

Attachment G: Methodology for the Bid Calculator and MEA Project Financial Model

FY27 Megawatts for Maryland

Issued October 26, 2026

1. Purpose

This document is a companion guide for the Bid Calculator (Attachment D) and the MEA Project Financial Model (Attachment E) included in the application materials for the Megawatts for Maryland (MW4MD) program.

The **Bid Calculator** section provides additional guidance on the methodology used to calculate the bid price per megawatt of generation.

The **Project Financial Model** section provides guidance to model the project financial information. This model template is intended to serve as a tool for the Maryland Energy Administration (MEA) for evaluation and incorporates simplifying assumptions, such as working capital requirements to create a streamlined view of the proposed project's financials. It is not intended to replace the applicants' own, more detailed project financial models.

Applicants can write to MEA at grid.mea@maryland.gov for questions and clarifications until the deadline. Also, if any conditions unique to an Applicant's project are not covered by the models provided, Applicants may contact MEA for consideration.

2. Bid Calculator

BID PRICE CALCULATIONS

The MW4MD auction is structured as a closed reverse auction. Applications will be ranked from lowest to highest based on their unit bid price (Bid Amount). The lowest bids will win the auction, provided they meet all eligibility criteria.

All Bid Amounts will be evaluated through the technology-agnostic Bid Calculator. Bids from all eligible technologies will be treated equally, using the requested bid amount per unit of energy generated¹.

¹ As required by the Utility Relief Act, House BILL 1532 § 9–20E–02(D)(1)(I)

$$\text{Bid Amount (\$/MWh)} = \frac{\text{Total amount requested from the grant (\$)}}{\text{Total energy delivered over project lifetime (MWh)}}$$

The applicant will enter their unit bid price (Bid Amount) into the Bid Calculator. The total grant award will be this Bid Amount multiplied by the total amount of energy the project is expected to generate over its lifetime.

This lifetime generation is calculated by the Bid Calculator using a straightforward method: the applicant specifies the Tier 1 Renewable or Storage technology and enters the annual energy (MWh) expected to be delivered by the project — dispatched to the grid — into the Bid Calculator. The calculator has built-in assumptions for the technical lifetime and annual degradation of standard technologies. Utilizing these key assumptions, the Bid Calculator projects the total energy delivered to the grid over the project's lifetime.

Additional details can be found in the following sections.

ELIGIBILITY

Bids will be filtered based on the eligibility criteria detailed in the Funding Opportunity Announcement (FOA).

GUIDANCE ON INPUTS

The leftmost tab labeled 'Instructions' is the starting point for the Bid Calculator. This tab has information on the fields in the 'Bid Calculator' tab and the 'Reporting' tab. To proceed to the Bid Calculator, users may click on the Home button on the top-right corner, or click on the Bid Calculator tab.



**Megawatts for Maryland FY27
Bid Calculator**
v.1.000



USER INSTRUCTIONS

This calculator is for FY27 Megawatts for Maryland applications. This calculator can be used to submit project specifications, including project size, energy generated, grant amount requested, and GHG emissions avoided. Each project is eligible for only ONE grant application and ONE associated calculator. Applicants may submit a separate application and calculator for each additional project.

This calculator is designed for use in Microsoft Excel. The calculator has two tabs for user input: 'Bid Calculator' and 'Reporting'. Guidance on their use is provided below. The other tabs are for reference only.

Questions? Write to MEA at grid.mea@maryland.gov

'BID CALCULATOR' TAB		
Section	Field Type	Description
MEA Assigned Application ID	Alphanumeric input	Provide the Application ID assigned to the project by MEA in Stage 1 of the application.
Descriptive Title of Project	Text input	Enter a descriptive name for the proposed project.
Project Type Seeking Auction Funding	Dropdown selection	Select the project type for which auction funding is being sought.
For the Tier 1 RE project or Storage project		

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Instructions

Bid Calculator

Reporting

Update Log

Reference

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Guidance on individual inputs is provided within the calculator.

Hybrid projects. For hybrid projects combining co-located technologies — such as solar paired with storage — the applicant will select 'TIER 1 RE + Storage' for the field 'Project Type Seeking Auction Funding' in the Bid Calculator. This selection will open a dedicated row for co-located storage inputs.

Non-standard technologies. Most standard technologies are available as dropdown options in the Bid Calculator. For non-standard systems (either the Tier 1 RE technology or the Battery Technology), applicants must select 'Other' for the Technology Subtype field. Additional fields will appear to specify custom inputs for the expected lifetime and annual degradation factors. These custom inputs must be substantiated by supporting documentation.

The images below demonstrate sample inputs and outputs.

SAMPLE INPUTS

PROJECT INFORMATION							
Enter project information in the cells highlighted in yellow. Cells with gray background are auto-calculated.							
* Fields marked with a red asterisk indicate required inputs.							
MEA Assigned Application ID*	123	Descriptive Title of Project*	ABC	Project Type Seeking Auction Funding*	Tier 1 RE		
For the Tier 1 RE project							
Technology Type*	Solar PV	Technology Subtype*	p-type mono PERC	Nameplate Capacity (MWac)*	10.00	First-year Delivery to Grid (MWh)*	87,600.00
System Lifetime (years)	30	System Degradation Rate (%/year)	0.7%				
For the Tier 1 RE project, Technology Subtype 'Other' Only							
						Lifetime Delivery to Grid (MWh)	2,381,240.24

SAMPLE OUTPUTS

Total Lifetime Delivery to Grid From Project				
			Project Lifetime Delivery to Grid (MWh)	2,381,240.24

PROJECT BID							
The bid amount cannot be changed after this application stage.							
Estimated Project Cost (\$)*	\$ 50,000,000	Bid Amount (\$ requested/MWh lifetime)*	\$ 2.00	Grant Amount Requested (\$)	\$ 4,762,480	Grant Amount as Percent (%) of Total Project Cost	10%

TECHNICAL ASSUMPTIONS

Battery Technical Life and Degradation

Key technical assumptions regarding the technical life and degradation rates (%/year) of the five battery technologies in the bid calculator were based on PNNL's Energy Storage Technology Cost and

Performance Assessment report published in 2022², and an updated database published in 2024³. The PNNL database contains cost and performance metrics for various battery technologies (for the years 2023 and 2030) such as capital, O&M, and decommissioning costs, levelized cost of storage (LCOS), and technical metrics like depth of discharge, round trip efficiency (RTE), and rest period (after discharge and before charge).

This analysis covers five battery technologies – lithium-ion Lithium Iron Phosphate (Li-Ion LFP), lithium-ion Nickel Manganese Cobalt oxide (Li-ion NMC), lead-acid, vanadium redox flow (VRF), and Zinc composite for a reference 10 MW capacity with a 4-hour duration for each cell type using the Point values for 2023.

The parameters that determine degradation rate are primary and secondary depth of discharge (DOD), cycle life at DOD, end of life, and calendar life as the maximum duration before end of life regardless of operating conditions.

Input parameters for degradation rate calculations (Point values for 10 MW, 4-hour duration systems) (PNNL, 2024) are shown below.

Technology	Primary Depth of Discharge (DOD)	Secondary DOD	Cycle Life at Primary DOD ($N_{\text{cycle life}}$)	End of Life (% of rated energy) ($E_{\text{remaining}}$)	Calendar Life (years)
Li-ion LFP	80%	60%	2,400	60%	16
Li-ion NMC	80%	60%	1,520	60%	13
Lead acid	68%	-	2,368.33	60%	14
Vanadium Redox Flow	80%	-	5,250	80%	12
Zinc	80%	-	3,687.5	80%	12

² Energy Storage Cost and Performance Assessment, PNNL (2022), <https://www.pnnl.gov/projects/esgc-cost-performance>

³ Energy Storage Cost and Performance Database, PNNL (2024), <https://www.pnnl.gov/projects/esgc-cost-performance/download-reports>

Step 1: Energy Remaining at the end of cycle life

$$DE_{cycle\ life} = 1 - E_{remaining}$$

where

$$E_{remaining} = \begin{cases} \text{Primary DOD for Li-ion (LFP and NMC)} \\ \text{End of Life for lead-acid, VRF, and zinc} \end{cases}$$

The energy remaining when the primary cycle life is used up determines how much capacity is lost over that life. For the two Li-ion technologies, the cycle life is assumed to run to the point where End of Life (% of rated energy) is equal to the DOD%. For example, for a Li-ion LFP system, at 80% DOD, 80% of the rated energy remains when the battery is cycled 2,400 times. The battery is then re-augmented and used until the secondary DOD. In this case, the ΔE is 20%.

Secondary DOD does not exist for lead-acid, zinc, and VRF batteries, and their primary life is taken to run to the end of life. Therefore, $\Delta E_{cycle\ life}$ is 40% for lead-acid, 20% for VRF, and 20% for zinc batteries.

Technology	Capacity Lost over Cycle life ($\Delta E_{cycle\ life} = 1 - E_{remaining}$)
Li-ion LFP	20%
Li-ion NMC	20%
Lead acid	40%
Vanadium Redox Flow	20%
Zinc	20%

Step 2: Capacity lost per cycle and annual cycling

For this analysis, it is assumed that each battery system cycles once per day. Therefore, the total number of cycles per year is 365.

$$N_{annual\ cycles} = 365 \frac{days}{year} \times 1 \frac{cycle}{day} = 365 \frac{cycles}{year}$$

To calculate the capacity lost per cycle, PNNL's approach assumes that battery capacity falls linearly with cycling⁴.

⁴ Performance Metrics sections for Li-ion LFP and NMC (4.1.4.2), and Zinc (4.4.4), Energy Storage Cost and Performance Assessment, PNNL (2022)

$\delta E = \frac{\Delta E_{cycle\ life}}{N_{cycle\ life}}$, where N is the cycle life at primary DOD Technology	Capacity Lost per Cycle (δE)
Li-ion LFP	0.0083%
Li-ion NMC	0.0132%
Lead acid	0.0169%
Vanadium Redox Flow	0.0038%
Zinc	0.0054%

Step 3: Annual degradation rate

The annual degradation rate is the capacity lost per cycle multiplied by annual cycles.

$$Degradation\ rate\ (\frac{\%}{year}) = \delta E \times N_{annual\ cycles} = 1 - \frac{E_{remaining}}{N_{cycle\ life}} \times 365$$

Technology	Degradation Rate (%/year)
Li-ion LFP	3.0%
Li-ion NMC	4.8%
Lead acid	6.2%
Vanadium Redox Flow	1.4%
Zinc	2.0%

Lifetime GHG Emissions Avoided Calculations

The Reporting tab in the Bid Calculator calculates the Lifetime GHG Emissions Avoided (in metric tons of CO₂ equivalent) from the project.

$$\begin{aligned}
 &Lifetime\ GHG\ Emissions\ Avoided\ (MT\ CO_2e) \\
 &= Lifetime\ Delivery\ to\ Grid\ (MWh) \\
 &\times Electricity\ Emissions\ Factor\ (\frac{MT\ CO_2e}{MWh})
 \end{aligned}$$

The Lifetime Delivery to Grid (MWh) is multiplied by the emissions factor for electricity (expressed in MT CO₂e/MWh⁵) to calculate the lifetime avoided emissions (in metric CO₂ equivalent) from operating this project.

⁵ Electricity emissions factor aligned with Maryland Department of Environment protocol

3. Project Financial Model

FINANCIAL MODEL CALCULATIONS

The MW4MD auction requires project financial data to be provided. The applicant will enter their project details and project financial information, including the expected revenues, capital and operating costs, *and* project financing in the MEA Project Financial Model.

The model will automatically calculate project capacities, capital costs, applicable tax credits, financing amounts, and the energy generation in the first-year (MWh) based on the inputs provided.

GUIDANCE ON INPUTS

The leftmost tab labeled 'Instructions' is the starting point for the MEA Project Financial Model. This tab has information on the fields in the 'User Inputs' tab.

Guidance on the built-in assumptions is provided below.

Built-in Assumptions

The model uses the same built-in assumptions for the technical lifetime and annual degradation of standard technologies as the Bid Calculator. The model also uses built-in assumptions for inflation rate and merchant price for electricity escalation rate:

Inflation Rate (%) – This value is based on the Congressional Budget Office's (CBO) Long-Term Budget Outlook 2025 to 2055. Reference: <https://www.cbo.gov/publication/61882>

Merchant Energy Price Escalation (%) – This value is also based on CBO's Long-Term Budget Outlook 2025 to 2055. Reference: <https://www.cbo.gov/publication/61882>. This is a simplifying assumption. It is acknowledged that the merchant price may not escalate linearly on a day-by-day basis, but over the course of a year the average price should increase relatively uniformly with inflation.

Additional details on data inputs can be found in the Financial Model.

The images below demonstrate sample inputs and outputs.

SAMPLE INPUTS

TIER 1 RE							
RESOURCE & PERFORMANCE							
Enter the applicable TIER 1 RE capacity and resource performance assumptions. Technology-specific degradation rates are automatically populated based on the selected technology, with applicant-provided rates required where reference values are unavailable.							
DC/AC Ratio (ILR)	1.3						
Other Technology Revenue Year 1 (\$/year)*	0	Other Revenue Escalation (%)*	2.0%				
ENERGY, REC & CAPACITY REVENUES							
Enter electricity sales prices, PPA and merchant allocation periods, renewable energy certificate (REC) prices, and capacity revenue assumptions.							
PPA Price (\$/MWh)*	42	PPA Price Escalation (%)*	—	Merchant Energy Price (\$/MWh)*	35	Merchant Energy Price Escalation (%)	2.0%
PPA / MERCHANT ENERGY SALES ALLOCATION SCHEDULE							
Enter the starting year and percentage of annual electricity generation (MWh) expected to be sold under a PPA for each period. The remaining generation is assumed to be sold at merchant prices. The ending year is calculated automatically. Starting years must be within the project lifetime.							
Starting Year*	Ending Year	PPA Energy%*	Merchant%				
1	5	100%	0%				
6	10	90%	10%				
11	15	50%	50%				
16	30	0%	100%				

SAMPLE OUTPUTS

GRANT — TIMING, TREATMENT & SCENARIOS							
Enter the total grant amount requested. The equivalent bid amount per lifetime MWh delivered is calculated automatically.							
Grant Amount Requested (\$)*	\$ 50,000,000	Bid Amount (\$ requested/MWh lifetime)	\$ 5.39	Grant Receipt at COD (Calendar Year)	2030	Lifetime MWh Delivered	9,282,739
CALCULATED PARAMETERS							
Displays automatically calculated project capacities, capital costs, tax credits, financing amounts, and first-year generation based on the inputs above.							
Nameplate Capacity (DC) (MW)	130	Storage Power Capacity (MW)	50	Energy Capacity (MWh)	200	Generation Total CapEx (\$)	\$ 145,000,000
Storage Total CapEx (\$)	\$ 50,000,000	Total CapEx (\$)	\$ 195,000,000	ITC Amount (\$)	\$ 15,000,000	Depreciable Basis (\$)	\$ 187,500,000
Debt Amount (\$)	\$ 107,250,000	Equity Contribution (\$)	\$ 87,750,000	Combined Tax Rate (%)	25.7%	Year-1 Generation (MWh)	200,000