Historical Behind-the-Meter Distributed Generation Insights

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List of Acronyms and Initialisms

BTM – Behind-the-meter

CAISO – California Independent System Operator

CPUC – California Public Utilities Commission

DIB – Data Integration Branch

DG – Distributed Generation

DGStats – California Distributed Generation Statistics

IOU – Investor-Owned Utility

MW – Megawatt

MWh – Megawatt Hour

NBT – Net Billing Tariff

NEM – Net Energy Metering

PA – Planning Area

PG&E – Pacific Gas and Electric

POU – Publicly Owned Utility

PV – Photovoltaics

QFER – Quarterly Fuel & Energy Report

SCE – Southern California Edison

SDG&E – San Diego Gas & Electric

UDC – Utility Distribution Company

Relevance

- **Historical BTM PV capacity use cases:**
  - ➢Used to calculate BTM PV Generation
    - Hourly Load Model (HLM)
    - Sector Models
  - ➢Input to dGen model
    - Forecasts BTM PV & Storage adoption
- **Historical BTM Storage capacity use cases:**
  - ➢Input to dGen model
    - Forecasts BTM PV & Storage adoption

Key Findings

- 54% increase in storage capacity in 2024
  - ➢ Month-to-month increase in attachment rate since NBT was adopted
  - ➢ Large amount of storage additions to standalone PV
- 2024 BTM interconnection applications close to 2019-2021 levels
  - ➢ Similar growth patterns in PG&E and SCE service territories

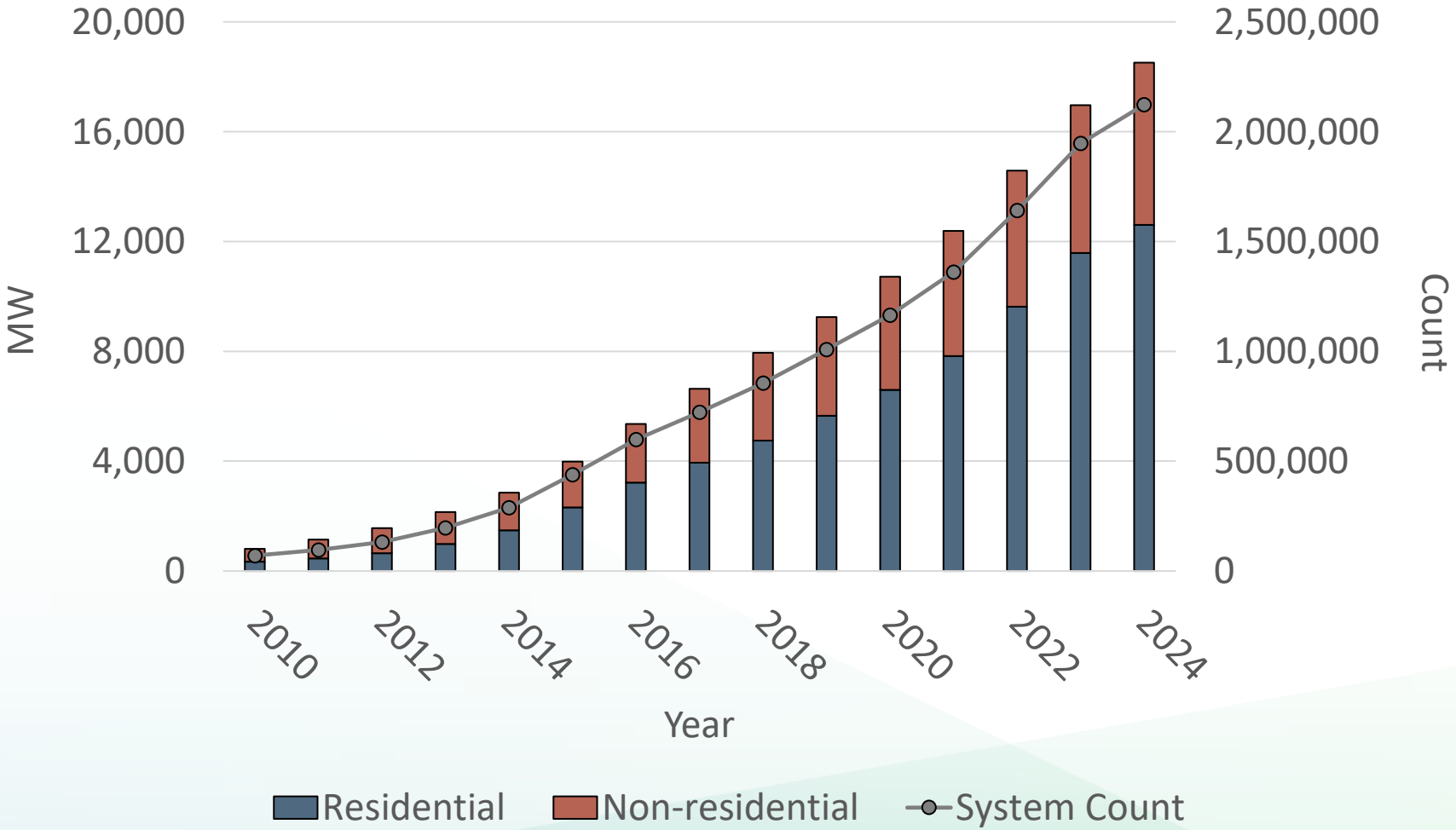
Historical BTM PV Adoption Trends

Historical BTM PV Methodology

- Same methodology as previous forecast cycles
- Data from QFER form 1304b
  - Cleaned and aggregated using R
  - Quality controlled and compared against:
    - Previous forecast cycle estimates
    - CPUC's DGStats (IOUs only)

Historical BTM PV Stats: Statewide

Year	MW	Count
2023	17,000	1,947,000
2024	18,500	2,123,000



Source: CEC Staff

Historical BTM PV Capacity: CAISO

- From 2023 to 2024
  - 9% increase in capacity in CAISO
  - 10% increase in PG&E and SCE PAs

Year	PG&E (MW)	SCE (MW)	SDG&E (MW)	CAISO (MW)
2014	1,300	900	300	2,500
2019	4,300	3,000	1,200	8,500
2024	8,800	6,100	2,100	17,000

Source: CEC Staff

Historical BTM Storage Adoption Trends

Historical BTM Storage Insights

- Capacity estimates include nameplate capacity and energy storage capacity
  - Some new batteries have higher nameplate capacity (KW) but store same amount of energy (KWh)

Model	KW	KWh
Tesla Powerwall 2	5.0	13.5
Tesla Powerwall 3	11.5	13.5

  - Unknown KWh estimated from:
    - CEC Solar Equipment List
    - Hours duration of known systems
- NBT effect:
  - Residential attachment rate 80% in December 2024
- In 2024, data suggests 12,000 storage additions to standalone PV systems in IOU service territory

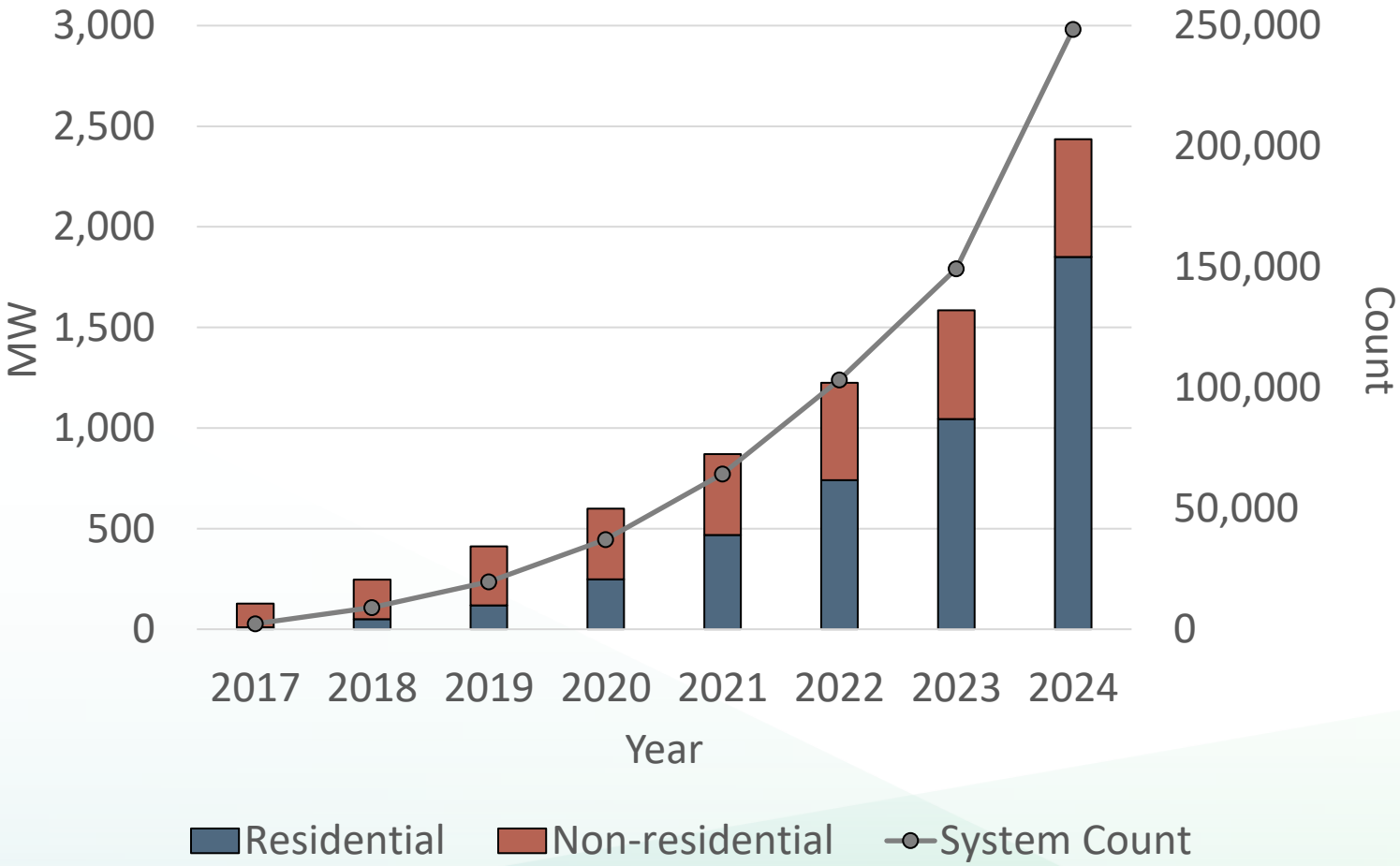
Source: CEC Staff

Historical BTM Storage Stats: Statewide

- Since 2017 average residential storage growth rate five times non-residential storage growth rate
- 800 MW of residential and 40 MW of non-residential storage added in 2024

2024 Cumulative BTM Storage Stats

Sector	MW	MWh	Count
Residential	1,900	4,100	246,000
Non-residential	600	1,300	3,100
Total	**2,500**	**5,400**	**249,100**

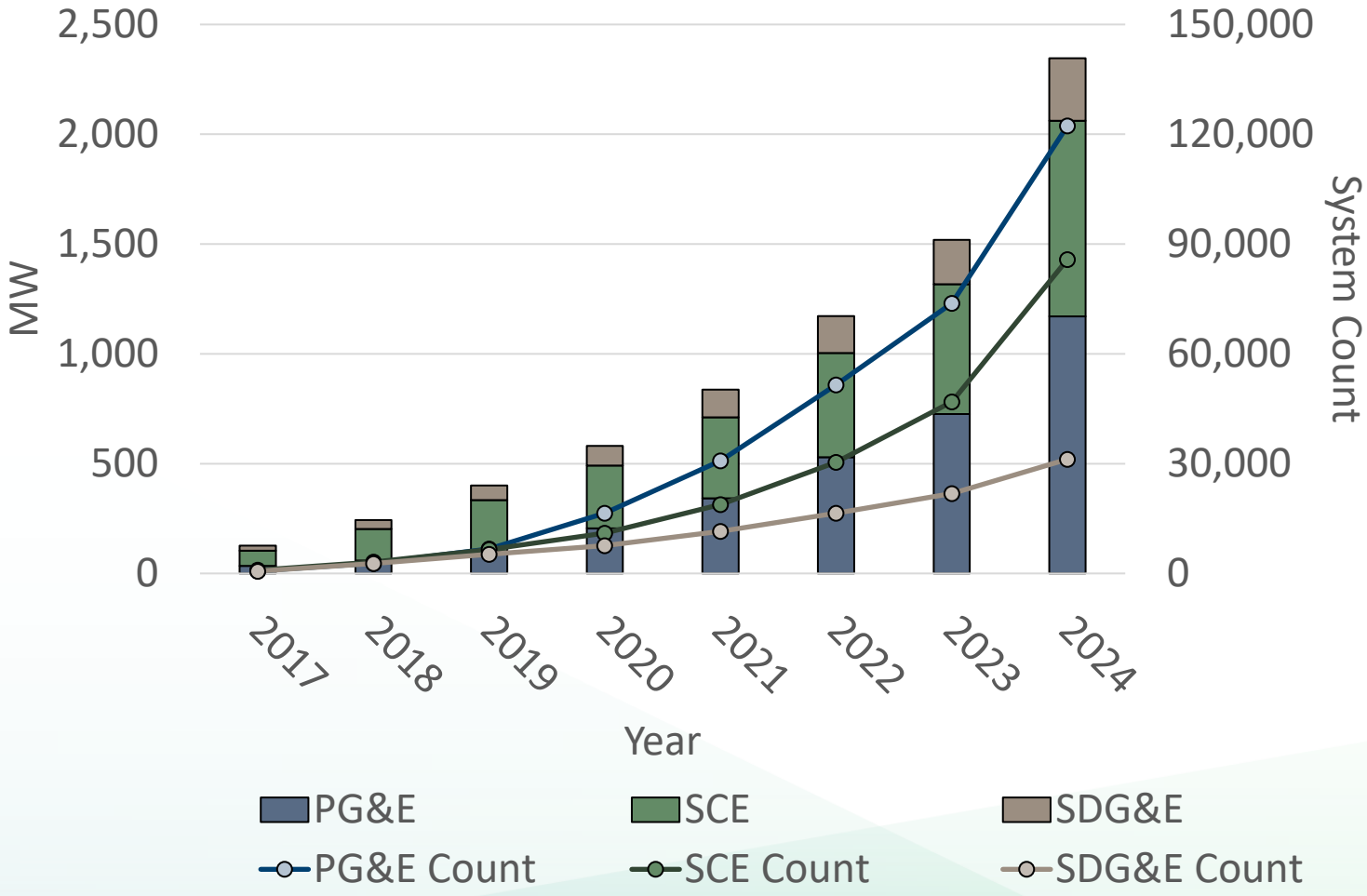


Source: CEC Staff

Historical BTM Storage Stats: CAISO

2024 Cumulative BTM Storage Stats

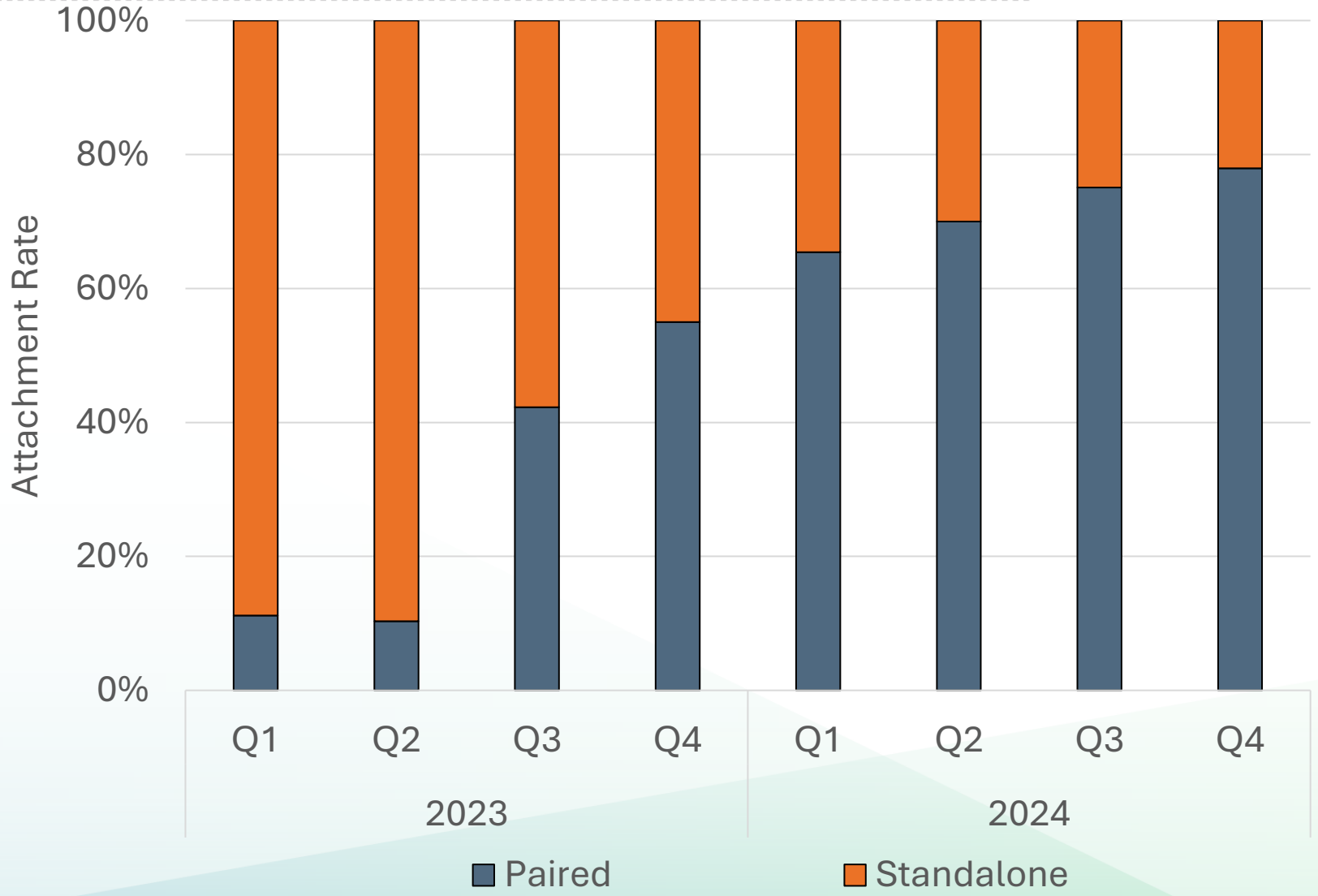
Planning Area	MW	MWh	Count
PG&E	1,200	2,700	123,000
SCE	900	2,000	86,100
SDG&E	300	500	31,200
Total	**2,400**	**5,200**	**240,300**



Source: CEC Staff

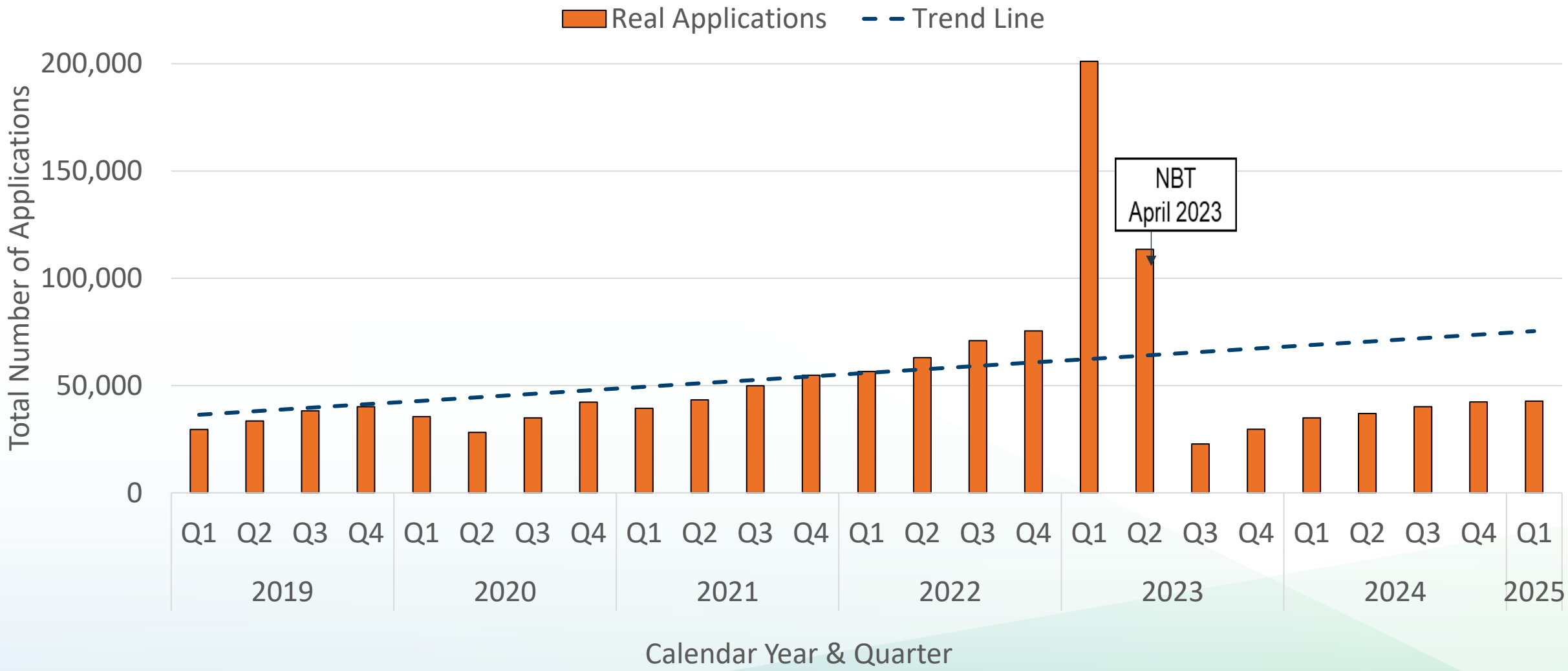
2023-2024 IOU Residential Attachment Rates

- Data for PG&E and SCE service territories
- Attachment rate
  - Q1 2023 – 11%
  - Q4 2024 – 77%
- 80% attachment rate in December 2024



Source: CEC Analysis of CPUC's Interconnection Application Data

Tracking Interconnection Applications

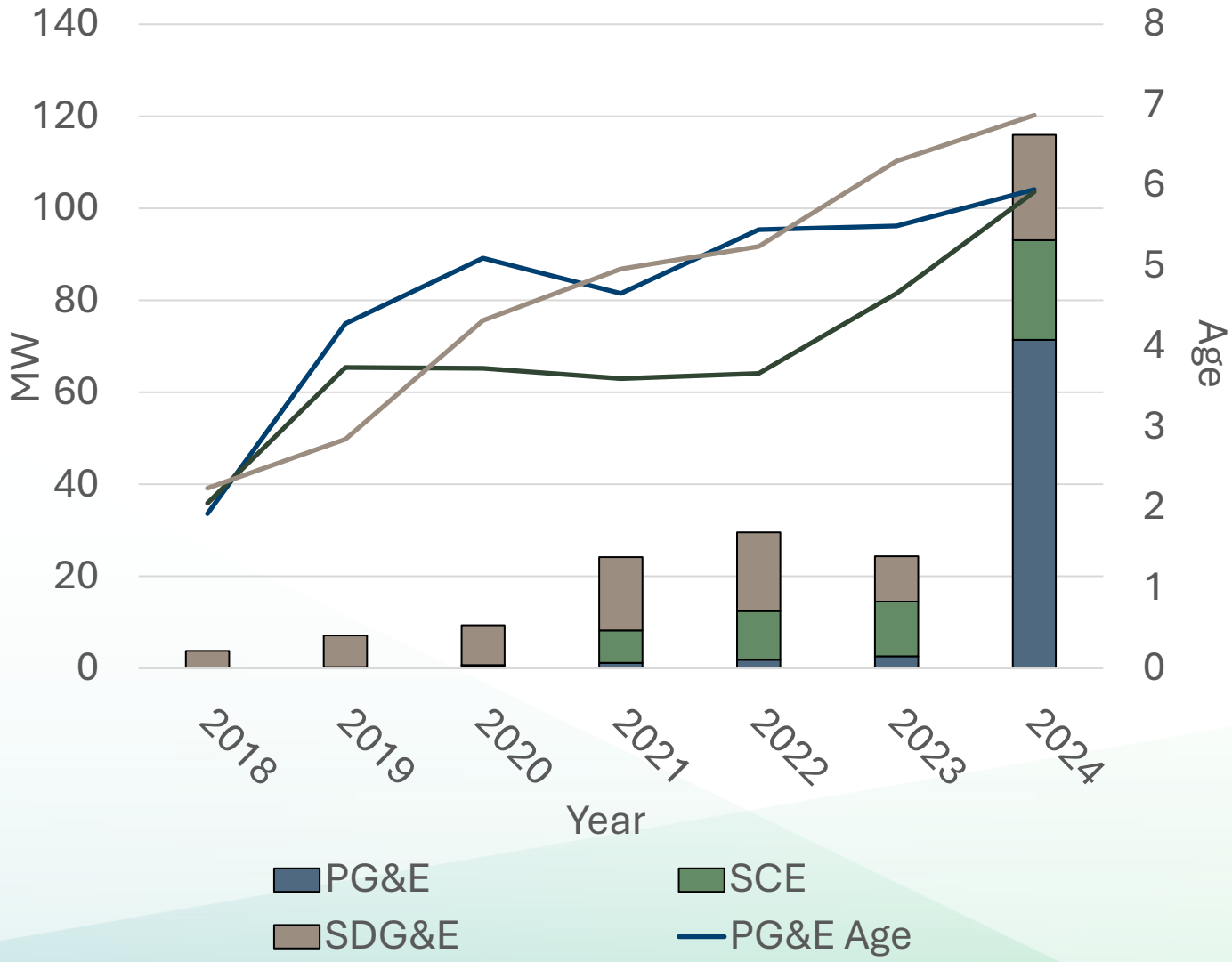


Source: CEC Analysis of CPUC's Interconnection Application Data

IOU Residential Storage Additions to Standalone PV

Data suggests:

- 115 MW of storage capacity added to existing standalone PV in 2024
- Median storage addition – 10KW
- Median PV expansion – 4KW
- Average age of standalone PV – 6 years
- 57% of storage additions also expanded PV systems



Source: CEC Staff

Questions

- Have IOUs observed storage additions in the data?
  - If so, how are these additions being tracked?
  - What's causing the influx of storage additions?

Thank You!

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