

Double Reliable Electricity¹

We are at the end of 2020. Double Reliable Electricity is a private company in Elbonia. It is considering a proposal to launch a new product, in addition to its existing product lines. This new product will be based on a recent discovery made in 2019 (the company holds a patent) which will give Double Reliable a two-year lead on its present competitors. The forecasts, established by the accounting department, are listed on the following Table 1 (please refer to notes to the forecasts, below).

You must :

- (a) Test the accuracy, and consistency, of the future cash-flows. Which entries make sense ? Which do not ? Why or why not ?
- (b) Tell what additional information you would need to construct a version of Table 1 that makes sense ?
- (c) Construct such a table (call it Table 1bis) and compute the NPV (*VAN*). Make all assumptions that are necessary.
- (d) List the items / assumptions / numbers that would change the NPV (*VAN*). Please choose the most important items (assumptions / numbers), in your opinion, and give an estimate of the various NPVs (*VANs*).

Notes to the forecasts (please refer to Table 1)

Capital expenditure (*Investissements*)

8 million \$ represent the cost of the new machinery, and 2,4 millions \$ stand for a warehouse extension (for new inventories, which will take half of the space of the new warehouse). The new machinery will be set up in the current factory, where there is room available (no extension needed). All investments can be made by the end of 2019.

Operating Working Capital (*Besoin en Fonds de Roulement*)

This new production will require an additional investment in Operating Working Capital to purchase inventories, pay employees and wait for the

¹ Case adapted from Reliable Electricity case, Brealey, Myers, Principles of Corporate Finance, 7th edition, McGraw-Hill, p. 143. All rights reserved.

collection of payments. This has been estimated at 4 million \$.

Turnover (*Ventes*)

Sales for this project, *in units sold* are forecast as follows :

Forecasts(in thousand \$, unless otherwise noted)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Units sold (in thousands)	2	4	10	10	10	10	10	10	10	10
x price per unit (in dollars)	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000

The price per unit is estimated to be fixed at 4 000 \$ per unit. (Price remaining constant over the years).

Operating costs (*coûts d'exploitation*)

Direct and indirect operating costs represent 50% of the selling price.

Research and development

The patent comes from a successful research project, whose overall spending amounted to 1,94 million \$ in 2019. This figure has been corrected for 3% inflation from the time of expenditure to date, that is $1,94 \times (1+3\%) = 2$ million \$.

Overhead costs (*frais généraux et commerciaux*)

Marketing and administrative costs for this project are estimated at 10% of sales.

Depreciation (*amortissement*)

Straight-line depreciation over 10 years.

Interest (*intérêts sur dettes*)

Financial expenses (interest on debt) generated by the financing of the project : capital expenditure + increase in operating working capital will be financed by a debt at a 5% interest rate.

Tax (*impôt*)

Tax rate is 35%. Losses on the project are carried forward and deducted from taxable income in the following year.

Net Present Value (*Valeur Actuelle Nette*)

Cash-flows are discounted at the cost of the financing, that is 5%.

Forecasts(in thousand \$, unless otherwise noted)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Units sold (in thousands)	2	4	10	10	10	10	10	10	10	10
x price per unit (in dollars)	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000	\$4 000
Turnover	\$8 000	\$16 000	\$40 000	\$40 000	\$40 000	\$40 000	\$40 000	\$40 000	\$40 000	\$40 000
Operating costs	-4 000	-8 000	-20 000	-20 000	-20 000	-20 000	-20 000	-20 000	-20 000	-20 000
Research & Development	-2 000									
Overheads	-800	-1 600	-4 000	-4 000	-4 000	-4 000	-4 000	-4 000	-4 000	-4 000
Depreciation										
New machinery	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800
Warehouse extension	-240	-240	-240	-240	-240	-240	-240	-240	-240	-240
Interest	-720	-720	-720	-720	-720	-720	-720	-720	-720	-720
Earnings before tax	-2 000	1 440	4 640	14 240	14 240	14 240	14 240	14 240	14 240	14 240
Tax	0	-504	-924	-4 984	-4 984	-4 984	-4 984	-4 984	-4 984	-4 984
Net earnings	-2 000	936	3 716	9 256	9 256	9 256	9 256	9 256	9 256	9 256
+ depreciation	0	1 040	1 040	1 040	1 040	1 040	1 040	1 040	1 040	1 040
Cash-flow	-2 000	1 976	4 756	10 296	10 296	10 296	10 296	10 296	10 296	10 296
- increase in Op. Work. Capital	0	0	0	0	0	0	0	0	0	0
= Operating cash-flow	1 976	4 756	10 296	10 296	10 296	10 296	10 296	10 296	10 296	10 296

Project cash-flows	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Net Cash Flow	-16 400	1 976	4 756	10 296	10 296	10 296	10 296	10 296	10 296	10 296	10 296

NPV Calculation

Discount rate	5,00%										
	0	1	2	3	4	5	6	7	8	9	10
Discounted cash-flow	-16 400	1 882	4 314	8 894	8 471	8 067	7 683	7 317	6 969	6 637	6 321
Net Present Value	50 154										