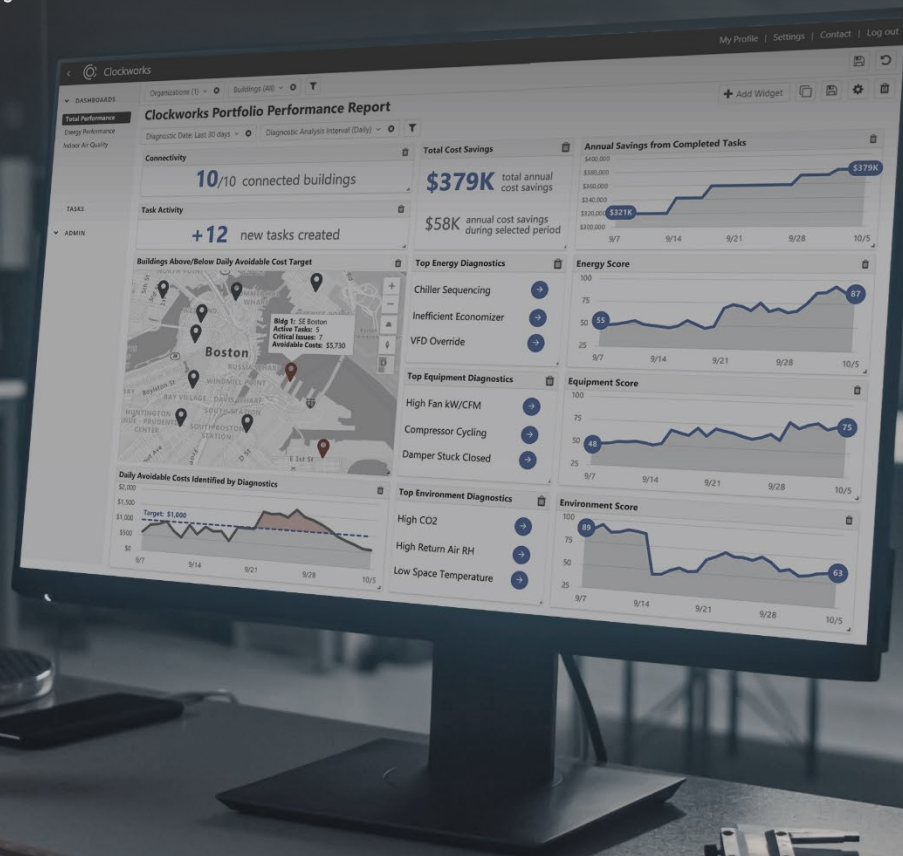




AUTOMATED ANALYTICS. SMARTER FACILITIES.

Clockworks is a cloud-based enterprise fault detection and diagnostics (FDD) platform, with a global analysis engine built on 30 person-years of research and development. The comprehensive library of root-cause diagnostics is curated and updated continuously to cover all HVAC equipment and systems and is flexible to provide analytics across a wide range of systems.

Clockworks has the ability to run in-depth diagnostics to quantify the avoidable energy costs of each identified performance issue and prioritize by impacts to energy, comfort, and maintenance on a 0-10 scale. Diagnostics can be sorted by portfolio or individual building, as well as equipment class and type of analyses. This allows a user to drill into a specific building, piece of equipment, or type of analysis.



PRIORITIZED DIAGNOSTICS

Clockworks is like having a team of engineers constantly reviewing your building systems to find and diagnose performance issues and optimization opportunities. The analysis engine continuously evolves with over a decade of engineering development across hundreds of thousands of buildings throughout the world.

The [Diagnostics Table](#) updates daily with the highest priority issues identified by the Clockworks analysis. Every issue is prioritized by its impact to energy, comfort, and maintenance performance on a simple 0-10 scale.

Clockworks Analytics

Settings | Help | Log out

DASHBOARDS

DIAGNOSTICS

TASKS

ANALYSIS BUILDER

ADMIN

Org: (1), Buildings: (2)

Equipment

Dates: Last 7 Days, Interval: Daily

Tasks

Diagnos

Viewing top 100 records by Avoidable Cost

Search Notes

	Building	Equip...	Analysis	Latest Analysis Results	Cost ↓	Energy	Comfort	Maint.	Max of ECM Priorities	Ongo...	Compl...	Act...
<input type="checkbox"/>	South Boston	Bldg2...3	AHU Coils	Leaking pre-heating coil valve. Return RH higher than setpoint. Return air RH setpoint below suggested min (IAQ). Simultaneous heating and cooling. Supply temp reset error.	\$5,570 sum	10.0 avg	8.6 avg	6.0 avg		5 ongoing	2 completed	
<input type="checkbox"/>	South Boston	HW Primary Loop	HW Loop	Low loop temp difference. Return/inlet temp mismatch. Supply/outlet temp mismatch. Config: Fractional point out of range.	\$1,520 sum	10.0 avg	0 avg	1.7 avg				
<input type="checkbox"/>	South Boston	Bldg2...3	AHU Fan	Mixed air static pressure higher than setpoint. No static pressure setback schedule. Room air static pressure higher than setpoint (IAQ).	\$743 sum	10.0 avg	10.0 avg	6.0 avg				
<input type="checkbox"/>	Brookline	Bldg4...Pre-Cond	AHU Coils	Leaking cooling coil valve. No supply temp reset. Over-aggressive freeze prevention. Simultaneous heating and cooling.	\$627 sum	10.0 avg	0 avg	5.4 avg				
<input type="checkbox"/>	South Boston	Bldg2...3	AHU Econom...	Excess mechanical cooling.	\$274 sum	9.9 avg	0 avg	2.0 avg				
<input type="checkbox"/>	Brookline	Bldg4...Pre-Cond	AHU Fan	No static pressure setback schedule.	\$241 sum	10.0 avg	0 avg	0 avg				
<input type="checkbox"/>	Brookline	Dual Temp Loop	Dual Temp Loop	Low loop temp difference. Minimal load across loop.	\$190 sum	8.1 avg	0 avg	0 avg				
<input type="checkbox"/>	Brookline	Bldg4...3	AHU Coils	Leaking cooling coil valve. Negative temp difference across pre-heating coil. Positive temp difference across cooling coil. Supply temp reset error.	\$125 sum	5.0 avg	0 avg	4.7 avg				
<input type="checkbox"/>	South Boston	Bldg2...3	AHU Econom...	Economizer should be off.	\$112 sum	3.3 avg	3.4 avg	2.9 avg				
<input type="checkbox"/>	Brookline	Bldg4...3	AHU Fan	Fan on while unoccupied. Inlet air flow higher than setpoint. Supply air static pressure lower than setpoint.	\$105 sum	5.1 avg	0 avg	5.7 avg				

Page 1 of 7 10 items per page

Clockworks Analytics.

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A [Diagnostic Report](#) is created for every issue to summarize performance issues, cost impacts, and direct users to the root cause of each issue.

Bldg2_AHU-3

Demo Site | South Boston

Diagnostic Report

Tasks

Equipment Profile

Results of the AHU Coils analysis for November 13, 2023:

100%

100%

100%

100%

100%

100%

100%

100%

100%

100%

Analysis Results

Leaking pre-heating coil valve. Return RH higher than setpoint. Return air RH setpoint below suggested min (IAQ). Simultaneous heating and cooling. Supply temp reset error.

\$817 avoidable cost

10 energy priority

10 comfort priority

6 maintenance priority

PROBLEM: SIMULTANEOUS HEATING AND COOLING

- The (pre)heating coil and cooling coil are either providing excess heating or cooling or operating simultaneously.
- This may have wasted around \$817 (\$428 in heating and \$389 in cooling) and 72844 kBtu total over 1 day(s).

Possible Causes:

- Pre-heating coil valve leaking or stuck open.
- Uncalibrated or malfunctioning temperature sensor.
- Controls or programming error.

PROBLEM: HEATING OCCURRING WHILE PRE-HEATING COIL VALVE IS CLOSED

- The pre-heating coil was performing heating while its valve control signal was off.
- The average temperature rise over the coil while the valve was closed and the fault was occurring was 13.1 F.
- This may waste around \$461 and 39759 kBtu over 1 day(s).

Pre-heating coil

Air temperature (F)

Time

11/13 00:00

11/13 06:00

11/13 12:00

11/13 18:00

11/14 00:00

Mixed air temp

Valve position

Pre-heating coil discharge air temp

Status/Position

0%

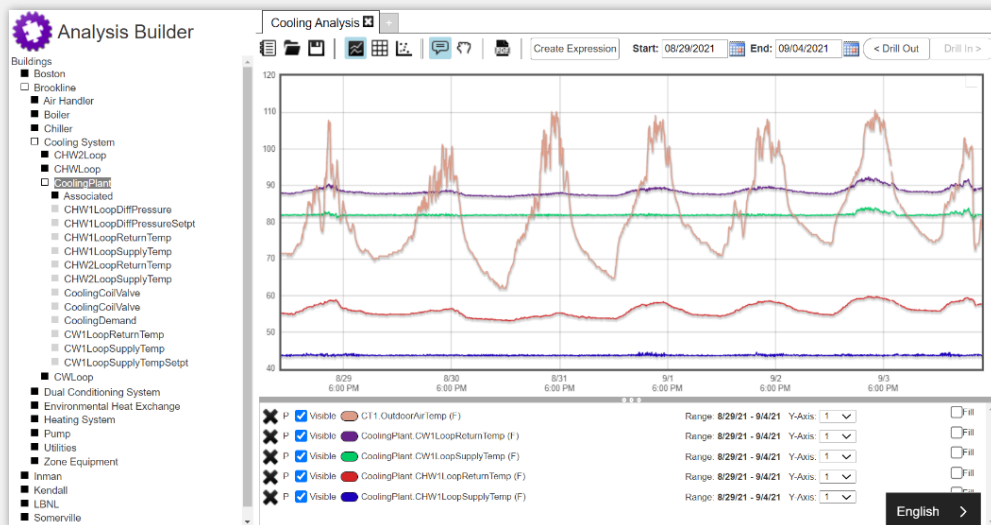
100%

Create Task

Close

PROACTIVE MAINTENANCE TOOLKIT

Analysis Builder allows users to create custom charts and calculated points to investigate issues and monitor performance of targeted systems.



Tasks can be created in Clockworks to act on the diagnostics. Advanced energy modeling techniques are utilized to calculate energy savings across a typical year.

The Edit Task interface shows a form for configuring a task. The 'Summary' field contains a description of the task: 'Bldg2_AHU-3 Leaking pre-heating coil valve. Return RH higher than setpoint. Return air RH setpoint below suggested min (IAQ). Simultaneous heating and cooling. Supply temp reset error.' The 'Building Name' is 'South Boston', 'Equipment Name' is 'Bldg2_AHU-3', and 'Analysis Name' is 'AHU Coils'. The 'Task Diagnostic Date' is '7/26/2023', 'Interval' is 'Daily', 'Reporter' is 'DKrieger@clockworksanalytics.com', 'Assignee' is 'demo@demosite.com', and 'Status' is 'Completed'. The 'Date Completed' is '8/1/2023'. The 'Description' field contains a detailed description of the task. The 'Recommendations' field contains 'Check valve'. The interface includes 'Save' and 'Close' buttons.

Dashboards give users the flexibility to configure a library of reports to help monitor performance, manage task activity, and highlight energy, comfort, and maintenance performance improvements.

