



Item 4: Information Item – Update on Interval Meter Data Analysis

September 11, 2024 Business Meeting

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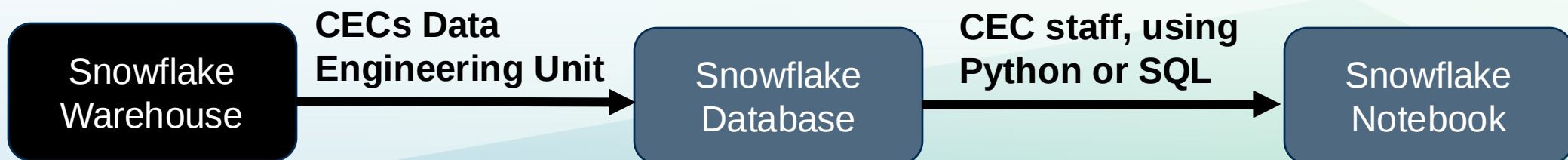
CEC Meter Data: Overview

Billing Data

- **4 billion** records from 2018-2023
- ~**Monthly** records of natural gas (THERMS) and electricity consumption (kWh)
- SCE, SMUD, and LAWP (Electric only); SCG (Gas only); PG&E and SDG&E
- Address, customer classification, rate code, EE program participation

Interval Meter Data

- **>1 trillion records** from 2018-2023
- **Hourly/15-minute** records of electricity consumption only (both delivered and returned)
- PG&E, SCE, SDG&E, and SMUD
- Customer classification





Billing and Interval Meter Data

Why Do We Care?

1. Improved forecasting
2. Targeting energy consumers for policies
3. Tracking progress of existing policies/goals
4. Cooperative research with other organizations

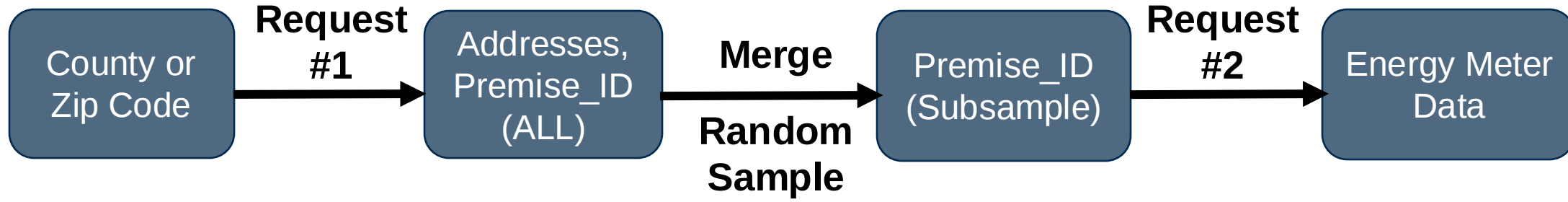
Agenda:

1. Overview of billing and interval data
2. For CEC staff – advice on querying the data
3. Example 1: Heat Pumps
4. Example 2: Data Centers

NOTE: Unless otherwise indicated, CEC staff developed all charts, figures, and tables.



CEC Meter Data: Querying



START

Request #1:
All Addresses in
County or Zip Code

Geocoding

ADDR_1	ADDR_2	Premise ID	LAT LONG_1	LAT LONG_2
715 P Street	715 P. Str	11111	987654, 123456	987654, 123456
23 Maggi Lane	23 Maggi Ln Apt 12	234567	434343, 444555	434343, 444555
18 Hugh Place	18 Hugh Pl	184567	181188, 222444,	181188, 222444

Merge

Merge

Request #2: Energy Meter Data

Premise ID	Time	NET_KWH	THERMS
11111	8/7/2019 - 9/7/2019	700	20
11111	9/7/2019 - 10/7/2019	600	30
11111	10/7/2019 - 11/7/2019	700	70



CEC Meter Data: Querying

How Much Data Can One Ask For?

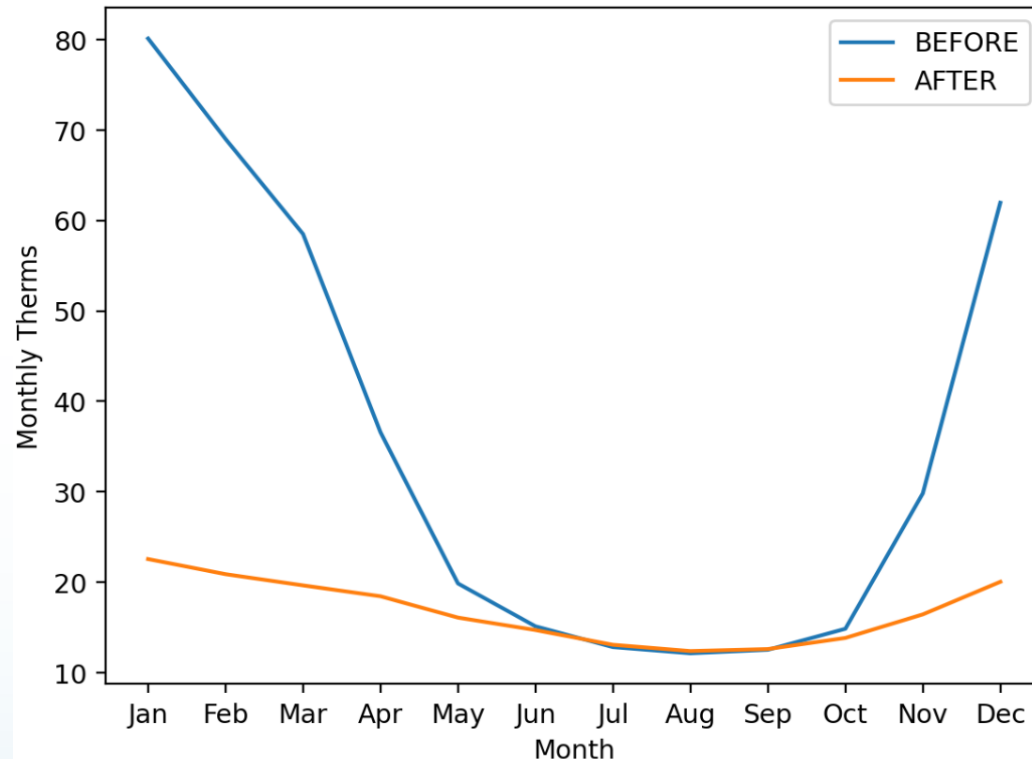
Let's try to keep it below 1M rows!

Search Field	Return
One (1) County	All Addresses
30 ZIP Codes	All Addresses
10,000 PREMISE_IDs	2018-2023 billing data
20 PREMISE_IDs	2018-2023 interval meter data
120 PREMISE_IDs	2023 interval meter data



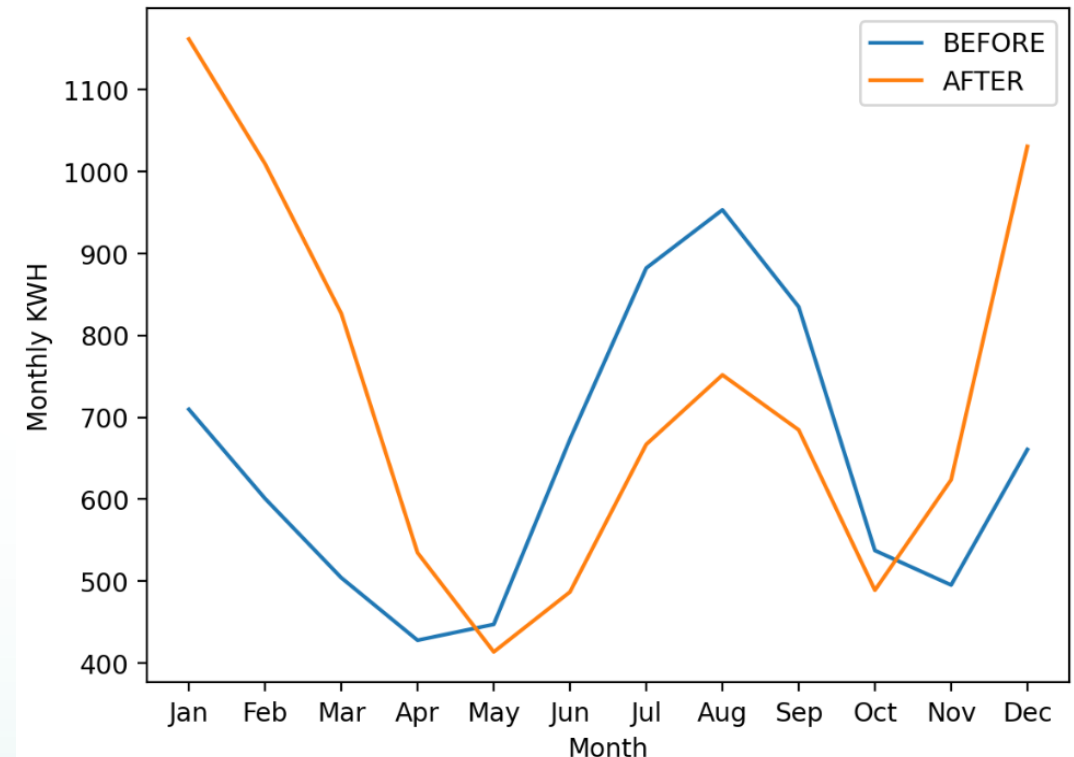
Heat Pump (HVAC) Seasonal Analysis

Impact of a Heat Pump on Monthly Thermal Consumption



Annual Energy Usage Before: 432 Therms
Annual Energy Usage After: 201 Therms

Impact of a Heat Pump on Monthly Electricity Consumption



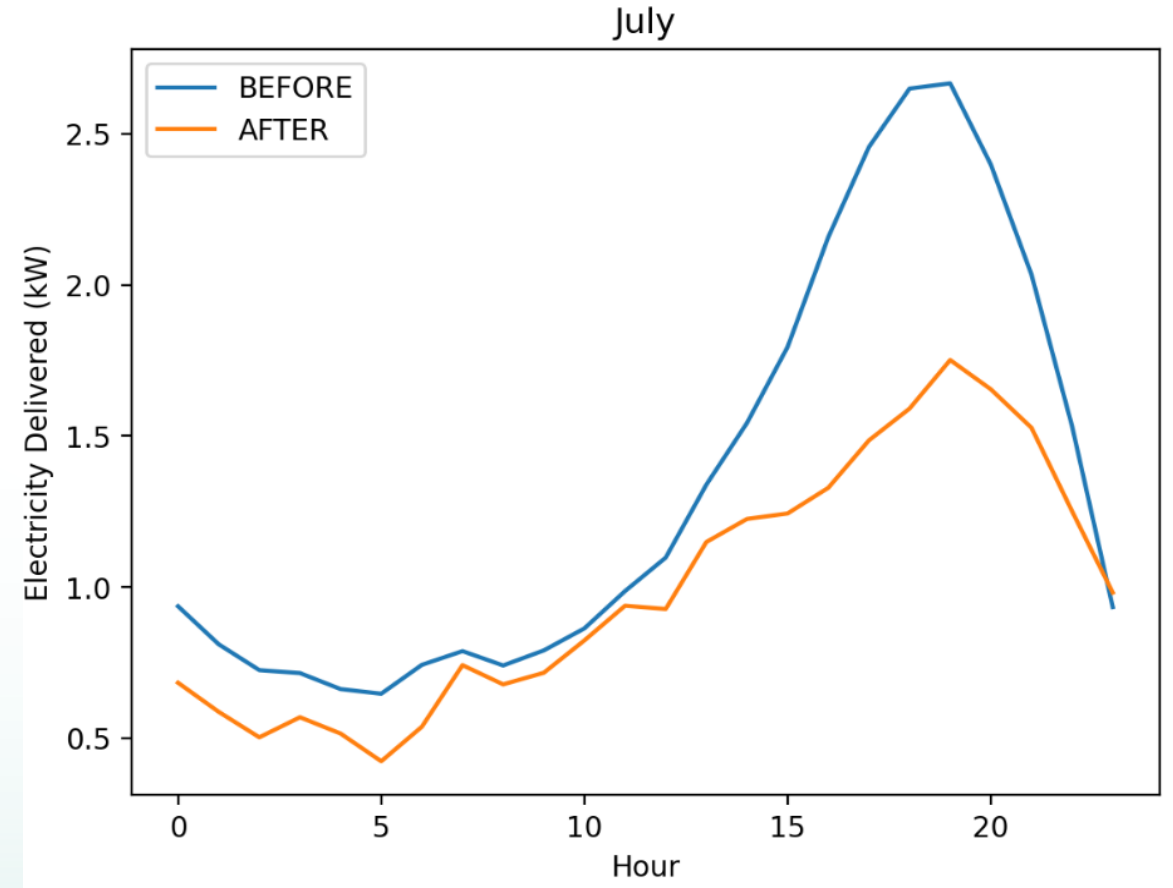
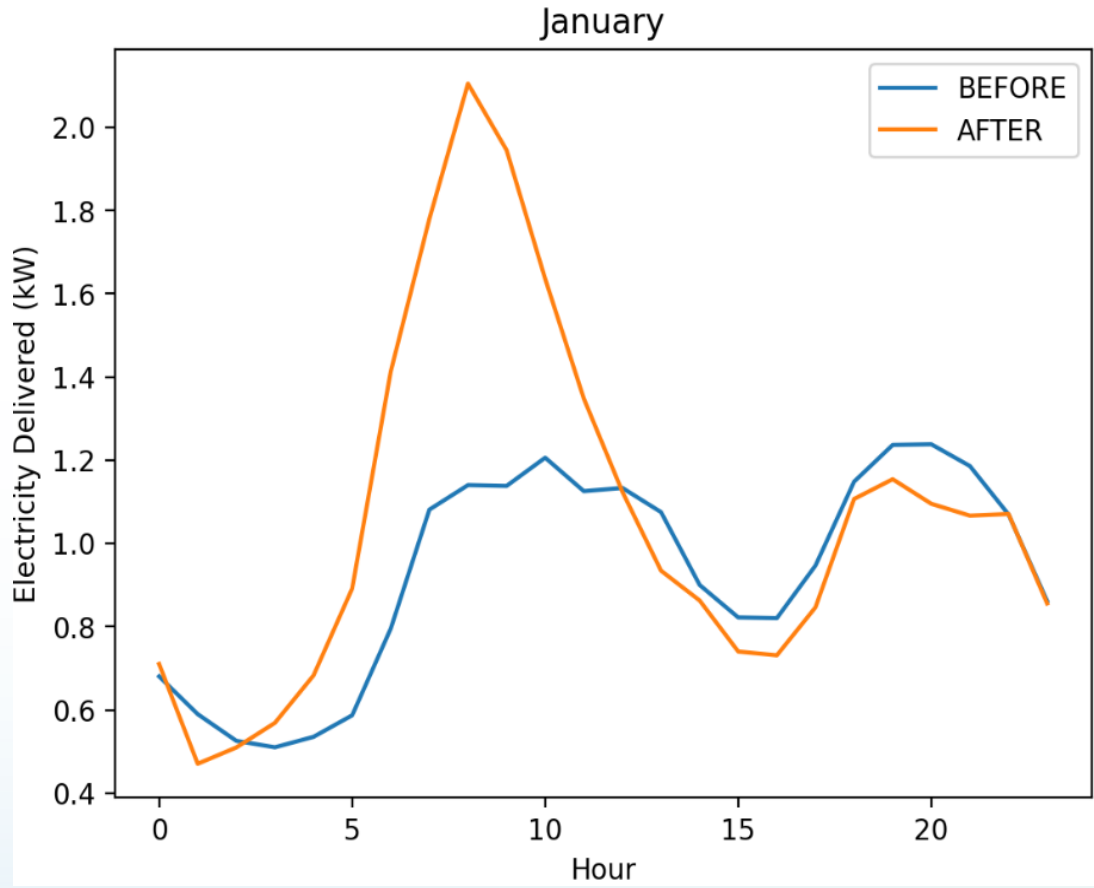
Annual Energy Usage Before: 7,726 KWh
Annual Energy Usage After: 8,768 KWh

$$Y = B0 + B1*after + B2*months + B3*afterxmonths + FEyr + e$$



Heat Pump (HVAC) Hourly Analysis

Impact of a Heat Pump on Hourly Electricity Consumption

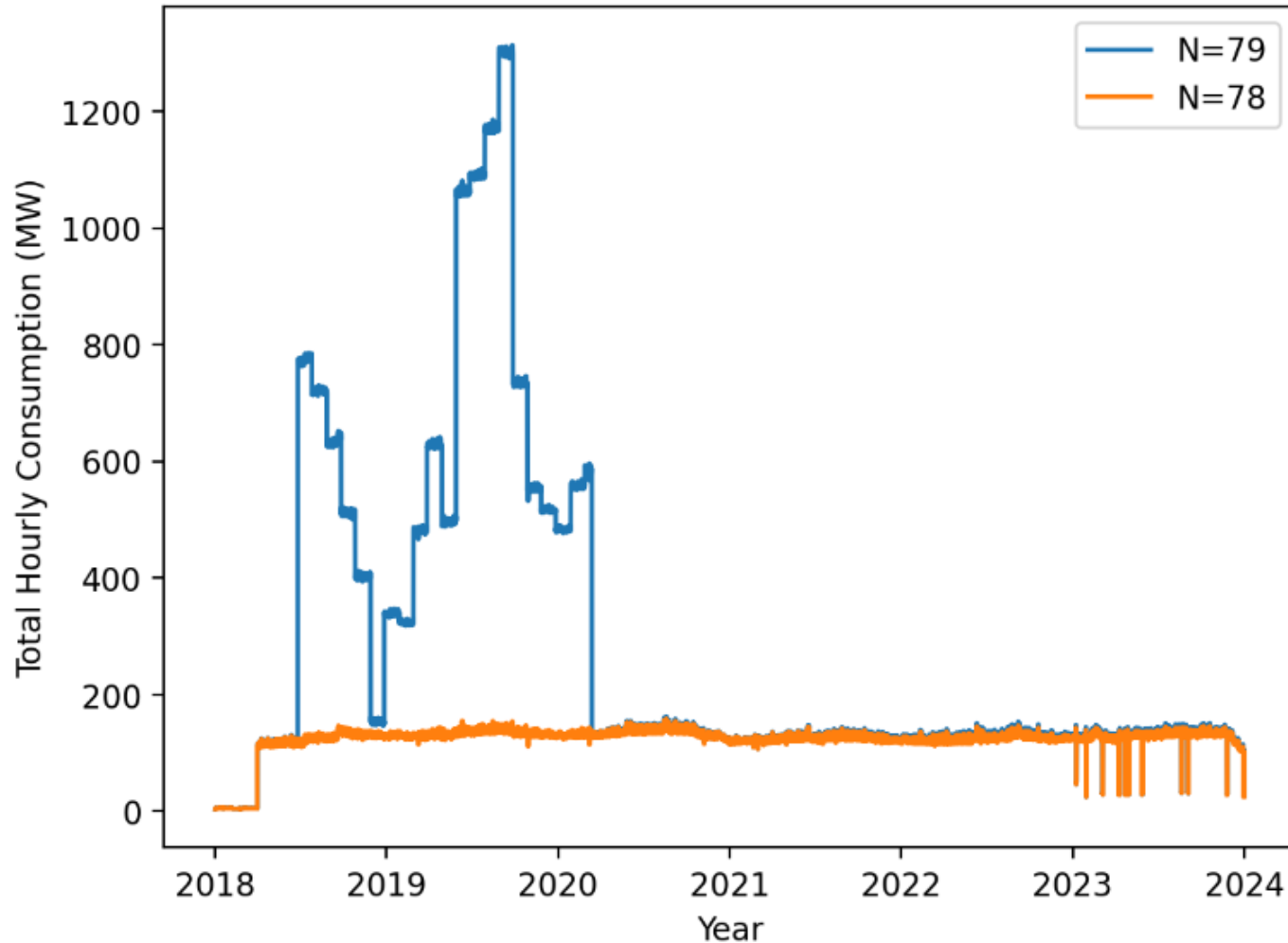


$$Y = B0 + B1*after + B2*hour + B3*afterxhour + FEyr + e$$



Data Centers Consumption

Hourly Electricity Consumption of 79 and 78 Data Centers



Sensitivity Analysis:

Sensitivity	Response
Flex Alerts	No
Locational Marginal Prices	No
Temperature	Yes
Weather Events	Sometimes
Hourly Impacts	2-15% midday increase
Monthly Impacts	5-12% summer increase



Meter Data Benefits

Heat Pumps

- Improved forecasting – how will electrification impact household energy demand? How will electrification impact the grid?
- Targeting specific households for energy improvements
- Tracking the CEC heat pump goal

Data Centers

- Improved forecasting – how will data centers impact the grid?
- Using historical data to validate data center consumption models, thus improving future predications
- Targeting demand response policies at specific data centers



Questions?

Thank you for listening!

Special thanks to my team this summer:

Commissoner McAllister

Bryan Early

Hughson Garnier

Maggie Deng

Jeremy Smith

Shubham Attri

Jason Harville

Ayan Navalur