Interim Results – Multi-Zone Heat Pumps

Board meeting 27 May 2026

Definitions

- Single Zone Heat Pump (SZHP or SZ) - 1 indoor unit connected to 1 outdoor unit
- Multi-Zone Heat Pump (MZHP or MZ) - 2 or more indoor units connected to 1 outdoor unit
- Whole-Home Heat Pump (WHHP) - 1 or more heat pumps installed in a home that meet Efficiency Maine's rebate eligibility criteria
- Turn-down ratio – maximum heat output compared to minimum heat output

Why have MZs been excluded from WHHP rebate eligibility?

- MZHPs have lower turn-down ratios, performing poorer in low-load conditions
- Repeated reports from customers with MZHPs about issues heating on different floors
- Cadmus study (2022) reporting very poor COP for 4:1 and 5:1 MZHPs, albeit small sample size

System Type	Description	Number of Indoor Heads	Number of Outdoor Units	Average Utilization, %	Average Seasonal Heating Performance, sCOP
Ductless	Single-zone, Wall	1	19	57%	3.23
	Single-zone, Ceiling	1	1	61%	1.85
	Single-zone, Floor	1	1	80%	3.20
	Multi-zone	2	15	66%	2.24
	Multi-zone	3	13	72%	2.57
	Multi-zone	4	3	45%	**1.12**
	Multi-zone	5	3	70%	**1.52**

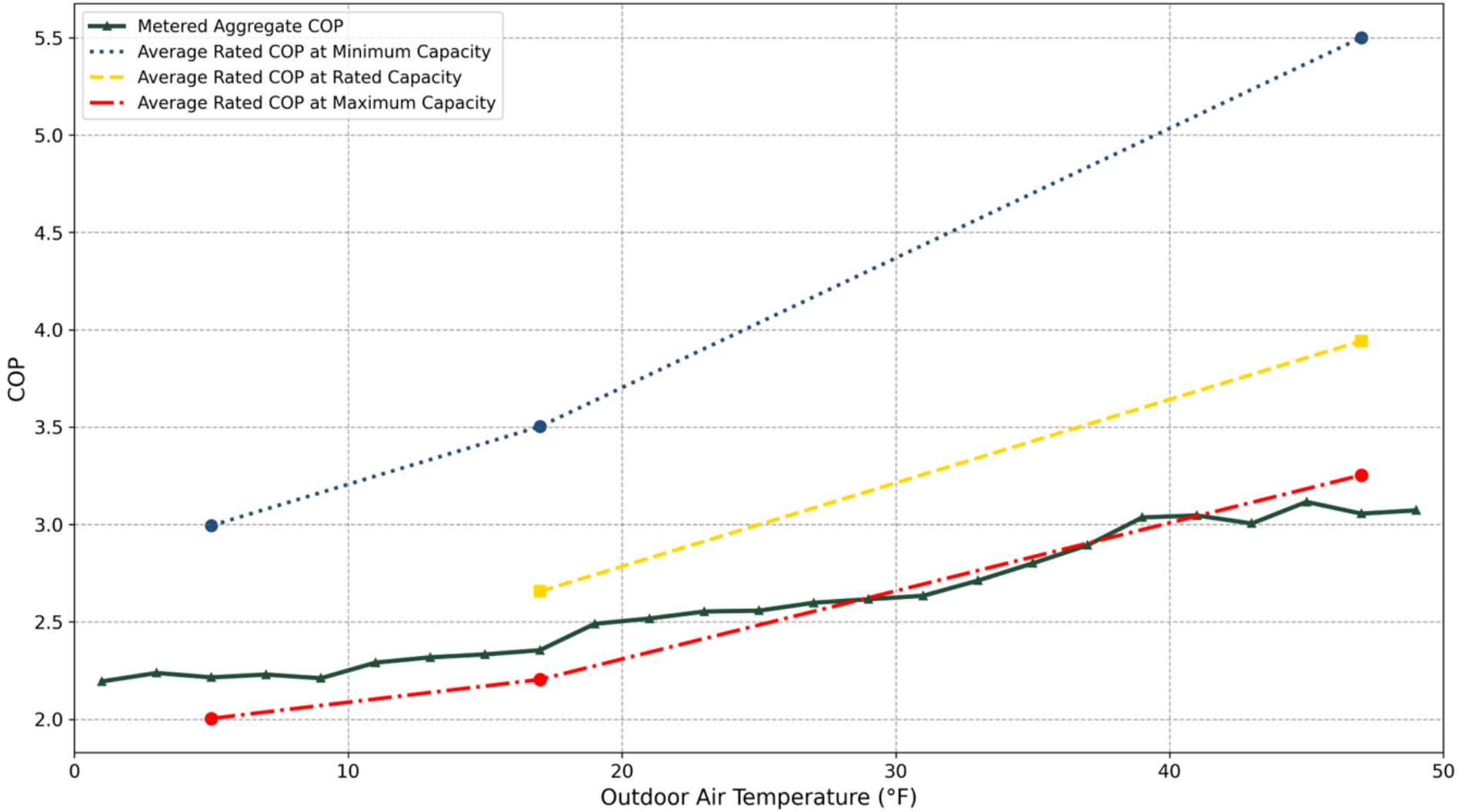
MZHP Metering sample

- **Why?** Confirm or update results of 2022 Cadmus study
- Sample specifically selected homes reporting that their MZHP was generally well-utilized. While this strategy means it is not a representative sample behaviorally, it provides the best quality performance data
- Joint with Vermont to get better sample size of manufacturers and MZ configurations. (2 test sites in Massachusetts)

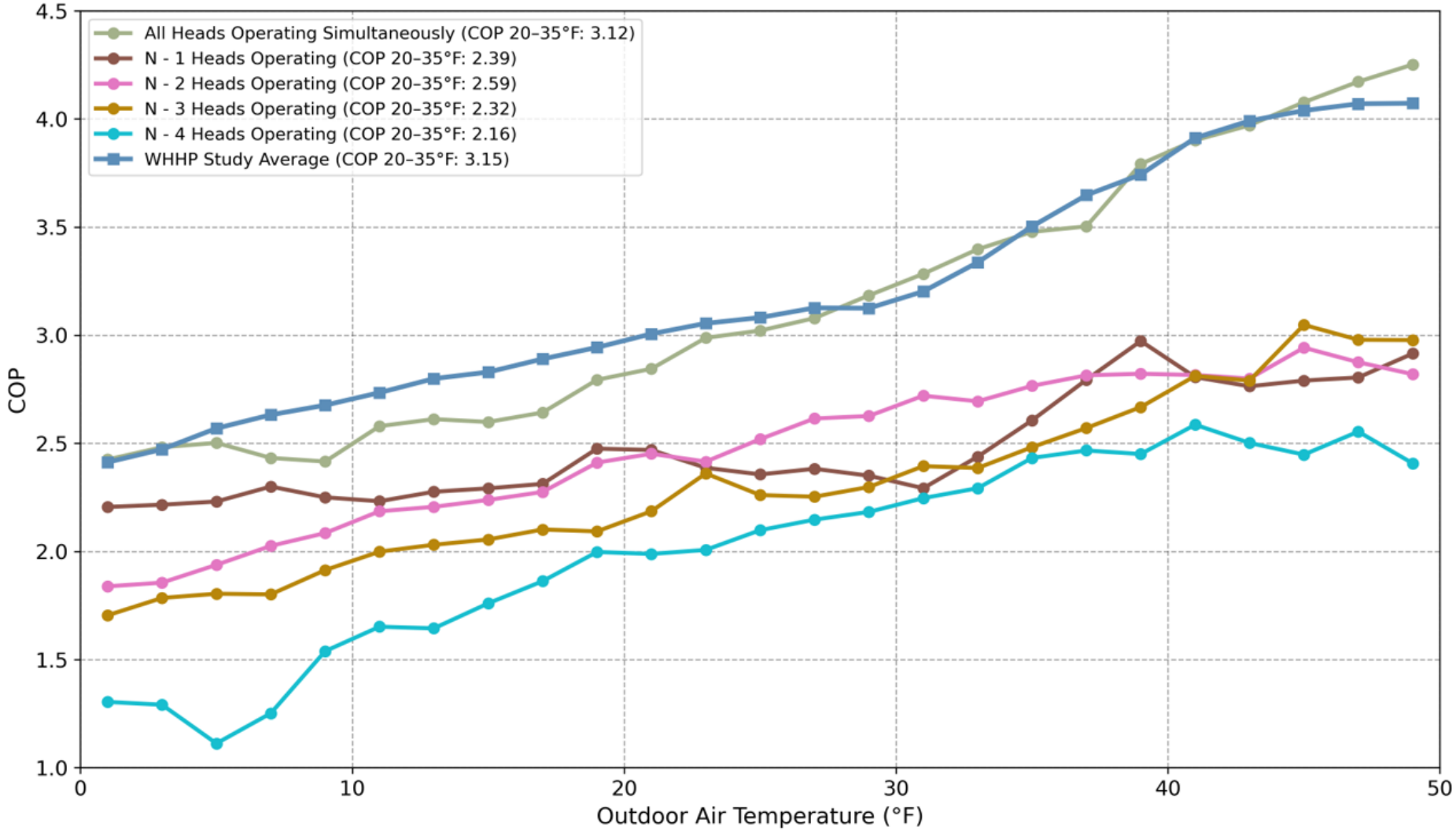
Heat Pump Brand	Maine & Massachusetts	Vermont	Total
Mitsubishi	8	8	16
Samsung	6	4	10
Daikin	6	2	8
Fujitsu	2	1	3
Other	1	3	4
Total	23	18	41

Multizone Heat Pump Type	Maine	Massachusetts	Vermont	Total
1-2	4	1	9	14
1-3	4	1	6	11
1-4	8	0	2	10
1-5	5	0	1	6
Total	21	2	18	41

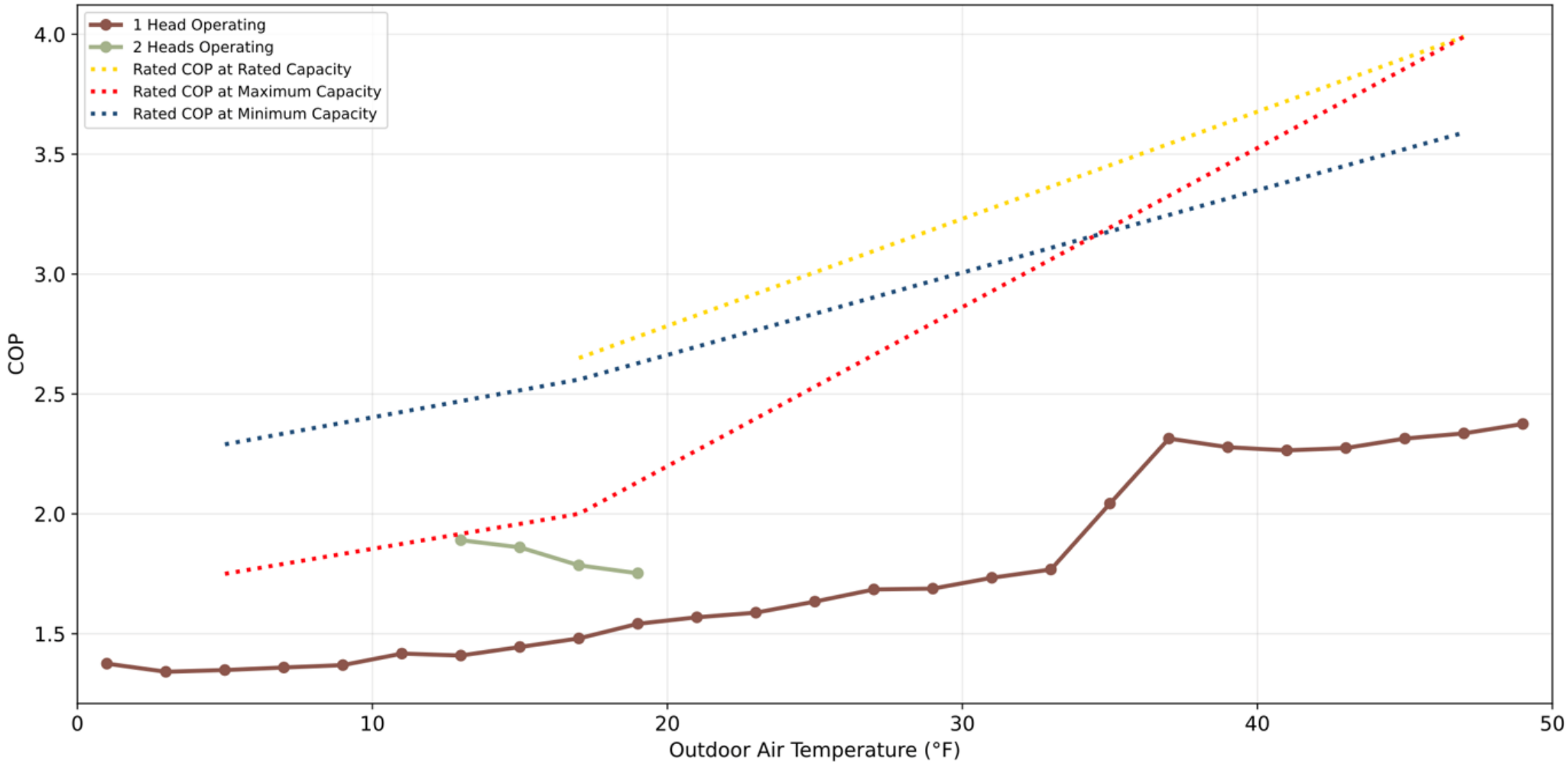
Average COP for the "generally good behavior" sample tracks at the minimum rated COP of the equipment



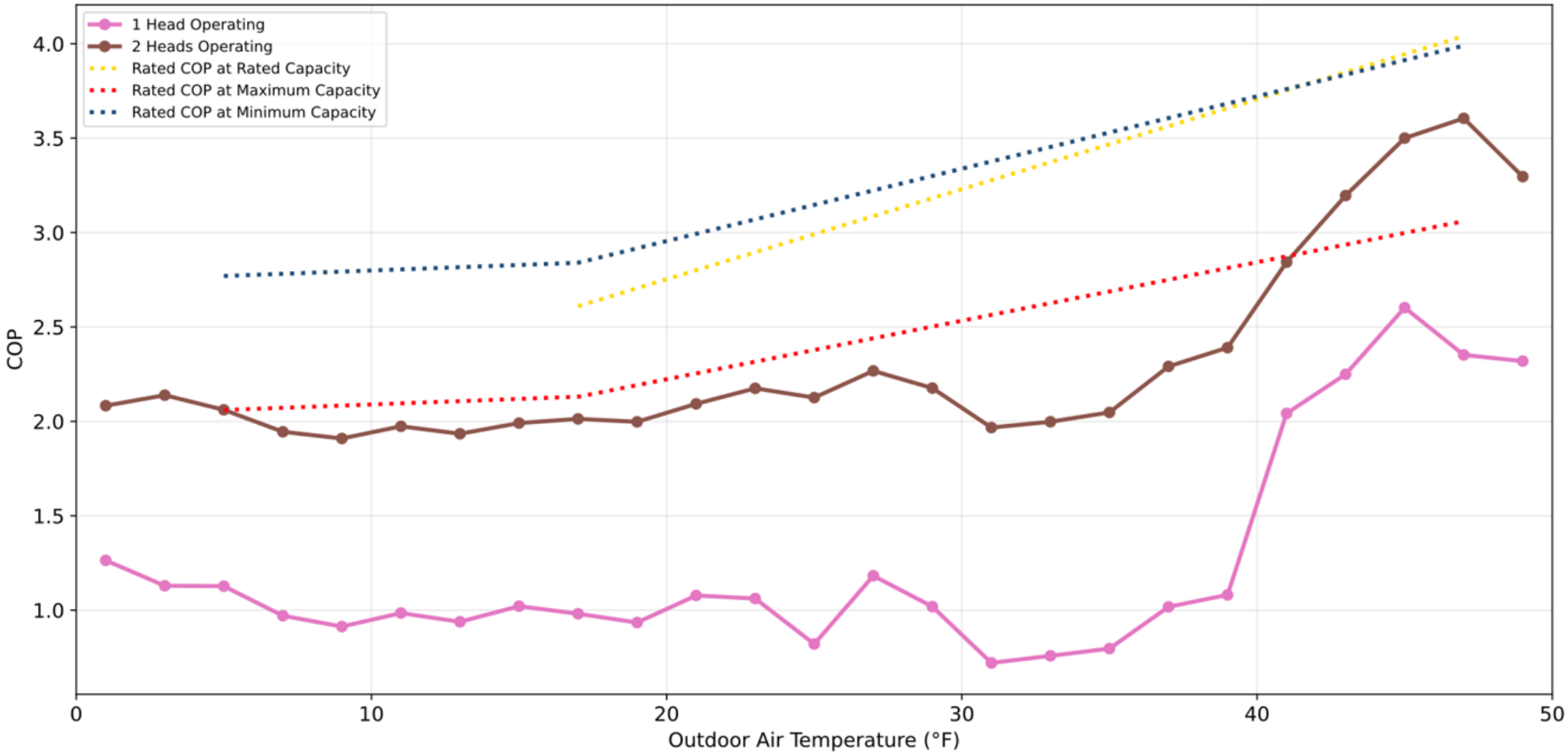
Isolating by the number of indoor units NOT in operation can control for overall consumer behavior



Individual example: 2-1



Individual example: 3-1



Individual example: 4-1