DOCKETED	
Docket Number:	25-BSTD-03
Project Title:	2028 Energy Code Pre-Rulemaking.
TN #:	273108
Document Title:	Abdulai Rabiu Comments - 2028 Nonresidential PV and Battery Storage Proposal, TN 271043
Description:	N/A
Filer:	System
Organization:	Abdulai Rabiu
Submitter Role:	Public
Submission Date:	10/12/2026 10:11:51 PM
Docketed Date:	10/13/2026

Comment Received From: Abdulai Rabiu
Submitted On: 10/12/2026
Docket Number: 25-BSTD-03

Abdulai Rabiu Comments on 2028 Nonresidential PV and Battery Storage Proposal, TN 271043

I research solar module fabrication and long-term stability. I support keeping PV and battery requirements for nonresidential buildings in the 2028 Energy Code. Staff analysis shows photovoltaics (PV) only have benefit-to-cost ratios above 1.0 for every prototype and climate zone, even without the federal tax credit. My comments focus on the performance assumptions behind those results.

1. Include PV degradation in the 30-year analysis
The memo assumes a 30-year panel life but does not state whether annual output declines over that period. Field studies of crystalline silicon modules commonly report median losses of about 0.5% to 0.8% per year. At 0.5% per year, average output over 30 years is about 7% below year one. I recommend that staff state the degradation rate used and one added if none is applied. The reason is that most Photovoltaics(PV) only ratios are well above 1.0, which should not change the overall finding. However, it would make marginal cases, such as Religious Worship and Sports and Recreation in Climate Zone 1, more reliable.

2. Confirm that PV output responds to the new hotter weather files
The 2028 weather data forecasts higher temperatures. Crystalline silicon output falls by roughly 0.3% to 0.4% for each degree Celsius of cell temperature rise. I suggest that staff should confirm the use of cell temperature from the new weather files for PV model. This will ensure that summer output in inland climate zones is not overstated.

3. Define round-trip efficiency at the AC meter (Question 8)
The proposal raises round-trip efficiency from 80% to 89%. Nonetheless, cell-level efficiency for lithium iron phosphate batteries can exceed 90%. The delivered efficiency also depends on inverter conversion, cooling or heating loads, and standby losses. These losses weigh more heavily on small systems. I recommend that the code specify round-trip efficiency measured AC-to-AC at the system terminals, including auxiliary loads, and that the analysis use that value.

4. Model battery capacity fade before year 10 (Questions 5 and 7)
The no-replacement scenario assumes the battery delivers full usable capacity for 10 years and then stops. In practice, capacity gradually decreases, and warranties only guarantee a minimal amount of capacity that will be preserved at the end of the term. Staff believes that operating between 20% and 80% state of charge reduces this reduction, and daily cycling of roughly 365 cycles annually is well within the rated cycle life of modern lithium iron phosphate products. I recommend modeling a gradual capacity loss over years 1 to 10. This matters most where results are already close: Table 16 shows a ratio of 0.91 for Religious Worship with a battery in Climate Zone 1,

so a battery requirement there would not be cost-effective even before fade is counted. Staff could also add a case in which the battery continues operating at reduced capacity after year 10, which is how many owners will use it.

5. Report how sensitive results are to the sizing season (Question 2)
Sizing to the lowest season keeps exports low but leaves schools with systems much smaller than their school-year loads. This is due to PV-only ratios for K-8 and high schools ranging from about 1.3 to 2.5. I am of the opinion that staff should report results for a second sizing case based on a higher-load season. This would tend to show whether larger systems remain cost-effective, and the code should make clear that the required size is a minimum, not a cap.

6. Keep module requirements technology-neutral.
Higher-efficiency products, including perovskite-silicon tandem modules, are approaching commercial use and can deliver more power from limited roof area. Requirements should be stated in terms of rated DC capacity and listing to recognized safety and performance standards, such as UL 61730 and IEC 61215, rather than assumptions tied to one cell technology. This lets building owners use better modules as they become available.

Thank you for the opportunity to comment.