

NYSERDA's NY-Sun PV Incentive Program

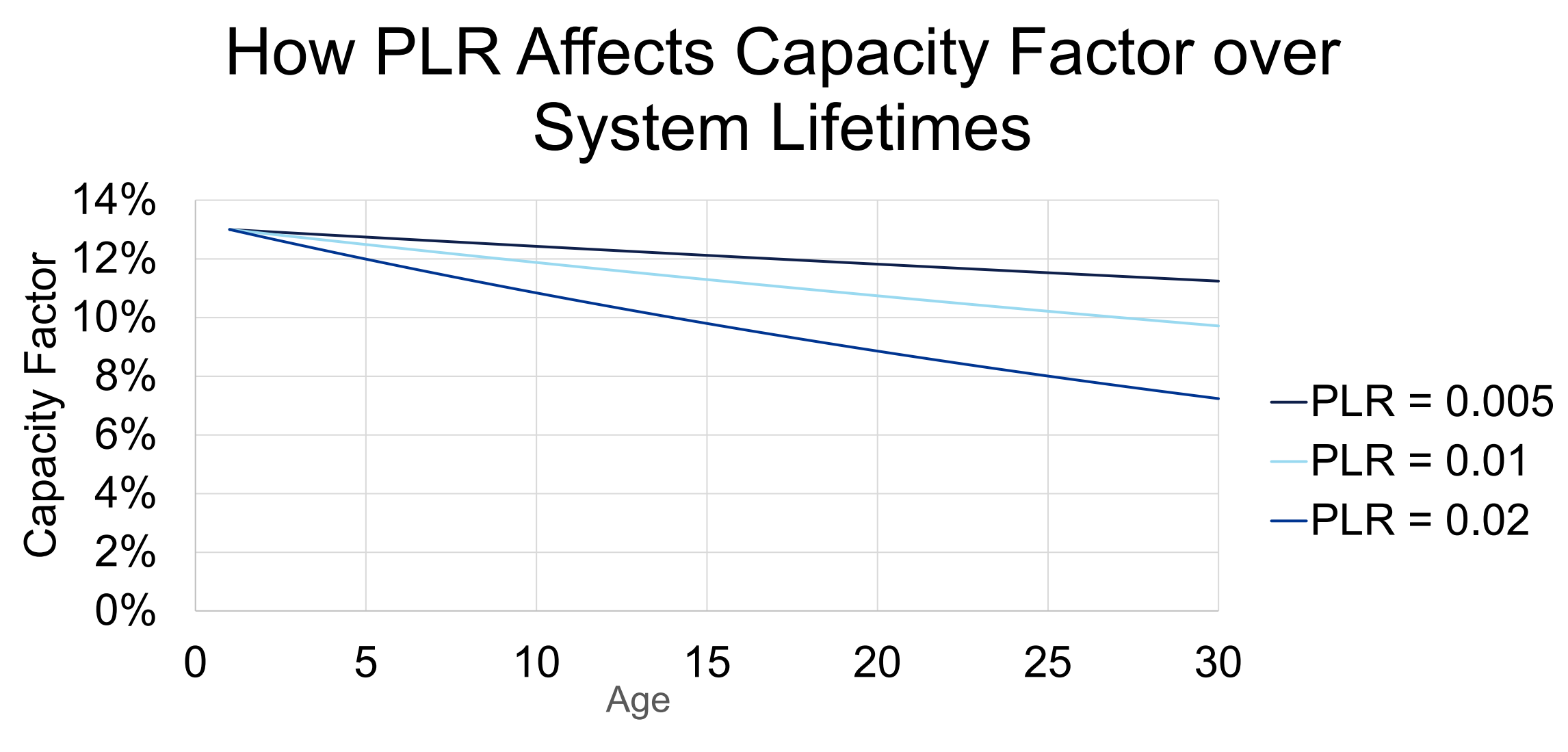
- Provides cash incentives and/or financing for distributed solar PV installations, 2010 - 2025

Study Goals

- Assess the persistence of distributed solar production in NYS over time and the relationship of persistence to solar asset characteristics.
- This will allow NYS to estimate the contributions of installed customer-sited assets to current and future renewable energy generation in the state.

Approach

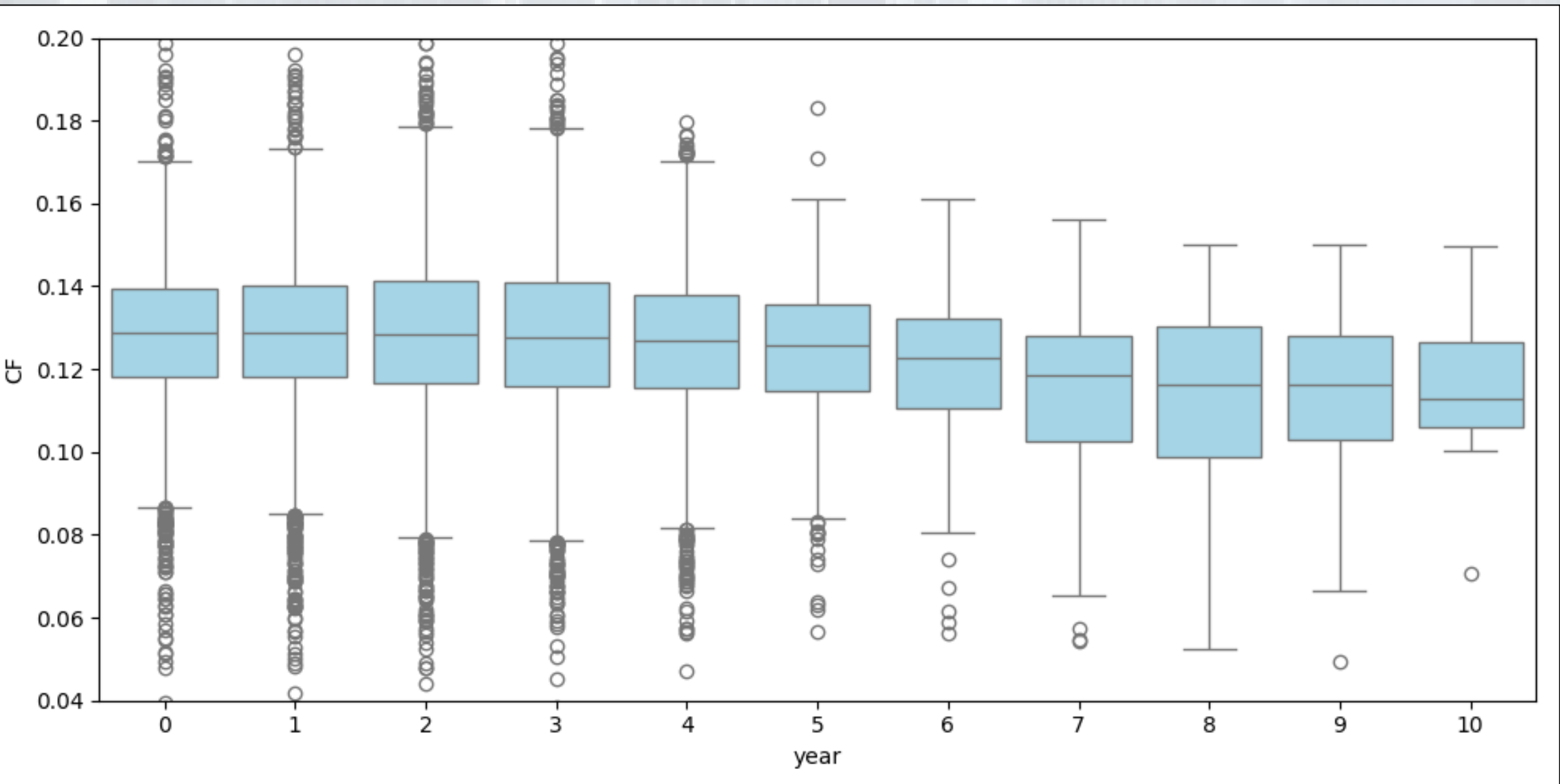
- Persistence is assessed by the **performance loss rate (PLR)**, the year-over-year percentage reduction in annual production, normalized to typical irradiation levels for the location.
- PLR is estimated from monthly production data on over 13,000 systems, using an exponential decay model with underlying monthly levels.
- Effects of system characteristics are assessed in **2 ways**:
 - Simple group differences of average asset-specific PLR
 - Cross-factor regression analysis to isolate the effects of each factor, controlling for the others



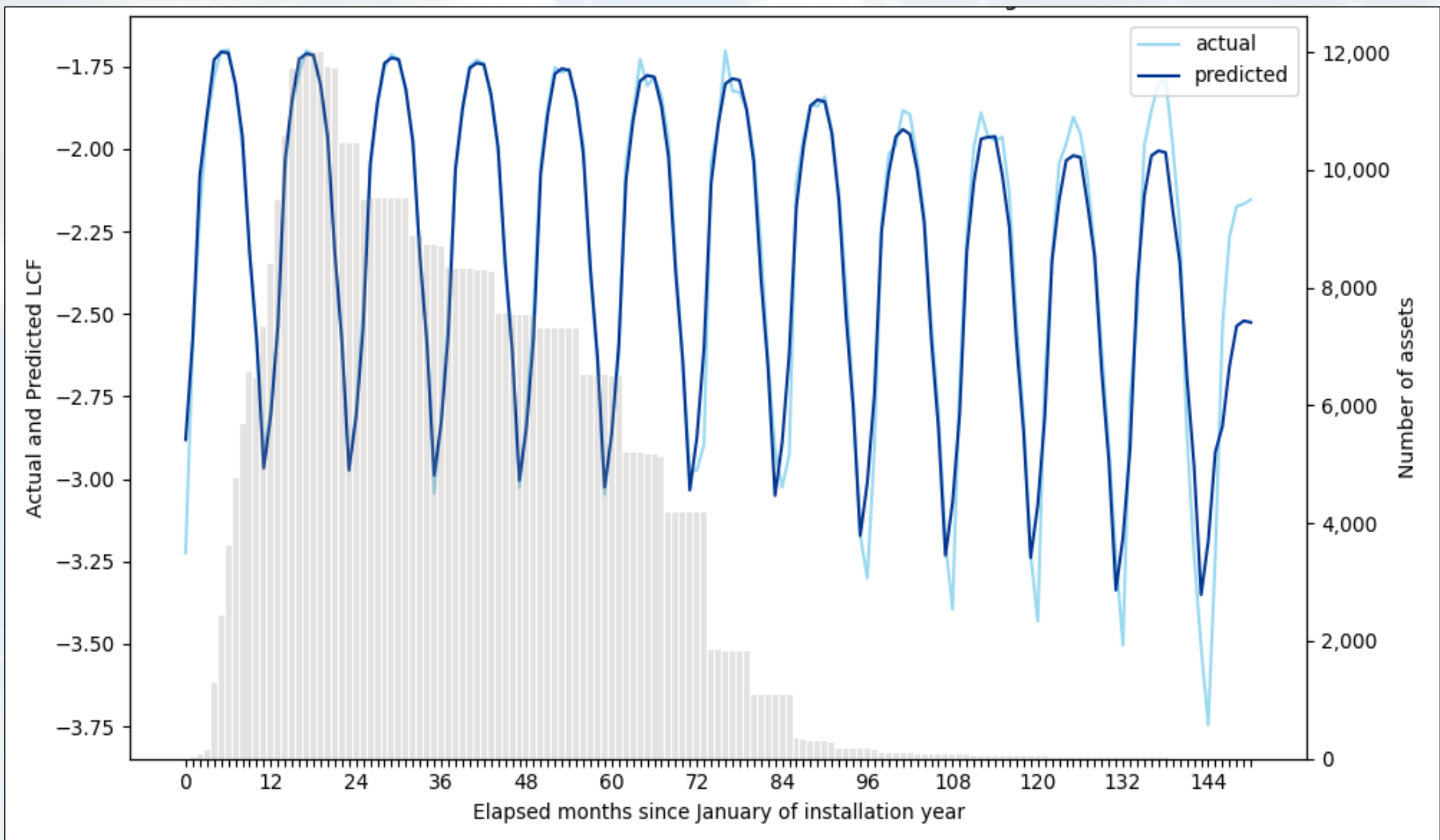
Declining capacity factor with age reflects a combination of PLR and technology changes over installation years.

Projects with more years are older technology.

Projects have up to 12 years of data, with the majority of 5 to 7.



Modeled production closely matches actual over months and years and shows overall declining capacity factor over time.



Potential Next Steps

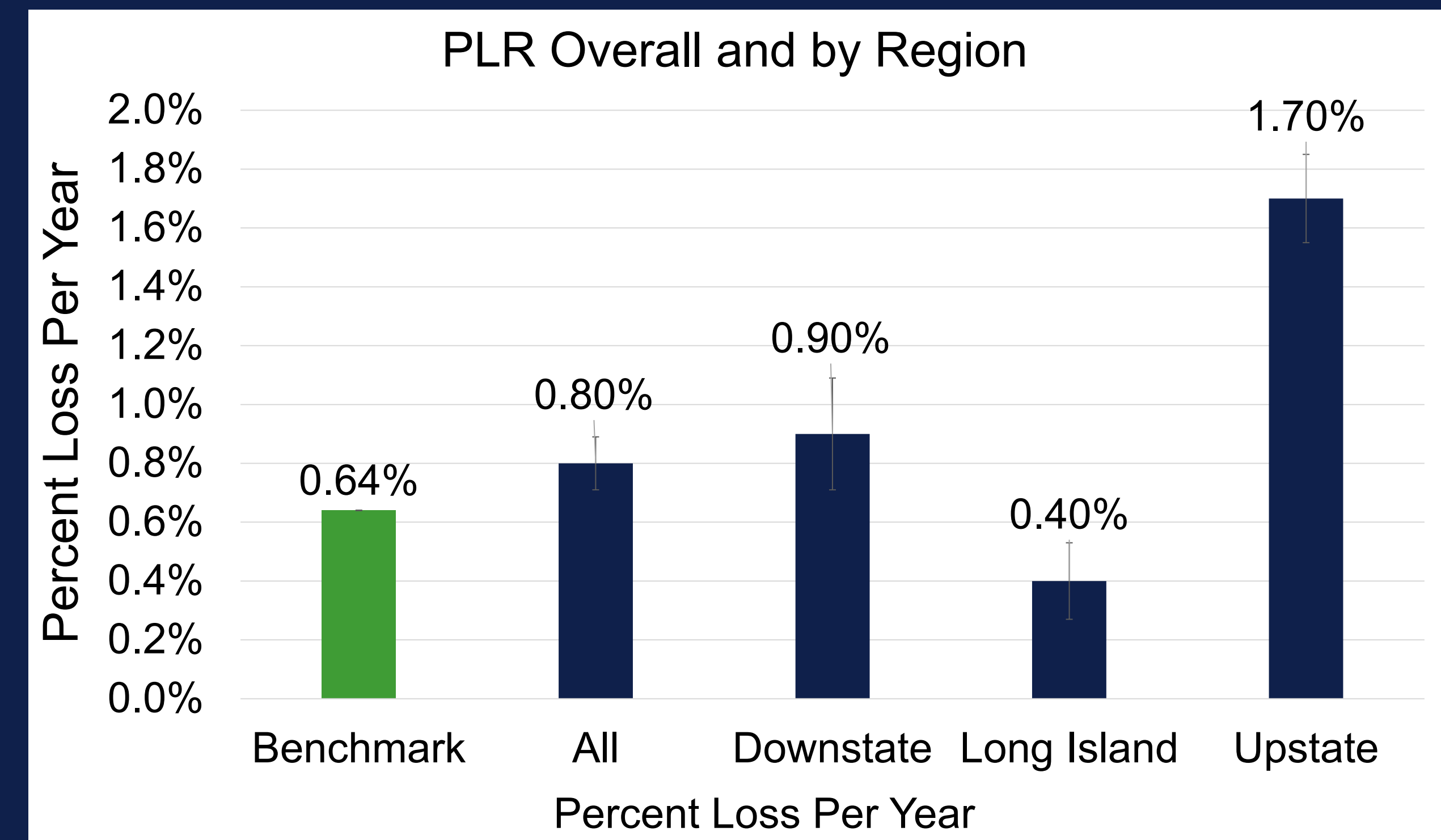
- Collect additional production data to understand how these systems operate later in life, as well as newer systems.
- Study what factors contribute to high PLRs and how to mitigate these factors. e.g., snow, pitch, other characteristics.

Key Findings

This study finds an average PLR of 0.83% per year for assets in NYS, with substantial variation by region.

If sustained over the system life, this PLR would mean a loss of over 20% of production by age 25.

Actual loss rates over later years are not yet observed.

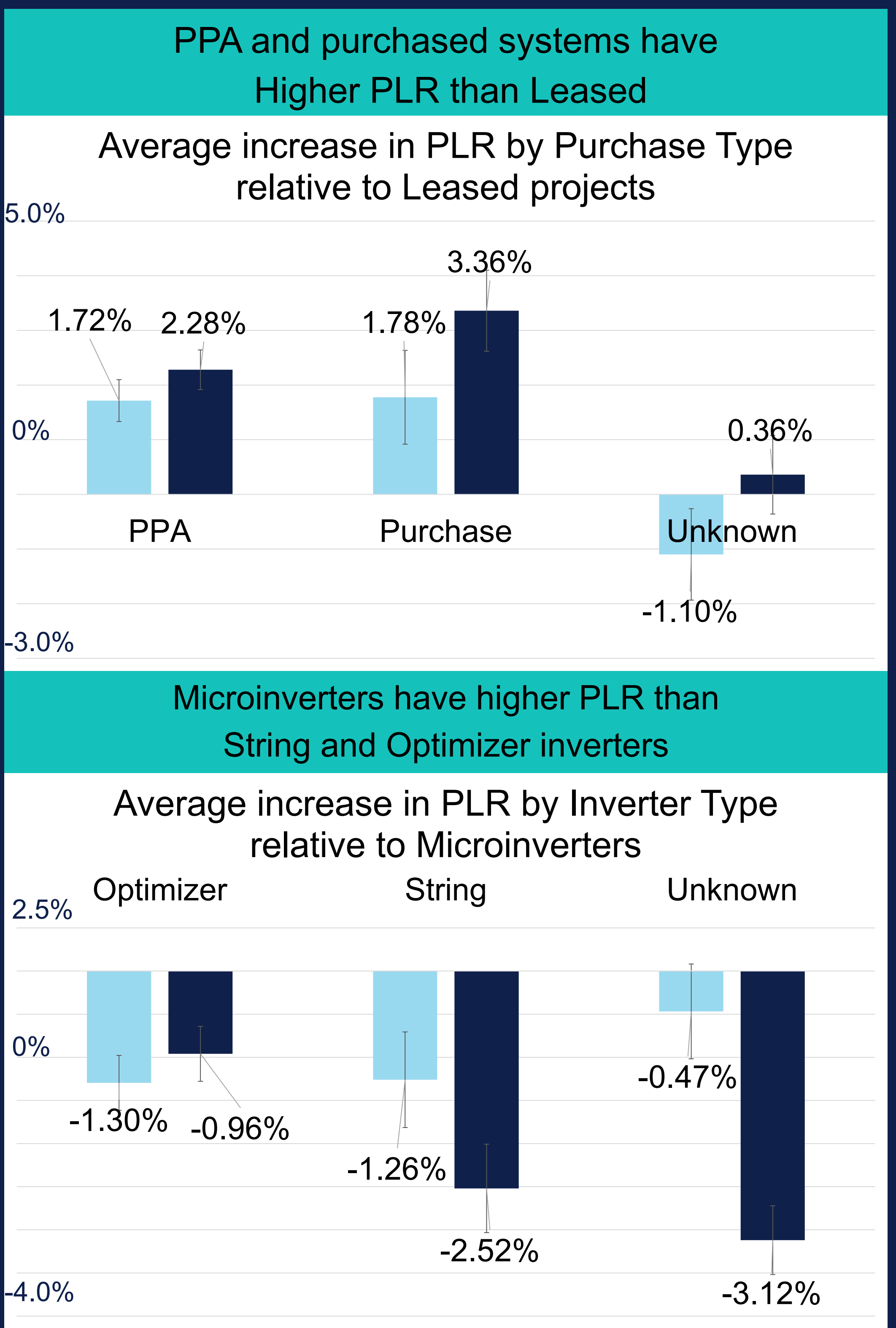
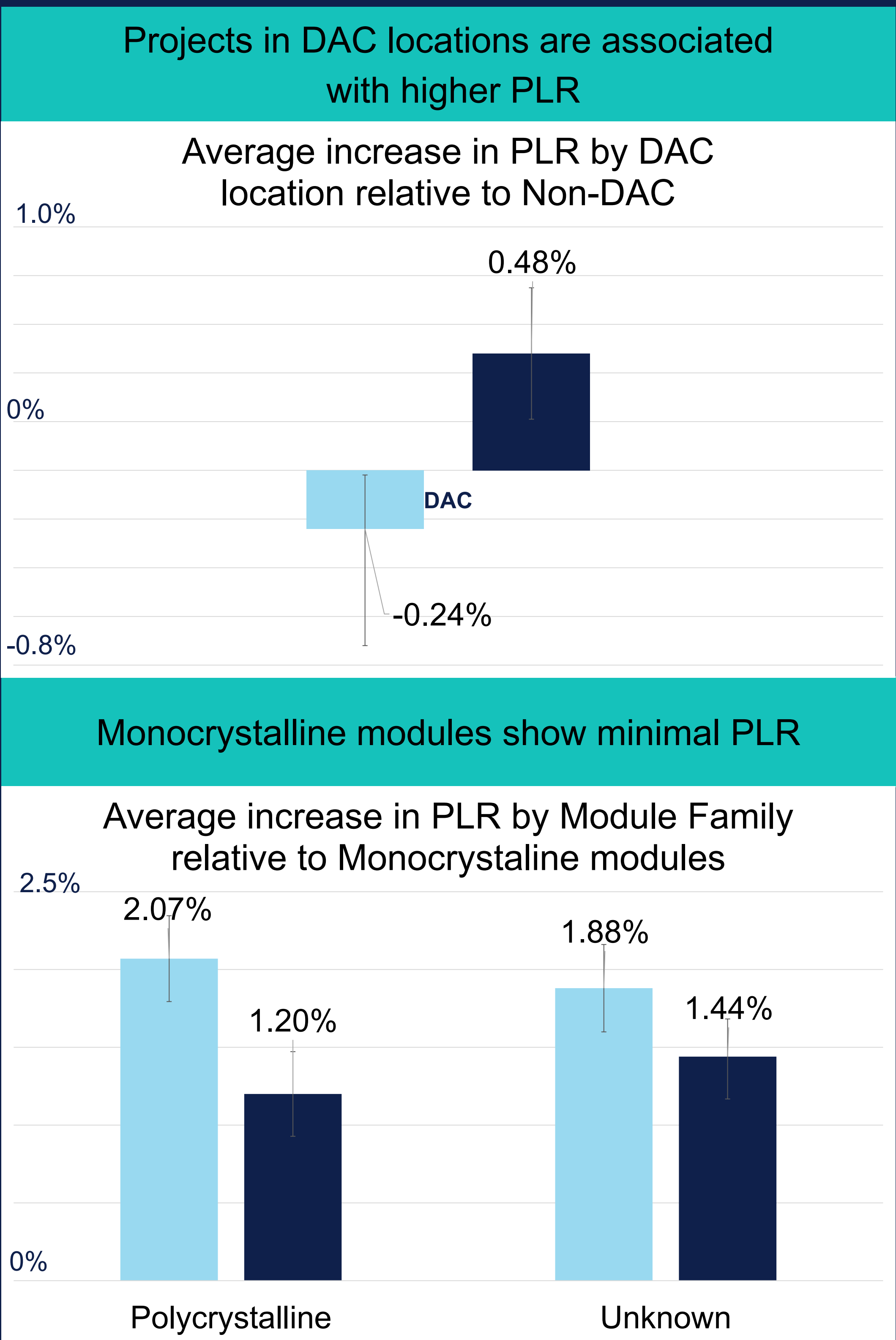


*Bars indicate standard errors

Prior work not specific to NYS identifies system degradation rates generally in the range of 0.4% to 0.8% per year across various studies and regions and identifies 0.64% as a working assumption for most systems.

NYS average is at the high end of this range, driven by high upstate PLR.

Incremental Effects on PLR of Differences in System Characteristics



*The axis = Percent Loss Per Year; Bars indicate standard errors

Incremental Effects Key:

Simple Difference of Average PLR

Incremental effect on PLR holding other factors constant