



## Dynamic Air Flow Balancing

Traditional systems don't acknowledge and fix frustrations and problems such as wasted energy, high energy bills, varied temperatures and uncomfortable working conditions caused by temperature variances and poor indoor air quality. **Pankaj Chawla, Co-founder and CTO, 75F**, discusses a new way to control HVAC systems called Dynamic Airflow Balancing made possible by 'Internet of Things' design.



**W**ith factors like climate change, increasing air pollution in India and the changing demands of millennial workforce,

there is no greater time than now to focus on a commercial building's HVAC system and invest in a predictive, proactive and dynamic management system that is tailored to suit your building's specific needs.

Traditional systems don't acknowledge and fix frustrations and problems such as wasted energy, high energy bills, varied temperatures and uncomfortable working conditions caused by temperature variances

and poor indoor air quality. They also make achieving business goals such as cost reduction, energy efficiency, flexibility and future proofing, very difficult. The need of the hour is centralisation, simplification and automation.

To address these problems, 75F has invented a new way to control HVAC systems called Dynamic Airflow Balancing™ made possible by “Internet of Things” design. 75F’s Dynamic Airflow Balancing Technology not only fixes the initial uncomfortable state, but brings in up to 40 per cent savings in energy, adds a whole new level of automation and empowers the facility manager with complete visibility of his facility and its real-time energy consumption.

**How the ‘Internet of Things’ is used in HVAC**

The Internet of Things (IoT) is enabling products or services to be smarter than ever before. For instance, it enabled 75F to revolutionize the HVAC industry by introducing an award-winning system that is making waves for its ability to break through what was once theory and continuously commission a building, ensuring that HVAC equipment runs exactly as it needs to, when it needs to.

Most thermostats only react to a temperature imbalance once it has occurred. They don’t take into account the daily changes in local temperature, humidity levels, or whether the sun is shining. This results in large temperature swings that have to be compensated for by running the HVAC system for a long period of time. As a result, the overall comfort and energy efficiency of your building goes down.

75F’s system, on the other hand, proactively adjusts to temperature changes because we know they are coming. We know whether the sun is shining and what the temperature is outside of your building - and even

better, we know how that effects the environment inside your building. This additional knowledge gets passed down to our Smart Dampers and into your HVAC equipment, allowing the system to work in harmony to increase comfort and efficiency.

**What is Dynamic Airflow Balancing?**

Dynamic Airflow Balancing is a radically new way to control airflow inside a building.

While traditional zone control systems are largely reactive, 75F’s Dynamic Airflow Balancing Technology commissions continuously, thereby saving upto 40 per cent energy and at the same time, guarantees optimum occupant comfort. The solution combines building orientation, geographical placement, local weather forecasts, and sunrise/sunset times to keep real time scheduling. Additionally, the system provides real time feedback on energy usage of a building, while performance evaluation can help predict failures and verify service actions.

**Collecting Data**

The 75F approach treats each room as a personal micro-zone and calculates the heat loads they require every minute of the day. Sensors collect data to generate a thermal model of the building. An algorithm takes a myriad of variables into account and calculates the thermal requirements of each room. Knowledge is power



**Balanced System**

and this data fuels 75F’s Dynamic Balancing System.

**Balancing**

Buildings are dynamic. The heat load required by each room will vary by time of day, number of people in the room, the weather outside, etc. Many HVAC systems cannot collectively account for these variables to make intelligent and orchestrated adjustments that both increase comfort and save energy.

When an HVAC system is first installed in a building, the loads for each space are calculated and the dampers are manually adjusted to reflect these calculations - which is known as commissioning a building. These adjustments are based on a “design day” the engineer deemed suitable for the space. When the external environment (weather, time



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of day, people in a room, humidity, etc.) match the scenario the engineer balanced the system for, things are great! But when any single variable deviates from the “design day”, there is an imbalance. And with an imbalance follows inefficiency and discomfort.

For example, an east facing room will need more AC in the morning than a room facing the West side. Under that scenario with existing HVAC systems, people on the east side sweat through the morning and people on the west side, freeze. With the 75F Dynamic Air Balancing Solution, the dampers adjust accordingly to condition the air as per the need providing optimal comfort to people irrespective of where they are and what time of the day it is.

### Modus operandi

Wireless Zone Controllers identify and collect information from the rooms in real time, every minute and share the data with the central control unit. Each night cloud computing algorithms analyze thousands of these data points, including weather forecast data feed that allows the system to predict future weather conditions (Big data analysis). Post which, a new set of instructions are sent to the Central Control Unit and dampers are modulated from time to time to achieve the perfect air flow balance. The system also takes into consideration real time events such as occupancy, change in CO2 levels, humidity etc to make instant adjustments to the heating/cooling plan as and when required.

## Facilisight

Web & Mobile Apps



### Web Mobile Apps

Facility Manager and Installer Portal are supporting tools that provide insight into the system’s operation and savings. A single sign-on portal allows facility managers to remotely monitor a wide range of system information in all sites at once including:

- Real-time status of all system devices
- Zone desired temperature
- Wet and dry bulb temperatures
- Fan status
- System heating or cooling status
- Animated heat map of the floor plan
- Inside and outside humidity levels
- Historical logging
- Remote control of all system settings

### The competitive edge

The key aspect which differentiates Airflow Dynamic Balancing Technology from other HVAC systems in the market is how we

make use of the Internet of Things in its products. All sensors and smart dampers are connected to the cloud and works collaboratively to be as energy efficient as possible without sacrificing on comfort. It sends hot and cold air as required and as much required and exactly to the place where it is required, thereby bringing down energy wastage and cost. Predictive intelligence and efficient hardware makes such a thing a magnificent reality. □

**Pankaj Chawla** worked for over 15 years in the Electronic Design Automation (EDA) industry working on multiple new products for Cadence Design Systems, before the proverbial entrepreneurial bug bit him. In 2012 he joined hands with Deepinder Singh to start 75F and work on building a new approach to solving heating and cooling problems faced by small to medium commercial spaces. Today, as the Co-founder and CTO of the company, Pankaj oversees the technology and design of 75F’s innovative range of products from India.

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**VOL MEDIA PVT LTD**

R-206, Sector 4, Near Corporation Bank, Airoli, Navi Mumbai- 400 708

Tel: +91 80800 12966, Telefax: +91 22 2779 0847

Email: [Marketing@volmedia.net](mailto:Marketing@volmedia.net), [hvcworld@volmedia.net](mailto:hvcworld@volmedia.net), Website: [www.hvcworld.com](http://www.hvcworld.com)

