U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Bringing Fault Detection and Diagnosis (FDD) Tools into the Mainstream: Retro Commissioning & Continuous Commissioning of HVAC and Refrigeration Systems

University of New Haven

Ravi Gorthala, Ph.D.

Associate Professor of Mechanical Engineering

Chair, Department of Entrepreneurship and Innovation

203-479-4119; rgorthala@Newhaven.edu

Team

- Ravi Gorthala, PI – University of New Haven

  Energy efficiency, FDD development and demonstrations, current CT EEB member

- Pat McDonnell – United Illuminating

  Director of Conservation and Load Management

- Amy Thompson – UCONN

  Industrial/Systems engineer with energy efficiency expertise; has a portfolio of over 1,000 benchmarked buildings; served on CT EEB

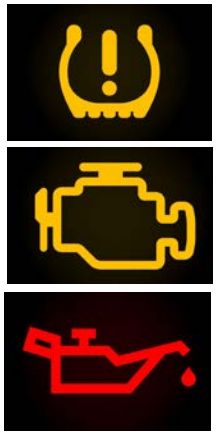
- Hayden Reeve – UTRC

  Leads Intelligent Building Technologies; FDD; collaborations on CBEI with Purdue, Penn State and on ARPA-E NODES with PNNL

Bringing Fault Detection and Diagnosis (FDD) Tools into the Mainstream…

The Problem (The Need/Challenge)

- Packaged RTUs provide cooling (and some heating) for over 60 percent of the commercial building space (87 billion ft^2) in the U.S.
- Refrigeration accounts for 10-16% of energy consumption in restaurants and 44-62% in supermarkets.
- Most HVAC&R systems have one or more faults that result in increased energy use.
- Fault Detection and Diagnosis (FDD) Tools have been developed to address this problem.
- A report by TIAX indicates that annual energy savings as high as 140 TBtu can be achieved by FDD for RTUs alone.
- However, FDD implementation is lagging behind due to market barriers – lack of awareness of the problem/FDD technologies; cost-benefit justification; building owners looking for short-term ROI; FDD an unknown saint?....



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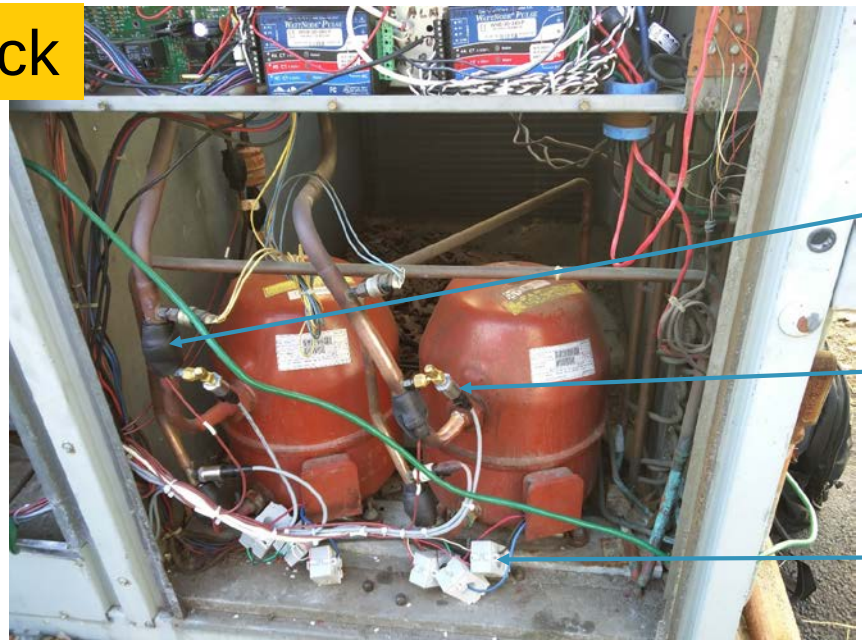

FDD Tools: Hardware/SaaS

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The Project Solution

- Demonstrate technical and economic feasibility of HVAC&R AFDD technologies for retro-commissioning and continuous commissioning through field testing.
- Identify pathways and commercialization strategies to promote widespread adoption of by bringing together all stakeholders to identify/analyze market barriers and address them.
- Support the development and roll out of utility rebate programs for the use of AFDD to promote energy efficiency in commercial buildings.
- Contribute to stakeholder education, outreach and dissemination; undertake workforce development and training.

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Advantage/Differentiation/Impact

- Comprehensiveness of the project – FDD field demonstration/evaluation, stakeholder input, addressing marketing barriers, education and outreach
- Project advisory committee to guide the site selection, FDD product identification; assure transparency
- Utility partners/stakeholder involvement from the beginning
- Significant cost-sharing by utilities; vested interest
- Tackling an important segment of DOE's HIT list; potential for significant national energy savings (Tbtu/year)

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Thank You

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