15. VALUE OF SOLAR RESULTS

15.1. Reference Case

When the annual costs and benefits presented above have their units converted to 2015$/MWh and are then combined, the net result is positive (i.e., a benefit) in each year of the study period. However, this benefits fluctuates considerably, with the highest benefits occurring nearer the beginning of the study period. These results are presented in Table 34 below.

Table 34. Reference case results

Year	Mid Utility System Total *2015$/MWh*	Mid Societal Total *2015$/MWh*
2017	$272.49	$356.04
2018	$80.89	$155.87
2019	$85.89	$154.58
2020	$92.68	$153.28
2021	$292.26	$407.08
2022	$141.30	$236.01
2023	$136.84	$221.40
2024	$129.57	$199.35
2025	$122.39	$178.55
2026	$113.35	$153.44
2027	$116.11	$156.89
2028	$117.86	$159.33
2029	$118.72	$160.03
2030	$120.90	$162.90
2031	$120.44	$163.12
2032	$119.53	$162.88
2033	$110.12	$154.14
2034	$110.27	$154.96
2035	$110.17	$155.53
2036	$110.54	$156.55
2037	$110.48	$157.14
2038	$110.26	$157.74
2039	$110.56	$158.86
2040	$108.95	$158.07

15.2. Reference Case Results—Levelized

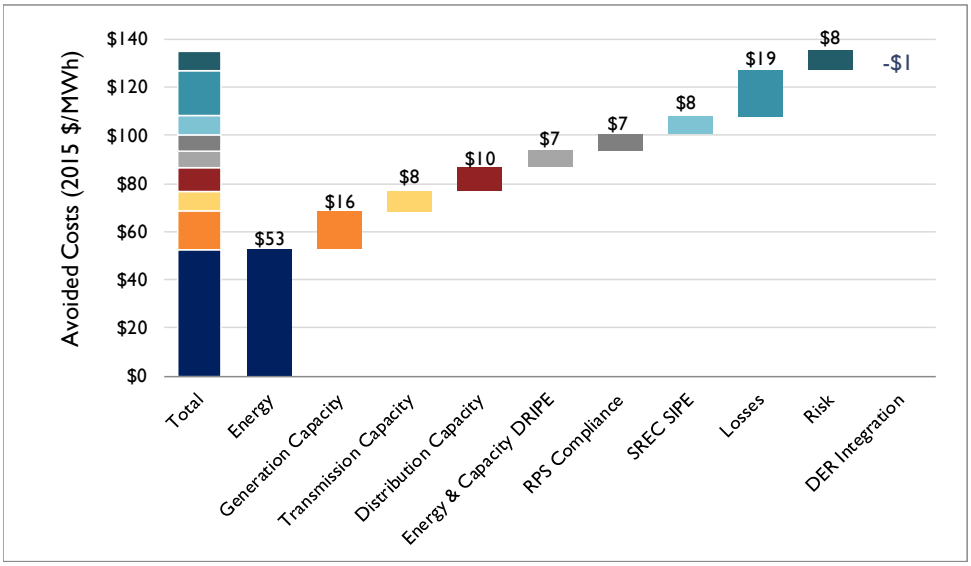
The annual values presented above were converted into a levelized value of solar by levelizing the categories' 2015$/MWh values over the study period using a discount rate. The discount rate reflects a "time preference," a way to weigh short-term benefits and long-term benefits in an apples-to-apples comparison. Rather than use Pepco's weighted average cost of capital (WACC), a lower discount rate was used for several reasons. First, many of the avoided costs are not capital costs at all—avoided

energy costs (including line losses) and avoided RPS costs, for example. Because these costs (or avoided costs) are passed through without the need for capital investment, the discount rate is necessarily less than the Pepco's WACC.

Second, many jurisdiction-specific policy goals imply a greater emphasis on future benefits. Indeed, all public policy efforts undertaken by the District to reduce or mitigate climate change impacts are policies focused on long-term costs and benefits, consistent with a lower discount rate. Finally, while the utility may be able to generate returns on the order of 9 or 10 percent, few residents have access to such high returns on investment. In deference to the academic literature on social discount rates, Synapse chose to use the same discount rates employed by EPA in its Social Cost of Carbon analysis.[406,407]

The utility system total value of solar for 2017–2040, when levelized with a 3 percent discount rate, results in a value of $132.66/MWh (2015$). The societal total value for 2017–2040, when levelized with a 3 percent discount rate, results in a value of $194.40 (2015$). The utility value of solar and societal value of solar levelized results are presented in Figure 31 and Figure 32, respectively.

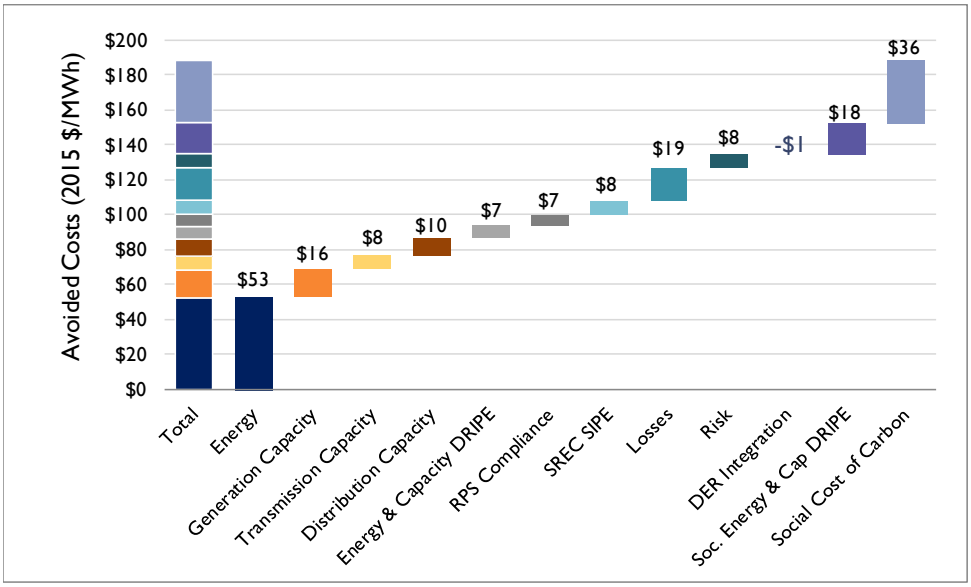
Figure 31. Levelized utility value of solar by component



406 Maureen Cropper, "How Should Benefits & Costs Be Discounted in an Intergenerational Context?" 2011. Available at http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-Resources-183_Feature-Cropper.pdf.

407 Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, "Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866 –" August 2016. Available at https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf.

Figure 32. Levelized societal value of solar by component



15.3. Sensitivities

While there many categories with high and low sensitivities, some of them must be moved in unison (e.g. avoided energy and energy DRIPE), whereas others are independent. Some categories may be anti-correlated in the long run, such as avoided energy and avoided generation capacity. Therefore, choosing sensitivities to generate the highest (or lowest) modeled value of solar represents a very unlikely outcome. In addition, Synapse modeled the impact of each of the three discount rates used by the social cost of carbon: 5 percent, 3 percent, and 2.5 percent.

As expected, the value of solar is highly dependent on future gas prices. This is both because the avoided energy including losses and costs associated with risk represents about half of the utility value of solar (over one third of the societal value) in the District, and because the range of potential input values is quite wide. Keeping all other inputs at the "mid" level, using the low gas forecast reduces the value of solar by over $22/MWh. Conversely, the "high" gas price increases the value of solar by nearly $37/MWh.

The societal value of solar is also quite dependent on the social cost of carbon, which represents nearly one fourth of the total societal value. Increasing the discount rate to 5 percent for the social cost of carbon and the levelizing of the revenue stream reduces the social value to $174/MWh, a reduction of nearly $21/MWh. Conversely, reducing the discount rate to 2.5 percent increases the social value by $17/MWh to $211/MWh.

Although avoided generation capacity value represents the third largest component value, its high and low sensitivity value streams do not result in a dramatic change in forecasted PJM capacity auction

prices. Therefore, employing the high or the low generation capacity value stream rather than the base case only changes the value of solar by $2.69/MWh.

While the SREC SIPE value is significant in the first year of solar carve-out compliance (and $0 all other years), its contribution to value of solar is a more modest $7.77/MWh because that value is spread across the entire study period. It will, however, represent a significant change in cash flow for that year: the dramatic decline in SREC prices that will occur when Pepco DC achieves solar carve-out compliance will represent a savings in the tens of millions of dollars, perhaps as high as $44 million. Whereas the value of solar calculations only attribute the first year of compliance to solar installed in any one year, the utility system will realize those tens of millions of dollars of savings each year until 2024, when the reduced ACP (and inflation) reduces the benefit to $10 million per year through 2027.