PROGRAMME LIFECYCLE							
STRATEGIC PHASE				DELIVERY PHASE			
INITIATION STAGE	DEFINITION STAGE	ESTABLISHMENT STAGE	MANAGEMENT STAGE	DELIVERY STAGE			CLOSE
PROGRAMME OBJECTIVES	PROGRAMME SCOPING	PROGRAMME PRIORITISATION	PROGRAMME OPTIMISATION	FEASIBILITY	DESIGN	IMPLEMENTATION	CLOSEOUT STAGE
		NPV 1		NPV 2			

Programme Prioritisation

Net Present Value (NPV) analysis

Helping our clients prioritise programmes and projects.

By the Introduction of a Financial prioritisation model using NPV analysis

What is NPV analysis?

Net Present Value (NPV) is an effective front end management tool for a programme of works. It's primary role is to confirm the Financial viability of an investment over a long time period, by looking at net Discounted cash inflows and Discounted cash outflows that a project will generate over its lifecycle and converting these into a single Net Present Value. (pvi present value index) for comparison.

A positive NPV (profit) indicates that the Income generated by the investment exceeds the costs of the project.

A negative NPV (loss) indicates that the whole life costs of the investment are less than the income generated.

Within a PMO and liaising with clients Finance departments there will be an NPV model which takes into account the cost of capital and discount rates and the time periods (20 years is common) that they want to use as a measure for all investments.

The Net cash values excludes the effects of taxation and interest.

The Discounted value of cash takes into account the fact that money in the present is worth more than the same amount in the future. The HM Govt Green Book specifies a Discount rate of 3.5% to be used for project lasting 1 to 30 years.

NPV analysis also includes operational costs/savings which are generated by a new investment.

Where Does NPV analysis Fit into the Overall Programme Cycle?

The 1st NPV process is positioned at the front end of a capital programme (NPV1 below). It allows for all projects within a programme to be ranked on their Net Present Values. Many organisations choose to use Financial ratio's to help prioritise initiatives and investments.

The 2nd NPV process takes place at the Feasibility stage of a project where a decision has to be made over two or more potential solutions to a requirement (NPV 2 below). For each option the NPV should be calculated and then used in the evaluation of the solution decision.

The History of NPV analysis

NPV methodology dates back to the 19th century, but has been used as a financial measuring tool since the 1950's. The HMT green book recommends that NPV is the preferred method of investment appraisal.

Why Do We Need NPV analysis?

Infrastructure has to be maintained / replaced / upgraded to meet the demands of the modern environment and customer needs, but there is also an additional element required which is value for money and maintain a ROI for the client's shareholders. This tool may be one used within a Multi Criteria Assessment (MCA) ranking system.

See MCA guidance note

Some alternatives to using an NPV are:

IRR

Internal Rate of Return which is a fixed % under which an organisation would not make the investment.

This methodology allows for a simplified comparison of a wide variety of types and lengths of projects.

Payback Period

The payback period is the length of time required to recover the costs of an investment. This differs from the NPV calculation as it ignores the time value of money. This indicator is used more where income (cash) is generated by the project and not on infrastructure type investments.

Return On Investment (ROI)

The ROI of an investment is an indicator of the efficiency of an investment, it measures the assumed return against the estimated costs, the result being expressed as a percentage.

Social Return On Investment (ROI)

More recently some companies have adopted an SROI ratio which brings in social (S) impacts on investments.

Worked Example:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Capex	(-£50m)	(-£5m)	(-£5m)	(-£5m)	(-£5m)	(-£5m)
Opex Benefit	£0m	£15m	£25m	£25m	£20m	£15m
Net Cash Flows	(-£50m)	£10m	£20m	£20m	£15m	£10m
Discount Rate	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Discount Factor	1	0.965	0.931	0.898	0.867	0.837
Annual - NPV	(-£50m)	£9.7m	£18.7m	£18.0m	£13.1m	£8.4m
Cumulative NPV	(-£50m)	(-£40m)	(-£22m)	(-£4m)	£9.4m	£17.9m
IRR						15.5%
Payback Year					Payback	

Notes for worked example:

- Investment occurs over 5 years
- Net cash flows are sum of capex plus opex benefit
- Discount factors as per HM Treasury Green book at 3.5% Discount rate

The NPV for this investment is £17.9m
The IRR is 15%
Payback occurs when net cash is zero which is after year 3 payback starts in year 4.

Glossary of Terms

As there are several financial acronyms we have included a glossary of terms to assist in clarifying how the NPV approach works

NPV (Net Present Value): In financial terms, the NPV the measurement of the profitability of a project or programme. This is achieved by subtracting the current values of expenditure from the current values of income over a period of time. Income can be referred to as benefit and expenditure can be referred to as cost.

PVI (Present Value Index): This is basically the efficiency of the project, i.e. the NPV the project over its total expenditure (Totex) needed to deliver and operate. Net Present Value / Total expenditure, if above 1.0 the project is profitable.

Discount Rate: The discount rate is the interest rate used in analysis of discounted cash flow (DCF)

Discounted Cash Flow (DCF): is used to calculate the current present day value of cash flows in the future. As well as taking into account the specific time value of money, the discount rate used in DCF analysis takes into account the risk or uncertainty of future cash flows.

Net Cash Flow: is the balance between money received and money expended in a specific time period

Net Cash Value: The Net cash values excludes the effects of taxation and interest.

Influencing Factors

There are two challenges with adopting an NPV ranking methodology at this early phase of the programme:

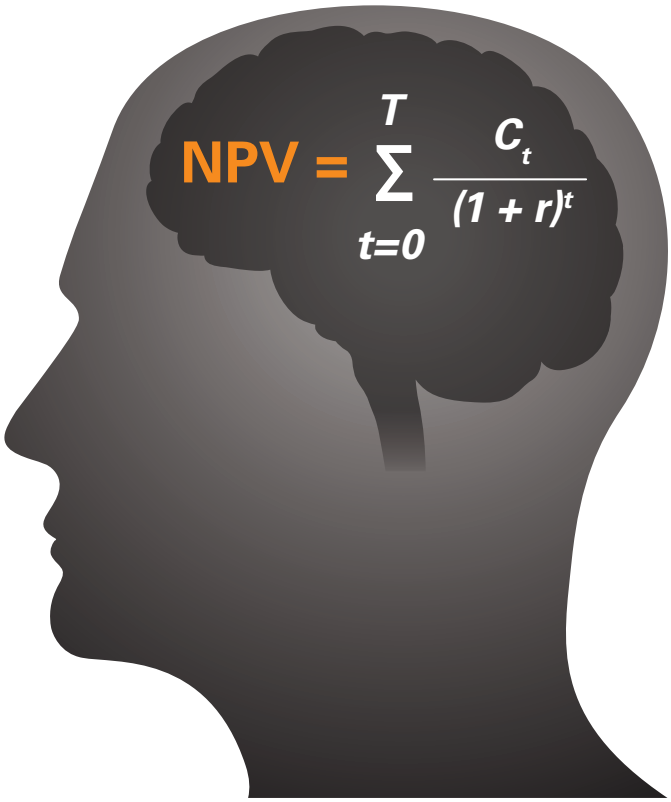
1. **The accuracy of the Investment estimates. At this stage of the programme it is likely that only a parametric estimate is available, as long as all the projects are using the same parametric approach then NPV comparisons are valid.**

2. **The accuracy of the Spend profile (cash Flows). Again at this stage of the programme without knowing when the projects may start and finish populating the cash flows by months within years may lead to inaccuracies in calculating the NPV of an investment as the time value of money decreases.**

What is NPV analysis Used for and what are the alternative measures?

This is the standard accepted Formula for calculating the Net Present Value of an investment or project:

$$NPV = \sum_{t=0}^{T} \frac{C_t}{(1+r)^t}$$



T = Number of time periods

t = Net cash flow in period

r = Discount rate

To produce an NPV for a project you will need the following pieces of financial information:

Capex Financial Inflows

Monthly profile of all new cash capital inflows (if any)

Capex Financial Outflows

Monthly profile of all new cash capital outflows

Opex Financial Inflows

Opex Financial Outflows

Monthly profile of any new operational (annual) cash inflows (if any) and outflows

The time periods and discount rates will be applied within the NPV model used.

Once each project in a programme has had its NPV calculated this value can be used to rank the project on the basis of its PVI.

However this method does not take into account the size or total value in that a large project over 5 years and costing say £20m will have a higher NPV than a project lasting 3 years and costing £10m, in these circumstances a company may choose to use other indicators as a measure.

Key Benefits

- Simple Consistent Approach
- Every project has an NPV and can be ranked
- Provides an effective challenge on "preference projects"
- Demonstrates a Financial priority in capital rationing environment
- Helps all parties to accept decisions
- NPV's can be flexed by deferring/ accelerating the investment

Limitations

- Does not take account of project durations or cost differences
- Relies on early estimates
- Relies on early spend profile
- Does not include for Risks

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