

NET PRESENT VALUE METHOD: EXAMPLE VIDEO

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Module 3 Session: Capital Budgeting

Technique: Net Present Value Method

Session Objectives

By the end of this session, learners will be able to:

- calculate the PV of Annuity over multiple years.
- calculate salvage value of an asset.
- calculate the average rate of return and determine if an investment is worthy of further investigation.

Learning Approach:

Gain Attention: buy providing an animated story about buying a new truck for a company and setting the stage for calculating the net present value of the truck.

Audio Script:

- 1-2. Animated instructor: Your company is looking into purchasing a new truck that will cost \$94,000.
3. With the mileage and use involved, it is expected to last five years.
4. The truck will still run after five years; however, not at the level your company requires. So, in five years, you are going to sell the truck at an estimated resell price of \$12,000.
5. The estimated return expected over those five years will be \$30,000
6. And the rate of the return will be 12%.

Animation:

1. An animated instructor talking with a truck appearing.
2. A dollar value of \$94,000 will appear above the truck.
3. A calendar with 5 annual pages goes by to show time flying.
4. Show a sold sign on the truck for \$12,000.
5. A pop-up with Estimated Return = \$30,000
6. A pop-up with the Rate of Return = 12%



Developer Notes:

An animation of the instructor, Denise Gibson, will appear to discuss the scenario. As she talks, the animation will show various items appearing on the screen to demonstrate her story.

Learning Approach:

Gain Attention: students work out the formulas to test their knowledge (low stakes).

Activate Prior Knowledge: students recall previous concepts and calculate similar formulas from prior Sessions.


Audio Script: Animated Instructor continues

Now that we know the variables involved in evaluating the truck purchase, I'd like you to take a few moments to work through the formulas on net present value to determine if purchasing a truck is a good investment for our company.

Pause the video and see if you can figure out the answer, then come back and we'll walk through it together.

Screen Image:

Pause the video and see if you can figure out the answer, then come back and we'll walk through it together.



Truck

Year	PV of Annuity (Calculation)	PV of Annuity
1	$\$30K / (1+0.12)$	
2	$\$30K / (1+0.12)^2$	
3	$\$30K / (1+0.12)^3$	
4	$\$30K / (1+0.12)^4$	
5	$\$30K / (1+0.12)^5$	
Total PV of Annuity:		

Cost = \$94K
 Life = 5 Years
 Estimated Resell Value = \$12K
 Estimated Return over 5 years = \$30K
 Rate of Return = 12%

Salvage Value is: $\frac{\$12K}{(1+0.12)^5} = \underline{\hspace{2cm}}$

(Total PV Annuity + Salvage Value) – Cost of the Truck = $\underline{\hspace{2cm}}$

Based on your calculations, do you think this is a good investment?

Developer Notes:

The animated instructor will continue to introduce the example. After the introduction, when the instructor states “pause,” the animated instructor will walk off the screen to show the full screen image of calculations. This will allow students to pause the video and take the time to work out the video.

Learning Approach:

Present the Material: the instructor explains the problem, works through the calculations, and discusses the outcome.

Audio Script:

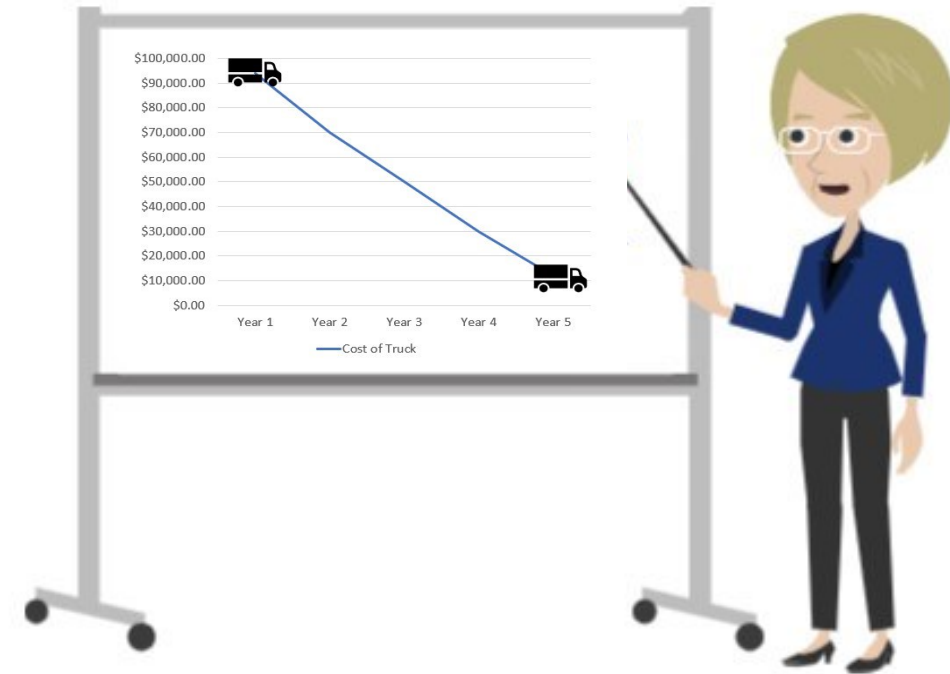
Hopefully, you were able to work out the calculations and review the results. Now, let's work through the example together to see how you did and determine if purchasing a truck for our company will be a good investment.

Here's what we know:

The cost of the truck is \$94,000.

We plan to use the truck for five years. We estimate the resell value of the truck to be \$12,000 which is the amount we can sell the truck for at the end of those five years.

Keep in mind that is what the truck will sell for in five years from now, not what we could sell it for today.

Screen Image:**Developer Notes:**

The animated instructor returns to the screen and the graph of a truck appears with the truck on the top left to simulate the cost of the truck. As the instructor continues talking, the truck drives downward leaving a line to the bottom right of the screen about \$12,000. The y axis displays the cost of the truck and the x-axis is the years of using the truck.

Learning Approach:

Present the Material: the instructor explains the problem, works through the calculations, and discusses the outcome.

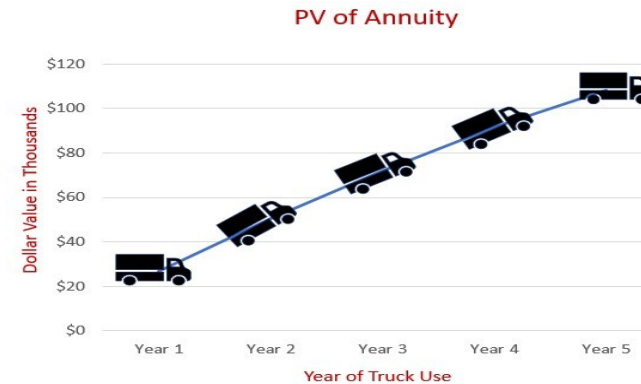
Audio Script:

Over the five years, the truck is estimated to generate a revenue of \$30,000 per year using 12% as the rate of return.

Now that we know the truck cost, the period of time, the rate of return, and the estimated resell value of the truck, we have enough variables to determine if buying this truck is a good investment for our company.

Look at your answer, what did you decide earlier in the video?

Is the truck a good investment?

Screen Image:**Developer Notes:**

Animated instructor speaks and the graph of a truck on the bottom left appears. As she talks the line and truck moves up to the top right of the graph to simulate rising rate of return each year. The y axis displays the increase in value while the x-axis displays each year the truck is used.

Learning Approach:

Guided practice of the problem before they calculate the problems on their own for a grade or in the real world.

Audio Script:

To determine if the truck is a good investment, calculate the annuity which is the \$30,000 the truck is going to generate in each one of those five years, so we can figure out the present value of the truck.

Looking at the table for the five years, let's work through year one: $\$30k / (1+0.12)$ and we get 26.8

For year 2, we use the same calculation, but calculate in $\wedge 2$ since it is the second year.

Continue with the same formula with $\wedge 3$, $\wedge 4$ and $\wedge 5$

Then add up the PV of Annuity to get the total income stream of the truck.

5 Year Chart

Year	PV of Annuity (Calculation)	PV of Annuity
1	$\$30K / (1+0.12)$	
2	$\$30K / (1+0.12) \wedge 2$	
3	$\$30K / (1+0.12) \wedge 3$	
4	$\$30K / (1+0.12) \wedge 4$	
5	$\$30K / (1+0.12) \wedge 5$	
Total PV of Annuity:		

Year 1: $\$30k / (1+0.12) = \$26.8K$

Year	PV of Annuity (Calculation)	PV of Annuity
1	$\$30K / (1+0.12)$	\$26.8K
2	$\$30K / (1+0.12) \wedge 2$	
3	$\$30K / (1+0.12) \wedge 3$	
4	$\$30K / (1+0.12) \wedge 4$	
5	$\$30K / (1+0.12) \wedge 5$	
Total PV of Annuity:		

$\$30k / (1+0.12) \wedge 2 = \$23.9K$

Year	PV of Annuity (Calculation)	PV of Annuity
1	$\$30K / (1+0.12)$	\$26.8K
2	$\$30K / (1+0.12) \wedge 2$	\$23.9K
3	$\$30K / (1+0.12) \wedge 3$	
4	$\$30K / (1+0.12) \wedge 4$	
5	$\$30K / (1+0.12) \wedge 5$	
Total PV of Annuity:		

Sum of PV of Annuity

Year	PV of Annuity (Calculation)	PV of Annuity
1	$\$30K / (1+0.12)$	\$26.8K
2	$\$30K / (1+0.12) \wedge 2$	\$23.9K
3	$\$30K / (1+0.12) \wedge 3$	\$21.4K
4	$\$30K / (1+0.12) \wedge 4$	\$19.1K
5	$\$30K / (1+0.12) \wedge 5$	\$17.0K
Total PV of Annuity:		\$108.1K

Developer Notes:

The animated instructor will calculate the first two formulas on a white board. Depending on the software available, this could also be accomplished by writing on a tablet or in Excel to calculate the formula for lines 1 and 2. After the solution is calculated for years 1 and 2, the answer will appear in the table. After the instructor mentions to continue with the same formula, the answers for years 3 – 5 will appear. After the instructor finishes the sentence to add up the PV column, the answer of \$108.K will appear in the bottom right cell of the table.

Learning Approach:

Guided practice of the problem before they calculate the problems on their own for a grade or in the real world.

Audio Script:

We also need to consider the present value of the salvage (called the salvage value) of the \$12,000 that we're going to sell this truck for in five years.

\$12,000 divided by $(1+0.12)^5$

gives us \$6.8 thousand as the salvage value for the truck.

Animation to be drawn out in the video:

1. Formula without answer

$$\text{Salvage Value is: } \frac{\$12\text{K}}{(1+0.12)^5} =$$

2. Formula with answer highlighted with a box

$$\text{Salvage Value is: } \frac{\$12\text{K}}{(1+0.12)^5} = \boxed{\$6.8\text{K}}$$

Developer Notes:

The animated instructor will draw the formula and calculations on a white board. However, depending on the software available, this could also be accomplished by writing on a tablet or use Excel to calculate the formula. The animated instructor gives a brief explanation of the formula and the answer 6.8 will have a box appear around it to highlight the answer.

Learning Approach:

Gain Attention: students work out the formulas to test their knowledge (low stakes).

Activate Prior Knowledge: students recall previous concepts and calculations.

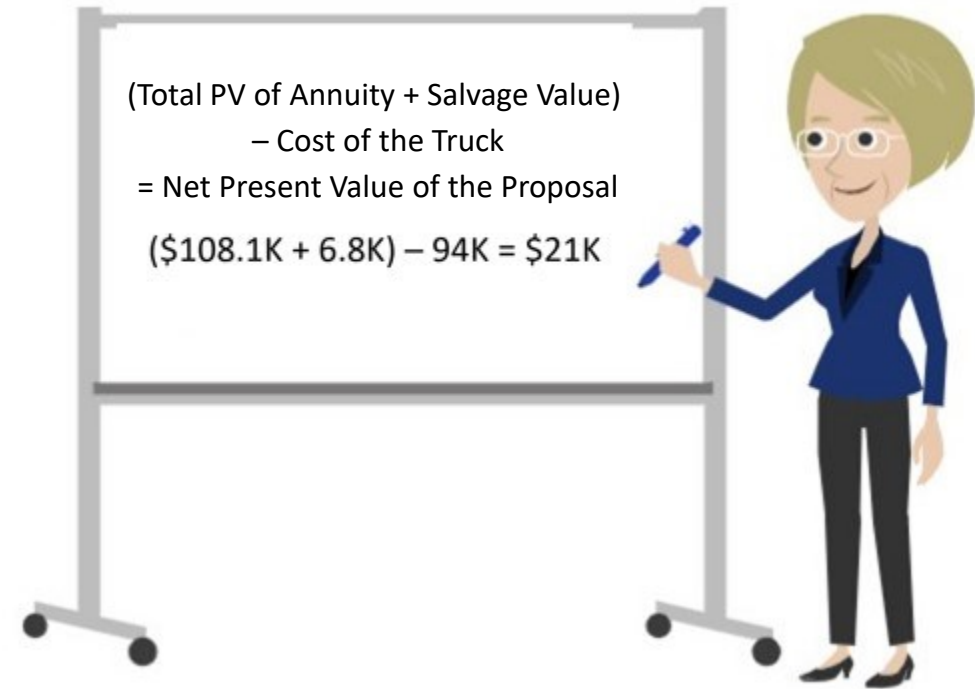
Audio Script:

Lastly, to determine if this truck is a good investment for us, we add the Total PV of Annuity (the sum we calculated of the estimated \$30,000 annuity generated over the five-year period we owned the truck) with the salvage value.

Then we subtract the purchased price of the truck.

And we get the sum of \$21,000.

Screen Image:



Developer Notes:

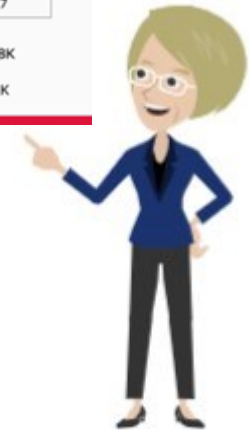
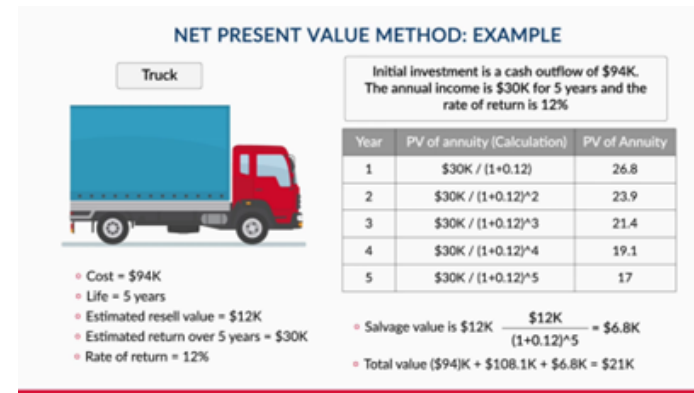
The animated instructor will work out the total value by writing on the screen to explain the values and show how to calculate the formula and provide the answer.

Audio Script:

To clarify, add the estimated sum of the PV of Annuity and the salvage value.

If the sum of the Total PV of Annuity and the Salvage Value exceeds the cost of the truck, it is considered a good investment. If it's less than the cost of the truck, it's not.

The net present value is \$21,000 and is therefore a good investment.

Screen Image:**Developer Notes:**

The animated instructor will wrap up the net present value method example by displaying an image of the calculations that were completed. The instructor reviewing how the total value was calculated and if purchasing the truck is a good investment. The image brings us back around to the first image of this video with the calculations in the within the image. Students can compare their original answers to the answers on the image. The total value formula and answer will be highlighted with a box around it to bring attention to the answer.