

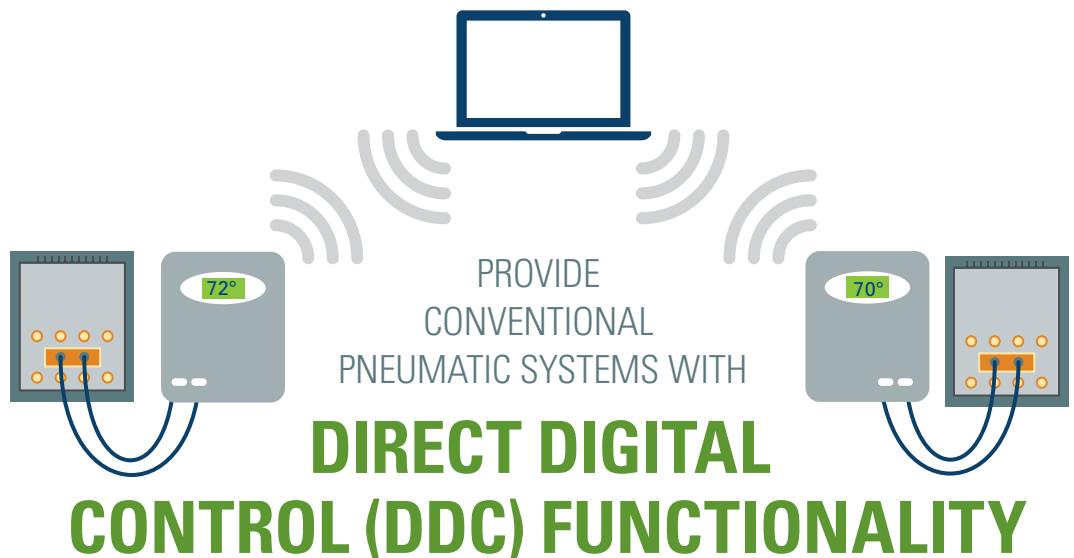
## OPPORTUNITY

Where are pneumatic thermostats typically found?

**COMMERCIAL BUILDINGS BUILT BEFORE 1999** that are > 20,000 ft<sup>2</sup> and multi-story<sup>1</sup>

## TECHNOLOGY

How do Wireless Pneumatic Thermostats work?



## M&V

Where did Measurement and Verification occur?

**OAK RIDGE NATIONAL LABORATORY** assessed wireless pneumatic thermostats at the Woodrow Wilson International Center for Scholars in Washington, DC

## RESULTS

How did Wireless Pneumatic Thermostats perform in M&V?

**EFFECTIVE APPLICATION**  
OF ENERGY-SAVING CONTROL STRATEGIES<sup>2</sup>

**ENERGY SAVINGS**  
ACROSS CLIMATE ZONES AND OFFICE SIZES<sup>3</sup>

**<2-6 YRS PAYBACK**  
WITH UNOCCUPIED/OCCUPIED CONTROL STRATEGY AND LOW INSTALLATION COSTS<sup>4</sup>

### Modeled Payback for Unoccupied/Occupied Control Strategy

Payback assumes an unoccupied setback of 83° for cooling and 62° for heating

Location		Large Office - 498,500 ft <sup>2</sup> Payback (years)		Medium Office - 53,630 ft <sup>2</sup> Payback (years)		Small Office - 5,500 ft <sup>2</sup> Payback (years)	
CLIMATE ZONE	CITY	LOW <sup>1</sup>	HIGH <sup>2</sup>	LOW <sup>3</sup>	HIGH <sup>4</sup>	LOW <sup>5</sup>	HIGH <sup>6</sup>
1A	Miami, FL	3.6	6.5	3.7	6.8	1.9	3.3
2A	Houston, TX	3.7	6.7	4.5	8.2	2.9	5.0
2B	Phoenix, AZ	4.6	8.2	4.0	7.3	2.5	4.3
3A	Atlanta, GA	3.0	5.4	3.5	6.4	2.6	4.5
3B-coast	Los Angeles, CA	2.8	5.1	3.7	6.8	3.7	6.3
3B	Las Vegas, NV	5.3	9.5	5.0	9.2	3.1	5.4
3C	San Francisco, CA	3.0	5.5	3.8	7.0	3.2	5.5
4A	Baltimore, MD	2.8	5.0	3.3	6.0	2.7	4.7
4B	Albuquerque, NM	5.4	9.7	6.0	10.9	3.5	5.9
4C	Seattle, WA	3.6	6.5	4.5	8.2	4.3	7.4
5A	Chicago, IL	3.1	5.6	3.8	7.0	2.8	4.8
5B	Boulder, CO	5.0	8.9	5.7	10.5	3.7	6.4
6A	Minneapolis, MN	4.6	8.3	5.7	10.5	3.7	6.3
6B	Helena, MT	3.9	7.1	4.6	8.4	3.3	5.7
7	Duluth, MN	4.3	7.8	5.3	9.7	3.7	6.3
8	Fairbanks, AK	4.2	7.6	5.2	9.5	3.1	5.3

Installation Costs: <sup>1</sup>\$0.50/ft<sup>2</sup> <sup>2</sup>\$0.90/ft<sup>2</sup> <sup>3</sup>\$0.60/ft<sup>2</sup> <sup>4</sup>\$1.10/ft<sup>2</sup> <sup>5</sup>\$0.70/ft<sup>2</sup> <sup>6</sup>\$1.20/ft<sup>2</sup>

## DEPLOYMENT

Where does M&V recommend deploying Wireless Pneumatic Thermostats?

**ANY FACILITY WITH CONVENTIONAL PNEUMATIC CONTROLS\***

Deployment priority should be given to facilities with high energy costs

<sup>1</sup>Wireless Pneumatic Thermostat Evaluation, Ronald Reagan Building and International Trade Center, Washington, DC, Dan Howett, P.E., Mahabir Bhandari, PhD ORNL, March 2015, p. 2 <sup>2</sup>Ibid, p.3 <sup>3</sup>Ibid, p.4 <sup>4</sup>Ibid, p.4 <sup>5</sup>Subject to evaluation and approval by GSA-IT and Security