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Project Appraisal: *The separation of distillery waste streams to produce a concentrated pot ale syrup for resale as cattle feed*

1.0 Project Outline

Since 2012 Penderyn's operating capacity has increased 10-fold with Penderyn expecting to produce c.1m LPA in the financial year 2023/2024, thanks to the recent expansion into 3 distilling sites. Whilst this increase in output has required many process modifications, one area that has remained stagnant is the management of pot ale (PA - the waste product remaining once distillation of the Penderyn wash has occurred). At present, this waste is stored within a holding tank at each site, before disposal to land-spreading under a National Resources Wales permit. The costs for these collections are significant, at c.£450 per collection (approximately £35,128 per site annually); the company foresees further increases in this in the near future due to ongoing domestic and global market challenges.

Penderyn has been offered the opportunity to develop an in-house treatment of PA to convert this waste product into a concentrate/syrup which could then be sold on to an anaerobic digestion facility. The process, (the 'MacOwen' method) is summarised as below:

1. Removal of solids from PA
2. Removal of copper from the remaining organic product via pH balancing
3. Evaporation of liquid from the remaining substrate (via a proprietary process) leaving a PA 'syrup' – this syrup has a value and can be sold on (the syrup will comprise approximately 20% of the original volume of the PA)

There are a number of benefits to Penderyn in maximising this opportunity:

1. Significant reduction in the cost of disposal of the PA via land-spreading, (c.£28,750 per year - collections cannot be eradicated completely as caustic washings still need to be disposed of)
2. Lifting the reliance upon land-spreading contractors, the service outputs of which have historically been a source of operational frustrations/delays for the company
3. Creation of an additional income stream for the PA syrup, estimated to be worth c.£24,680 per annum
4. Heat energy harnessed from the water source heat pump utilised in this process can be passed back to a proportion of the distillery processes, resulting in an estimated offset of £5,570 against the sites energy costs
5. Involvement of the distillery in such an innovative and sustainable project would contribute to positive brand awareness and assist with strengthening its green credentials

The total estimated financial return for this project (taking into account savings on PA land-spreading collections, an additional income stream and offsetting of heat energy) is £59,000 per annum.

The initial investment required is £155,000, comprising £11,000 design engineering costs, £95,000 for the purchase of the treatment unit itself, £22,000 distillery site modification/groundworks and the remainder in installation/commissioning costs.

1.1 Time Considerations

It would take a period of 16 weeks to get this project fully operational;

- 2 weeks design/planning strategy between Penderyn/MacOwen group to specify/HAZOP
- 9 weeks manufacturing and shipping lag
- 2.5 weeks installation
- 2 weeks commissioning

Normal operations would run with no interference during this period, with the exception of the installation period.

1.2 Implications for Labour

There are no staffing level implications relating to the adoption of this project; the majority of the process is inline and does not require real time continuous monitoring by an operator. The aspects of the process that do require operator intervention directly replace those points in the existing process. As such, there are no redundancy requirements; likewise, there is no requirement for additional recruitment.

1.3 Implications for infrastructure

At present, the PA is held within a 56m³ tank prior to collection; the MacOwen process treats the PA on an immediate basis as the waste PA leaves the distillation vessels and so this tank would no longer be required. It could be sold on, although given its use to date its resale value is likely low. The tank could also be reutilised elsewhere within the business (requiring lifting/transport costs). As the future of the tank is as yet undetermined, any additional revenue income (through sale) or saving (through redeployment) has not been factored into the models.

2.0 Financial Appraisal Models

2.1 Payback Period (PP)

The PP is the length of time an investment takes to pay for itself/breakeven; it is a rapid, simple calculation that can give an initial steer as to whether a project is worth investment, and can assist with prioritising from a pool of potential investments. The payback period for this project is 2.6 years; suggesting the project is a worthwhile consideration and the risk period for this investment is quite short. It is important, though, to consider the payback period in line with other appraisal models and a clear view of the company circumstances – the breakeven point may not be far away, but if the company can't afford the initial outlay of £155,000 comfortably it would be a reckless course of action to commit to this.

One of the benefits of PP is that it highlights the liquidity within the company – a short PP (as in this case, of 2.6 years) indicates that within a fairly rapid period of time that cash will be available to the business for reinvestment once again (Kagan, 2023). The flipside of this, however, is that in focussing on liquidity, the profitability of this project is ignored; while the investment in this project will be recovered after 2.6 years, either the profitability needs to also be strong (in that the project is financially worthwhile and contributes to the ongoing income of the business, either by attracting revenue or mitigating against outlays) or there must be a stronger case for the project to be non/low profitability. In the case of this project, this would be in the form of significantly reducing reliance upon third-party contractors who currently disrupt operations by not operating to agreed service plans, and

by allowing the company to meet its green credentials. However neither of these are sufficient reasons alone for adopting the project if it is not to become profitable – therefore, profitability will be considered in the following models.

However, PP must be considered with regards to its limitations; in being a quick, real-time calculation, the PP assumes that all figures remain as they were at the time of the calculation. If, for example, the AD market for PA declines, with less demand and so lower incoming revenue, or energy prices continue to increase at their current rates, the income return for years 2 and 3 may be very different to what was originally forecast. Thus, while the current PP is 2.6 years, it could actually be longer than this.

Likewise, the PP calculation does not account for the TMV (time value of money) and so the effects of inflation are not mitigated against. The impact of this is variable; in the current economic climate where inflation is rising rapidly at rates not seen for decades the PP figures for projects such as this could be out of kilter very quickly.

The PP also doesn't consider any contribution the investment makes after the breakeven point – in this situation, the project will continue to provide both savings and a return (albeit perhaps at varying levels) for potentially the next 8-11 years post breakeven point, if the MacOwen R&D evidence is correct.

2.2 Accounting Rate of Return (ARR)

ARR is a useful tool for assessing the suitability of an investment due to its simplicity and being a rapid comparison tool.

ARR for this project has been calculated as 32%; this is a strong ARR and suggests that this project is a viable and therefore, worthwhile investment. Penderyn operates on a Required Rate of Return of $\geq 19\%$; this project far exceeds this IRR and so is proceedable on this basis.

However, as with the PP, ARR doesn't take into account variations from the forecasted yearly returns – if the sale price of the PA syrup were to fall, or the offset effect upon the company energy bills were to lessen, then ARR would be impacted and may be very different to that calculated today.

ARR also does not consider the cash flow relating to an investment income – it only calculates the total return. Whilst it may be important that this project returns a sufficient income, perhaps more important is how/when it does so. ARR makes no differentiation in whether the return is made equally through the 4 years, or all in year 4. Cashflow is critical; a steady ongoing return from year 1 onwards would be preferable.

This project will run for a minimum of 4 years and will be fully depreciated by the end of this period; ARR can be relied upon fairly well in these circumstances due to the relatively short-term nature of the investment, buffering against high levels of uncertainty seen with longer-term investment models. However, there is evidence to suggest that this kit could actually see a useful lifespan of up to 12 years, albeit with a far lower residual value after this period of £15,000. When recalculated for this situation, ARR emerges as 56% - stronger than at the 4-year model due to the increased income attracted over its useful life. However ARR becomes less reliable over this timespan as there is no way to mitigate against variable economic conditions which are more likely in a project timespan of this length.

ARR also doesn't consider that the technology utilised is emergent; the year 4 residual value of £45,000 is not a certainty – at the very least, the company would have the componentry and materials to sell

on, if not a 'pre-used' complete unit, but if the residual value is far lower than the projected figure then ARR would be impacted significantly (Dyson & Franklin, 2020).

2.3 Internal Rate of Return (IRR)

At 19.2%, the IRR for this project is fairly strong indicating that the project is viable and would be generating a worthwhile return (either via cost savings or via the additional income stream) for the duration of the 4-year period. However, it is important to remember that the Penderyn RRR is 19%, and so IRR for this project falls only just within that, suggesting that consideration is paid to the PI, ARR, affordability of initial investment and NPV, alongside other non-financial considerations, to determine whether this project is proceedable.

IRR is a useful model as, unlike ARR and PP, it recognises the TMV; it also complements the PP as it considers its liquidity which is critical for a small, independently-owned business such as Penderyn where every penny is accounted for tightly. If the company will be struggling for adequate cash flow for every month of the project's duration, then the PI, PP and ARR are entirely irrelevant.

However, IRR is most useful in comparing the potential of 2 or more projects of the same/similar size against each other as it provides perspective, something lost when only one figure is generated with no comparison. IRR should be used with caution as the rate is approximate (Dyson & Franklin, 2020).

2.4 Profitability Index (PI)

PI for this project has been calculated at 1.21, indicating that it's likely to result in viable returns (Pike, 2015). PI is of particular interest as it considers its liquidity, which, as outlined above, is critical for Penderyn which needs to manage cashflow to a high degree.

PI acknowledges the TMV and thus can be more accurately relied upon than some of the other models. PI is particularly useful as, due to it factoring the future values of returns, it allows for assessment/comparability for a) longer-term projects and b) several projects at once; however, it doesn't account for the size/scale of projects, rendering comparisons between small/large projects with varying profit margins less functional. PI is most useful used as a prioritisation tool between several projects; where there is a limited investment fund, PI allows a company to determine which will be most lucrative.

However PI doesn't acknowledge any further investment injections required into a product after initial investment and, as with all of the models utilised within this appraisal, its accuracy relies upon accurate forecasting of the year 1 to 4 income figures.

2.5 Net Present Value

NPV for this project sits at c.£32,000 – i.e., when the year 1-4 cash flows are discounted to today, the project should return £32,000 to the company's value; the positive NPV implies this project should be profitable and is therefore proceedable

As with most of the other models utilised here, NPV is a simple calculation which gives a rapid 'go/no go' indication. It recognises TMV which contributes to its accuracy for a project of this length (4 years) but buffers increasingly year on year against cash flows in several years' time so is more (cautiously) accurate for longer term investments (Seal, et al., 2018).

One limitation of NPV is that, because it gives a value in monetary units, it does not offer comparability of projects at vastly different sizes e.g. the NPV of a £5m project will be far, far above the NPV of a £1m project, regardless of if the latter is actually more profitable in percentage terms (Atrill & McLaney, 2006).

A further limitation is that NPV doesn't acknowledge costs associated with the project prior to the investment e.g. development costs, research costs etc. rendering it less accurate in the wider picture.

3.0 Financing Options & Recommendations

The investment cost to Penderyn of £155,000 for this project is already heavily subsidised (by £545,000) by the MacOwen group owing to the emergent nature of this project and Penderyn's position as a pilot for this process. Penderyn has, over the past few years, successfully obtained a considerable level of Welsh Government grant funding for its other projects and so is currently not eligible to apply for further grant funding for this project. Therefore, the £95,000 capital spend for the treatment unit itself must attract long-term (>1 year) financing by other means. This must be external as Penderyn doesn't currently have the capacity/risk management structure to internally fund this project; this does attract greater scrutiny from external stakeholders than internal funding would, and there is likely to be a delay in approval whilst stakeholders' reservations are met, which must be factored into the project timespan. The additional cost of this external financing must be considered carefully. However, by externally funding the treatment unit, Penderyn is able to preserve its cash flow status more readily by tying up less cash in this project. Long-term external funding via hire purchase/leasing are not appropriate for this project due to no hire facilities being available (pilot technology). Therefore, it's recommended asset financing (securitisation of assets) be sought from the company's bank to fund this unit; given the company's reputation with its bank, its trading history and its low gearing the company does not foresee there being a problem with this.

With regards to the remaining 'intangible' costs, these cannot be 'borrowed against'. Penderyn is a privately-owned SME and stable cash flow is critical. The shareholders and the executive team agree that it would be risky to fund the remaining £60,000 project costs internally (via retained profits), and that this may prevent the company being able to take on another project in the near future should a lucrative one present itself ('opportunity cost') or stabilise itself if a period of economic uncertainty were to occur within the 2.6 year PP, and so equity financing has been agreed for this. This manner of financing keeps finance costs low and lessens financial burden on the business. Penderyn is fortunate to have a supportive pool of shareholders who readily suggested equity financing, making this a quick financing option, but if the shareholders had reservations, this could have delayed the financing agreement. This was supported by Penderyn having a stable, well-respected senior management team.

Other distilleries have been known to utilise less traditional methods of external financing, namely crowdfunding – this keeps borrowing costs low and a large amount can be raised rapidly, but there is reputational risk to the brand if the project is not successful and returns do not materialise. Given its premium brand identity and the willingness of its shareholders to finance this project crowdfunding was discounted as a financing option.

Due to the size/timescale/scope of this project, short-term internal (e.g., reducing inventory stocks/delaying trade payables) and external (debt factoring/bank overdraft) aren't recommended as appropriate financing options.

Given the benefits (financial payback and operational improvements) and the availability (and cost) of financing for this project it would be wise to proceed with this investment on the basis of this appraisal. The investment is income generating/profitable based upon the initial 4-year minimum timespan for completion; if the project actually reaches its maximum potential lifespan of 12-15 years, then returns would be considerably improved upon this appraisal.

References

Atrill, P. & McLaney, E., 2006. *Accounting and Finance for Non-Specialists*. Fifth Edition ed. s.l.:s.n.

Chen, J., 2023. *Profitability Index (PI): Definition, Components, and Formula*. [Online]

Available at:

[https://www.investopedia.com/terms/p/profitability.asp#:~:text=The%20profitability%20index%20\(P%20I\)%20is%20a%20measure%20of%20the%20attractiveness,investment%20amount%20in%20the%20project.](https://www.investopedia.com/terms/p/profitability.asp#:~:text=The%20profitability%20index%20(P%20I)%20is%20a%20measure%20of%20the%20attractiveness,investment%20amount%20in%20the%20project.)

[Accessed 2023].

Corporate Finance Institute, 2022. *Equity Financing*. [Online]

Available at: <https://corporatefinanceinstitute.com/resources/valuation/equity-financing/>

[Accessed 2023].

Dyson, J. & Franklin, E., 2020. *Accounting for Non-Accounting Students*. Tenth ed. s.l.:s.n.

Fernando, J., 2023. *Internal Rate of Return (IRR) Rule: Definition and Example*. [Online]

Available at: <https://www.investopedia.com/terms/i/irr.asp#toc-what-does-internal-rate-of-return-mean>

[Accessed 2023].

Kagan, J., 2023. *Payback Period Explained, With the Formula and How to Calculate It*. [Online]

Available at: <https://www.investopedia.com/terms/p/paybackperiod.asp>

[Accessed 2023].

Murphy, C., 2022. *Accounting Rate of Return (ARR): Definition, How to Calculate, and Example*.

[Online]

Available at: <https://www.investopedia.com/terms/a/arr.asp>

[Accessed 2023].

Pike, R., 2015. *Corporate Finance and Investment: Decisions and Strategies*. Eighth ed. s.l.:s.n.

Seal, W., Rohde, C., Garrison, R. & Noreen, E., 2018. *Management Accounting*. Sixth ed. s.l.:s.n.

Swenson, S., 2023. *Net Present Value Defined & Discussed*. [Online]

Available at: <https://www.fool.com/investing/how-to-invest/stocks/net-present-value/>

[Accessed 2023].