Assignment

We have identified an opportunity to produce a total of 50 GW of renewable energy and want to evaluate the attractiveness of building our own Green hydrogen project versus exporting electricity via HVDC/HVAC. Our operations around will produce 2 GW of renewable energy per year that can either be sold in for US$0.2/kWh (net of transmission costs and loss) or processed through our own renewable energy plant. The purpose-built Green energy project will process the energy and produce Hydrogen and Methanol (using Direct air capture of CO2). Hydrogen will be sold domestically where the current price is AU$10/kg and the market price for methanol is AU$400/tonne (both net of transport costs).

To date, an initial scoping study has been completed, and we are now asking your group to help identify the feasibility of building the project by providing an assessment of its value. The design is being based on a 1 GW electrolysis plant that cost US$1600/kw of capacity to construct and commission in 2018 real money terms. The project will require a working capital injection equivalent to half a month of OPEX in the first year of production.

The project will require the investment in capital to be committed over 2 years of construction, with 70% of the capital being spent in year 1 and the remaining 30% spent in year 2. Once commissioned it will take another 3 years to ramp up to full production. During this ramp-up period, the energy input rates will be 1 GW in year 1, increasing to 1.5 GW in year 2, and reaching full design input capacity in year 3.

Operating costs are based on the production of Hydrogen and cost of Direct Air Capture (DAC) for production of Methanol, and are forecast to commence at US$10/kg of Hydrogen produced in the first year of production, dropping to US$5/kg of hydrogen produced in the second year and then reaching US$2/kg of hydrogen produced in real terms over the remaining life of the project. From each GWh of energy that is entering the plant we will produce 0.5 GWh equivalent of Hydrogen and 0.4 GWh equivalent of Methanol. (***Hint: Please assume a cost of DAC and make assumptions regarding the DAC cost over lifetime of the project.***)

Inflation will affect both revenue and costs to the same degree and is expected to average 2.1%. Your forecast is that the long-term exchange rate will be 1 US$ = 1.40 AU$, with US CPI forecast at 1.8% per annum. The Corporate Income Tax rate is 30% and for tax purposes, assume capital assets in this project depreciate using the diminishing value method over the 50-year life of the project, with a premium of 200%.

Owing to the sovereign setting, the upfront capital or development costs will be sourced in the ratio of 70% equity and 30% debt. The targeted long-term capital structure of the company reflects a preferred 30% debt target level. Woodside Energy Group (ASX : WDS) proxies as a comparable company in terms of its stock’s 3-year beta in the market. It has a Market Capitalisation of AU$67.42 billion with attributable net debt of AU$46.21 billion, and an existing gearing ratio of 69%. In addition, financial institutions will charge the project 3-month LIBOR plus 300 basis points for a 10-year debt facility, with an initial 3-year interest roll-up, capital-and-interest repayment moratorium (i.e. non-payment) period.

From the above, please address the following questions using the provided template (Excel worksheet is provided):

1. Determine the appropriate variable costs of capital (WACC) to use in the discount rates for this project.
2. Derive the value of this project for the company.
3. Comparatively, discuss the discount rates you chose in 1 above against using a single discount rate for the project over its life.
4. Present the business case in form of a short presentation for consideration for funding.

You may propose an alternate product such as NH3 and Jet fuel. In this case replace the Methanol price to the selling price of those produce based on literature value.

**Requirements**

* Please prepare both a report (less than 40 pages, references not included) and 15 min presentation (including 5 min Q&A session) for submission.