California Energy Commission

Historical Distributed Generation Adoption Trends in California

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Presentation Overview

- This presentation will cover the following topics:
  - California Energy Demand (CED) 2023 Overview
  - Historical Behind-The-Meter (BTM) Distributed Generation (DG) Updates for the 2023 CED Forecast.
  - Historical BTM solar photovoltaic adoption trends
  - Historical BTM energy storage adoption trends
- Questions and comments are encouraged throughout today's presentation.

2023 CED Overview

General 2023 CED Updates

- Moody's projections – May vintage

- DOF population projections – July vintage
  - CEC staff revised household projections based on population projections

- Forecast to 2040
  - Supports CAISO's Transmission Planning Process, per SB 887
  - Extend to 2050 for long-term demand scenarios

- Managed forecast scenarios
  - One baseline forecast
  - Planning Forecast (AAEE 3 / AAFS 3 / AATE 3)
  - Local Reliability Scenario (AAEE 2 / AAFS 4 / AATE 3)

Key Dates

IEPR Workshops
- Inputs and assumptions – August 15 and 18
- Load modifier results – November 15
- Overall forecast results – December 6

Historical BTM DG Updates

Historical Behind-The-Meter Distributed Generation Updates

- Refreshed historical BTM solar PV and storage cumulative capacity estimates.

- Refinements include:
  - Shifting to a single data source for BTM solar PV and energy storage capacity information.
  - Improving and expanding data cleaning tools

Interconnection Data

- Previously relied upon three data sets to estimate historical cumulative BTM solar and energy storage capacity in California.
  - Historical cumulative BTM energy storage capacity was estimated from a combination of CPUC's Self Generation Incentive Program (SGIP) and Rule 21 interconnection data.
- Staff transitioned to utility distribution company (UDC) interconnection data collected under California Code of Regulations, Title 20, Division 2, Chapter 3, Section 1304(b) to estimate historical cumulative DG capacity.
  - The data includes a list of all interconnected energy systems located within each UDC's service territory.

Data Cleaning Improvements

- Each UDC's interconnection data set may contain unique issues that have to be addressed to estimate historical DG capacity.
    - Previously, staff manually cleaned UDC interconnection data to resolve data problems.
    - For CED 2023, staff developed data cleaning scripts for each UDC to automate cleaning steps and improve the accuracy of our estimates.
        - The following slides highlight how our revised historical data cleaning process has impacted our historical BTM DG cumulative capacity estimates.

Historical BTM Solar Adoption

Historical BTM Solar Adoption: Statewide

- CED 2023 estimates 14,220 MW of BTM solar capacity statewide by end of year 2022.

- Cumulative BTM solar capacity estimate is about 7% lower than CEDU 2022 in 2021.
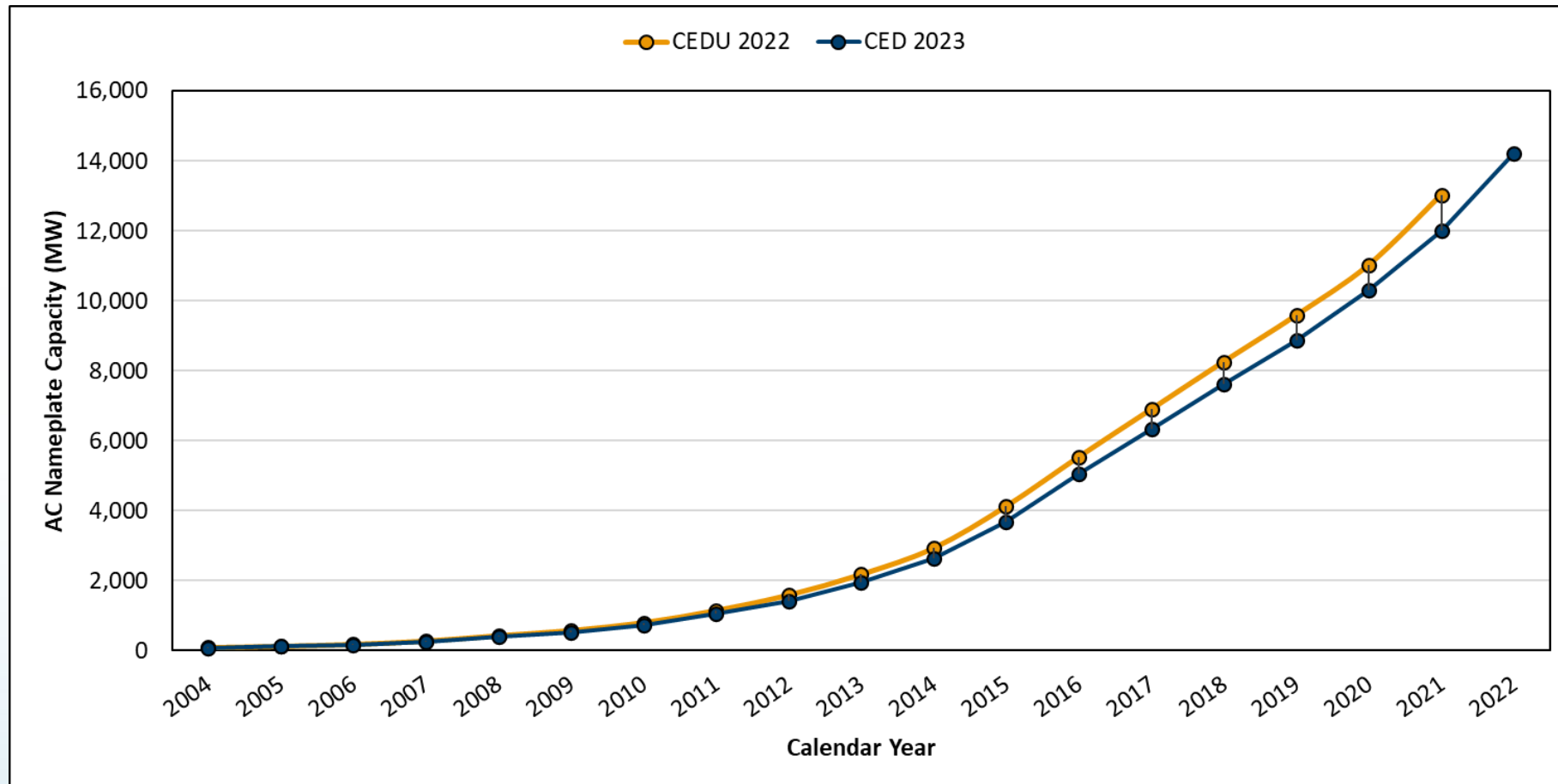
Solar Charts Notes

- Estimates cover IOU service territories not CEC Planning Areas.
  - Additional charts for each CEC Planning Area are provided in the slide deck appendix.
- CED estimates includes NEM **and** Rule 21 Non-Export interconnection agreements.
  - DG Stats **only** includes NEM interconnection agreements.

Historical BTM Solar Adoption: CAISO

- This estimate covers PG&E, SCE, and SDG&E service territories.

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	10,551	11,846	10,818
2022	12,626		12,870
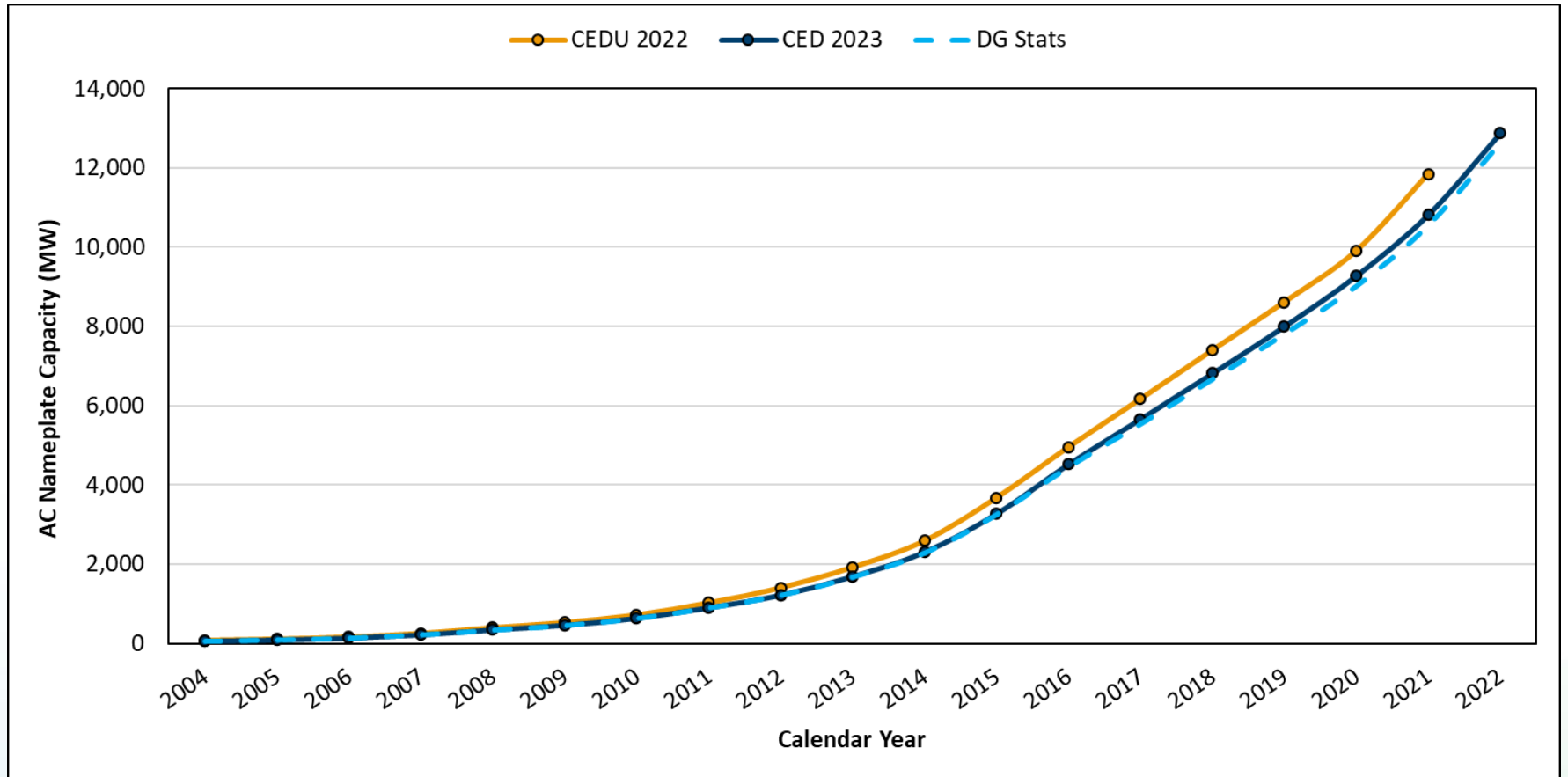
Historical BTM Solar Adoption: PG&E Service Territory

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	5,475	6,380	5,633
2022	6,511		6,733
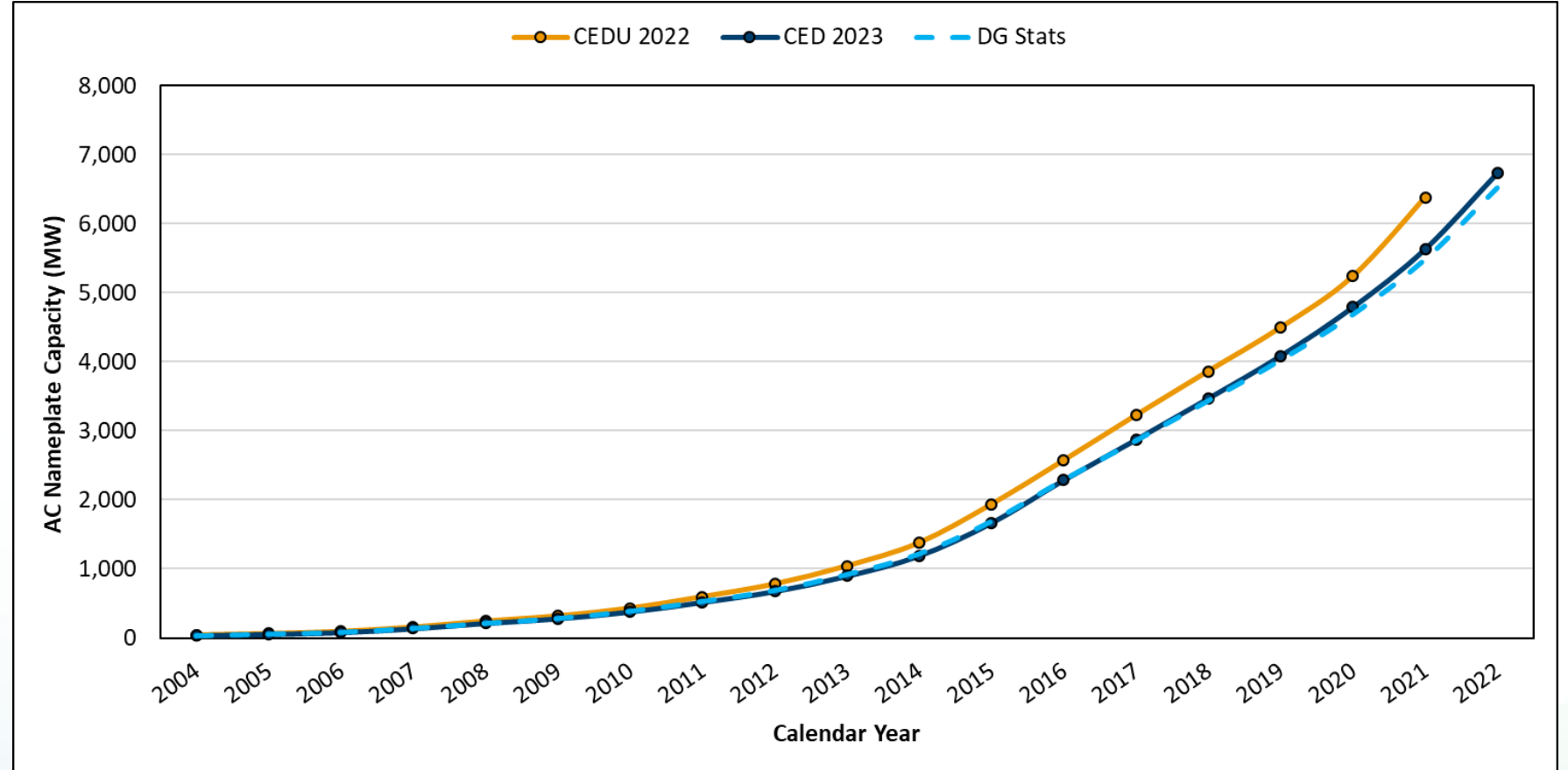
Historical BTM Solar Adoption: SCE Service Territory

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	3,497	3,865	3,594
2022	4,276		4,323
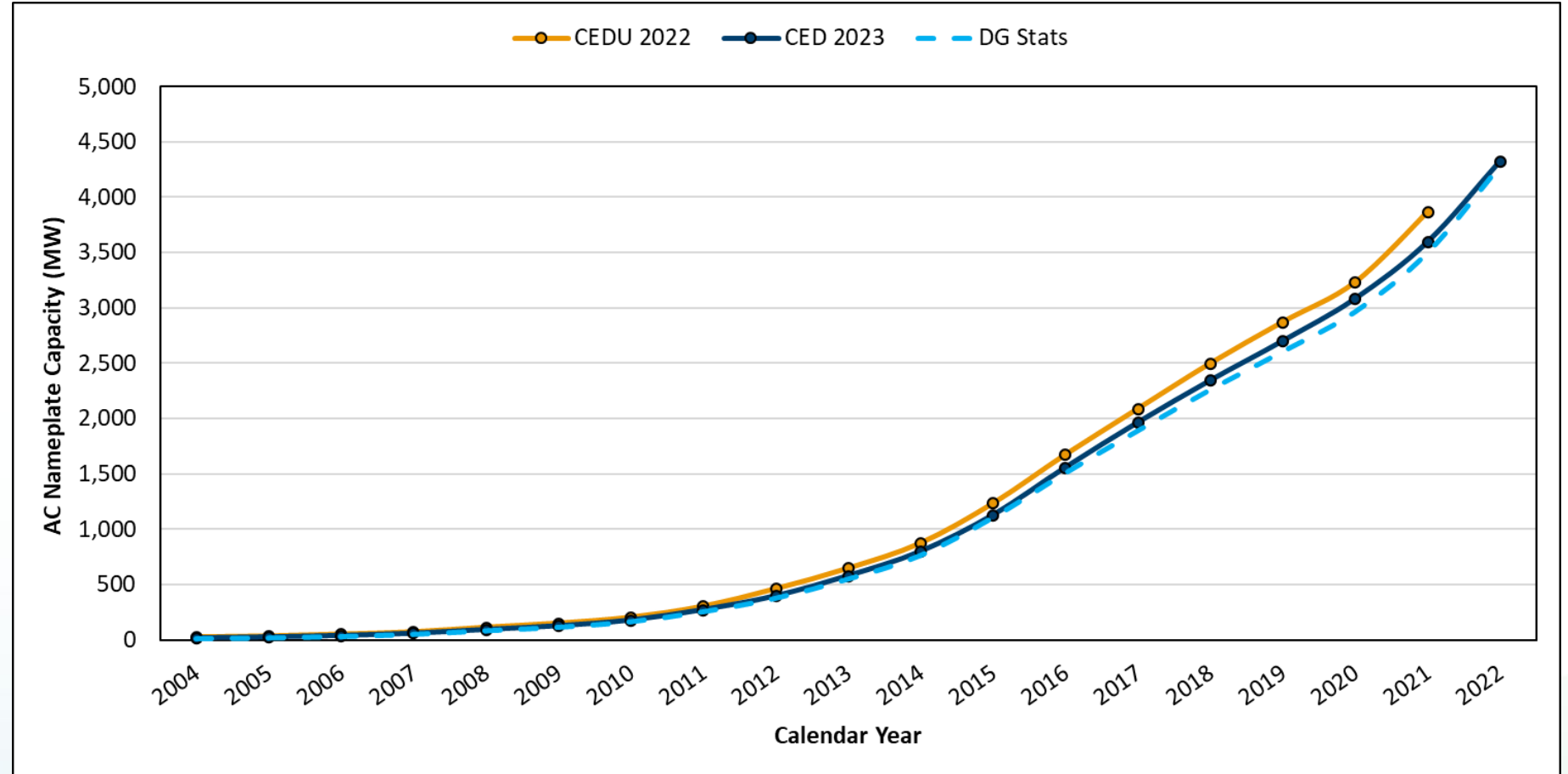
Historical BTM Solar Adoption: SDG&E Service Territory

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	1,580	1,601	1,591
2022	1,839		1,814
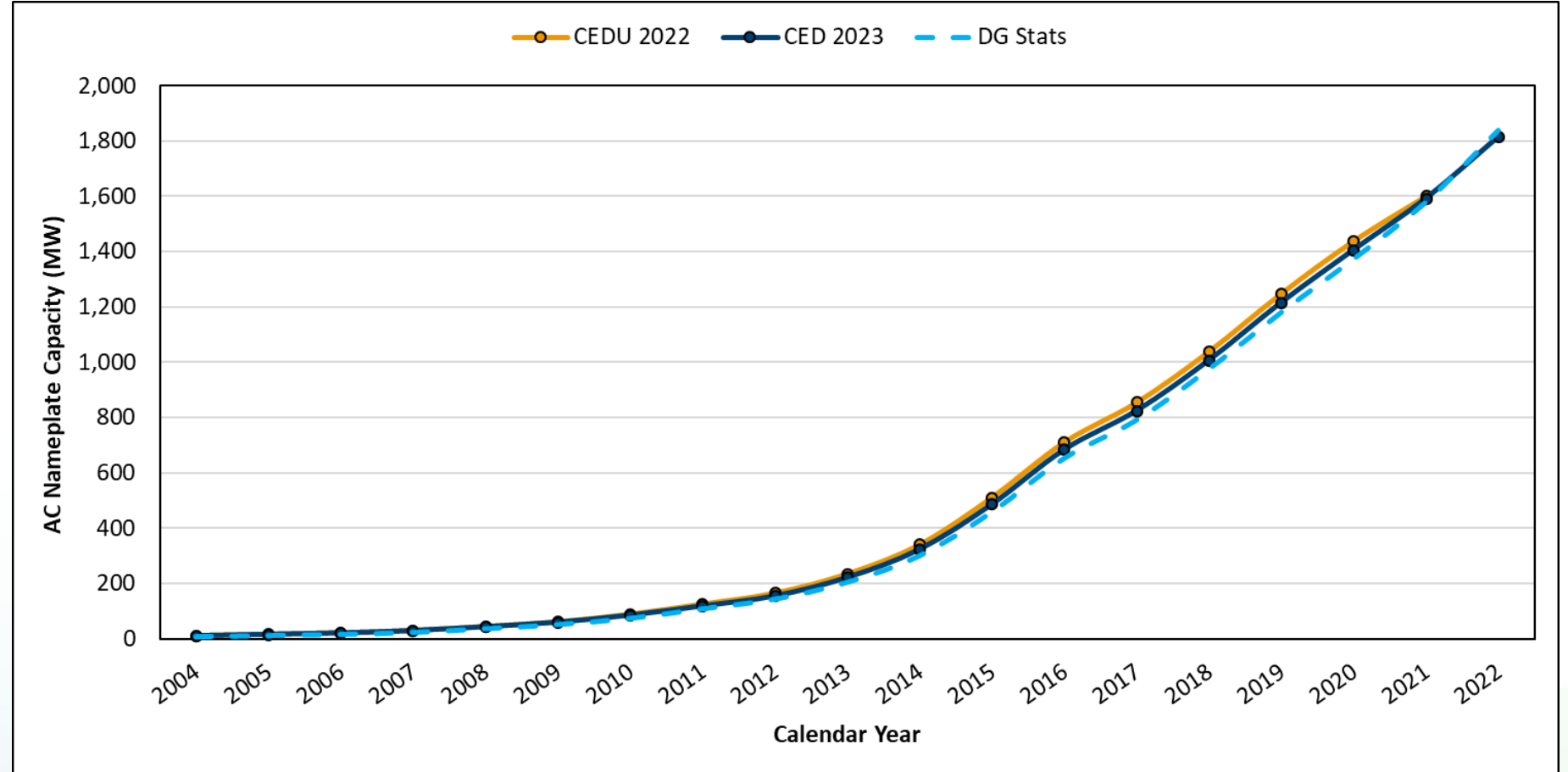
Historical BTM Storage Adoption

Storage Charts Notes

- Previous CED estimates are based off SGIP and Rule 21 interconnection data.
    - CED 2023 estimates are derived from UDC interconnection data.
- CEC staff reached out to IOUs and CPUC to resolve discrepancies shown in the following slides.
    - Staff will provide updated storage estimates as soon as possible.

Historical BTM Storage Adoption: SDG&E Service Territory

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	127	88	126
2022	172		167
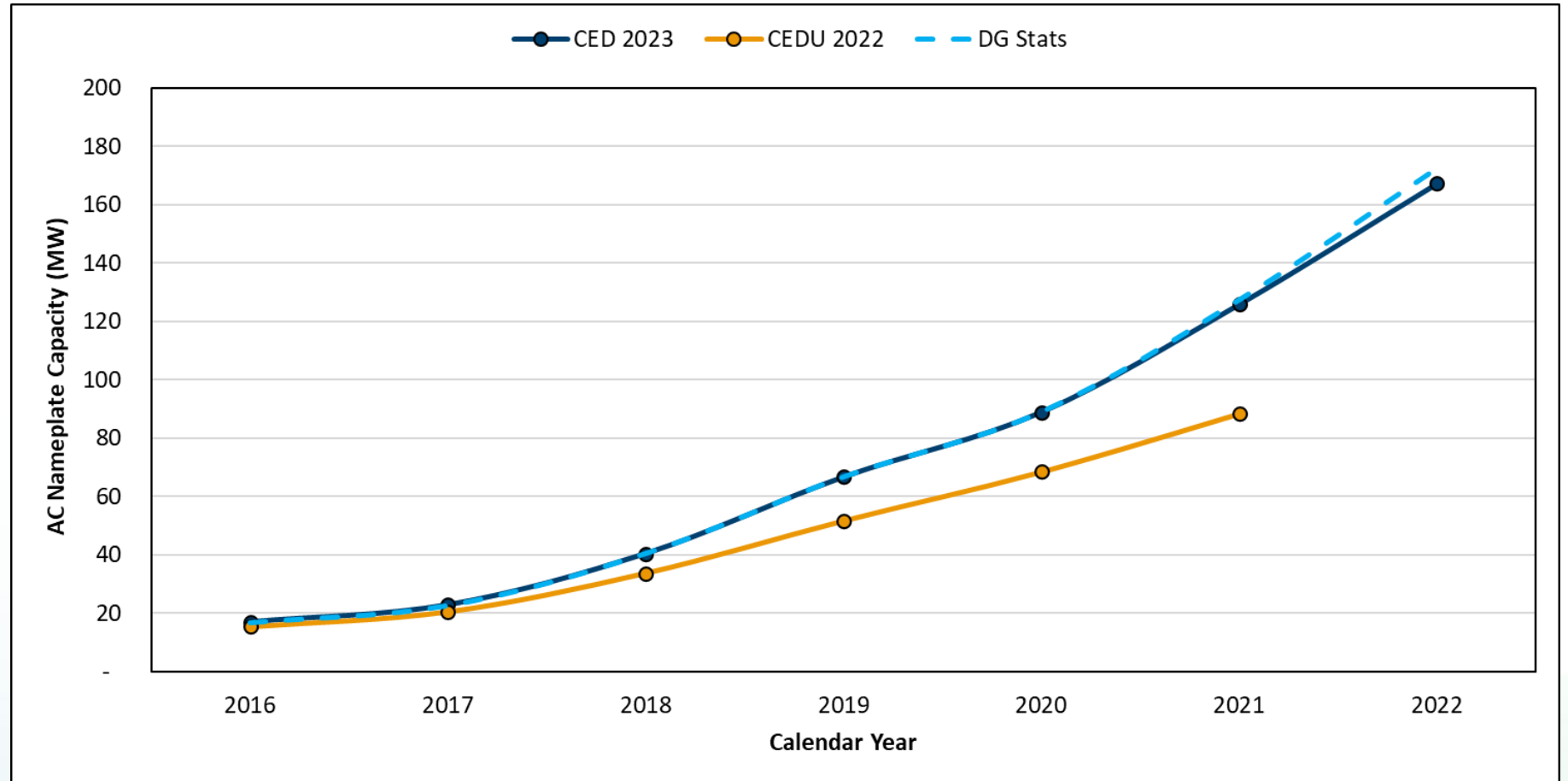
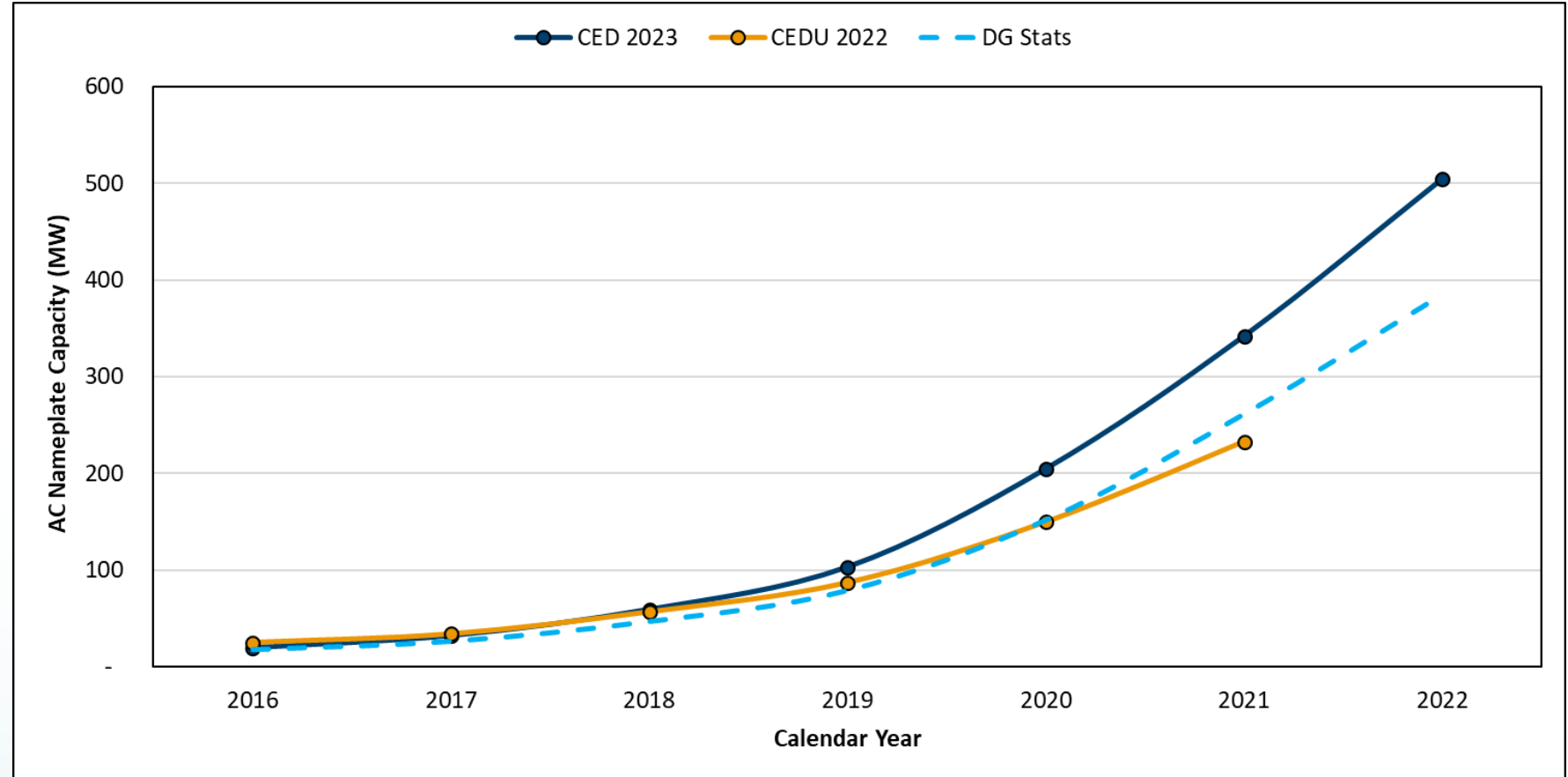# Historical BTM Storage Adoption: SDG&E Service Territory by Sector
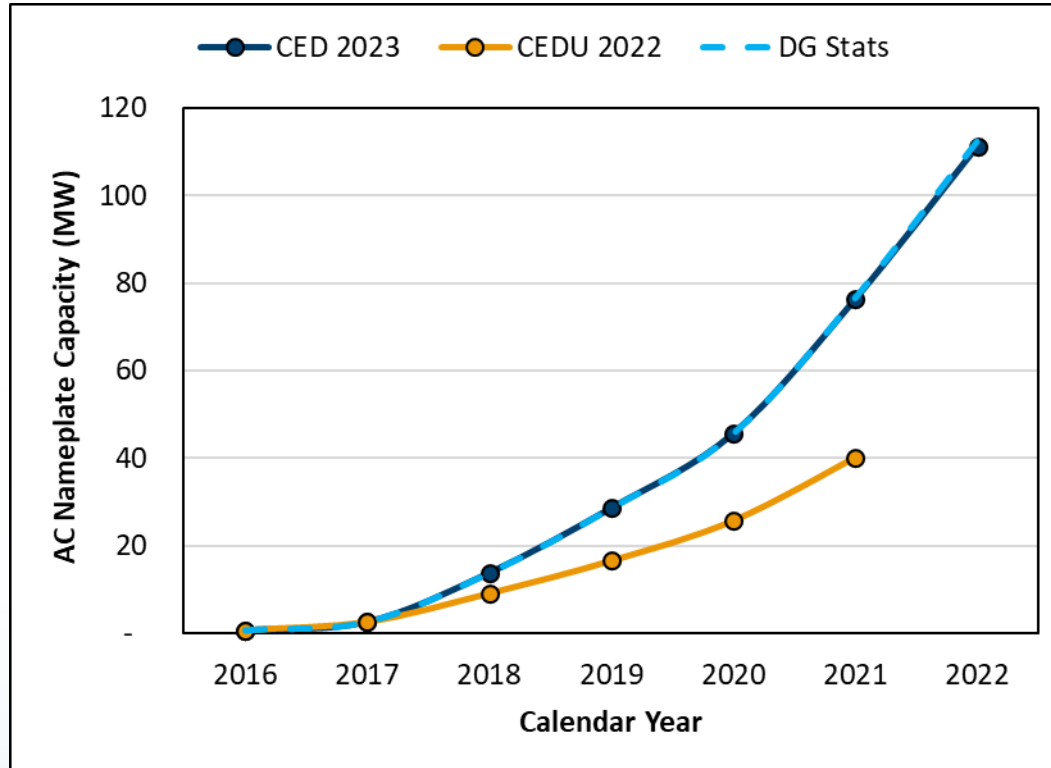
Residential
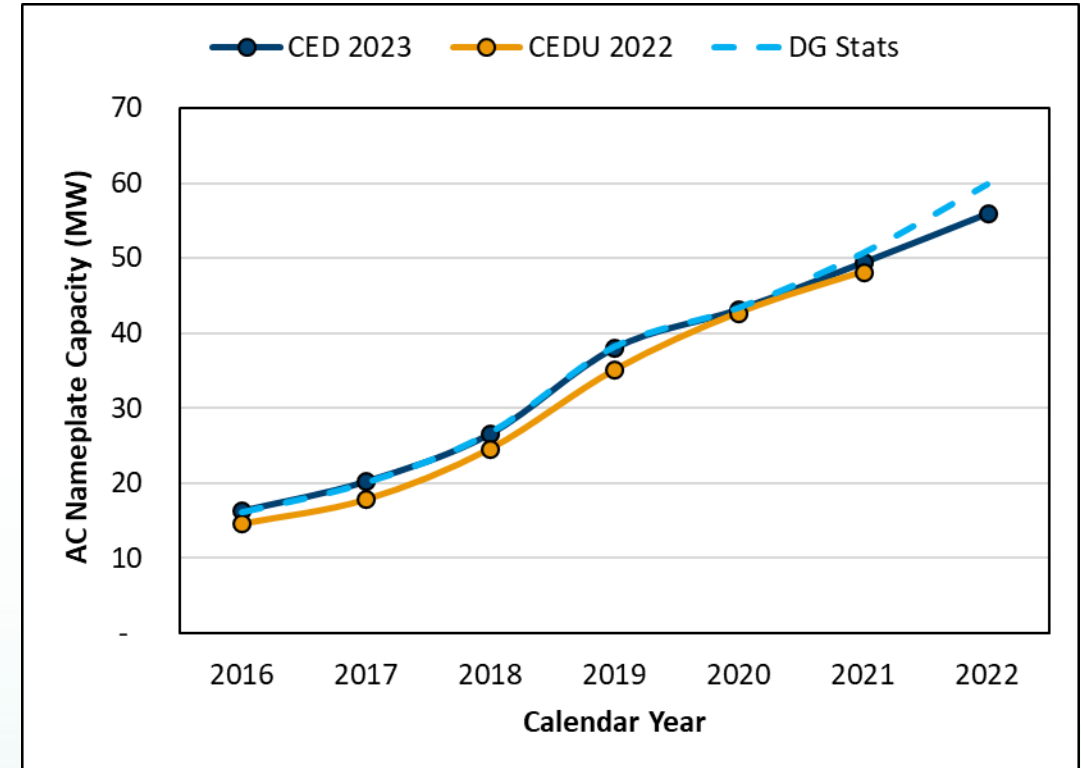
Non-Residential

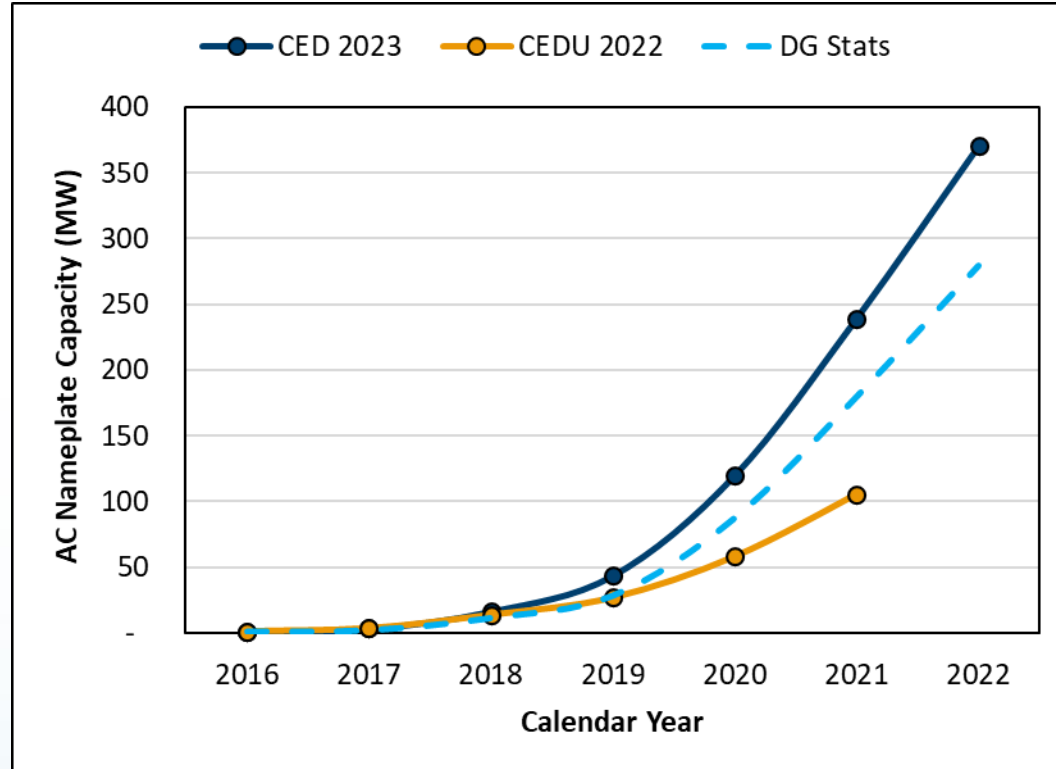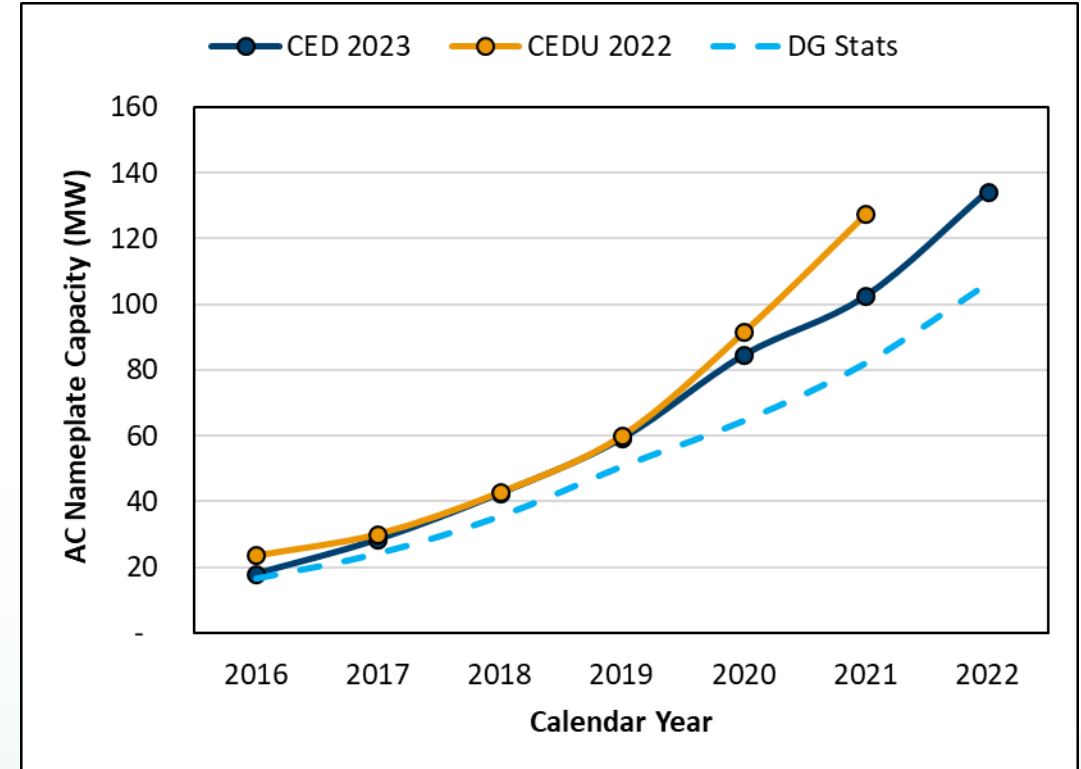# Historical BTM Storage Adoption: SCE Service Territory

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	287	246	335
2022	367		416

Historical BTM Storage Adoption: SCE Service Territory by Sector

Residential

Non-Residential

Year	DG Stats (MW)	CEDU 2022 (MW)	CED 2023 (MW)
2021	262	233	342
2022	385		505
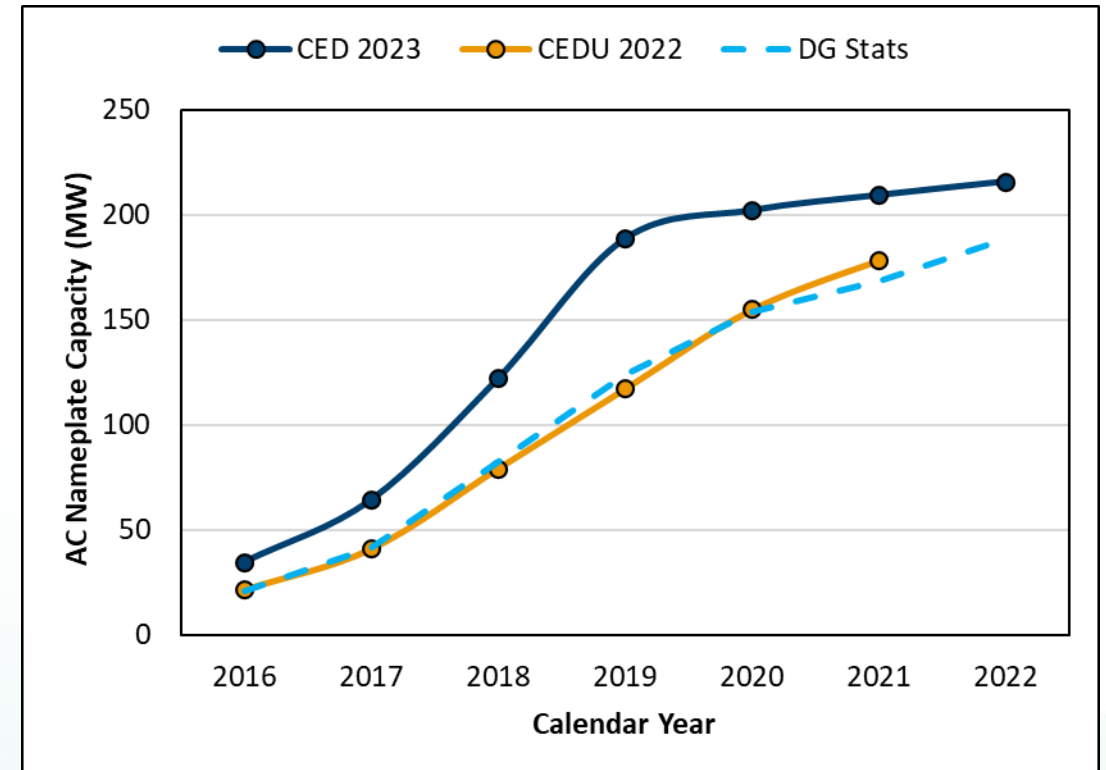
Historical BTM Storage Adoption: PG&E Service Territory by Sector
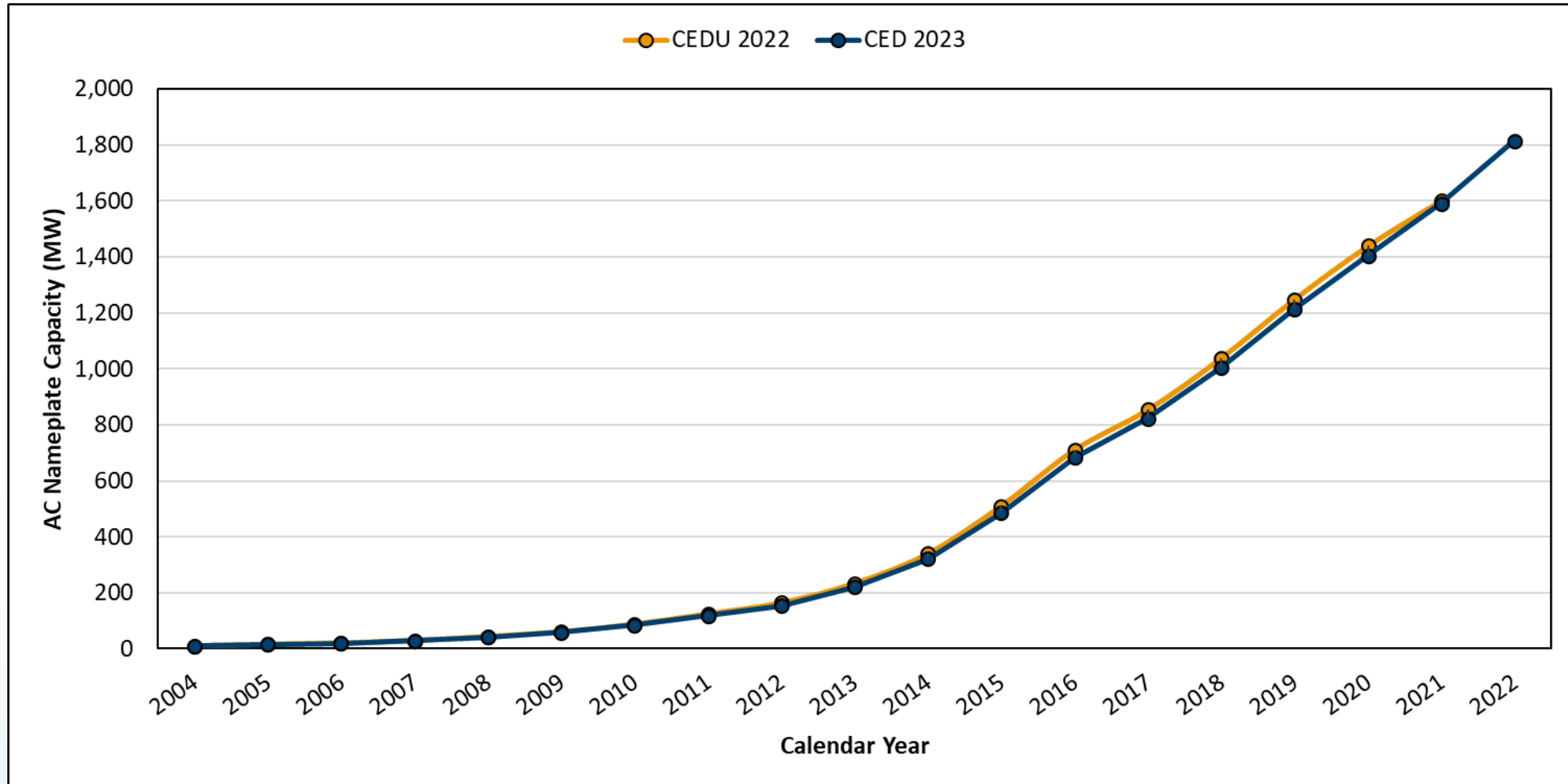
Thank You!

Slide Deck Appendix

Historical BTM Solar Adoption: PGE Planning Area
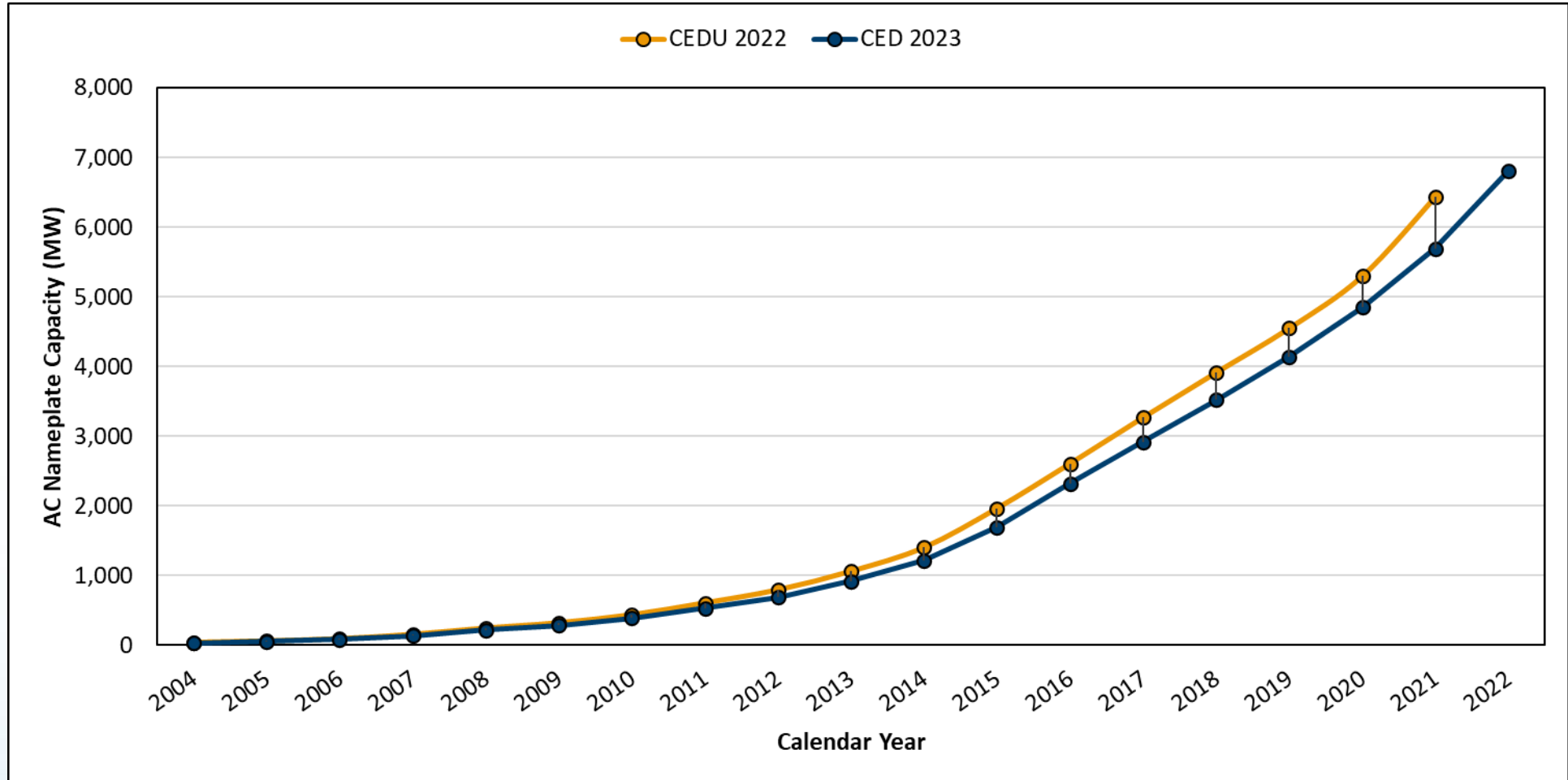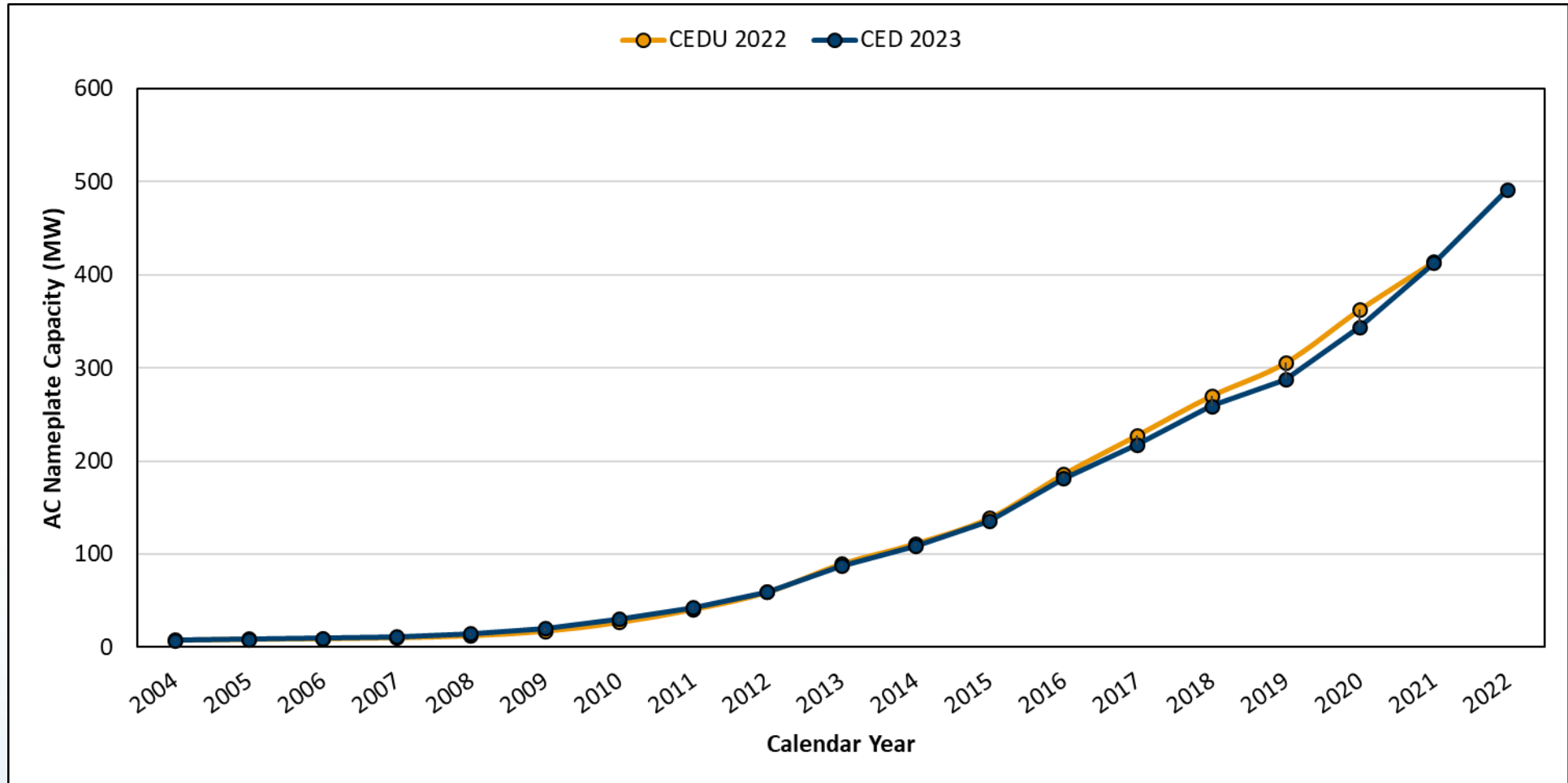
Historical BTM Solar Adoption: SCE Planning Area
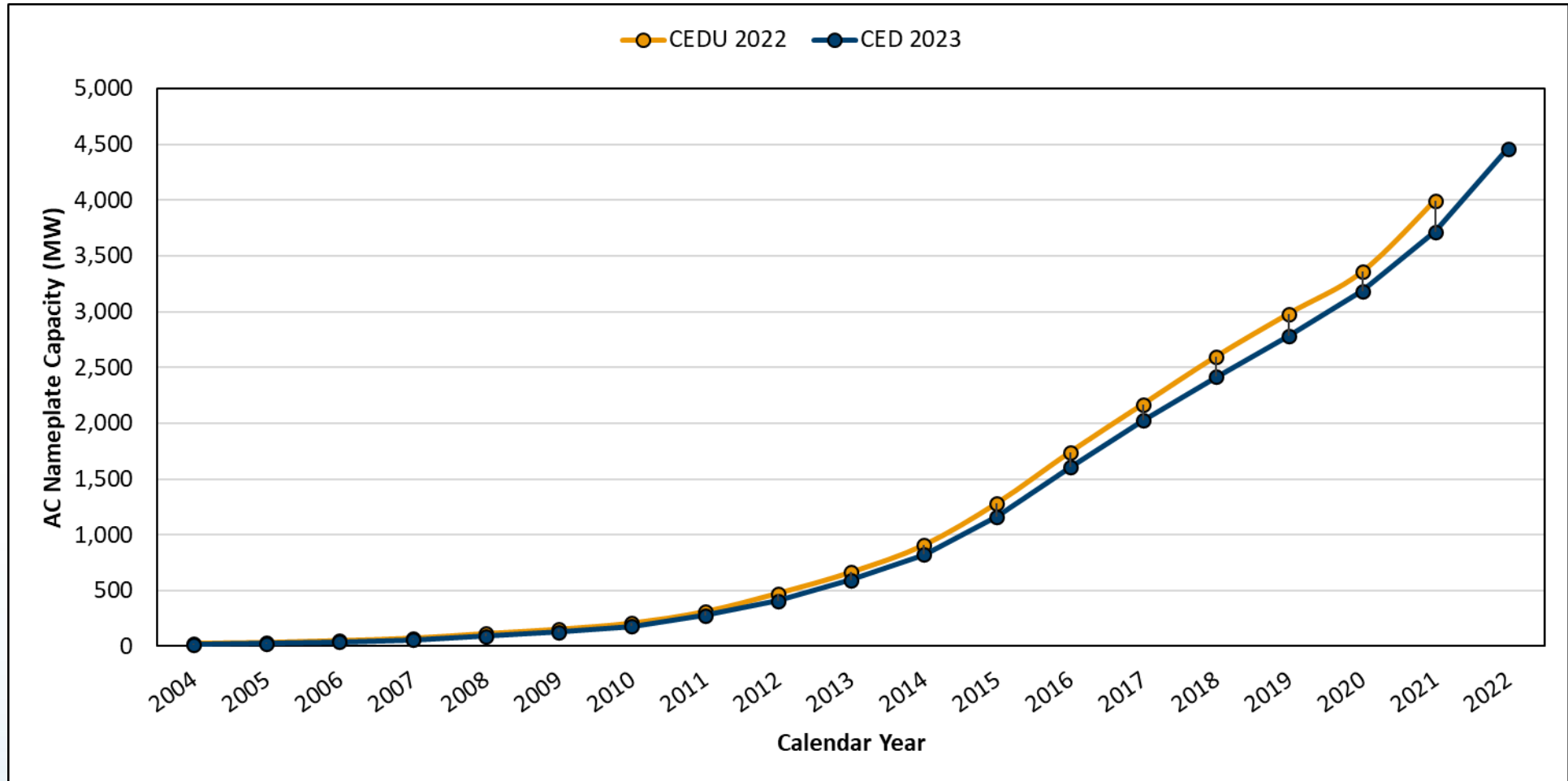
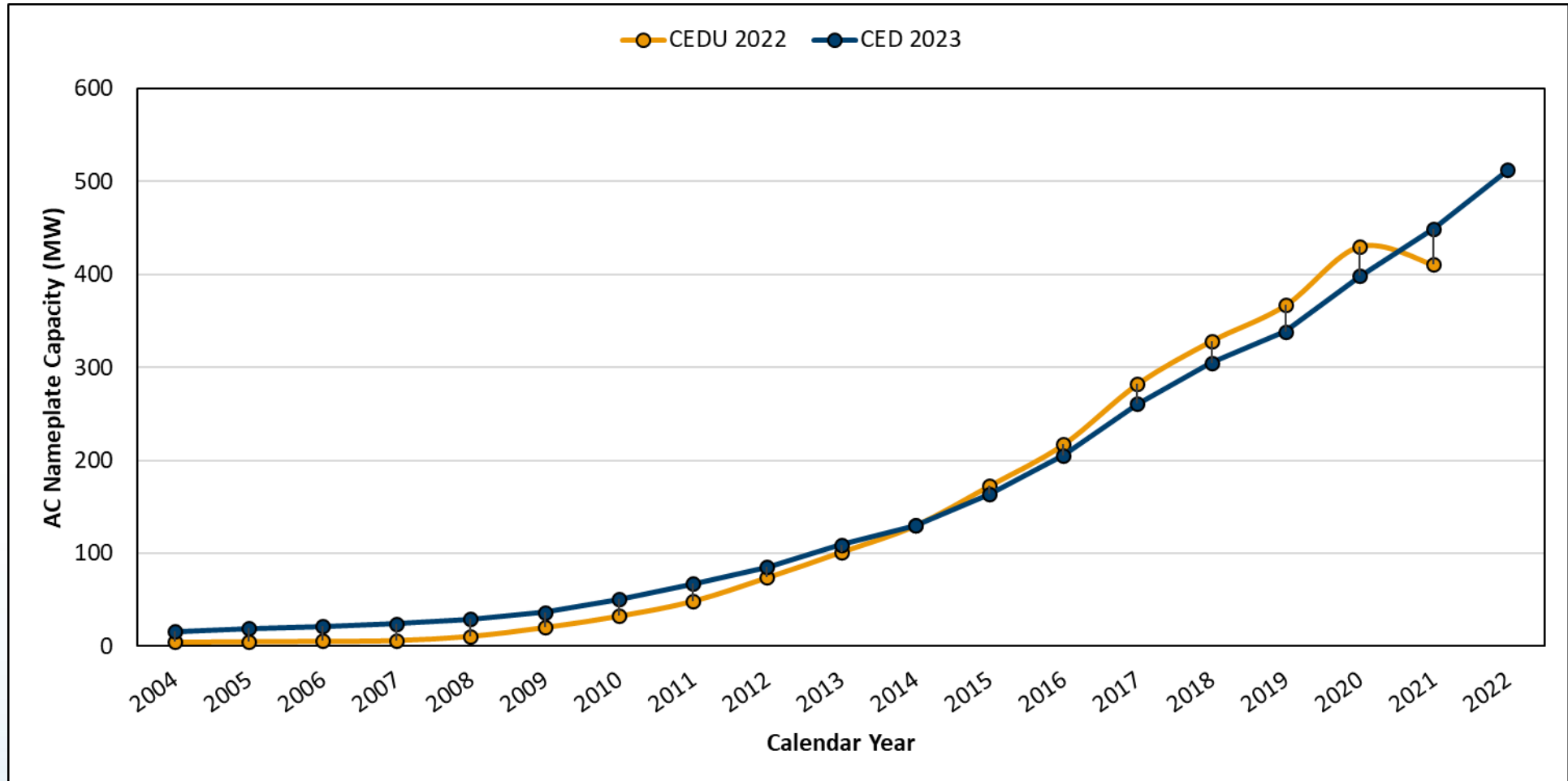# Historical BTM Solar Adoption: SDG&E Planning Area

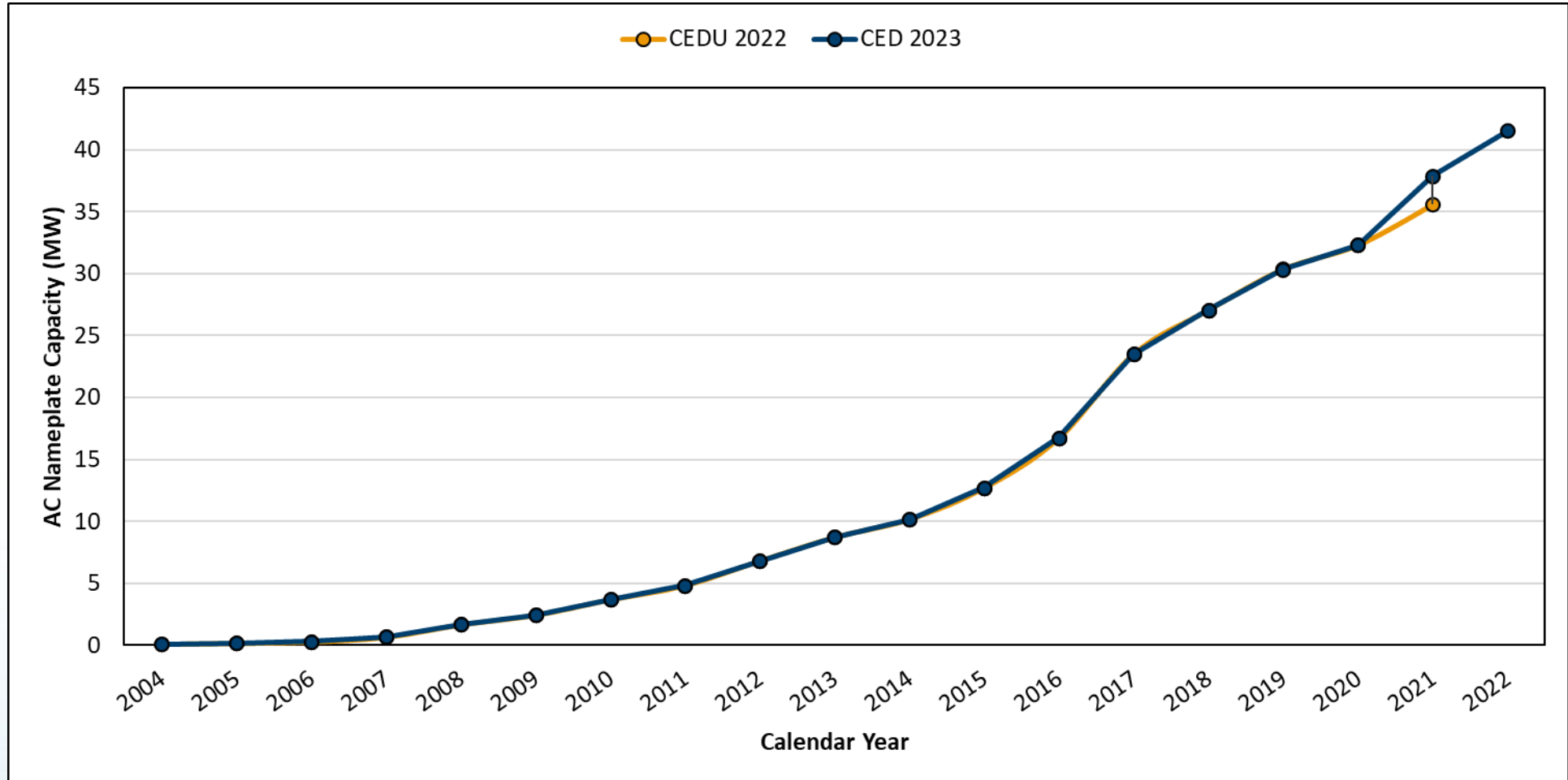# Historical BTM Solar Adoption: LADWP Planning Area
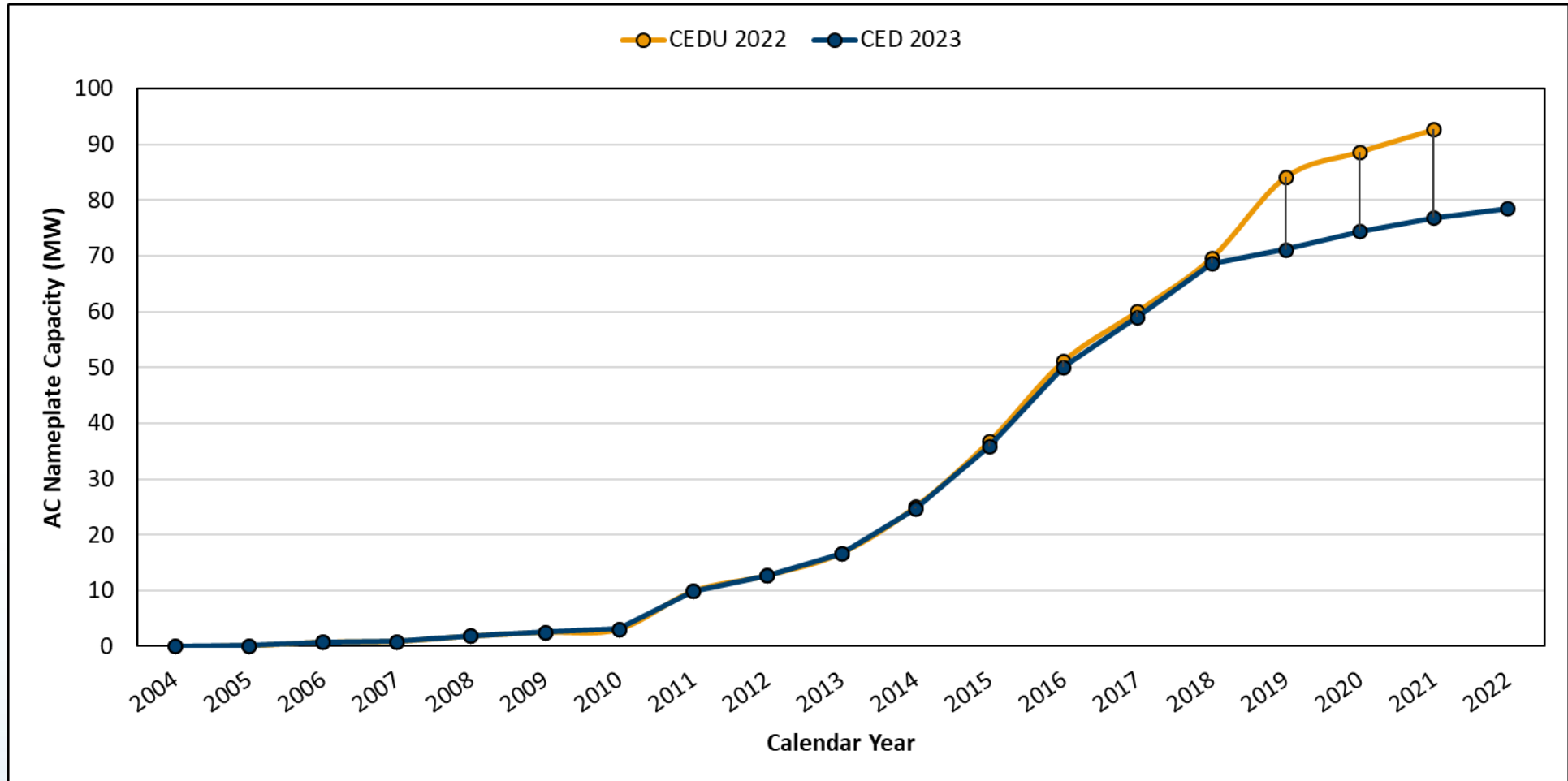
Historical BTM Solar Adoption: NCNC Planning Area

Historical BTM Solar Adoption: BUGL Planning Area

Historical BTM Solar Adoption: IID Planning Area

Historical BTM Solar Adoption: OTHER Planning Area