## Predictive Thermostats

### Author

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### Description

Predictive thermostats adapt over time to learn when occupants are going to be present or not, and widen the heating and cooling deadband when the space is unoccupied.

### Modeler Description

For each zone in the model, determine the current heating and cooling setback and setup temperatures. Compare the thermostat schedule to the occupancy schedule. Whenever the occupancy level is below the threshold, change the thermostat to the setback/setup temperature. This modeling approach assumes very good, very granular predictive capabilities.

### Use Case Types

Retrofit, New Construction

### Arguments

No arguments

### Initial Condition Message

### Final Condition Message

The total number of zones whose setpoints were modified.

### Not Applicable Messages

Not applicable if no zones were impacted.

### Warning Messages

Warn if a zone has no existing setup/setback, then use the default 5F.

### Information Messages

If a zone has no people, no occupancy schedule, no thermostat, or no heating/cooling schedule

### Error Messages

### Code Outline

* For each zone
  + Determine the heating and cooling setpoints, both setup/setback and occupied
  + Create a schedule that matches the occupancy schedule, using the setup/setback value during periods that fall below the occupied threshold and the occupied values at all other times.
  + Replace the existing heating and cooling setpoint schedules with these new schedules

### Tests

**This measure applies to:**

1. Large Office
2. Medium Office
3. Primary School
4. Secondary School
5. Large Hotel
6. Hospital
7. Small Office
8. Stand-Alone Retail
9. Strip Mall
10. Supermarket
11. Quick Service Restaurant
12. Full Service Restaurant
13. Small Hotel
14. Outpatient Healthcare
15. Warehouse
16. Midrise Apartment