Chapter 10 O&M Frontiers

As old a topic as O&M is, there are a number of new technologies and tools targeting the increased efficiency of O&M. As with most new technology introduction, these tools are in various stages of commercialization; for up-to-date information on each tool, contact information is provided in this chapter.

As previously mentioned, we are not able to provide a detailed description of all tools and technologies available. What we do provide are some of the more common tools that are currently commercially available. To locate additional resources, the authors recommend contacting relevant trade groups, databases, and the world-wide web.

10.1 ACRx Handtool/Honeywell HVAC Service Assistant

Developed by Field Diagnostic Services, Inc., the "HVAC Service Assistant" tool was designed to provide advanced diagnostics for rooftop and packaged HVAC equipment. The tool combines a handheld PDA and multiple pressure/temperature gauges into a single tool that provides expert diagnostic analysis of HVAC equipment to the service technician. This unit automates the detection and diagnosis of problems difficult to identify in compressors, heat exchangers, and expansion valves, as well as calculating the impact of the defect on the efficiency and capacity of the unit – expressing as the potential energy savings that can be achieved through effective implementation of the suggested diagnosis. The product also provides detailed reporting of all activity performed on the unit and can be used to ensure quality of service from the contractor/maintenance staff. Some of the tool features and applications are listed below – for the most current information we suggest contacting the company directly.

Tool features:

- Automated data collection

- Integrated fault detection

- Calculation and display of system efficiency and capacity

- Detailed Quality of Service and Return on Investment reporting

Tool Applications:

- Packaged cooling systems including roof-top units

- Split systems/residential and commercial air conditioning

- Cooling and heat side of heat pump systems

- Commissioning and tune-ups of all of the above units

For more information about the HVAC Service Assistant
Contact Field Diagnostics at: (267) 583-6330 Ext 10 or dlamb@fielddiagnostics.com
http://www.fielddiagnostics.com/serviceassistant.cfm

10.2 Decision Support for O&M (DSOM®)

The DSOM tool is a condition-based O&M hardware and software program designed to provide facility staff with intuitive actions to implement efficient, life-cycle asset management. DSOM was developed by researchers at the U.S. Department of Energy's Pacific Northwest National Laboratory (PNNL).

Based on the concept of condition-based management, DSOM focuses on finding the balance between high-production rates, machine stress, and failure. DSOM allows online condition monitoring of equipment and provides early warning signs of degraded performance. DSOM's diagnostic capabilities empower the operations staff to become the first line of maintenance. Moreover, a customized, integrated database, and intuitive access system provide the information all staff need to make informed decisions about how to operate their plant more effectively. Dramatic savings are achievable because DSOM (1) improves process efficiency, (2) cuts maintenance costs, (3) extends equipment life, and (4) reduces energy consumption and associated harmful emissions.

The DSOM technology was developed under government research funding from the U.S. Department of Energy. In 1994, it was installed at the central heating plant of the Marine Corps' Air Ground Combat Center in Twentynine Palms, California. Implementation at Twentynine Palms established proof of principle and verification of value. Recent installations have been completed at Marine Corp Recruiting District Parris Island, the Aberdeen Proving Grounds and a large metropolitan public housing project. Some of the tool features and applications are listed below – for the most current information we suggest contacting the company directly.

Tool features:

- On-line condition monitoring

- Integrated diagnostics and fault detection

- Real-time notification of degradation and inefficiency

Tool Applications:

- Heating, ventilation, air conditioning systems

- Central plants

- Single building, campus and multiple building/process facilities

For more information about DSOM
Contact Darrel Hatley (509) 375-2136
www.pnl.gov/dsom/

10.3 ENFORMA® Portable Diagnostic Solutions

ENFORMA Building Diagnostics (EBD) utilizes data from an existing building automation system (BAS) to continuously and automatically identify energy inefficiencies and their financial impacts. EBD has automated the manual performance analysis process with algorithms designed to identify problems often undetected by traditional methods and/or BAS monitoring. Some of the tool features and applications are listed below – for the most current information we suggest contacting the company directly.

Tool features:

- Automated data collection via existing BAS

- Integrated fault detection

- Automated notification of inefficiencies and accompanying diagnostics

    Tool Applications:

- Heating, ventilation, air conditioning systems

- Single building, campus and multiple BAS environments

    For more information about ENFORMA
    Contact Architectural Energy Corporation at: (303) 444-4149
    www.enformadiagnostics.com

10.4 Performance and Continuous Re-Commissioning Analysis Tool (PACRAT)

PACRAT is a versatile diagnostic tool developed by Facility Dynamics Engineering to detect problems with HVAC equipment. This tool is designed to provide automated diagnostic capabilities for air handlers, zone distribution systems, chillers, hydronic systems, and whole-building energy use. PACRAT makes use of time-series data collected by existing energy management and control systems (EMCS), utility meters or other data-logging equipment. Once collected, the data are processed making use of an extensive automation of expert rules to assess HVAC system performance (Friedman and Piette 2001). PACRAT is designed to calculate and report deviations from baseline operation and estimate the resulting cost of wasted energy. Some of the tool features and applications are listed below – for the most current information we suggest contacting the company directly.

Tool features:

- Automated data collection via existing EMCS, utility meters, or data loggers

- Calculates key system parameters, loads, energy use, indoor air quality, etc.

- Diagnoses system problems including poor performance and energy waste.

Tool Applications:

- Whole building and systems (HVAC) applications

- Single building, multi-building and campus environments

    For more information about PACRAT
    Contact E. Lon Brightbill (410) 290-0900
    www.facilitydynamics.com

10.5 Energy Expert

The Energy Expert is a software application making use of data collected by utility interval meters, an EMCS or other data logging devices, to develop building diagnostics and performance indicators. This application processes the data and then trains itself to create a "smart model" of a building. Once developed, this model compares daily energy use against the model to determine if the facility has over-consumed, under-consumed, or used the expected amount of energy. The Energy Expert provides daily scorecards to show energy use, cost savings, load profiling, etc. Some of the tool features and applications are listed below – for the most current information we suggest contacting the company directly.

Tool features:

- Automated data collection via existing EMCS, utility meters, or data loggers

- Develops data-based building model for performance comparison and diagnostics

- Provides email/pager notification of anomalies

- Enterprise roll-up of multiple facilities

Tool Applications:

- Whole building and system applications

- Single building, multi-building and campus environments

For more information about the Energy Expert
Contact Patrick O'Neill (877) 743-4232
www.energyworksite.com

10.6 Reference

Friedman, H. and M.A. Piette. 2001. *Comparative Guide to Emerging Diagnostic Tools for Large Commercial HVAC Systems*. LBNL No. 48629, Lawrence Berkeley National Laboratory, Berkeley, California.