

## CHAPTER/REGIONAL TECHNOLOGY AWARD - SHORT FORM

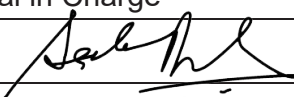
### 1. Category - Check one and indicate New, Existing, or Existing Building Commissioning (EBCx)

- |  |   |                                      |                               |
|--|---|--------------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> Commercial Buildings       | <input checked="" type="checkbox"/> New | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| Institutional Buildings:                                       |   |                                      |                               |
| <input type="checkbox"/> Educational Facilities                | <input type="checkbox"/> New            | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| <input type="checkbox"/> Other Institutional                   | <input type="checkbox"/> New            | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| <input type="checkbox"/> Health Care Facilities                | <input type="checkbox"/> New            | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| <input type="checkbox"/> Industrial Facilities or Processes    | <input type="checkbox"/> New            | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| <input type="checkbox"/> Public Assembly                       | <input type="checkbox"/> New            | <input type="checkbox"/> Existing or | <input type="checkbox"/> EBCx |
| <input type="checkbox"/> Residential (Single and Multi-Family) |   |                                      |                               |

2. Name of building or project: 800 West Fulton  
City/State: Chicago IL

3. Project Description: Office Tower  
Project Study/Design Period: 06/01/2018 to 06/30/2019  
Begin date (mm/yyyy) End date (mm/yyyy)  
Percent Occupancy at time of submission: 30%

### 4. Entrant (ASHRAE member with significant role in project):

a. Name: Anand Sachin  
Last First Middle  
Membership Number: 5184161  
Chapter: Illinois  
Region: VI  
b. Address (including country): 303 W Erie Street, St. 510  
Chicago IL 60654 USA  
City State Zip Country  
c. Telephone: (O) 312-915-0557 d. Email: sanand@dbhms.com  
e. Member's Role in Project: Principal in Charge  
f. Member's Signature: 

5. Engineer of Record: dbHMS

By affixing my signature above, I certify that the information contained in this application is accurate to the best of my knowledge. In addition, I certify that I have discussed this entry with the owner and have received permission from the owner to submit this project to the ASHRAE Technology Awards Competition.

## 800 FULTON MARKET

Thor Equities has built a cutting edge 19-story speculative office building in the West Loop District of Chicago. The building has 465,000 sf of total space with a lower-level garage, retail on the first floor, amenities on the second floor and seventeen (17) tenant office floors.

Unlike typical office towers of this kind, the goal was to build a cutting edge highly sustainable building with high levels of energy efficiency, enhanced indoor air quality, improved thermal comfort, an improved occupant experience and enhanced operations. The building incorporates the following:

1. LEED Platinum and WELL Gold Certification
2. Platinum Wired Score Certification
3. 49% energy savings over ASHRAE 90.1 Baseline
4. De-Coupled HVAC system to improve indoor air quality
5. Smart building Systems and Controls with an Occupant App to improve occupant experience

dbHMS developed a design that maximizes the flexibility of the building and provides efficient heating and cooling strategies. The facility includes a decoupled system with a water-cooled heat pump and a dedicated outside air system (DOAS) with a water cooled Variable Refrigerant Flow (VRF) system for local heating and cooling. This system uses smaller ductwork, allowing the design team to reduce the floor-to-floor height by 6 inches on each floor without impacting ceiling heights. Further, the heat pump based system allows for an exchange of heating and cooling energy between zones improving efficiency.

The project incorporates one of the largest water cooled DOAS systems (80,000 cfm) and delivers ventilation via variable air volume (VAV) boxes controlled via CO2 sensors. Exhaust air is transferred to the core toilet rooms on each floor and exhausted as toilet exhaust with a heat exchange of the incoming fresh air thus eliminating the need for a general exhaust riser.

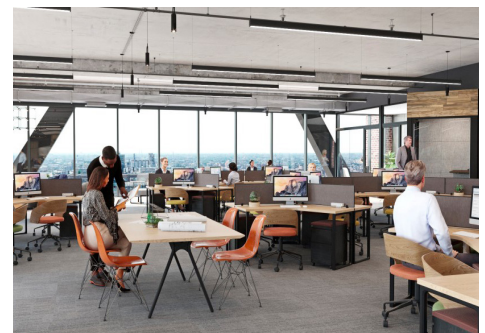
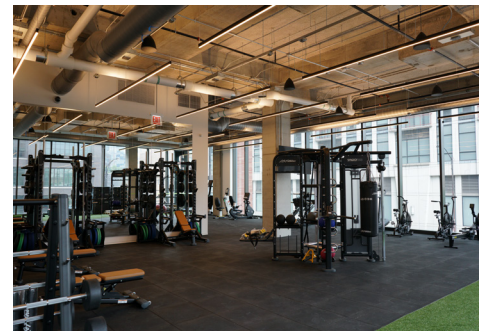
The VRF system allows for metering of the use of heating and cooling energy by the tenant, something most typical office towers do not offer.

All the technology-based systems in the building ride on a single consolidated Passive Optical Network with switches on each floor for connections from BAS, lighting controls, security, and IT. These systems can be accessed by operator and occupants based on levels of access using a single "pane of glass". The building is also outfitted with specialty sensors in the lobby, amenity spaces and core restrooms. These count the number of occupants in each space and allow tenants to make reservations for amenity spaces via a phone app. These sensors also measure the air quality of these spaces with temperature, humidity CO2, ammonia and PM2.5. Additional sensors in toilet stalls and under trash receptacles inform building operations on when to dispatch cleaning crews to optimize building operations. The phone app also integrates with secure entry into the building and destination dispatch elevators.

### ENERGY EFFICIENCY

The building systems have been optimized to reduce the energy consumption of the facility. The energy data is tabulated below in Table 1

Table 1: Energy Metrics		
Estimated Energy Usage/Cost	Baseline Case	Proposed Case
<b>Energy Use Intensity (kBTU/SF-year)</b>	58.71	30.03
<b>Energy Savings</b>	-	48.85%
<b>Yearly Energy Cost (\$)</b>	480,023	354,081
<b>Yearly Energy Cost per Square Foot (\$/sf)</b>	1.03	0.76
<b>Energy Cost Savings</b>	-	26.24%



**INDOOR AIR QUALITY**

The facility includes a dedicated outside air system (DOAS) with demand control ventilation in each space to maintain a high-quality environment for indoor air quality.

**INNOVATION**

By choosing to not use a traditional VAV type system and use a water cooled VRF system the building demonstrates how an efficient and cost effective VRF system can be applied to a large office high rise building. Further the use of integrated technology for IT, BAS, security and building operations is a model of a modern smart building.

**OPERATION & MAINTENANCE**

The front-end Smart Building software has built in Fault Detection and Diagnostics (FDD) to not only help with typical operations but to give operating staff insight into early fault detection.

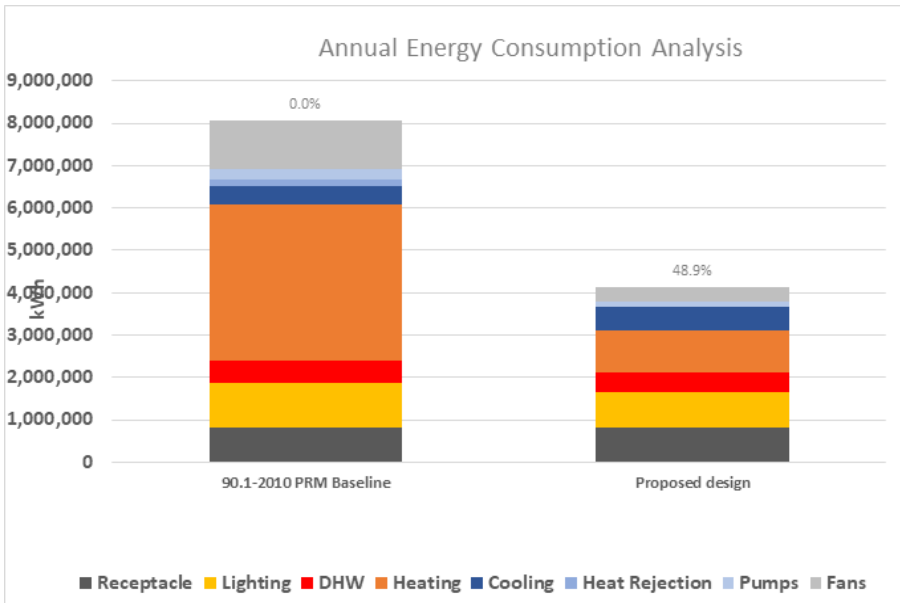
**COST EFFECTIVENESS**

The use of the VRF system reduced the floor-to-floor height by 6 inches per floor. This allowed the saving of building facade by 9 feet. Further, the early cost estimating established that the total cost of the building and systems after buildout was comparable to a typical office building with a VAV system. Shell and core costs were significantly lower allowing for improved project cash flows.

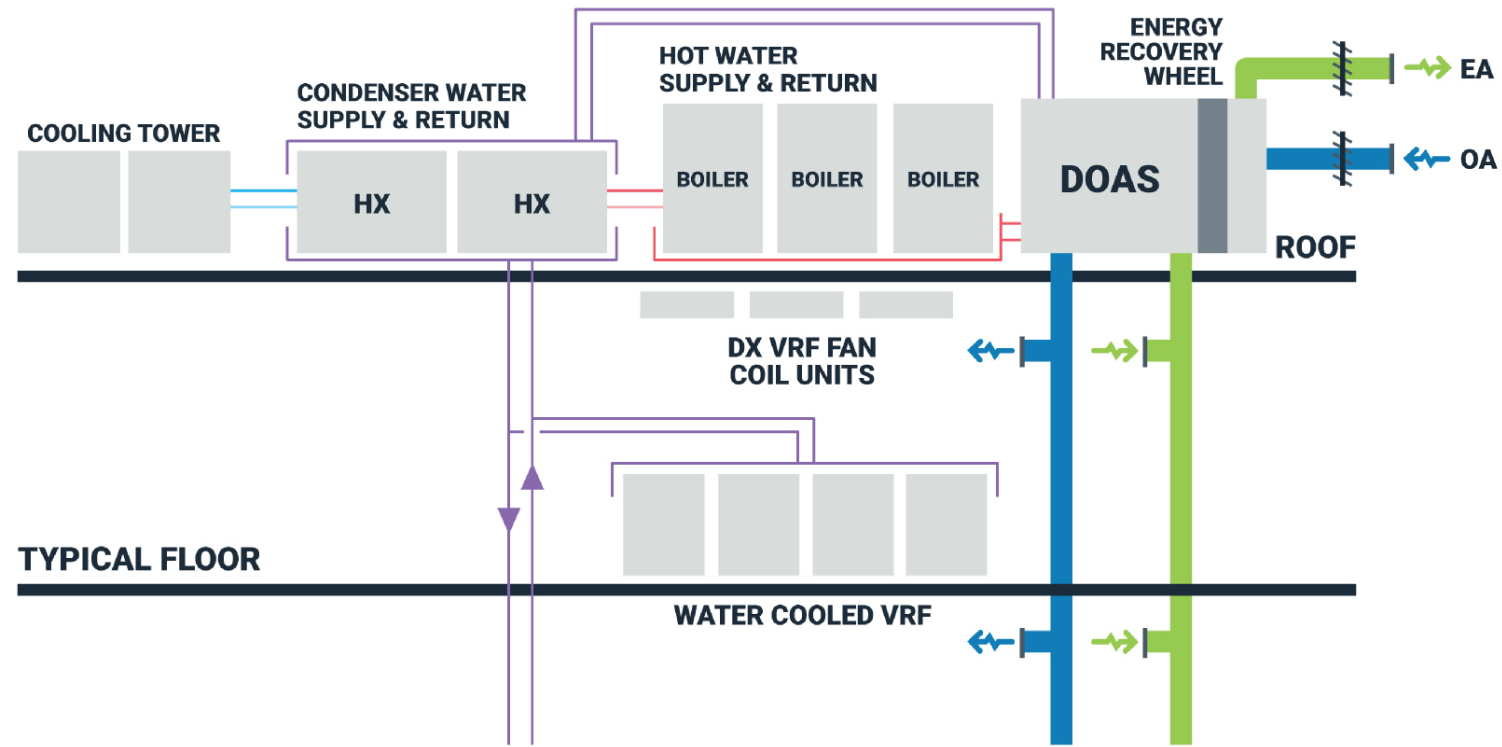
**ENVIRONMENTAL IMPACT**

Table 2 summarizes the predicted environmental impact of the building relative to the ASHRAE 90.1-2010 Appendix G Baseline.

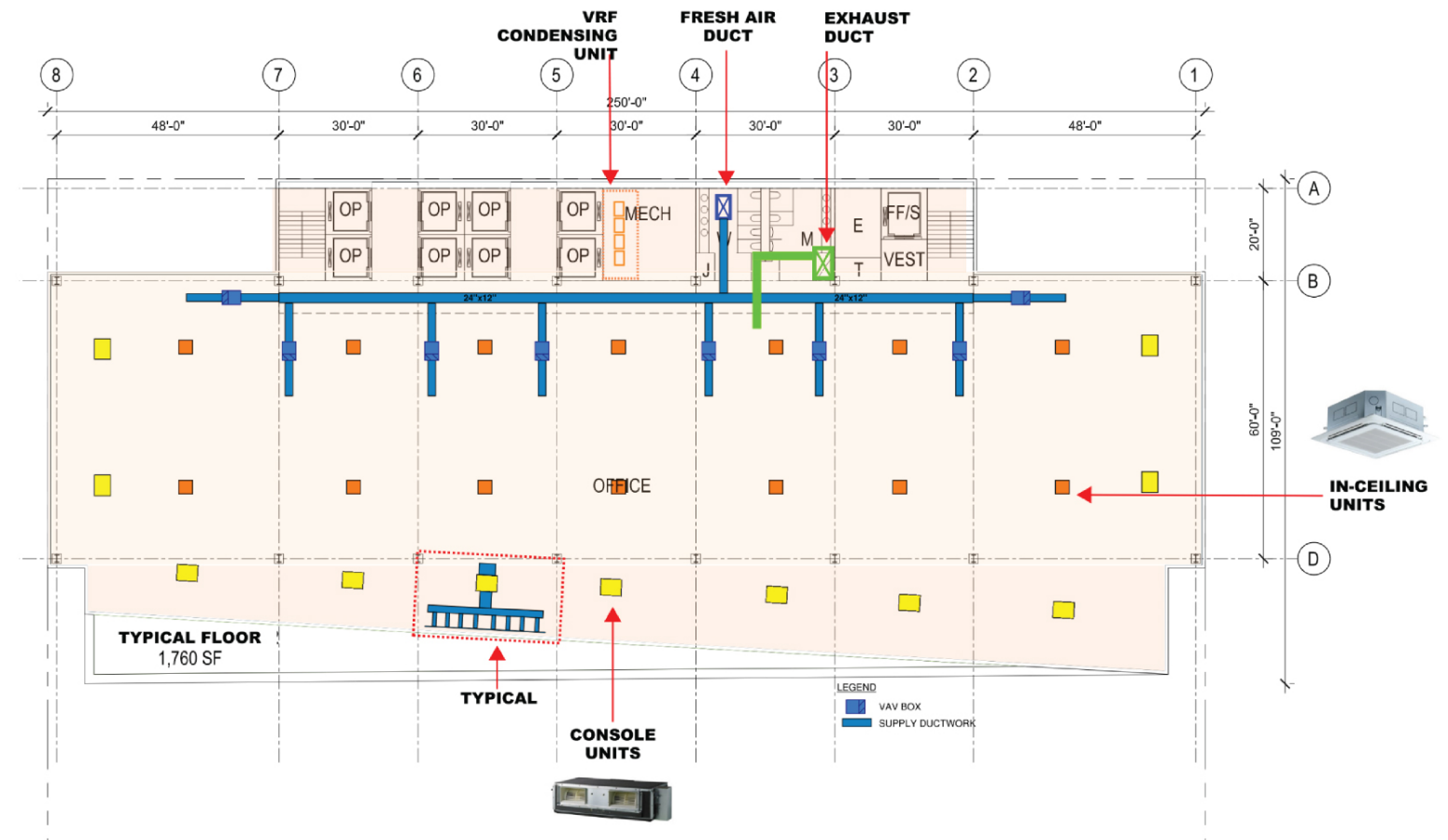
	Baseline	Proposed	Reduction
kg CO2 equivalent*	3,875,560	1,566,014	60%



# SCHEMATIC



# TYPICAL FLOOR PLAN



**OWNER'S RELEASE**  
**2021 Illinois ASHRAE Technology Awards**

I, Peter McEneaney, certify that I am a representative of  
Thor 816 W Fulton Owner, LLC, and grant  
permission to dbHMS, 303 W Erie. St., Chicago, IL 60654, to submit this project for entry in the  
2021 Illinois ASHRAE Technology Awards Competition.

*PM*  
\_\_\_\_\_  
**Signature**

9/16/2021  
\_\_\_\_\_  
**Date**