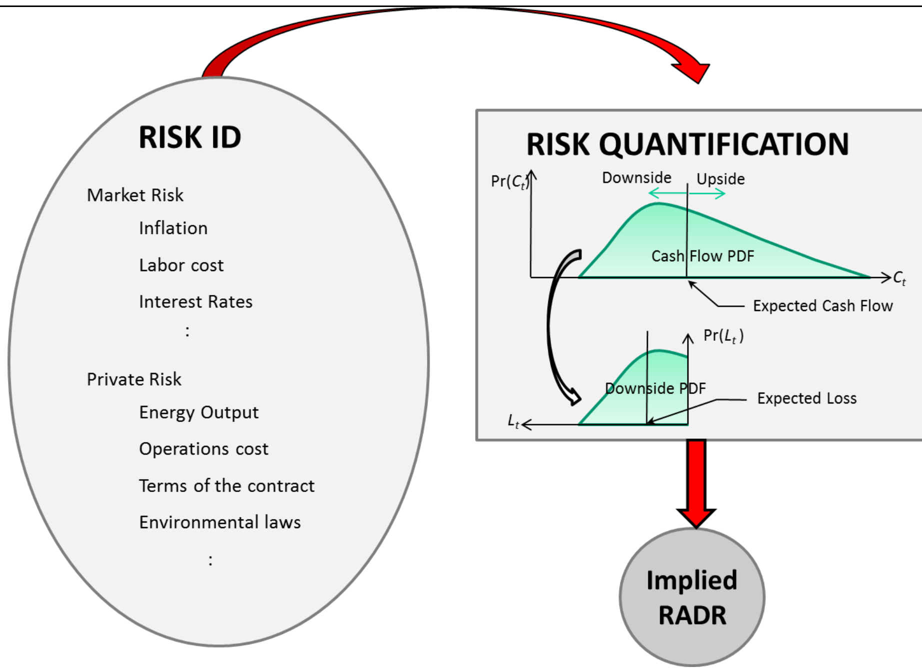

Figure 1 – Mapping Risk to a RADR

The classical NPV method is a top-down approach that resulted from the process of acquiring capital and mandating that all investments must earn its weighted average cost of capital (WACC). So the classical NPV is more concerned with the source of funding than the project itself (i.e., it is exogenous to the project). DNPV is a bottom-up approach that first identifies the risks and then integrates this risk in the project valuation (i.e., it is endogenous to the project). Hence, NPV can be viewed as a measure of the financial performance of the project whereas DNPV can be used to measure the risk performance of the project and both measures can and should be calculated when evaluating capital allocations or infrastructure projects. Hence, a project is said to earn a return consistent with the risk of the project if DNPV>0 (or IRR≥RADR) and it earns its cost of capital if NPV>0 (or IRR≥WACC). Hence, an investment is said to be optimal, if both the financial and risk performance measures are greater than zero (i.e., fall in Box 1 in Figure 2).

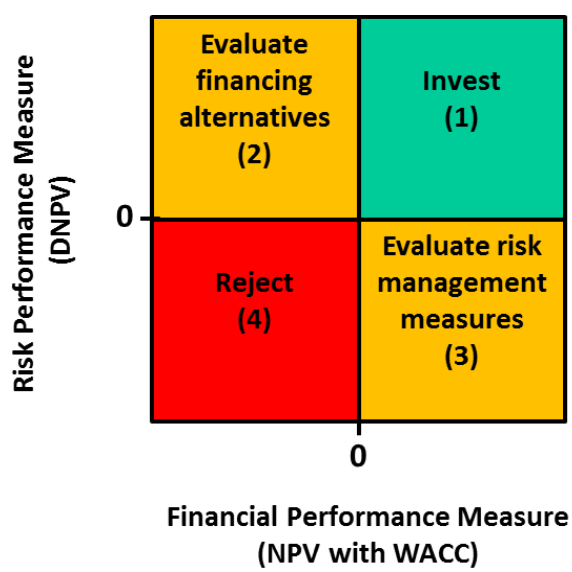

Figure 2 – Proposed Project Valuation Metric