# ARE CALIFORNIA'S NEM TARIFFS FAIR?

## HOW CAN WE AVOID A COST SHIFT?

William Marin, Verdant Associates

2022 International Energy Program Evaluation Conference, San Diego, CA

VERDANT

# BACKGROUND

## The NEM 2.0 Lookback Study

» **Assembly Bill 327** (Perea, 2013)

*"…reform the existing NEM program in a manner that better aligns compensation for customer-sited renewable generation with the net benefits that it provides to the electric system, while preserving sustainable growth of behind the meter renewable generation in California."*

» **CPUC Decision 16-01-044** committed to "…later review the NEM successor (or NEM 2.0) tariff, citing interactive, yet unresolved, policy movements within the Commission."

» **Order Instituting Rulemaking** on August 27, 2020 to revisit the existing NEM tariffs.

# BACKGROUND

## The NEM 2.0 Lookback Study

Phase I → Phase II

**Backward look at NEM 2.0:**

*Cost-Effectiveness Analysis*

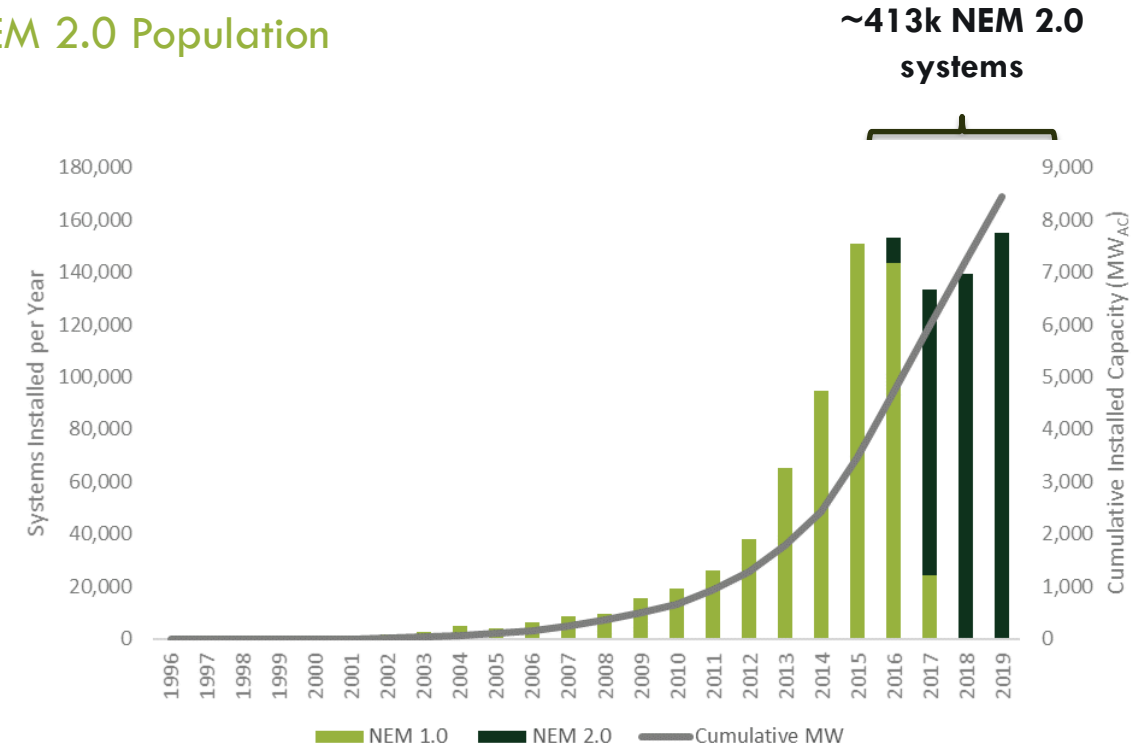
*Cost of Service Analysis*

*Demographic Analysis*

**Forward look at NEM 2.0 successor tariff**

# NEM POPULATION OVER TIME

## Defining the NEM 2.0 Population



# NEM SYSTEM SIZES AND CONSUMPTION PATTERNS

## Residential Solar PV Customers

| Customer Type | Metric | PG&E Residential | SCE Residential | SDG&E Residential |
|---|---|---|---|---|
| NEM 2.0 | Avg. Pre-Interconnection Electricity Consumption (kWh) | 8,425 | 10,513 | 7,824 |
| | Avg. Post-Interconnection Net Consumption (kWh) | 1,249 | N/A | 416 |
| | Change in consumption after interconnection (kWh) | 2,520 | | 2,252 |
| | Avg. Post-Interconnection Electricity Consumption[6] (kWh) | 10,945 | | 10,076 |
| | Avg. System Size ($kW_{DC}$) | 5.9 | 6.9 | 5.6 |
| | Avg. PV Annual Generation[7] (kWh) | 9,696 | N/A | 9,661 |
| | % Pre-Interconnection Consumption Supplied by PV | 115% | | 123% |
| | % Post-Interconnection Consumption Supplied by PV | 89% | | 96% |

# NEM 2.0 LOOKBACK STUDY

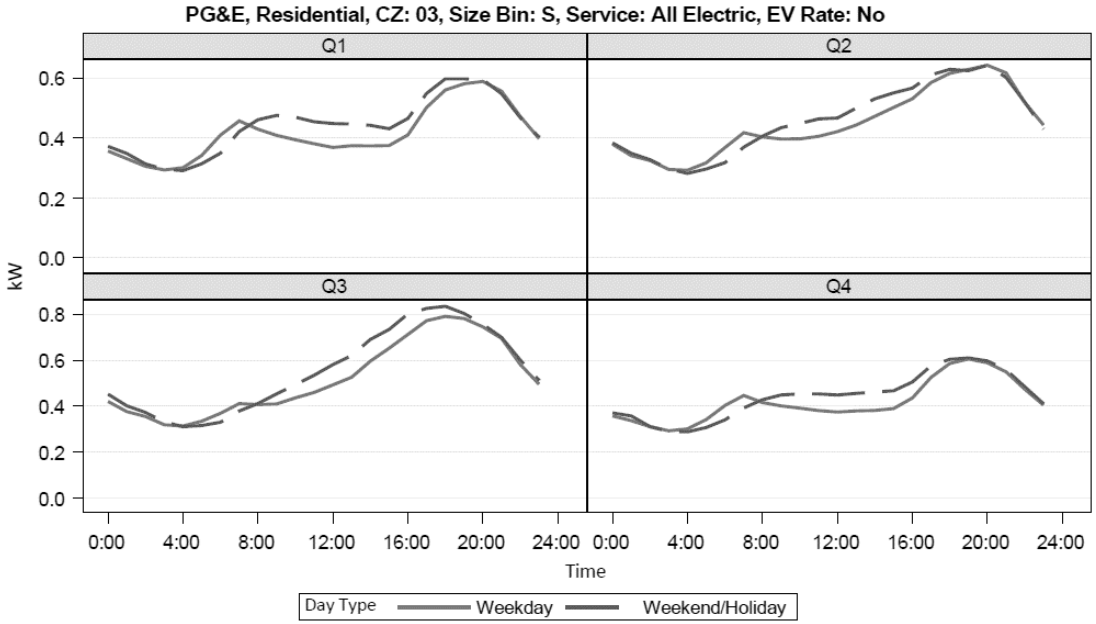
## Analysis Overview

- **Cost-Effectiveness Analysis.** What are the estimated costs and benefits attributed to NEM 2.0 on the margin?
  - Based on California Standard Practice Manual (SPM) tests
  - Utilizes CPUC Avoided Cost Calculator (ACC 2020 v1c)

- **Cost of Service Analysis.** What is the estimated marginal cost borne by the utility to serve a NEM 2.0 customer?
  - Based on estimates of utility marginal costs and total customer bills
  - Utilizes utility general rate case (GRC) filings

# NEM 2.0 LOOKBACK STUDY

## Customer Binning / Clustering Example




*202 Distinct Load Shapes*

# NEM 2.0 LOOKBACK STUDY

## Model Permutations

| Utility | Number of Simulations | | | | |
|---|---|---|---|---|---|
| | Solar PV | Solar PV + Storage | Wind | Fuel Cell | All |
| PG&E | 1,546 | 416 | 1 | 0 | 1,963 |
| SCE | 1,086 | 440 | 0 | 6 | 1,532 |
| SDG&E | 1,059 | 403 | 0 | 1 | 1,463 |
| ***Total*** | ***3,691*** | ***1,259*** | ***1*** | ***7*** | ***4,958*** |

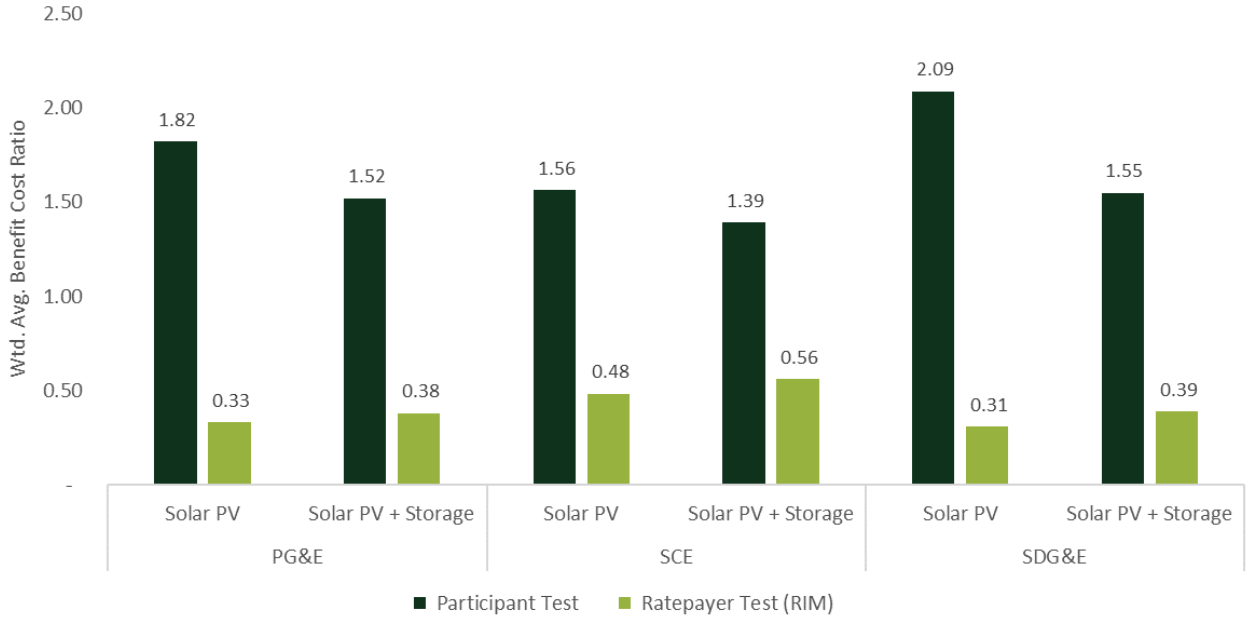
# NEM 2.0 LOOKBACK STUDY

## Standard Practice Manual Tests

| Component | Participant Cost Test (PCT) | | Program Administrator (PA) Test | | Total Resource Cost (TRC) Test | | Ratepayer Impact Measure (RIM) Test | |
|---|---|---|---|---|---|---|---|---|
| | Benefit | Cost | Benefit | Cost | Benefit | Cost | Benefit | Cost |
| Electricity Avoided Costs | | | X | | X | | X | |
| Electric Bill Savings | X | | | | | | | X |
| State (SGIP) Rebate* | X | | | | | | | |
| Capital, O&M, Insurance Cost | | X | | | | X | | |
| State Tax Refund / Paid** | X | | | | | | | |
| Federal Tax Refund / Paid** | X | | | | X | | | |
| Investment Tax Credit† | X | | | | X | | | |
| Utility NEM Costs†† | | | | X | | X | | X |
| Customer Interconnection | | X | X | | | | X | |

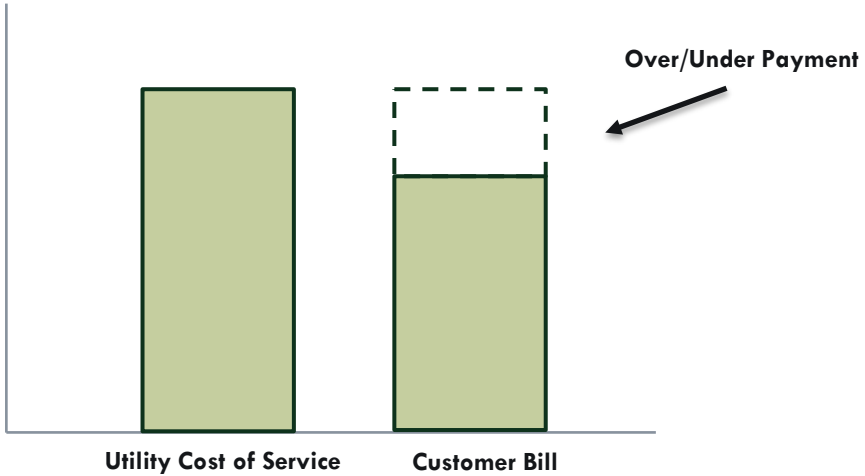
# NEM 2.0 LOOKBACK STUDY

## Cost-Effectiveness Results (Weighted)



# NEM 2.0 LOOKBACK STUDY

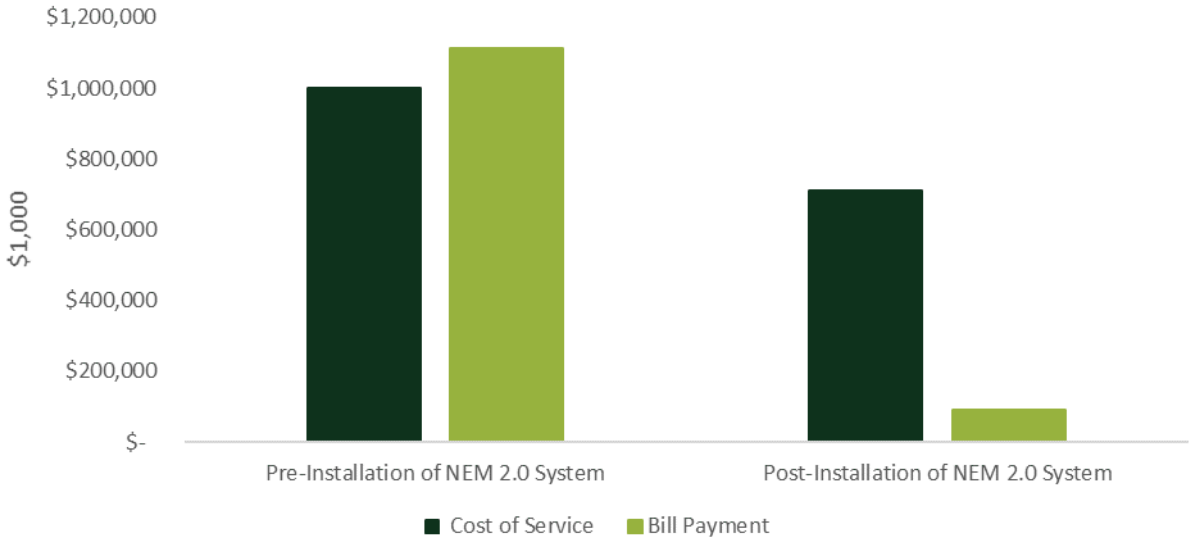
## Cost of Service Analysis




$$Full\ COS = MEC \cdot Load * EPMC(G) + MGCC \cdot GenerationAllocationFactor \cdot Load \cdot EPMC(G) + MDCC \cdot DistributionAllocationFactor \cdot Demand \cdot EPMC(D) + (T + Reg) \cdot Load + MCC \cdot EPMC(D) + NEMC$$

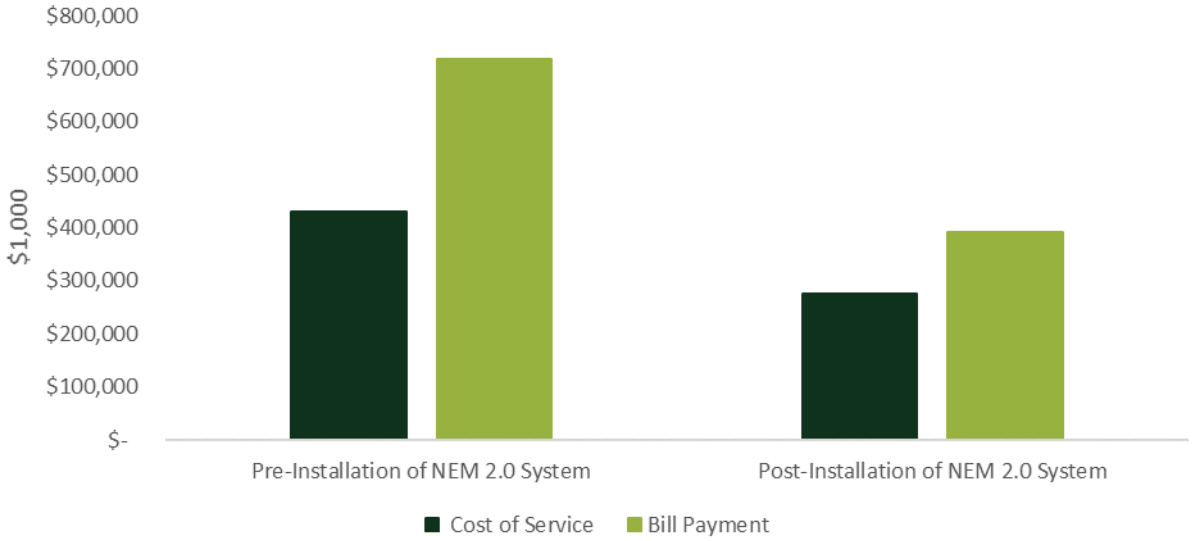
# NEM 2.0 LOOKBACK STUDY

## Cost of Service Results - Residential



# NEM 2.0 LOOKBACK STUDY

## Cost of Service Results - Nonresidential



# TOOLS FOR REFORMING NET METERING

## NEM Revisit

- NEM reform is not rate reform
  - Cannot assign NEM customers a retail rate not available to all customers

- Tools for NEM reform include:
  - Valuation of exports
  - Fixed fees
  - Upfront incentives / market transition credits
  - Non-bypassable charges
  - Minimum bill

# SOME LESSONS LEARNED AND TAKEAWAYS

## NEM Revisit

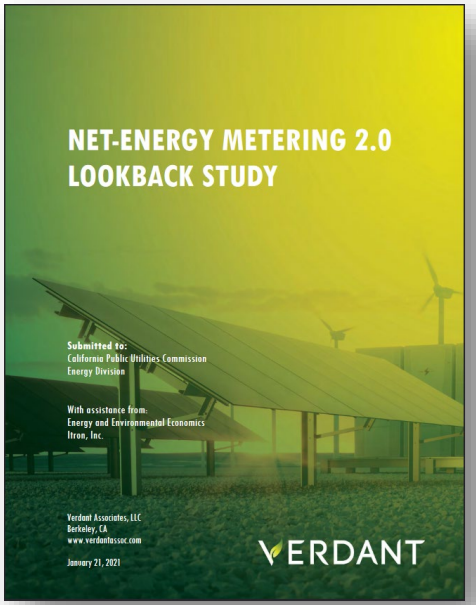
- Customer payback period is a more useful metric than the participant benefit cost test when thinking about NEM compensation
  - However, underlying variables driving payback period such as capital costs, interest rates, retail rates, and utility avoided costs are constantly in flux

- Transparency in modeling and assumptions is critical to maintain stakeholder trust

# NEM 2.0 LOOKBACK STUDY

## Additional Findings in the Report

- Cost-effectiveness and cost of service analysis methodology and results
  - Crosstabs by technology, utility
  - Sensitivity analyses
- Customer demographics and adoption trends
  - By household income, disadvantaged communities
  - Storage attachment rate




https://verdantassoc.com/wp-content/uploads/NEM-2_Lookback_Study.pdf


THANK
YOU
VERDANT