

Background

P.L. 2021 ch. 390 section 4 subsection 2 (B) (“the Act”)¹ requires the Distributed Generation Stakeholder Group (“the Stakeholder Group”) to determine “the optimum total amount of distributed generation for the program period [2024 through 2028] calculated using 7% of total load based on operational capacity.” Section 4 subsection 3 (A) of the Act further requires “identification of the recommended optimum total amount of distributed generation for the program period represented as a percentage of total load.” This memorandum provides an illustrative example of the optimum total amount of distributed generation (“program target”) utilizing previously developed and publicly available data sources and tools to inform the Stakeholder Group’s discussions.

Assumptions

Modeling conducted on behalf of the Maine Climate Council projects Maine’s total electric load in 2030 assuming sufficient electrification of transportation and thermal sectors to achieve emissions reduction goals will be 15.6 terawatt hours (TWh).² Because 2030 would be two years after the program period concludes and load growth is projected to increase each year, using this figure would result in a slightly higher program target than anticipated by the Act.

For simplicity, this analysis assumes a representative distributed generation resource to be a 5.49 MW_{DC}/4.99 MW_{AC} solar photovoltaic facility installed in Augusta, Maine. Entering these characteristics into the National Renewable Energy Laboratory’s (NREL) PVWatts^{®3} calculator with default assumptions results in an estimated annual output of 6,935,381 kWh. Using a representative facility rather than a set of potential resources is a simplifying assumption that could over- or under-represent the actual results. Furthermore, solar PV facilities are only one technology included in the definition of distributed generation.

Calculation

Identifying the program target in terms of capacity (MW) requires identifying the total distributed generation capacity required to serve 7% of total load. Given the Maine Climate Council total load projection of 15.6 TWh, the program target would be sufficient distributed generation capacity to serve:

$$7\% \text{ of total load} = (15.6 \text{ TWh})(0.07) = 1.092 \text{ TWh}$$

Converting from TWh to kWh:

$$(1.092 \text{ TWh})(1,000,000,000 \text{ kWh/TWh}) = 1,092,000,000 \text{ kWh}$$

Given a representative distributed generation facility with capacity 4.99 MW_{AC} would generate approximately 6,935,381 kWh annually:

$$\text{Number of facilities} = 1,092,000,000 \text{ kWh} / 6,935,381 \text{ kWh} = 158 \text{ representative facilities}$$

¹ <http://www.mainelegislature.org/legis/bills/getPDF.asp?paper=HP0692&item=6&snum=130>

² http://climatecouncil.maine.gov/future/sites/maine.gov.future/files/inline-files/ERG_MCC_Vol3_MaineEmissionsAnalysisSynapse_11-9-2020.pdf, slide 55.

³ <https://pvwatts.nrel.gov/>

158 representative facilities with 4.99 MW_{AC} capacity would yield a program target of⁴:

$$\text{Overall program target} = (158)(4.99 \text{ MW}_{AC}) = 788.42 \text{ MW}_{AC}$$

Finally, assuming the overall program target of 788 MW_{AC} was evenly allocated across the five years from 2024 to 2028, the annual program target would be:

$$\text{Annual program target} = 788.42 \text{ MW}_{AC} / 5 \text{ years} = 158 \text{ MW}_{AC} \text{ per year}$$

Limitations

This approach is intended to be illustrative. It is limited in its applicability by the assumptions detailed above, as well as implicit assumptions about future technological changes and other factors.

⁴ Section 4 subsection 2 (C)(2) of the Act requires “developing a mechanism to adjust the calculated optimum total amount of distributed generation described in paragraph B by subtracting the total amount of megawatts of commercially operational distributed generation resources developed in excess of the goal established in the Maine Revised Statutes, Title 35-A, section 3209-A, subsection 7 [750 megawatts].” For example, if a total of 1,000 MW were to reach commercial operation under net energy billing, the overall program target would be reduced by 250 MW.