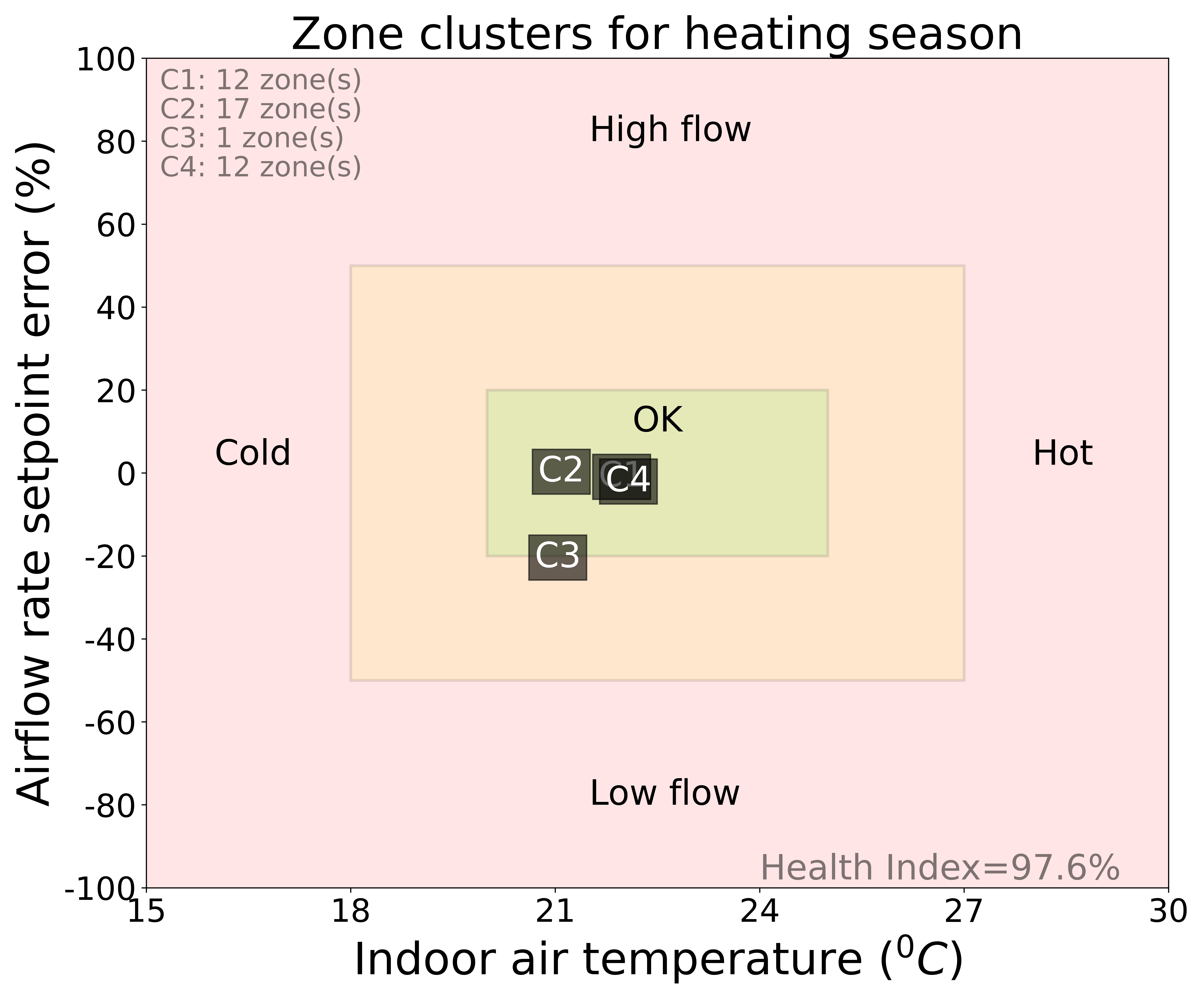
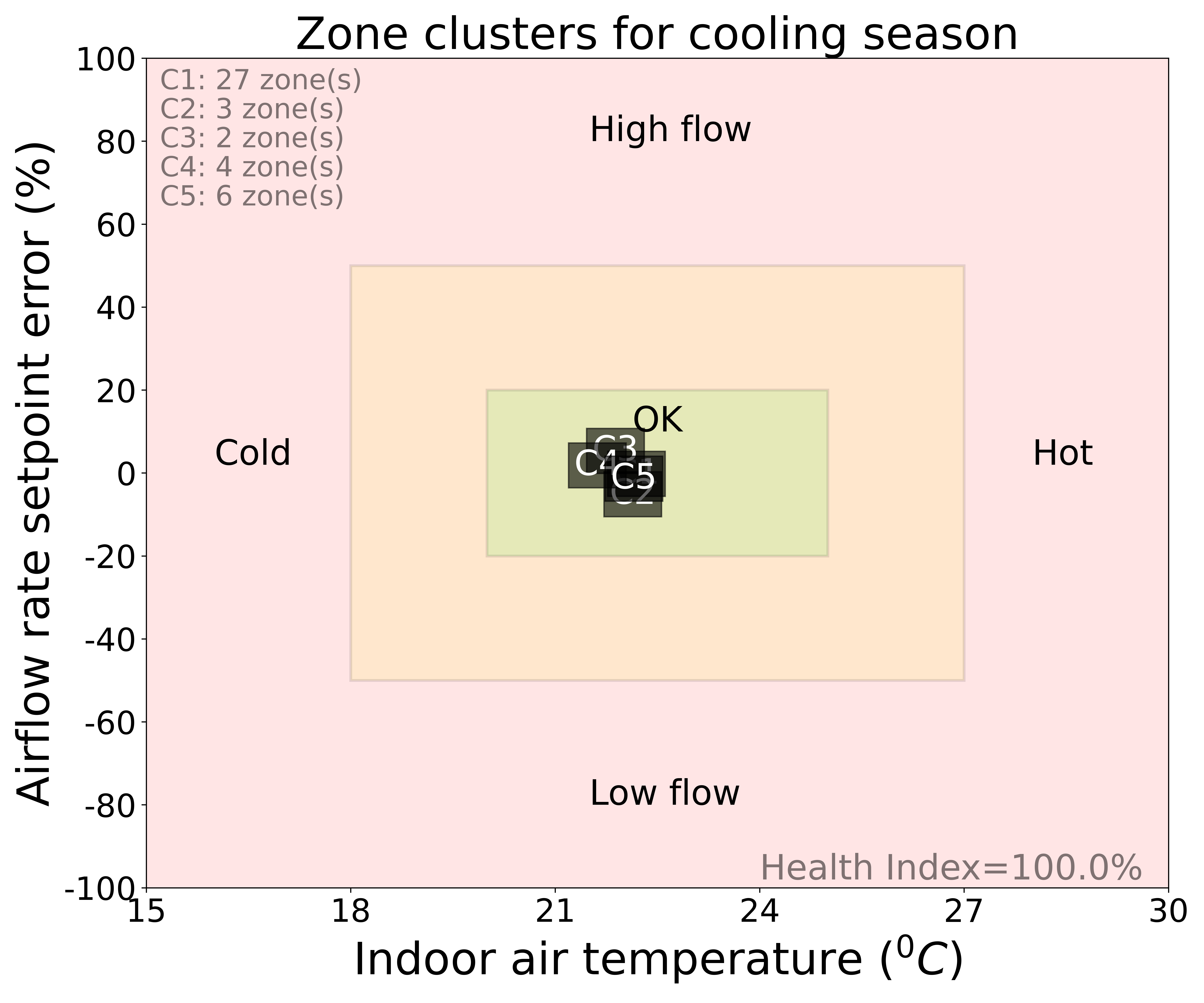
Zone Anomaly - Analysis Report

The zone anomaly function inputs zone-level HVAC controls network data and employs a clustering algorithm to group zones of statistically similiar **indoor air temperature** and **airflow rate setpoint errors**. This report outputs the results of the clustering algorithm, including the number of clusters generated, the number of zones included in each cluster, the average indoor air temperature of each cluster of zones, and the average airflow rate setpoint error of each cluster of zones. Visualization are also generated which depict the zone clusters relative to their average indoor air temperature and average airflow rate setpoint error; this is done separately for the heating and cooling season. This function is intended to help the user identify abnormal or undesirable operating conditions in groups of zones.

# Visualizations

The generated visualizations depict the resultant zone clusters relative to their average indoor air temperature and average airflow rate setpoint error. This is done separately for the heating season (December through February) and cooling season (May thorugh August). Zone clusters are represented by the black semi-transparent boxes and cluster identifier. The cluster identifier (C1, C2, C3, etc.) is also presented on the top-left of the visualization along with the number of zones that are included in each cluster. This information is also provided in the Key Performance Indicators section.





# Key performance Indicators

This section presents the generated KPIs - **the zone health index**. The zone health index is the **ratio of zones with acceptable indoor air temperature and airflow setpoint error over the total number of zones** - this is calculated separately for the heating season (December through February) and the cooling season (May thorugh August). An acceptable indoor air temperature is considered to be between 20 and 25 degrees, and an acceptable airflow setpoint control error is +/- 20%. The airflow setpoint control error is the ratio of the difference between the actual airflow rate and setpoint airflow rate over the setpoint airflow rate.

* Zone health index for heating: **97.6%**
* Zone health index for cooling: **100.0%**

The clustering algorithm resulted in 4 zone clusters for the heating season and 5 zone clusters for the cooling season. The below tables lists the resultant zone clusters, the number of zones included in each cluster, the average indoor air temperature, and average airflow rate setpoint error for each cluster. For the heating season, the average fraction of active (On-state) perimter heaters within a zone is also provided for each cluster.

## Heating season KPIs

|  |  |  |  |
| --- | --- | --- | --- |
| Number of zones | Average indoor air temperature (C) | Average airflow rate setpoint error (%) | Average fraction of active perimeter heaters (%) |
| 12.0 | 22.0 | -0.9 | 19.5 |
| 17.0 | 21.1 | 0.3 | 86.4 |
| 1.0 | 21.0 | -20.4 | 82.4 |
| 12.0 | 22.1 | -2.1 | 53.7 |

## Cooling season KPIs

|  |  |  |
| --- | --- | --- |
| Number of zones | Average indoor air temperature (C) | Average airflow rate setpoint error (%) |
| 27.0 | 22.2 | -0.2 |
| 3.0 | 22.1 | -5.1 |
| 2.0 | 21.9 | 5.3 |
| 4.0 | 21.6 | 1.8 |
| 6.0 | 22.2 | -1.4 |