

# Front Range Beneficial Electrification Network (FRBEN)



## Heat Pump Adoption Goal

The FRBEN charter establishes a goal to install 300,000 heat pumps within the network by 2030. The goal is based on a review of community greenhouse gas (GHG) reduction targets. The goal was calculated to determine the heat pump adoption level required to achieve a 40% reduction in residential natural gas use, a critical target for communities to achieve their GHG reduction goals.

## Heat Pump Participation in Xcel Energy’s Residential HVAC Program

To help establish a baseline and track ongoing progress to this goal, FRBEN is interested in understanding heat pump adoption within individual communities at a more granular level. Utilizing data from Xcel Energy’s Residential HVAC program, participation in heat pump related rebates can be broken out from overall program participation that includes other non-heat pump related measures.

From a SWEEP report, it is estimated that 2.5% of Colorado homes have an air-source heat pump installed at their home. Applying this to FRBEN, 2.5% of FRBEN Xcel Energy premises yields approximately 20,000 heat pumps installed in total today. Xcel Energy is the only natural gas utility provider within FRBEN, and Xcel Energy offers heat pump rebates to all eligible residential customers within their service territory. The FRBEN communities combined represent approximately 46% of Xcel Energy’s residential premises in Colorado. This analysis uses rebate participation data to track rebated heat pump installations over the last four years, as a trackable proxy for the total number of heat pumps installed within FRBEN over time. Between 2020-2023, 4,510 heat pumps were rebated in Xcel Energy-served homes within FRBEN, capturing about 22% of the approximated 20,000 heat pumps installed in homes within FRBEN.

Data were collected for the full years of 2020-2023 for the Residential HVAC program and summarized to show annual heat pump participation by community, not including heat pump water heaters. Shown in Figure 1, Denver, Boulder and Jefferson County have the highest annual participation within FRBEN. As FRBEN is a collaboration with both counties and many municipalities within those counties, municipal data are shown in total and county data are representative of the “remaining” data not already within a FRBEN municipality located within that county to prevent double-counting. The numerical total heat pump participation by community is shown in Table 1 on a following page.

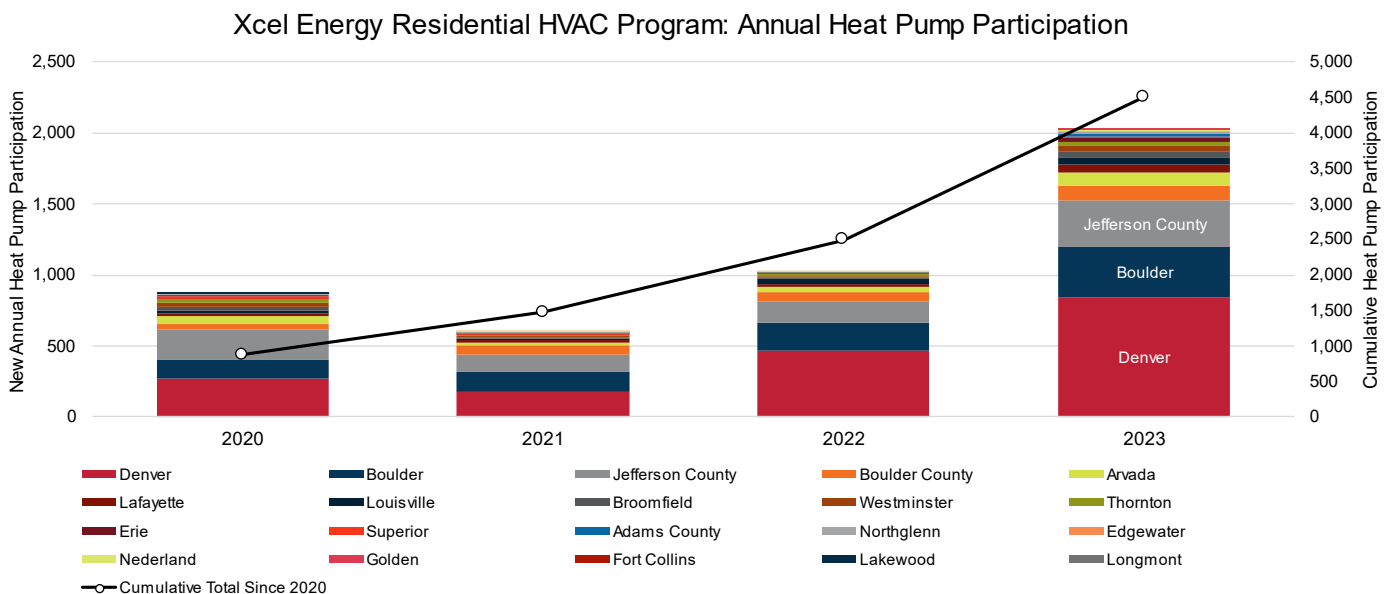


Figure 1: Annual Heat Pump Participation in FRBEN, 2020-2023.

Heat pump participation in FRBEN has roughly doubled in each of the last 3 years, based on the Residential HVAC data. The Colorado Governor has proposed quadrupling heat pumps installed by 2030, which could be interpreted as quadrupling the annual rate of participation by 2030, or the cumulative number of heat pumps installed by 2030. In Figure 2, a forecast of these two increases in Residential HVAC program heat pump participation is shown, against the results from a workforce-based analysis. A quadrupling of the total cumulative number of heat pumps installed by 2030 would result in roughly 12,700 heat pumps, where a quadrupling of the annual rate of adoption of heat pumps would result in roughly 23,000 heat pumps in 2030. The previously completed Workforce Ecosystem Analysis estimated heat pump installation potential based on workforce capability, assuming workforce growth and a 100% installation rate by HVAC professionals by 2035. These estimated results incorporated a 15-year equipment life and factors in housing stock growth. The workforce ecosystem analysis aligns more closely with a quadrupling of annual participation in heat pump measures, estimating approximately 25,200 heat pumps installed by 2030.

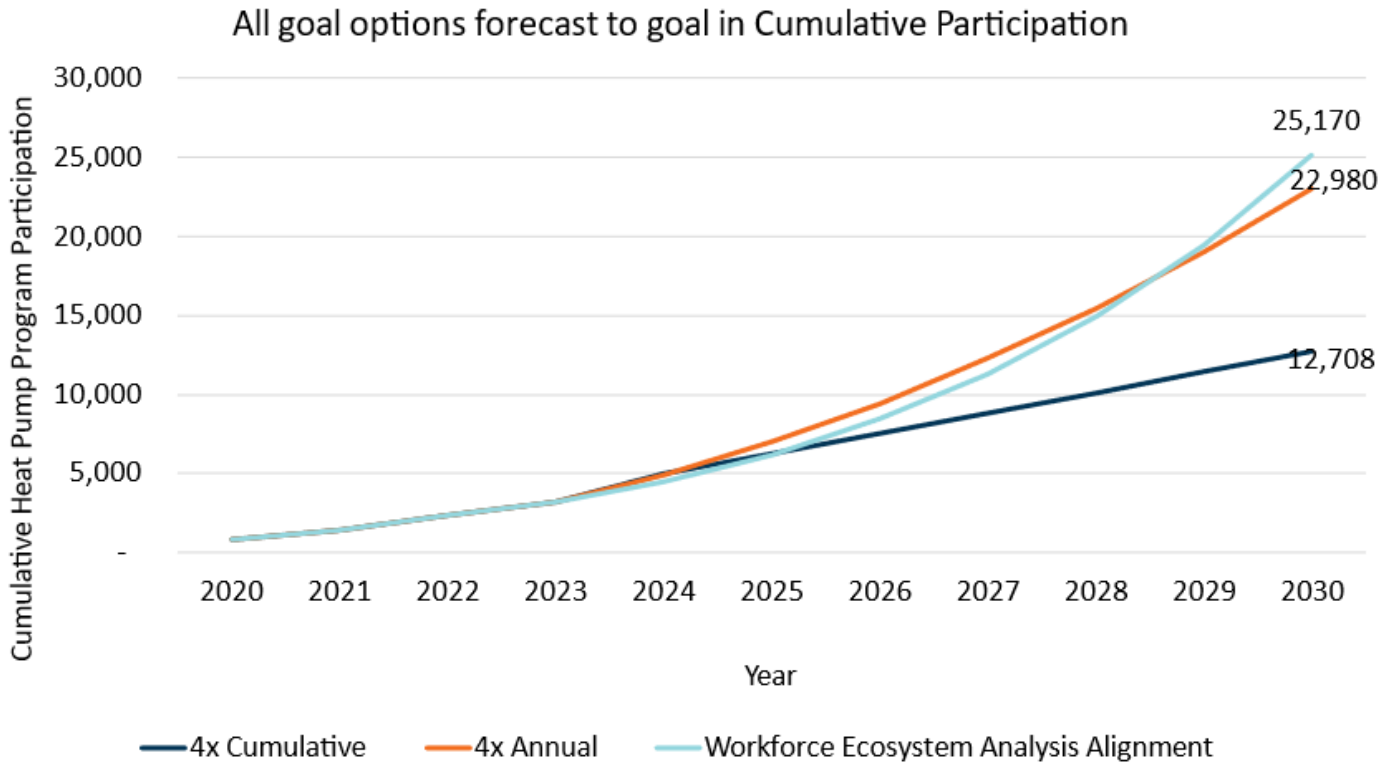


Figure 2: Forecasted Heat Pump Adoption Scenarios to 2030

Viewed on a map in Figure 3, individual heat pump participants were aggregated to the census tract across each municipality within FRBEN and overlaid with the Federal Government’s Justice 40 designation highlighting disadvantaged areas within each municipality. With these two components mapped at a granular level, it is quickly apparent specifically where within a community heat pump adoption is occurring, and if those areas are disadvantaged. Conversely, it is also quickly apparent where future outreach and engagement might be opportunistic in increasing adoption, especially in support of historically disadvantaged areas of a community. Between 2020-2023, 0.4% of heat pump participation occurred in a Justice 40 disadvantaged area.

In order to group heat pump participation by community and by census tract, a list of premises with geospatial data was compiled using each FRBEN community premise list that was provided for this analysis. For each of the communities in FRBEN, the geospatial data were joined with census tract boundaries and the heat pump participation data by premise and the resulting data were mapped.

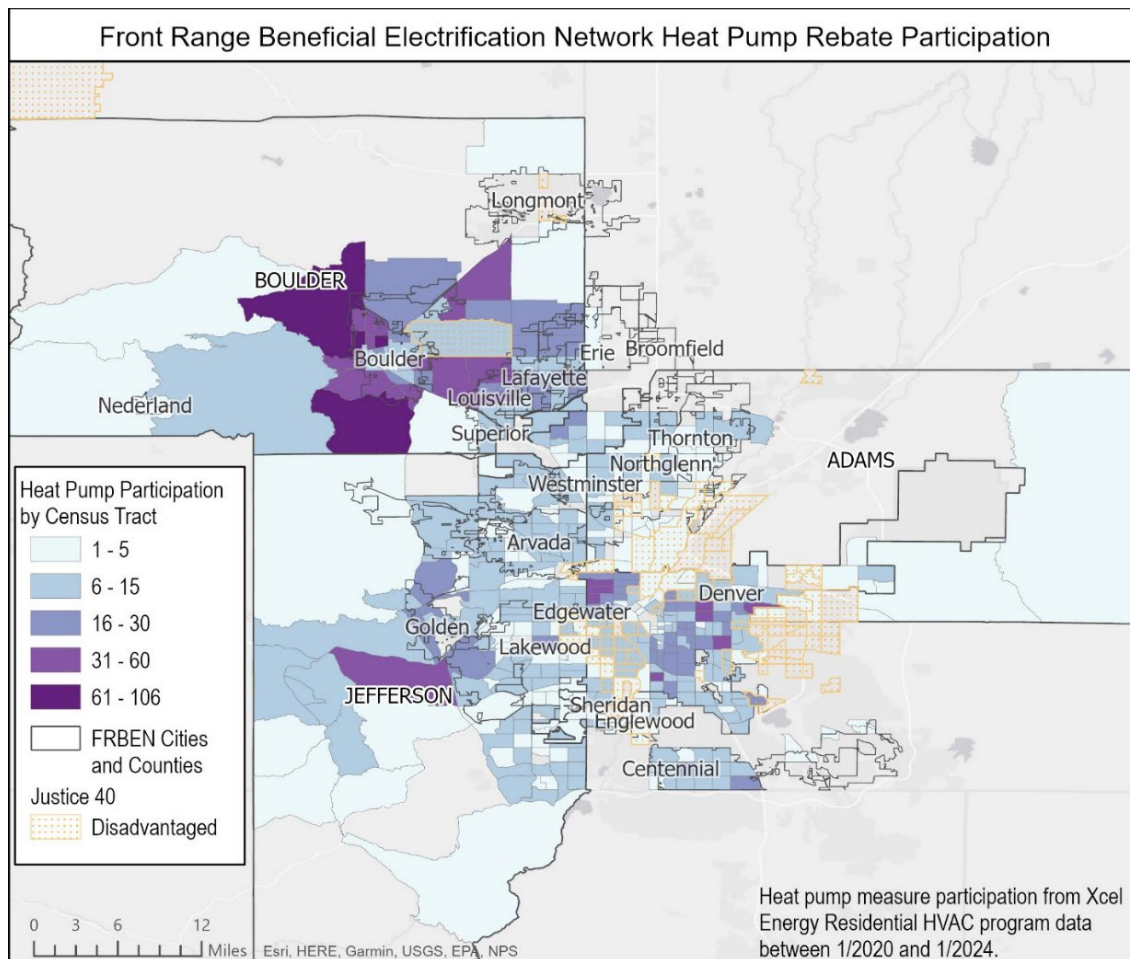


Figure 3: 2020-2023 Cumulative Heat Pump Participation by Census Tract in FRBEN.

Table 1: Cumulative Heat Pump Participation in FRBEN, 2020-2023.

| Heat Pump Participation in FRBEN Since 2020 | 2020-2023 Participation | Premises       | Adoption Rate |
|---|-------------------------|----------------|---------------|
| Denver                                      | 1,752                   | 203,094        | 0.9%          |
| Boulder                                     | 826                     | 30,995         | 2.7%          |
| Jefferson County*                           | 814                     | 80,560         | 1.0%          |
| Boulder County*                             | 277                     | 22,483         | 1.2%          |
| Arvada                                      | 199                     | 50,071         | 0.4%          |
| Louisville                                  | 118                     | 8,299          | 1.4%          |
| Lafayette                                   | 109                     | 12,768         | 0.9%          |
| Broomfield                                  | 100                     | 31,085         | 0.3%          |
| Westminster                                 | 85                      | 47,318         | 0.2%          |
| Thornton                                    | 72                      | 48,886         | 0.1%          |
| Adams County*                               | 38                      | 81,033         | 0.0%          |
| Erie  | 34                      | 9,996          | 0.3%          |
| Superior                                    | 34                      | 5,094          | 0.7%          |
| Northglenn                                  | 28                      | 14,315         | 0.2%          |
| Edgewater                                   | 13                      | 2,437          | 0.5%          |
| Nederland                                   | 8                       | 1,747          | 0.5%          |
| Lakewood                                    | 2                       | 68,518         | 0.0%          |
| Golden                                      | 1                       | 6,035          | 0.0%          |
| Fort Collins                                | 0                       | 55,465         | 0.0%          |
| Longmont                                    | 0                       | 34,308         | 0.0%          |
| <b>FRBEN Cumulative Total Since 2020</b>    | <b>4,510</b>            | <b>814,507</b> | <b>0.6%</b>   |

\* County premises represent the remaining number of premises after removing estimated municipality premises nested within the county