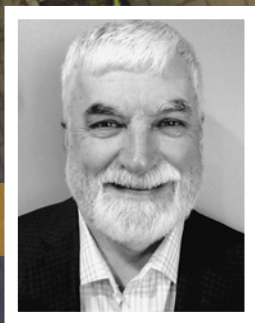


# How to determine the contributory value of **SOLAR PANELS** on a small apartment building



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This real estate case involves a lender's requirement to separate the market value of a three-storey walkup apartment building with and without the contributory value of the solar panels located on the roof. This would be a reasonable request since the life expectancy of the solar panels is significantly lower than the remaining economic life of the building. Furthermore, the income from the solar panels represented 10% of the overall gross income of the property. If the solar panels added significantly to the overall value of the property, this might require an additional risk rate over and above typical mortgage rates.

The building in question is located in a good-sized community in southwestern Ontario. It is a 54-year-old 12-plex. The solar panels had been installed on the building for four years as of the date of the valuation and have 13 more years to run on their existing lease. The average rent from the solar panels over the last four years was \$11,320.



Image 1 - The solar panels from an aerial photo.

We first determine the market value of the property with and without the solar panel income in place using Quality Point in the DCA analysis. One of the Predictor Variables used in the analysis was the Net Operating Income of the property. Therefore, it was easy to segregate the Net Operating Income with and without the solar panel. Since there were no comparable sales of small apartment buildings that generated income from solar panels that had been sold, this method was the best alternative. The differences in the market values of the property by the Quality Point method are as follows:

WITHOUT SOLAR PANEL INCOME	WITH SOLAR PANEL INCOME	DIFFERENCE
\$1,516,000	\$1,587,000	\$71,000
\$1,549,000	\$1,622,000	\$73,000
\$1,583,000	\$1,657,000	\$74,000

An alternative for determining the contributory value of the solar panels was using a Discounted Cashflow Method. Here the net operating income (solar panel income less any expenses) is determined over the remaining contract period. A Discount Rate is applied to the net operating income of each. The discounted cash flows are added together to represent the Present Value of the Solar Panels. There is no residual year because there

is no guarantee that the lease would be renewed.

**\* SELECTING THE PROJECTED INCOME**

The solar panel lease expires on May 31, 2032. This means it has 13 years to run, if we use the year 2019. The 2019 year was used in the valuation of the apartment building since the rents were going to increase in that year under the *Residential Tenancy Act of Ontario*. The average income from the solar panels was \$11,320 over the last four years. We straight-lined the income stream even though we observed some variation in the annual payments over the last four years. There was no point in trying to forecast the projected income over the 13 years based upon the variation in the payments over the last four years. In other words, no varying income trend line could be supported. There was just as much chance that using the average for the last four years would be as accurate over the investment horizon of the solar panels as trying to vary the net income over the same period. By applying a discount rate for each year of operations, it would alter the annual future value of the cashflows and would reflect any variation in the income.

YEARS	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Income	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320	\$11,320
<b>Expenses</b>													
Management Some Repairs	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566	\$566
Net Operating Income	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754	\$10,754
Discount Rate 10%	0.9091	0.8264	0.7513	0.683	0.6209	0.5645	0.5132	0.4665	0.4241	0.3855	0.3505	0.3186	0.2897
	\$9,776	\$8,888	\$8,080	\$7,345	\$6,677	\$6,070	\$5,519	\$5,017	\$4,561	\$4,146	\$3,769	\$3,427	\$3,115
<b>Total Cashflow or Present Worth: \$76,389</b>													

Table 1

Discount Rates		
	Viewpoint Integra Realty Resources Publications 2017	Rynne, Murphy and Associates
Offices	8.03% to 9.02%	8.75% to 9.75%
Multi-family	6.97% to 7.85%	8.25% to 9.75%
Retail malls	7.98% to 8.10%	8.75% to 9.00%
Industrial	7.91% to 8.61%	9.50% to 11.25% (heavy and older)
Hospitality	9.69% to 10.09%	
Mobile home		9.5 average
Restaurants		10.00 average
Auto dealers		9.5
Subdivisions		15.5
Nursing homes		13.5
Hotels Motels		10.25
City commercial industrial		9.75

Table 2

#### \* EXPENSES

Although we would like to think that the income from solar panels is truly net free, we concluded that there are going to be some costs associated with the investment. These costs represented some management aspects as well as maintenance costs because they are subject to all types of weather conditions. We used 5%. The analysis does not include the cost of borrowed funds to install the solar panels each year because the valuation is based upon both the building and the solar panels being free and clear of debt. Table 1 shows the Discounted Cashflow for the solar panels to the end of the lease.

#### \* CHOSEN DISCOUNT RATE

There were no published discount rates for solar or wind panels found on the internet. When it comes to discount rates, there was very limited information from Canadian real estate market publications. There are several mathematical formulas available to determine a discount rate, however, these tend to be fraught with inputted risk rates without any support.

We do know that, over the last 20 years, discount rates were in the 10% to 12% range and are most likely between 8% to

10% for most real estate investments. We did find some references to 3<sup>rd</sup> quarter discount rates from the USA from Rynne, Murphy and Associates, Inc. These are shown in Table 2.

It is noted that the discount rates shown in Table 2 for multi-family are between 7% and 8% (2017). However, when viewing the other types of real estate investments that reflect more risk, the discount rate also rises.

#### \* WHAT SHOULD THE DISCOUNT RATES BE FOR THE SUBJECT PROPERTY?

This question is complex because it depends upon future rising hydro costs and whether or not any elected government is going to honor past solar panel agreements. Is the sun going to shine more so in the future years? Nobody knows the answers to these questions.

Since we know that discount rates have been decreasing on a wide variety of properties, but are very sensitive to riskier types of real estate, we decided to take a harder stance on the applicable discount rate for the subject property. The rationale for the selection of an appropriate discount rate was the following.

1. Solar panels are becoming more commonplace in the real estate marketplace. We are seeing them on homes, institutional buildings, and in large fields. They are an expense to install.
2. Over the next 13 years, there is a possibility of a decrease in the payment of energy being produced to the grid by solar panels via the weather.
3. The discount rate should reflect the fact that no new lease agreement is possible at the end of the term of the solar panel lease. This would mean that tenants might be subsidizing higher utility costs since the benefit of the solar panels could be gone. This produces another risk factor for the owner.
4. There is a lost opportunity cost in the investment of the original construction of the solar panels. The cost is either paid fully in cash or against borrowed funds. Either way, there is a loss in terms of an interest in borrowing costs or the loss of investing that money into a different venture.

We concluded that the discount rate that seems to best capture the negative issues of having solar panels on the roof of a 10-plex apartment complex is 10%. The 10% discount rate provides a present worth value of \$76,389 (rounded to \$76,000).

#### \* CONCLUSION

The Quality Point analysis using the difference between the net operating income of the subject property with and without the Solar Panel Income produced a value for the solar panels of \$71,000 to \$74,000. The Discounted Cashflow Model indicated a contributory value of \$76,000. The concluded single-point estimate of the contributory value for the solar panels was \$75,000. 📌