

Exhibit 1

City of Carlsbad Energy Conservation Ordinance Cost Effectiveness Analysis (2019)¹

Building size

	Small Office	Medium Office	Warehouse	Retail Strip Mall
Gross Floor Area (ft ²)	5,502	53,628	49,495	9,375
Solar PV Rule	5 kW	15 kW/ 10,000 ft ²	15 kW/ 10,000 ft ²	5 kW
Solar PV Size	5 kW	80 kW	74 kW	5 kW

Figure 4: Nonresidential PV Sizing

New Construction

Note: This study by TRC determined cost-effectiveness in two ways: 1) using time dependent valuation (TDV) of energy as per the CEC Life Cycle Cost Methodology and 2) using San Diego Gas & Electric (SDG&E) utility rates to determine bill impacts. The study uses a benefit to cost (B/C) ratio as the cost effectiveness metric. If the benefits of a measure are positive and greater than the costs of the measure, then the B/C ratio will be greater than 1.0 and the measure or package is considered cost effective.

TRC analyzed solar PV and water heating measures individually and packaged for nonresidential new construction compared to the 2016 Title 24 baseline. As per Carlsbad measure descriptions, PV was sized at:

- ♦ 15 kW per 10,000 ft² of gross floor area on buildings of 10,000 ft² or more, and
- ♦ 5 kW for buildings under 10,000 ft².

Figure 2 shows that electric water heating alone is not cost effective using either TDV or Bill B/C ratios. Solar PV alone, and solar PV in conjunction with electric water heating, are cost effective using both the TDV and Bill B/C ratio for each nonresidential new construction prototype with the exception of the retail strip mall, which has a very low hot water demand.

New Construction	Small Office		Medium Office		Warehouse		Retail Strip Mall	
Measure (2016 Title 24 Baseline)	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)
Solar PV	1.7	2.6	1.6	2.0	1.4	1.7	1.7	2.1
Federal Min Efficiency HPWH	-1.0	-3.3	-10.6	-22.7	-2.1	-5.6	-4.0	-4.7
Federal Min Efficiency HPWH + PV	1.3	1.9	1.5	1.8	1.4	1.7	0.9	1.2
Tier 3 HPWH	0.6	-1.1	-5.3	-12.7	-0.6	-2.8	-1.2	-0.3
Tier 3 HPWH + PV	1.6	2.2	1.5	1.9	1.4	1.7	1.3	1.7
Electric Resistance WH	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Electric Resistance WH + PV	1.6	2.2	1.4	1.7	1.4	1.7	0.7	0.7

Figure 2: New Construction Nonresidential Summary, Tier 3 HPWH.

¹ Source: <https://www.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=37506>

Major Alterations

TRC analyzed solar PV measures for nonresidential alterations compared to the 2016 Title 24 baseline. The solar PV sizing requirement for alterations is identical to that of new construction and is triggered by roof additions $\geq 2,000$ ft² or permit valuations $\geq \$1,000,000$ that affect ≥ 75 percent the building. Figure 3 shows Bill Net Savings and TDV Net Savings for solar on nonresidential alterations.

Major Alterations	Small Office		Medium Office		Warehouse		Retail Strip Mall	
Measure	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)	B/C ratio (TDV)	B/C ratio (Bill)
Solar PV	1.5	2.5	1.5	2.4	1.4	1.7	1.5	3.0

Figure 3: Nonresidential Alterations Summary