

COMMISSIONING



Manitoba Hydro's
Downtown Office
Project

ENERGY MANAGEMENT TASK FORCE
2008

November 5, 2008

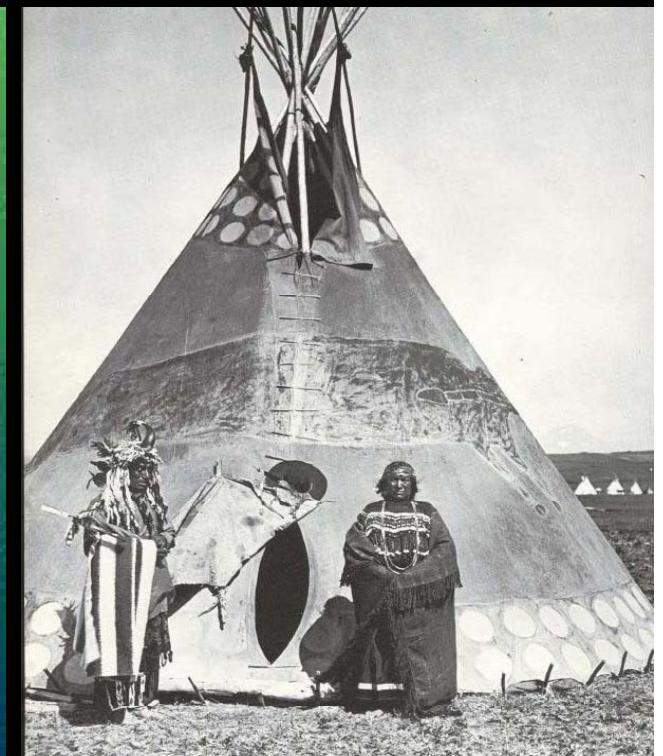
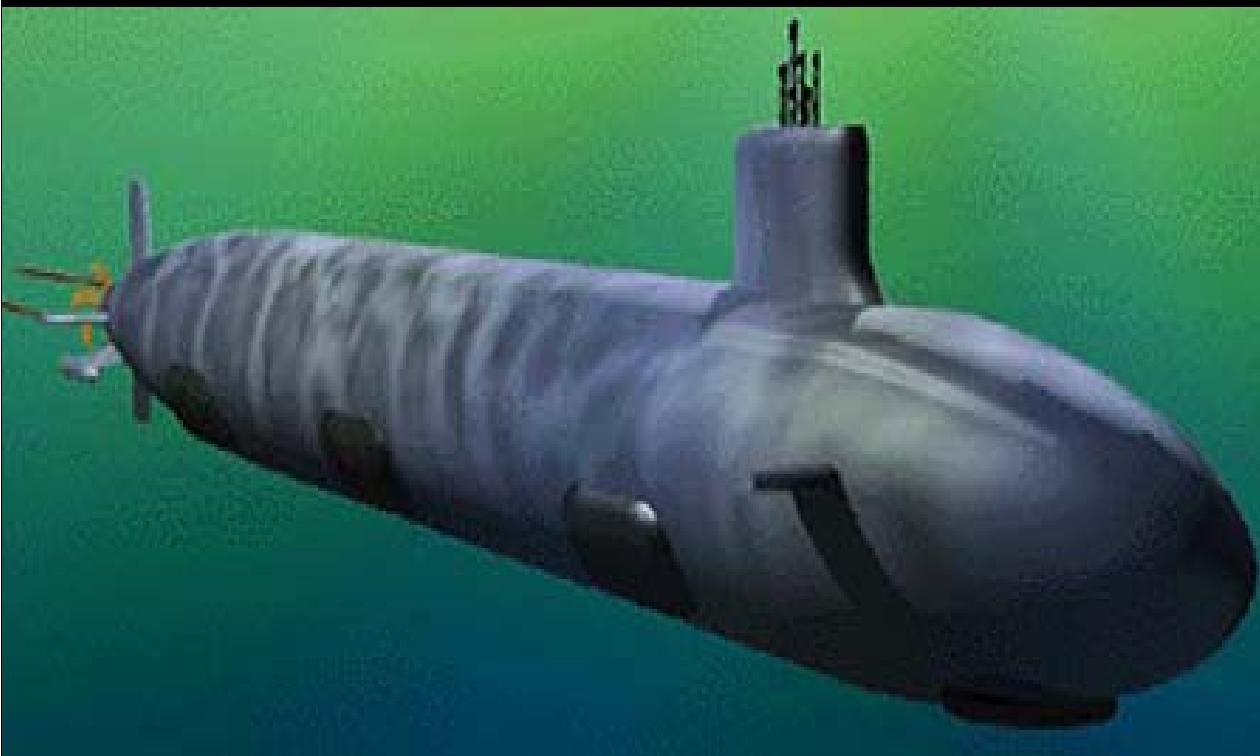
Project Charter



- Supportive Workplace: healthy & effective contemporary office environment for employees
- Sustainability: LEED Gold
- Energy Efficient: 60% more energy efficient than the MNECB
- “Signature”
- Urban Context
- Cost-effective

Different approaches for an Energy Efficient building design

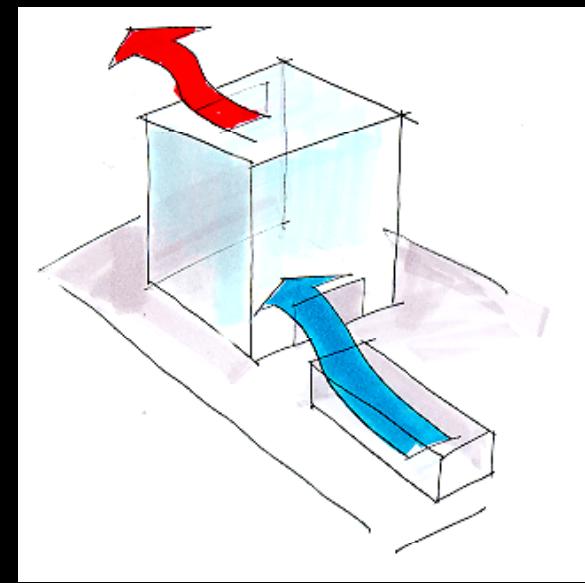
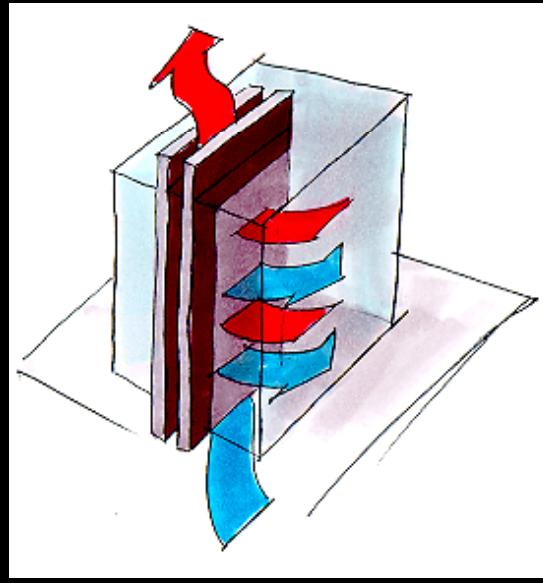
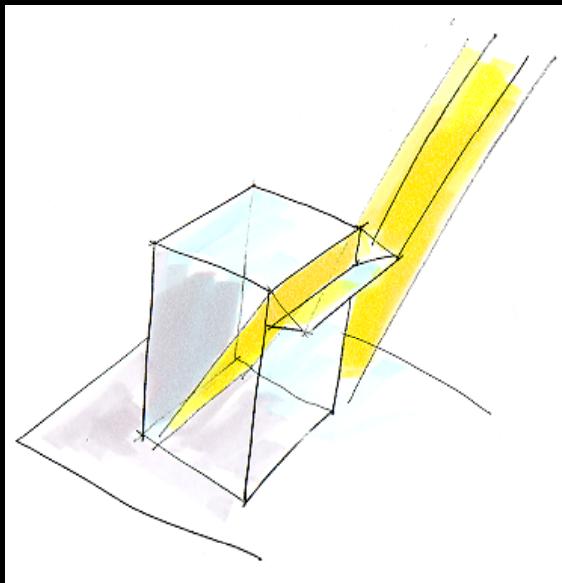
Closed Box vs. Breathing Structures



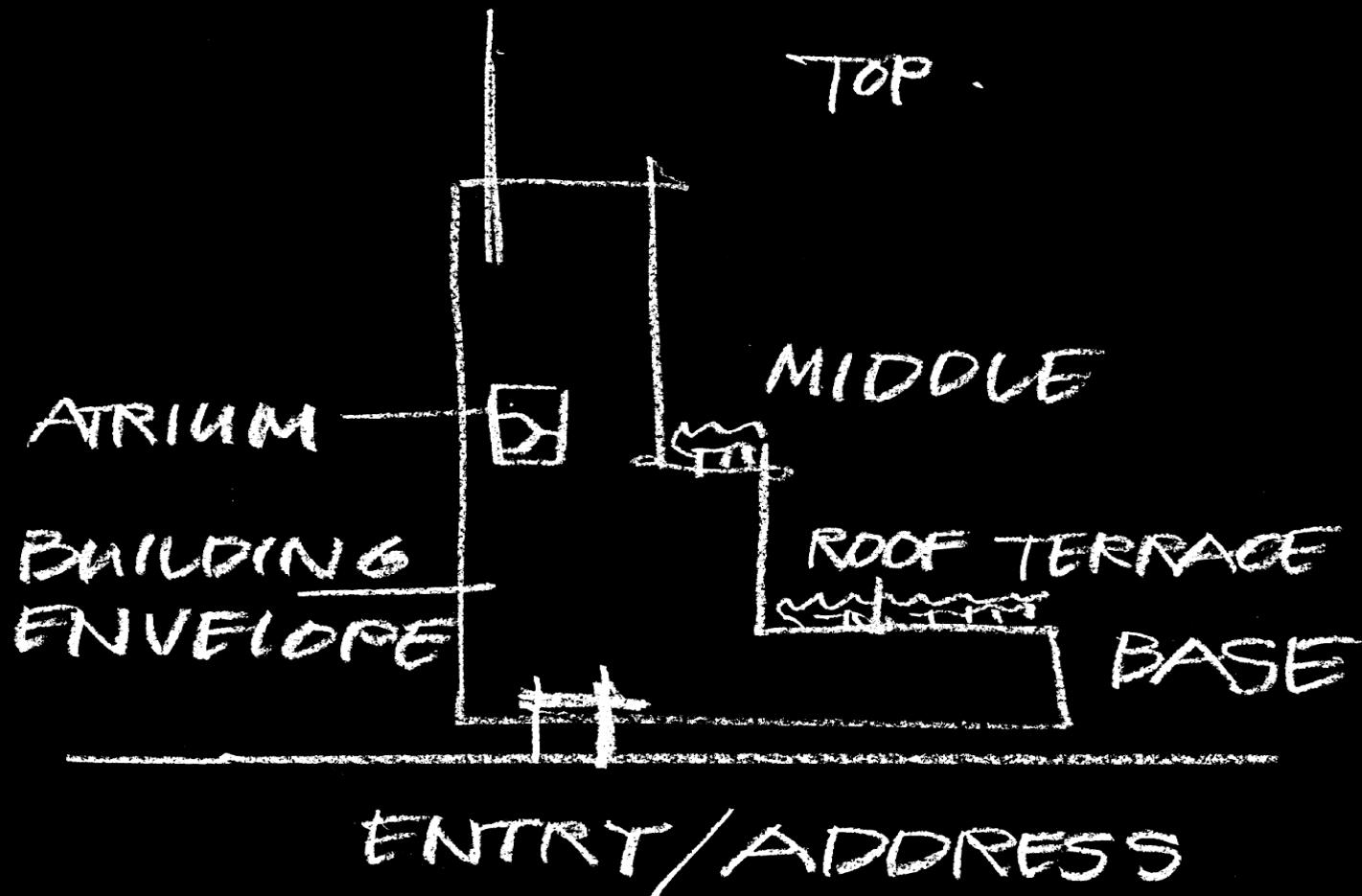
Energy Efficiency

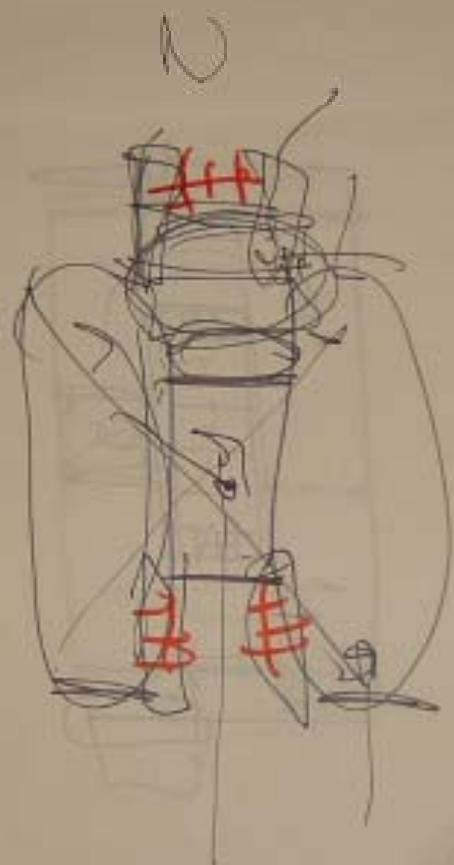
Climatic Responsive Design

- Taking advantage of natural sources

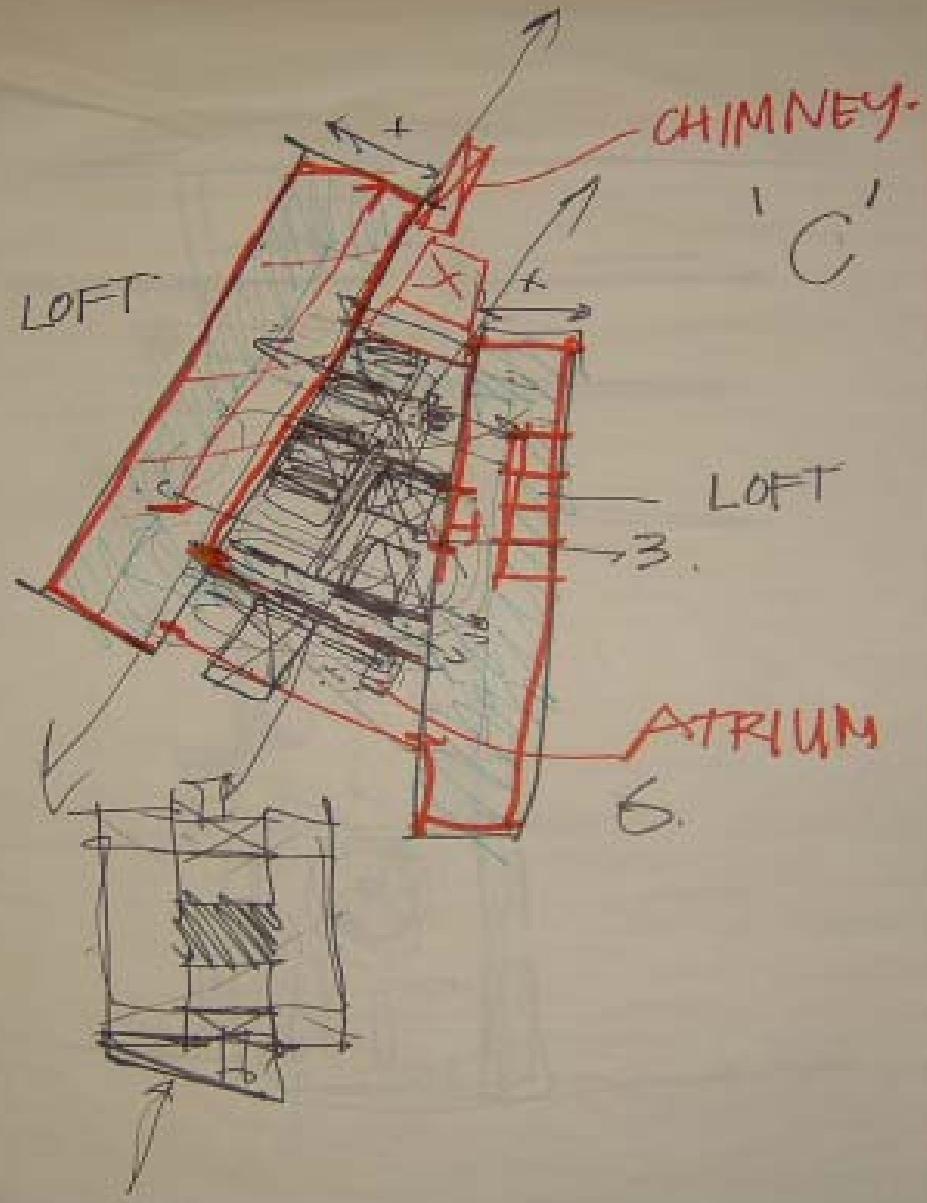


Climatic Responsive Design





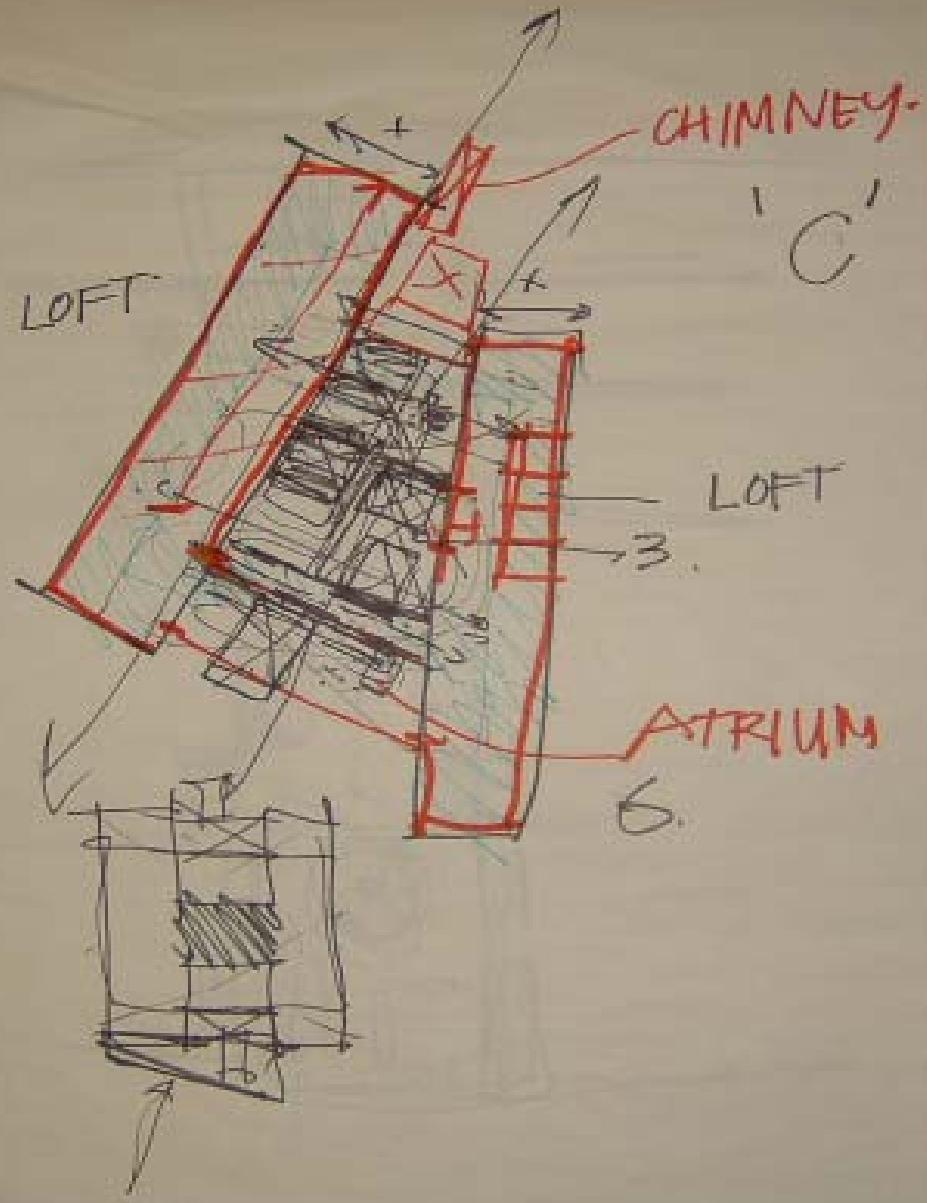
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Integrated Design Process

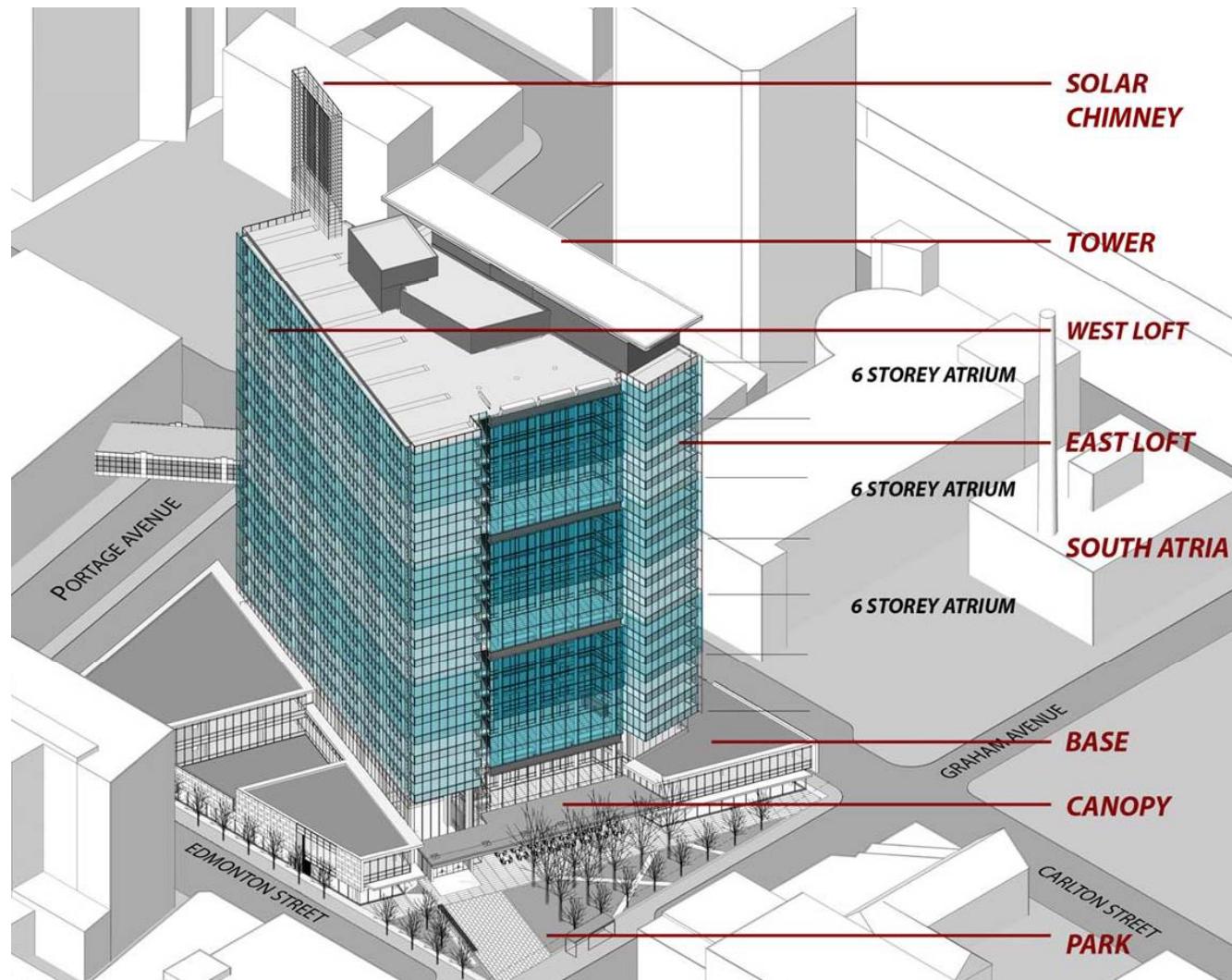


Building the Winning Team

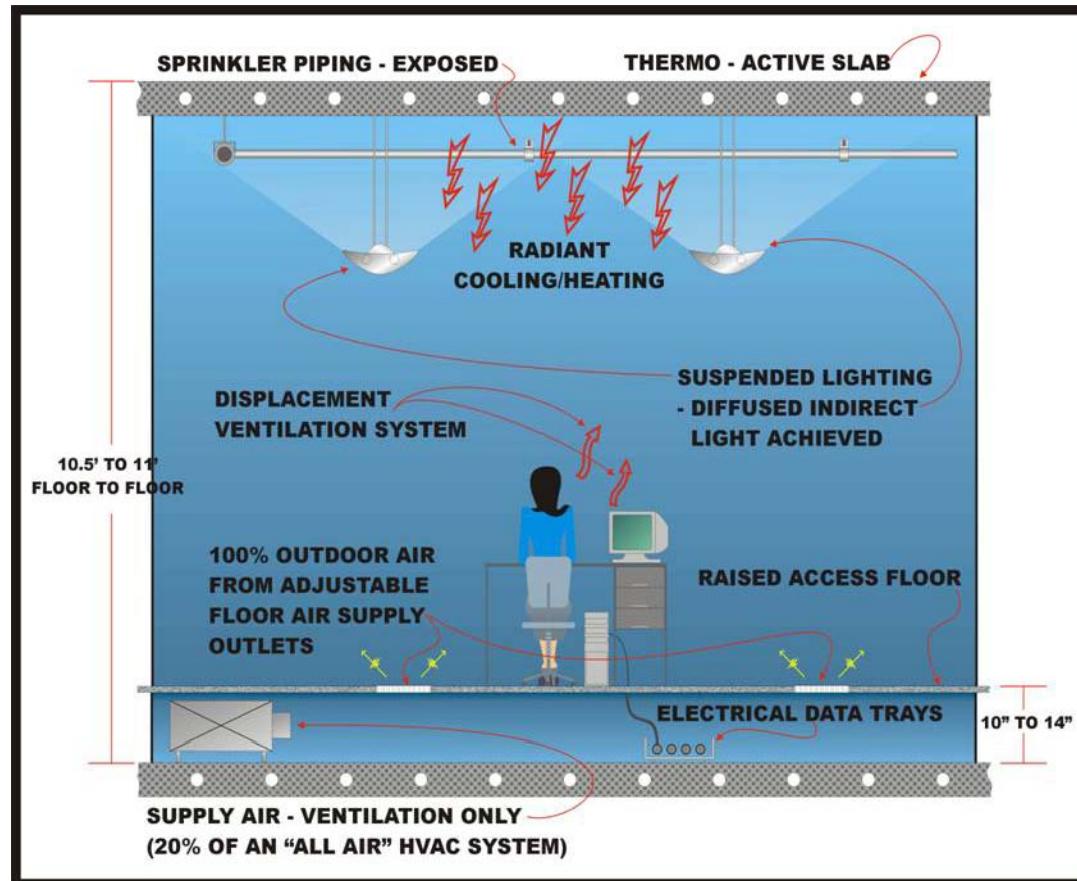


Commissioning for Energy Efficiency and Sustainability in Manitoba Hydro's Downtown Office Project by Kevin Thurston

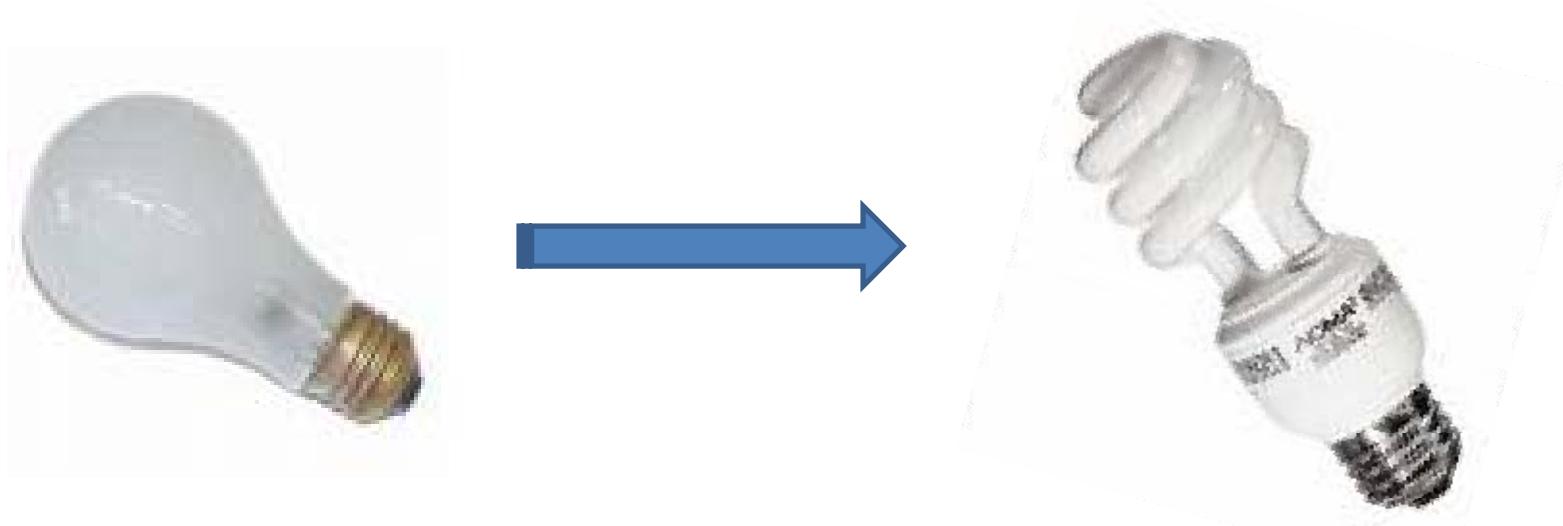
Today's Better Buildings are Energy Efficient , Sustainable & Durable



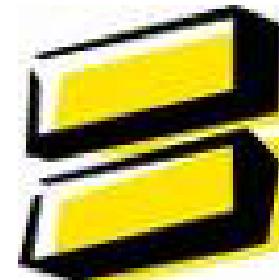
*You are looking for ways to make
your buildings more energy efficient,
sustainable and durable.*



Designing & Operating energy efficient integrated systems



Realizing the
benefits of an
energy efficient,
sustainable and
durable design



Engage an Experienced
Commissioning Agent



What does the
CxA do to
meet your
challenge and
get you to your
end goal?



How do you ensure system integration?



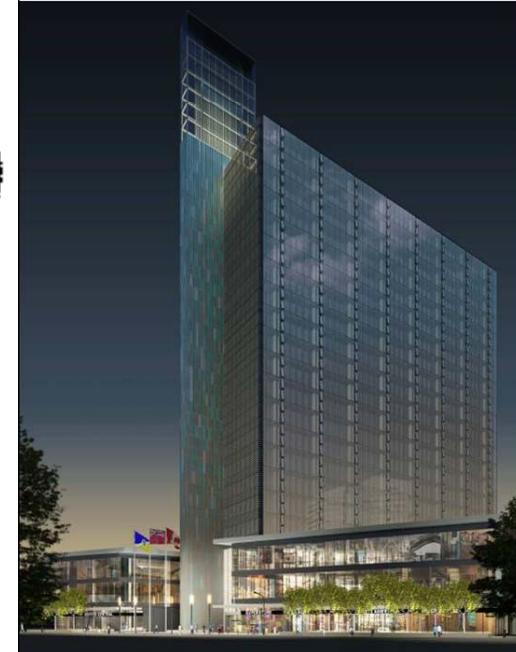
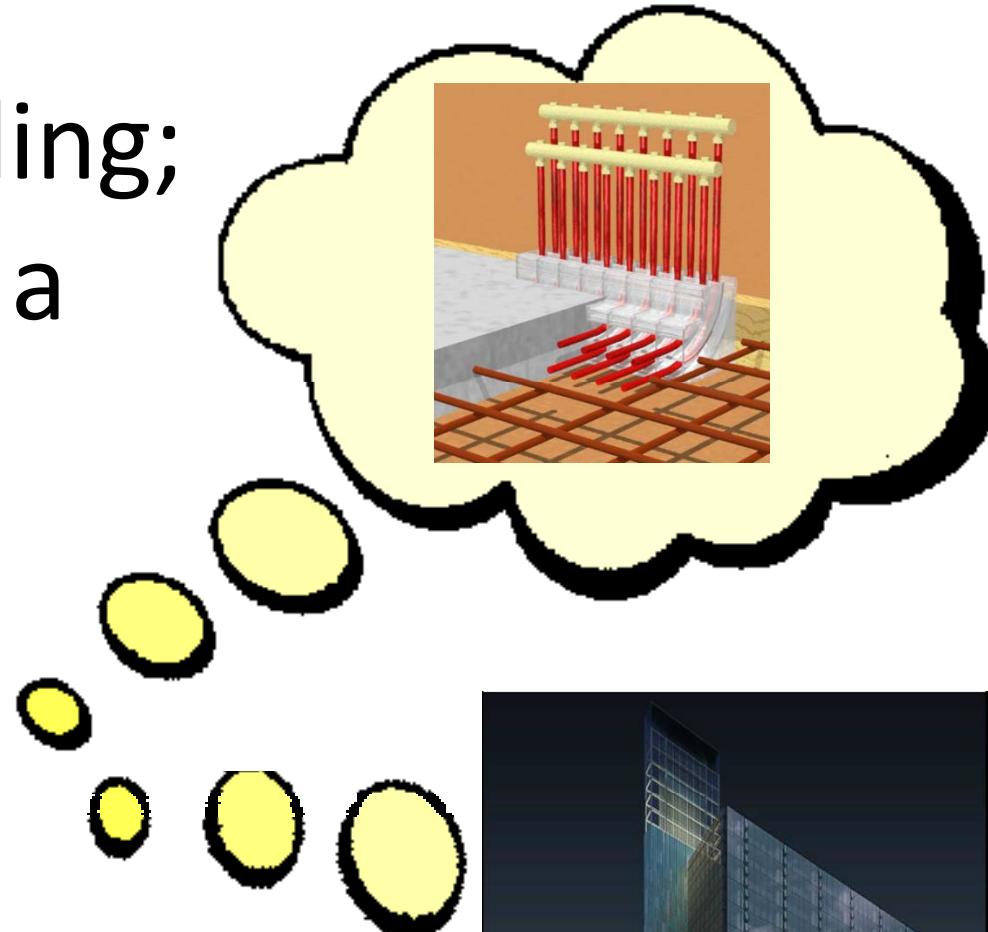
A critical
member of the
Design Team



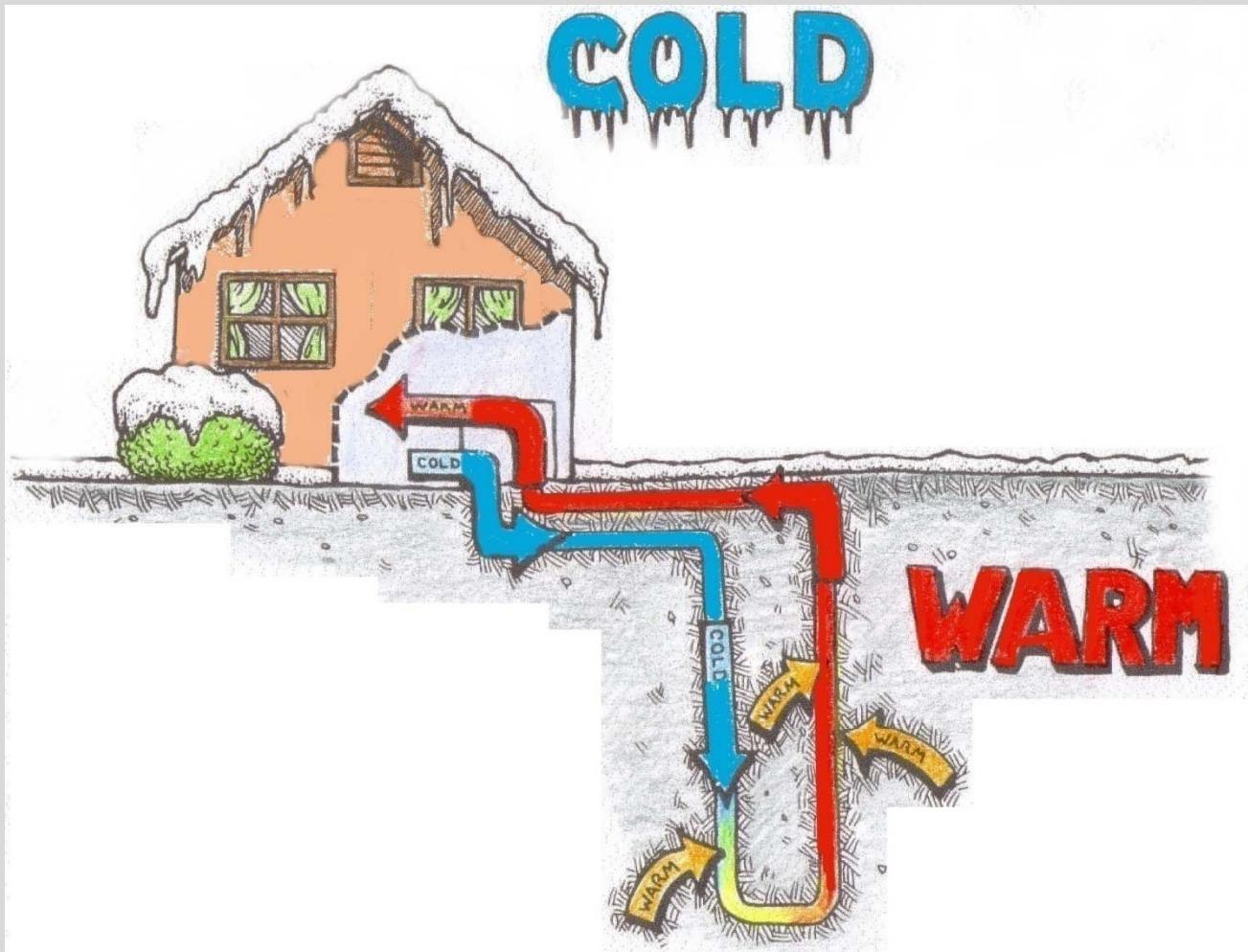
Design Reviews



Be the building;
think like a
system



How do you ensure system functionality?



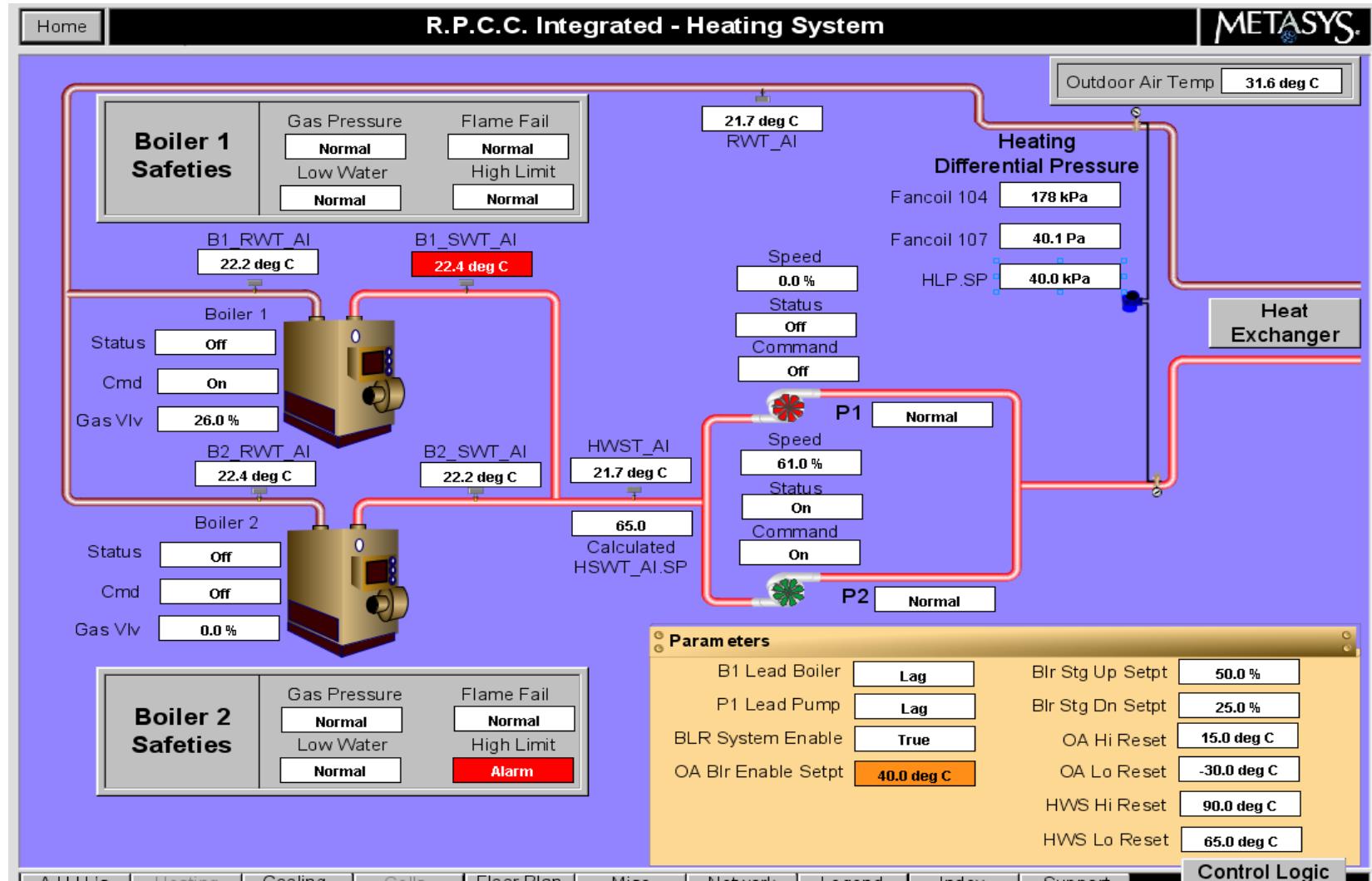
Component Verification Forms (CVFs)

Downtown Office Project		COMPONENT VERIFICATION FORM	
Manitoba Hydro Winnipeg, Manitoba		Tag No.	L2-CP-01
		Description	Hot Water Recirculation
		Section	23 21 23
		Discipline	Mechanical
		System	HTHW System
Equipment Data:			
Manufacturer	Bell & Gossett		
Type	Pump - Hydronic		
Model No.			
Serial No.			
Supplier			
Nameplate Data		Specified	
Motor Data			
Manufacturer	Bell & Gossett		
Model no.	NBF-10S/LW		
Size	0.055 kW		
BHP (kW)			
RPM			
Pump Data			
			

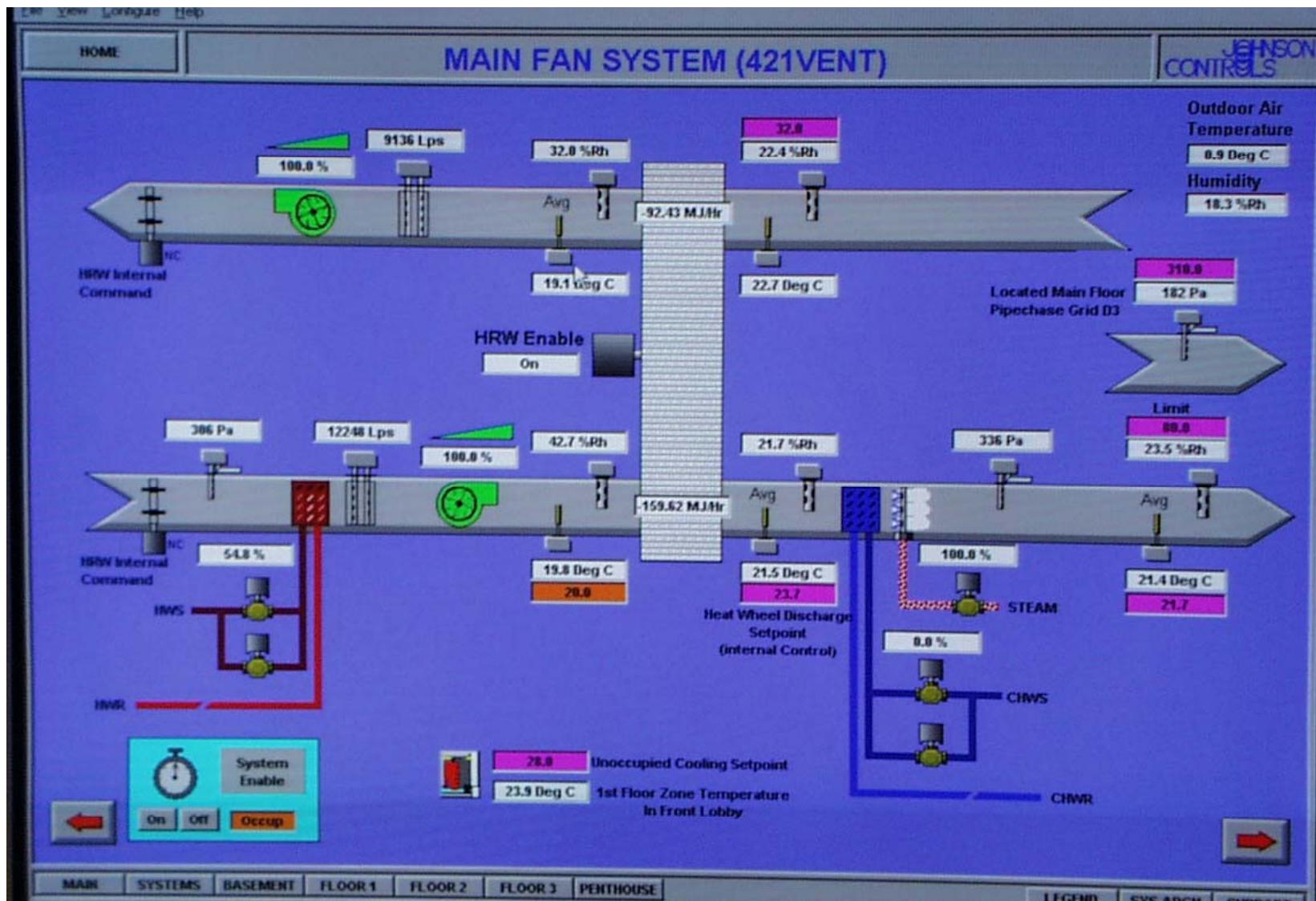
System Tests (STs)



System Tests (STs)



Integrated System Tests (ISTS)



Long Term Sustainable Operations



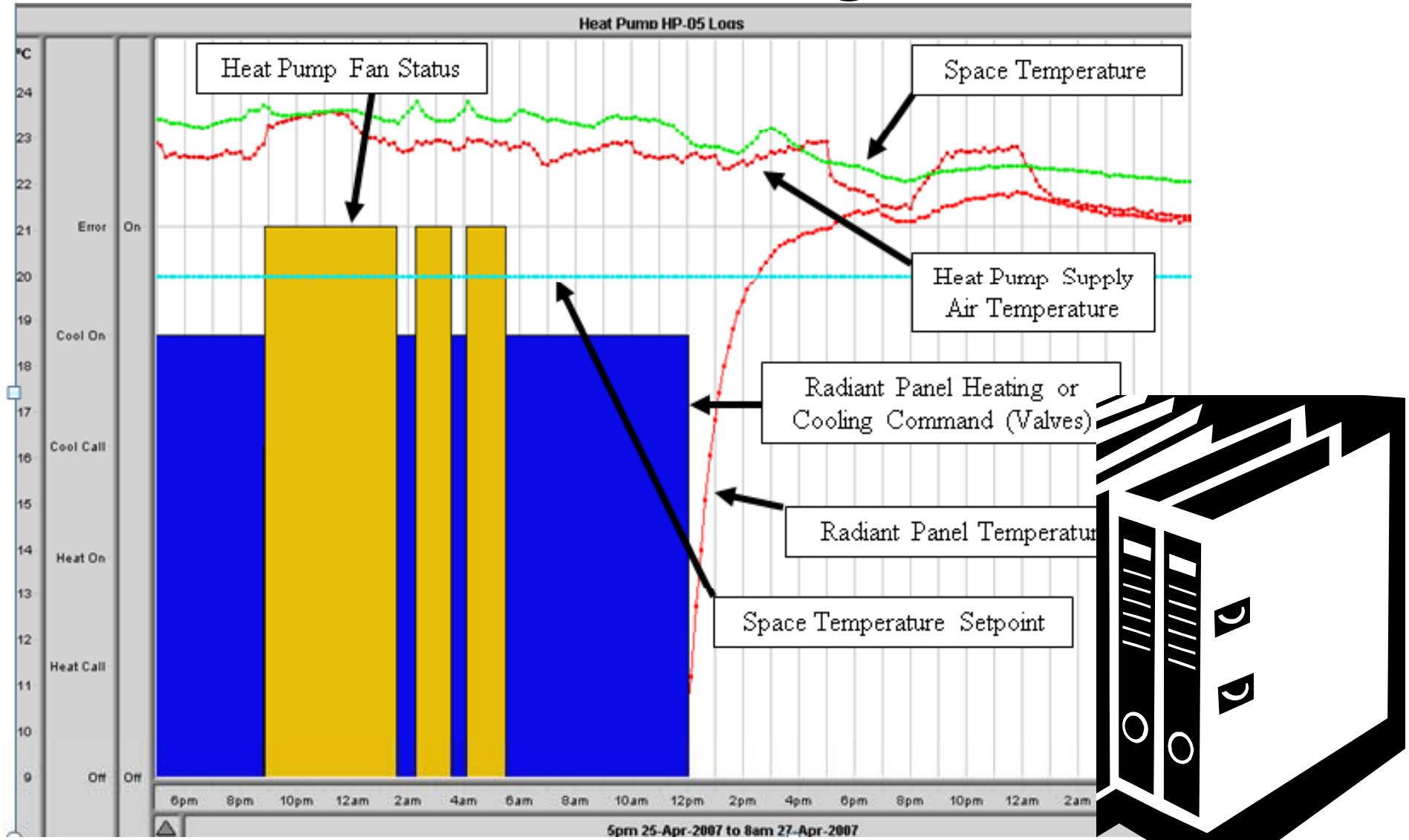
Building meets Owner's needs



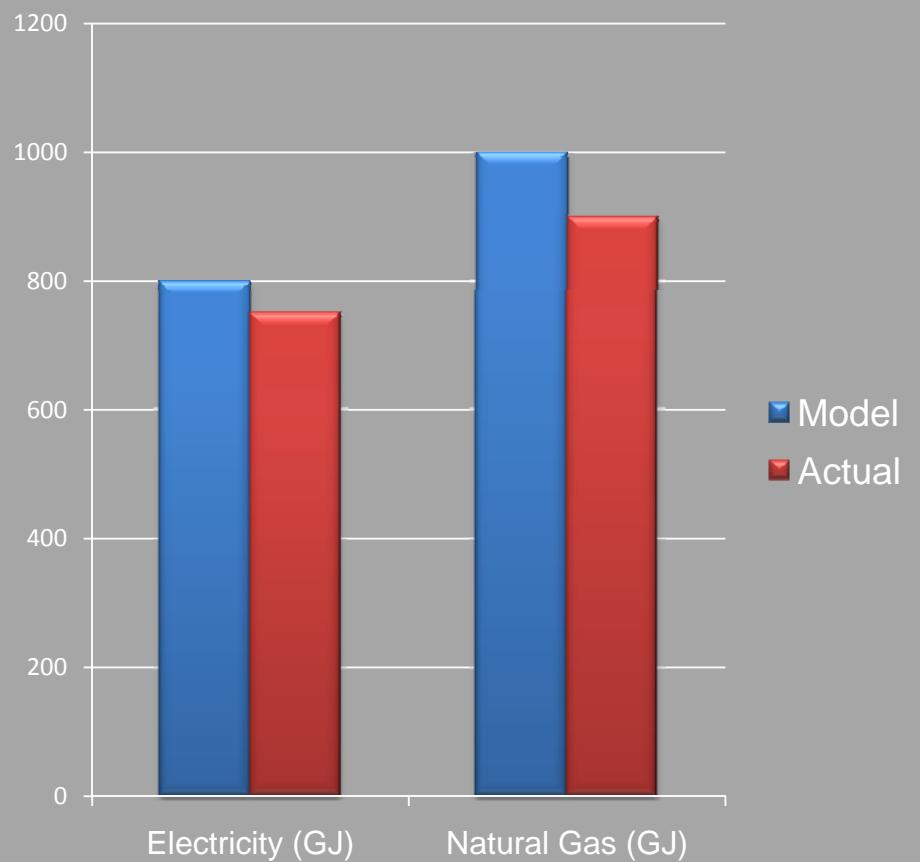
Operator Training and Involvement



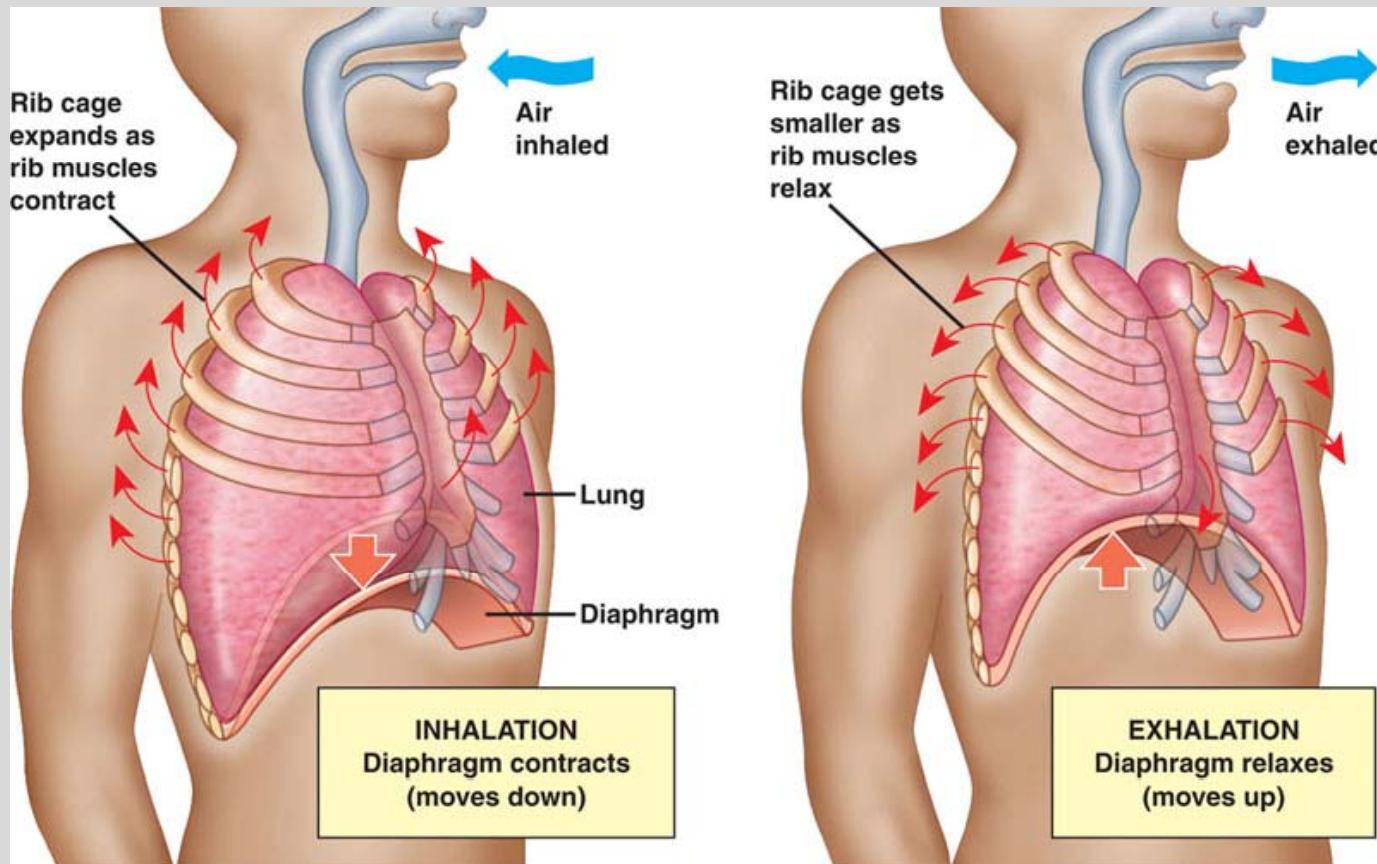
Re-Commissioning Manual



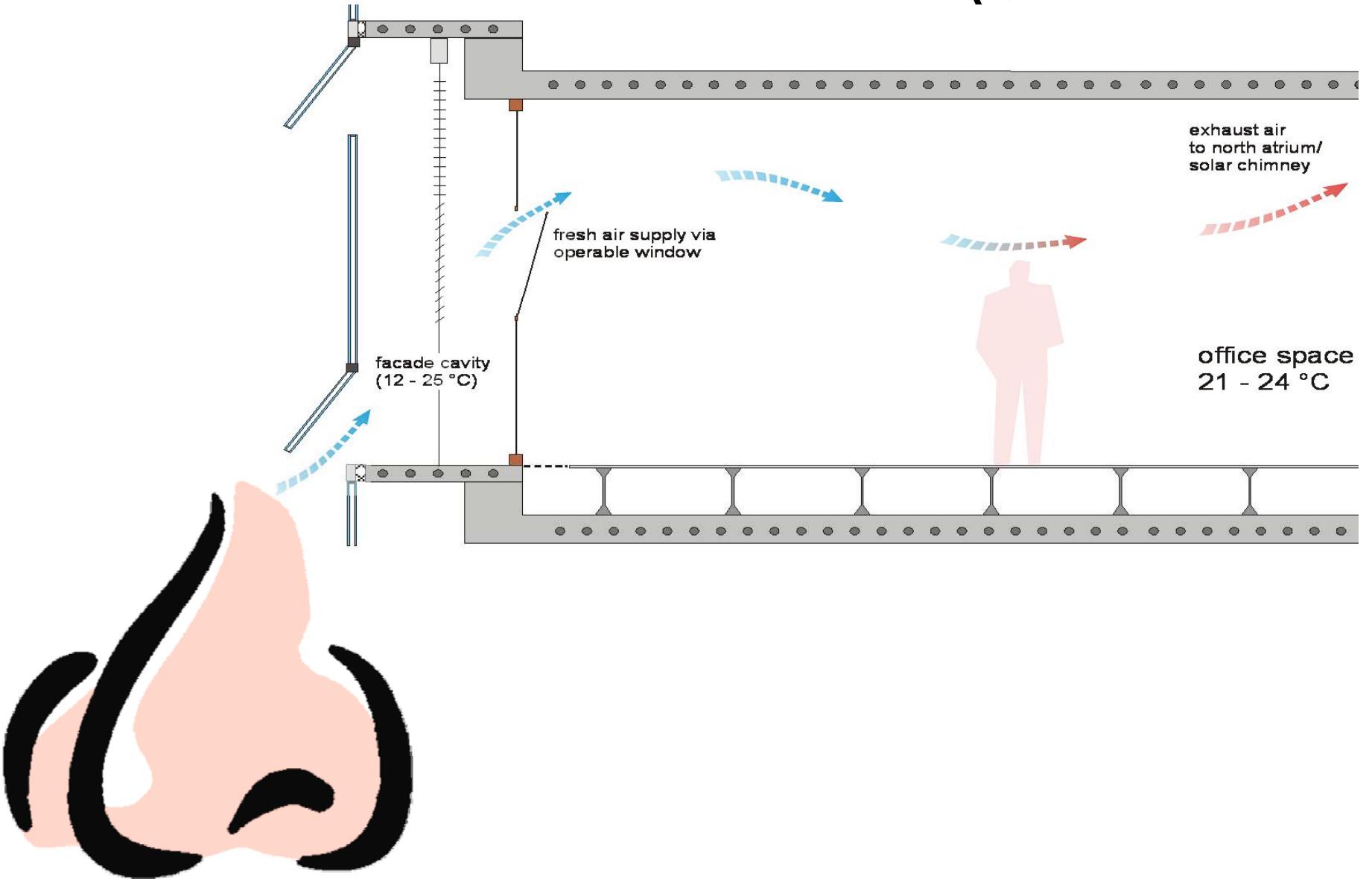
MH's challenge of integrating systems to meet energy efficiency goals



Ventilation

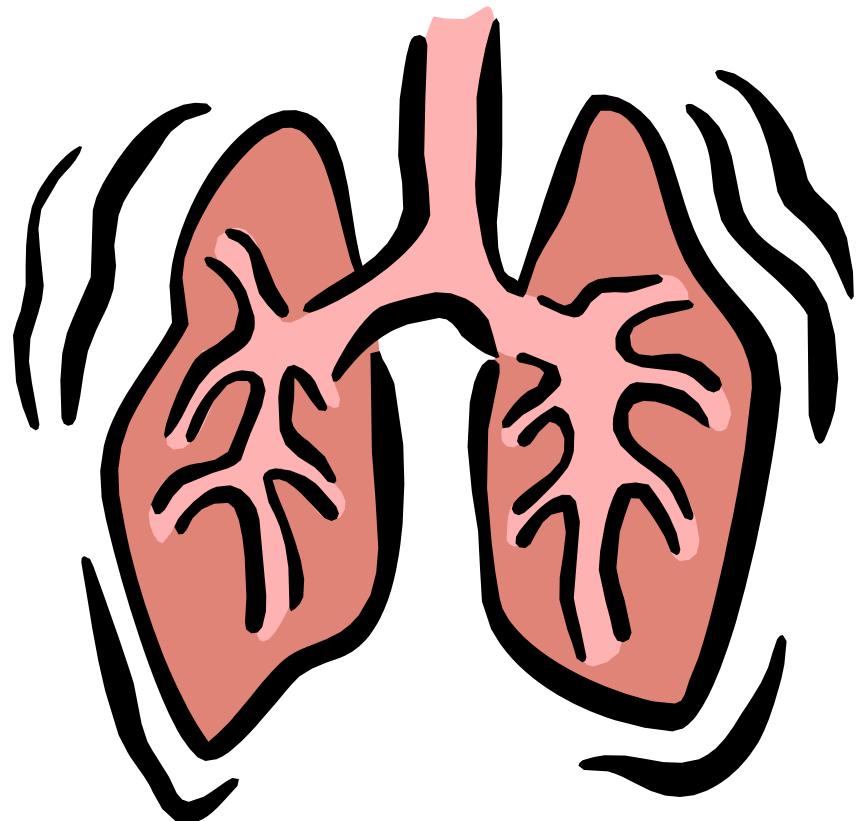


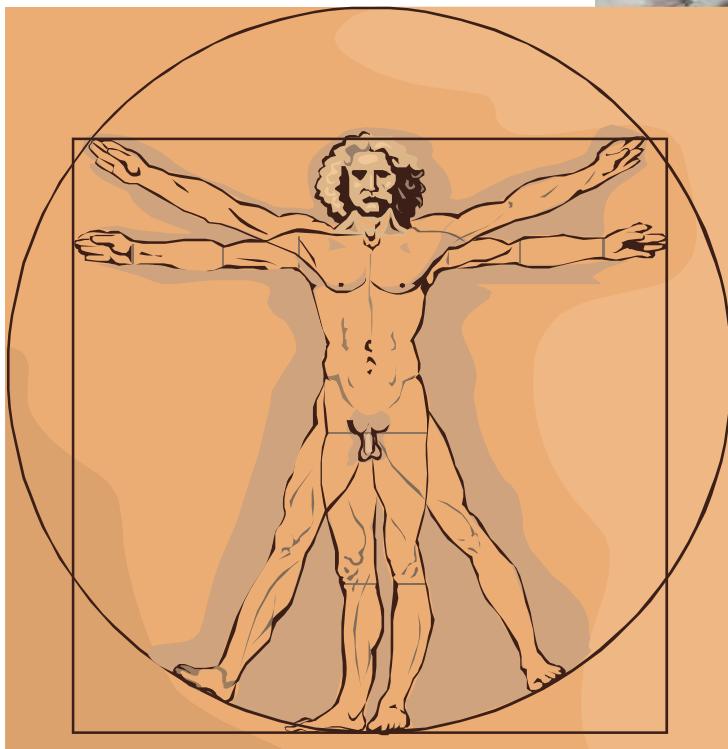
Double Façade





Winter Gardens



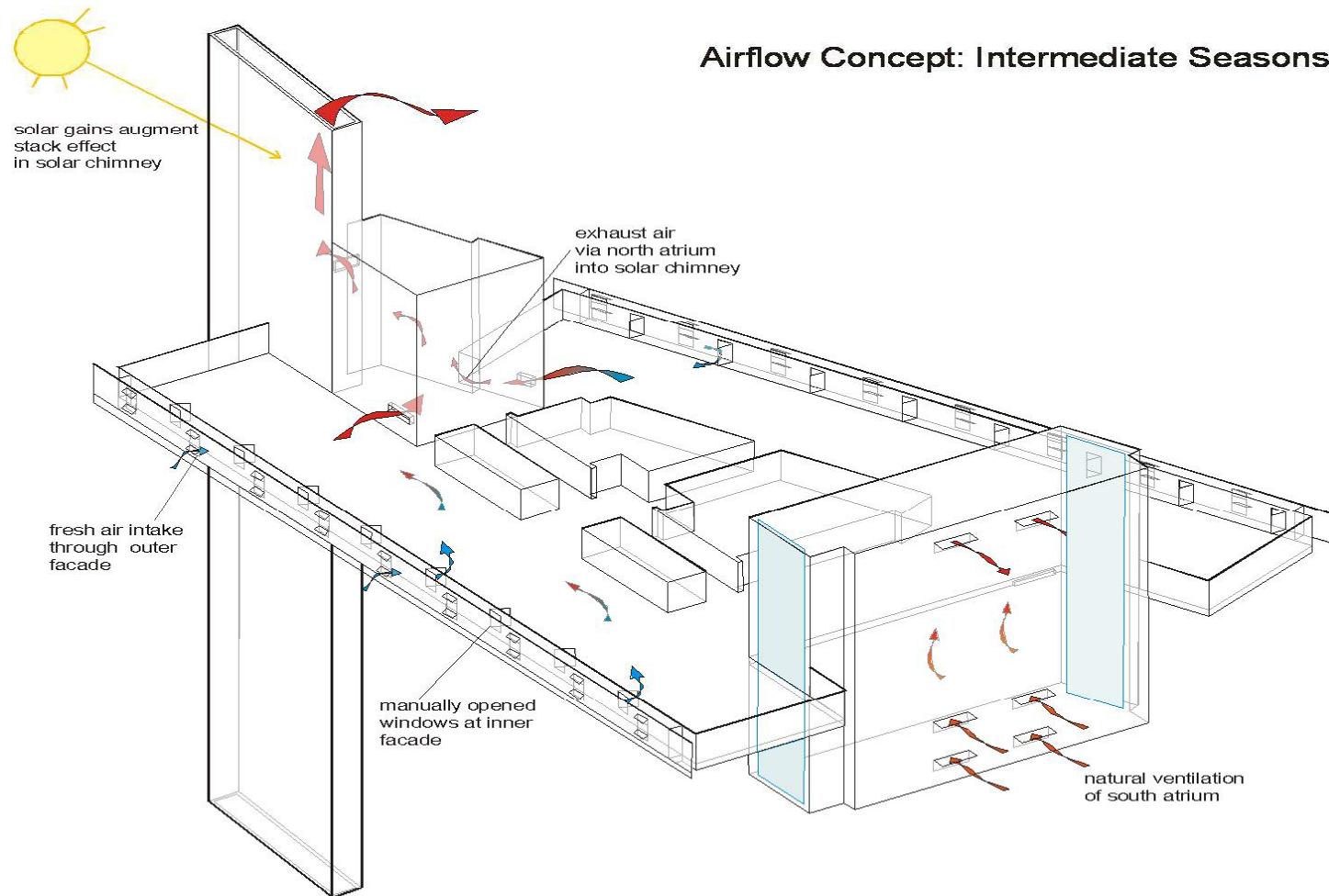


Raised Floor

Air Highways

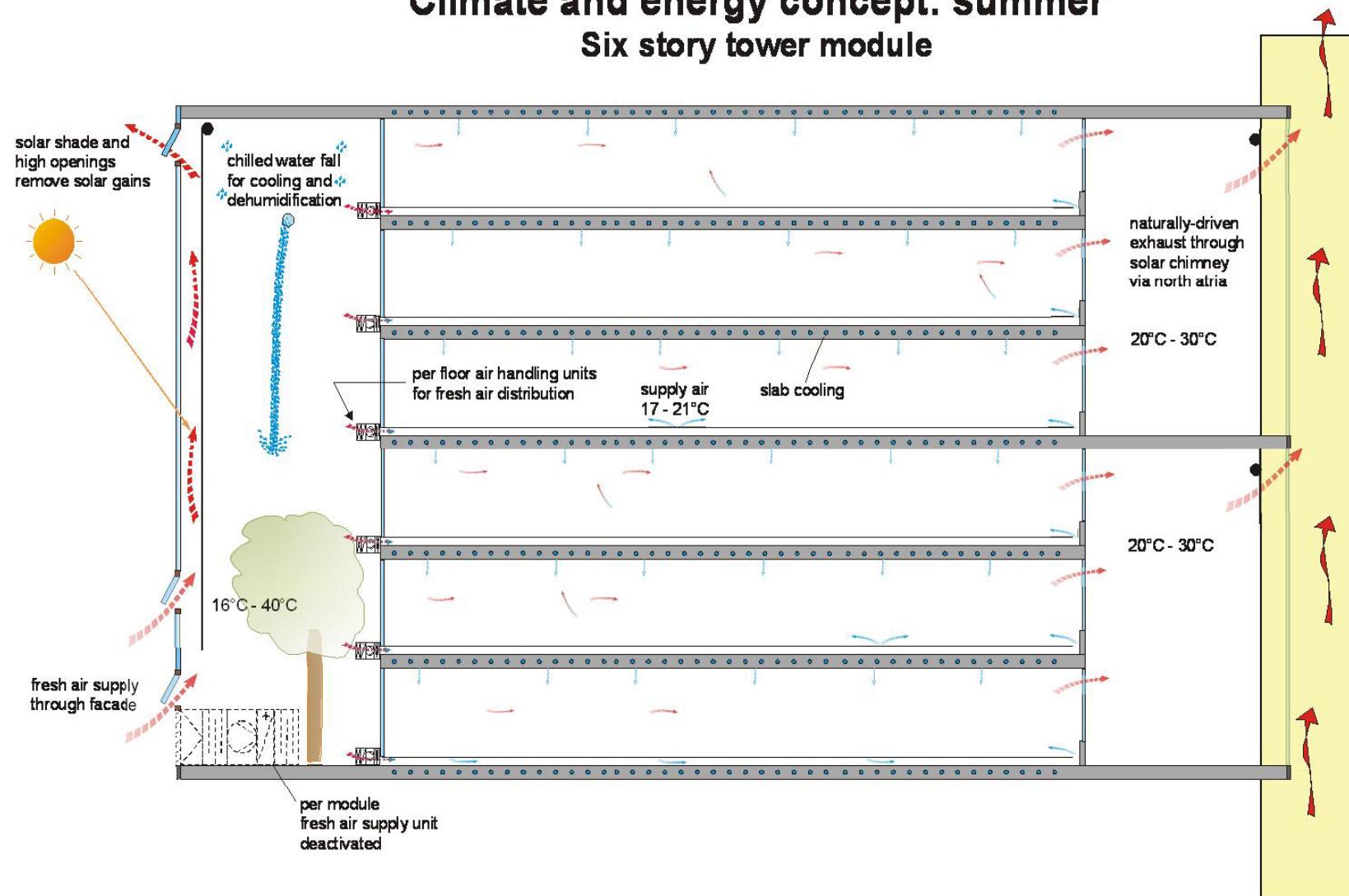


Solar Chimney

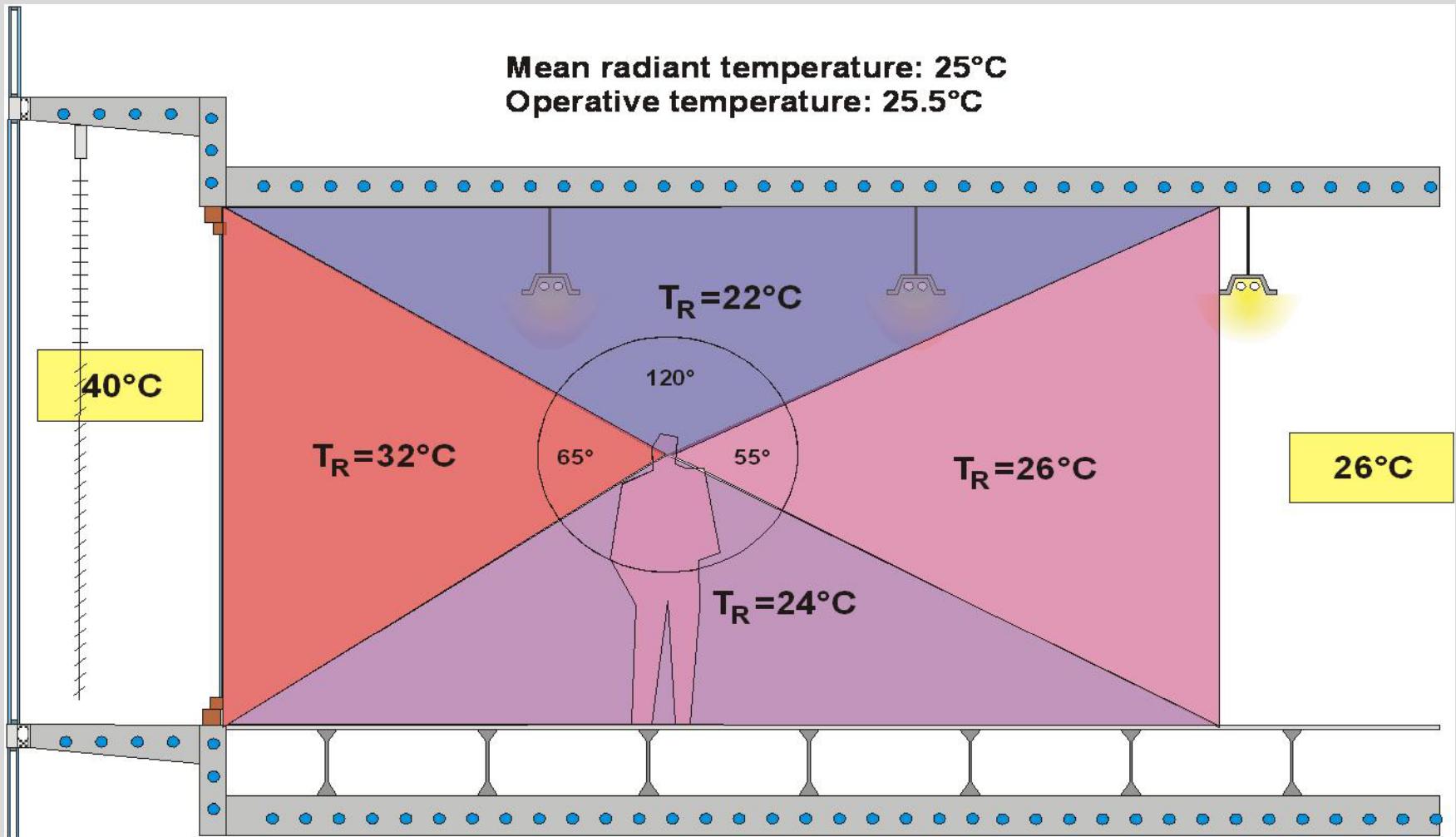


Three distinct Seasons

Climate and energy concept: summer
Six story tower module



Heating/Cooling



Geo Exchange System



In-slab Heating and Cooling



Boilers/Chillers



Commissioning is an
important
component of MH's
new sustainable
energy efficient
building



GREAT MOMENTS
in TECH
SUPPORT...



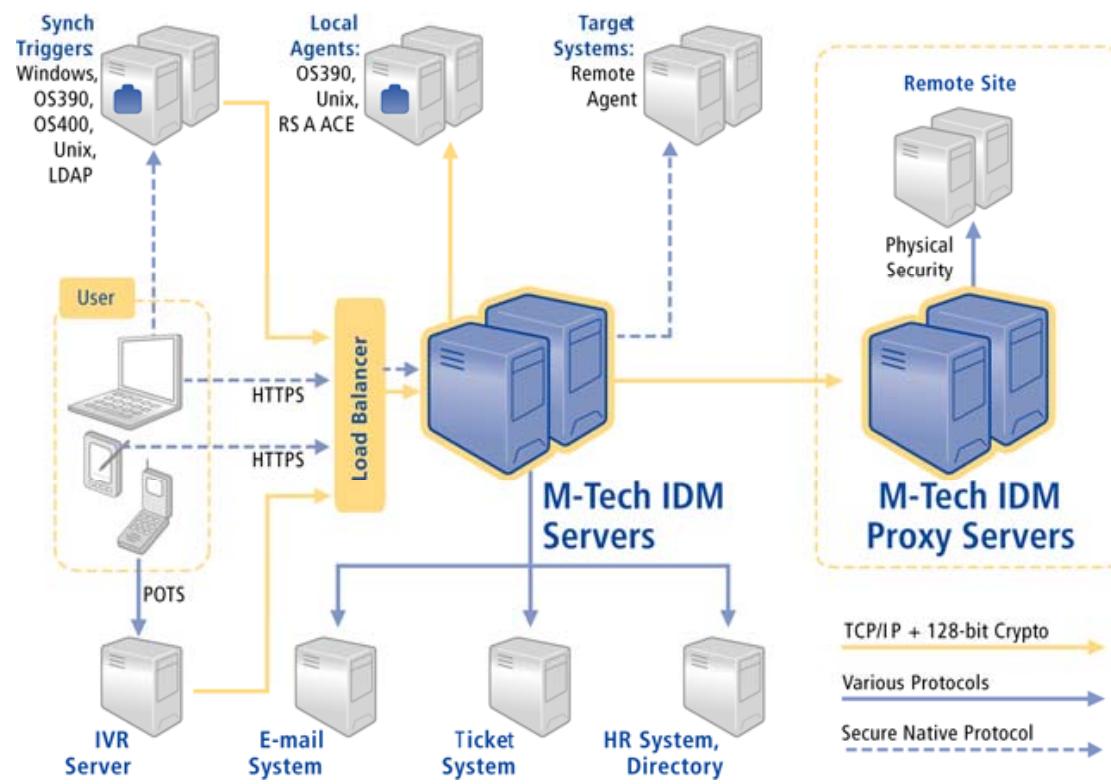
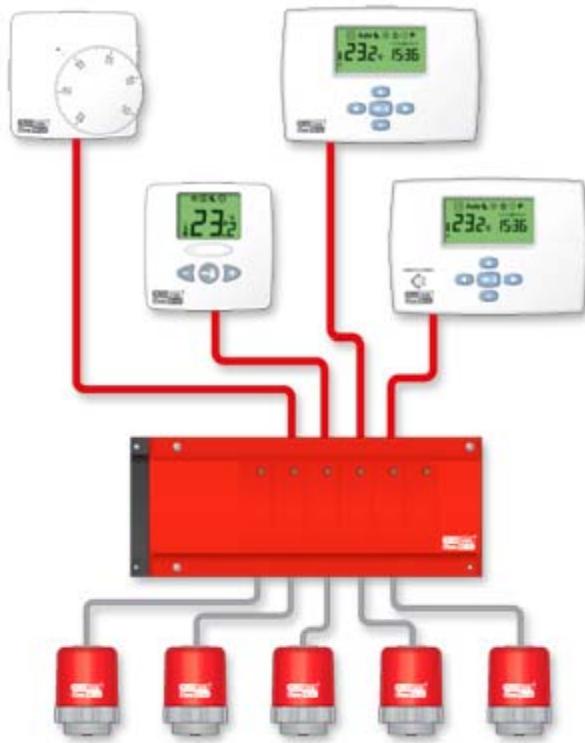
System Design Integration



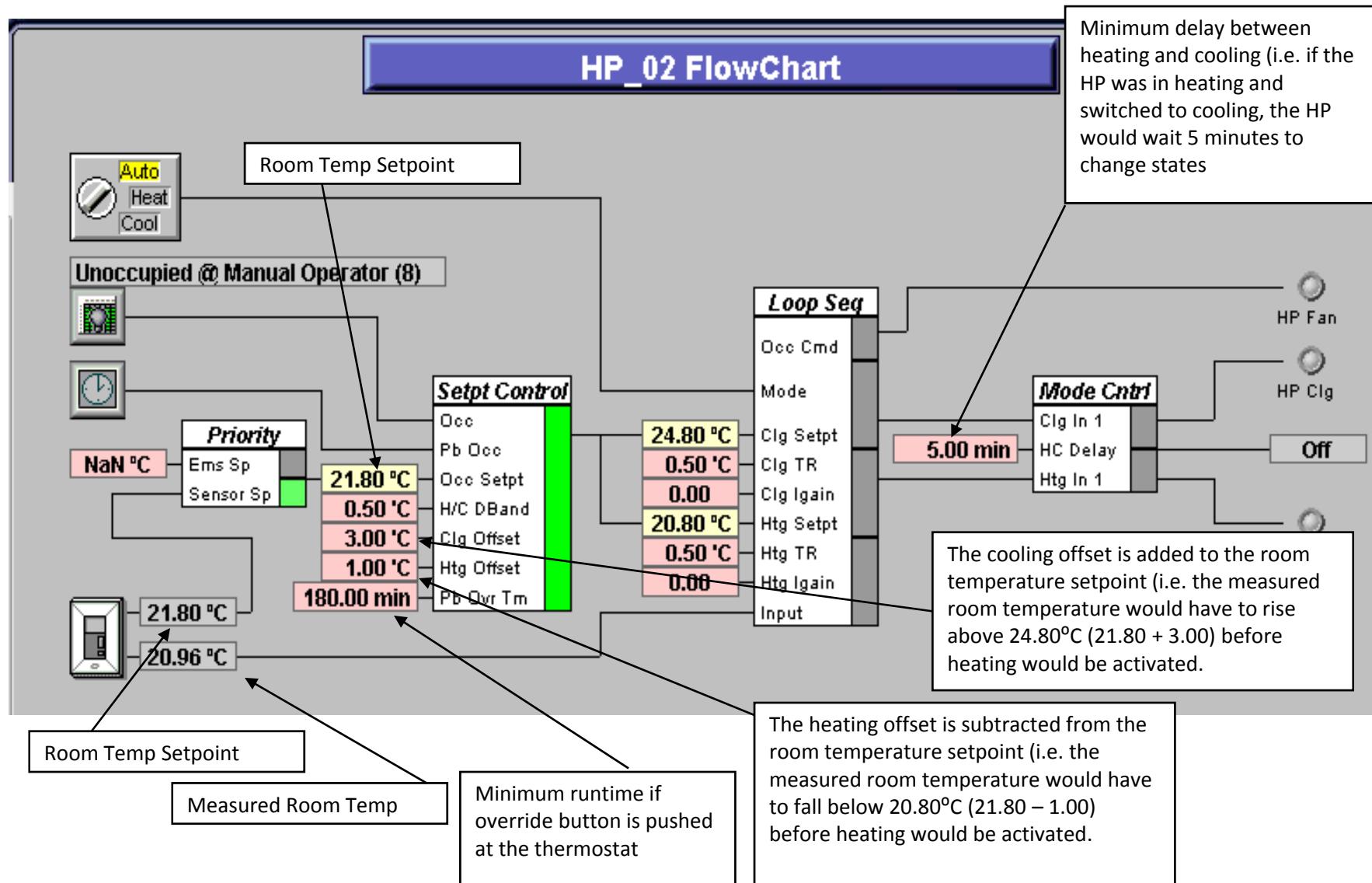
Design Reviews have been invaluable



Control System Reviews



Sequences of Operation



System Functionality



CVFs & Shop Drawing Review

Downtown Office Project		COMPONENT VERIFICATION FORM					
Manitoba Hydro Winnipeg, Manitoba		Tag No.	L1-FC-16				
		Description	Elevator Lobby Fan Coil				
		Section	23 36 00				
		Discipline	Mechanical				
		System	Air Systems Podium				
Equipment Data:			Location Data:				
Manufacturer	Enviro-Tec		Building	MH Downtown Office			
Type	Fan Coil Unit - Cooling		Floor	L01			
Model No.	Model HL Size 60		Room	01-136			
Serial No.			Service				
Supplier			Parent Equip				
Nameplate Data		Specified	Submitted	Installed	Verify	Review	
Fan Data		McQuay		Kdt			
Model No.		FTHC 4 H06		<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Serial No.		—		<input type="checkbox"/>	<input type="checkbox"/>		
Airflow (L/s)		282 L/s	296.61 L/s	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
External Static Pressure (Pa)		112 Pa	74 Pa	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Cooling Coil							
Capacity		3.8 kW	4.05 kW	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Entering Air Temp DB/WB (degC)		21.1/- degC	21.1/18.0 degC	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Leaving Air Temp DB/WB (degC)		12.8/- degC	14.4/14.1 degC	<input type="checkbox"/>	<input type="checkbox"/>		
Fluid flowrate (L/s)		0.16 L/s	0.16 L/s	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Entering/Leaving Fluid Temp (degC)		7.2/15.6 degC	7.2/13.2 degC	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Working Fluid		Water	Water	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

CVFs & Shop Drawing Review

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	AA	AB	
1		Model #FTHC			CHW Isolation Valves on Supply & Return Lines	CHW Circuit Balancing Valve	CHW Control Valve & Actuator	CHW Line Drain and Cap	CHW high point air bleed	CHW line insulated	CHW piping properly supported	Drain Pan sloped in proper direction	Condensate Pump installed	Condensate Pump Check Valve installed	Condensation Line Isolation Valve	HW Isolation Valves on Supply & Return Lines	HW Circuit Balancing Valve	HW Control Valve & Actuator	HW Line Drain and Cap	HW high point air bleed	HW line insulated	HW piping properly supported	Spring and Rubberized mounts installed	Duct canvas flex connectors installed	Filter Accessible & Removable	Unit is Labeled	Comments	
2																												
3	L05-FC-01																											
4	L05-FC-02																											
5	L05-FC-03																											
6	L05-FC-04																											
7	L05-FC-05	H06	74.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
8	L05-FC-06	H06	74.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
9	L05-FC-07	H06	74.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
10	L05-FC-08	H06	74.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
11	L05-FC-09																	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
12	L05-FC-10	H03	35	✓	✓	✓	✓	✓	✓	saddles		✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	issue	✓	✓	Verify Mode		
13																												
14	L05-FC-11	H03	35	✓	✓	✓	✓	✓	✓	✓	saddles	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓		
15	L05-FC-12	H02	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓		
16	L05-FC-13	H03	35	✓	✓	✓	✓	✓	✓	saddles		✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓		
17	L05-FC-14	H02	20	✓	✓	✓	✓	✓	✓	saddles		✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓		
18	-																											
19																												
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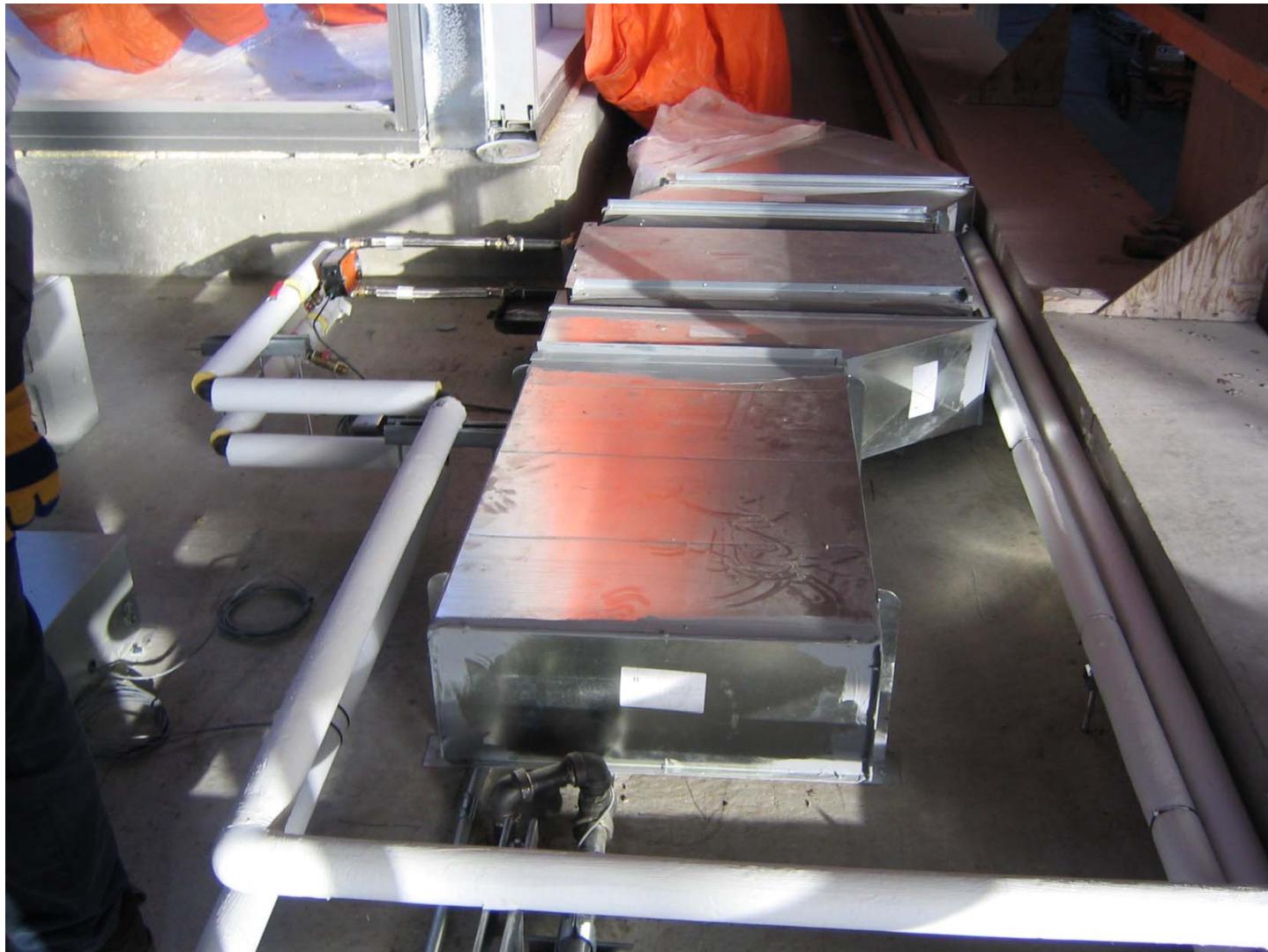
General Note: double check filter accessibility (wrt pedestals) during start up
Saddles are req'd for insulation support

CVFs & Shop Drawing Review

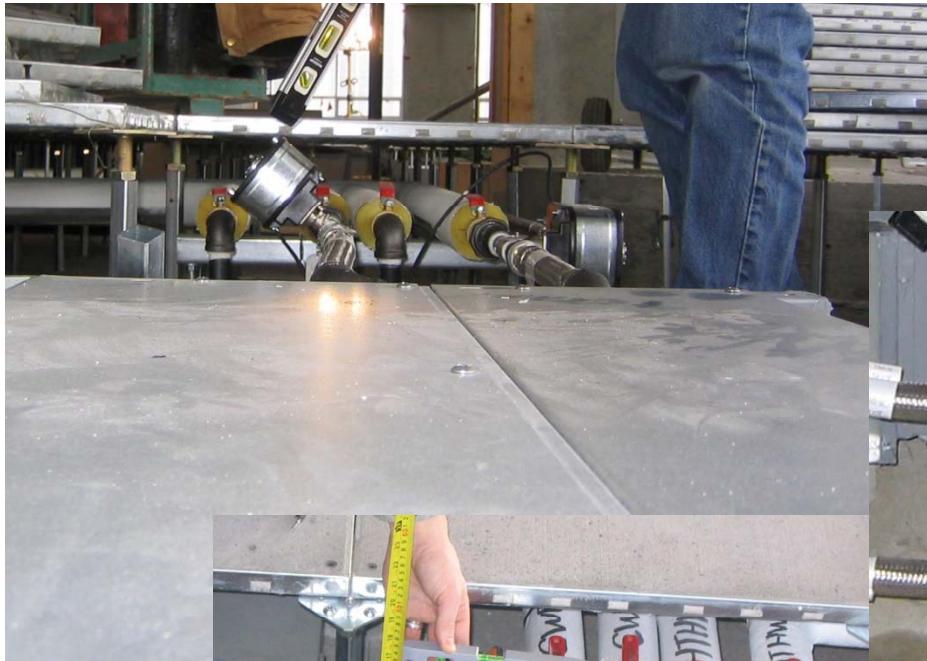
Static Checks-FCU (before)



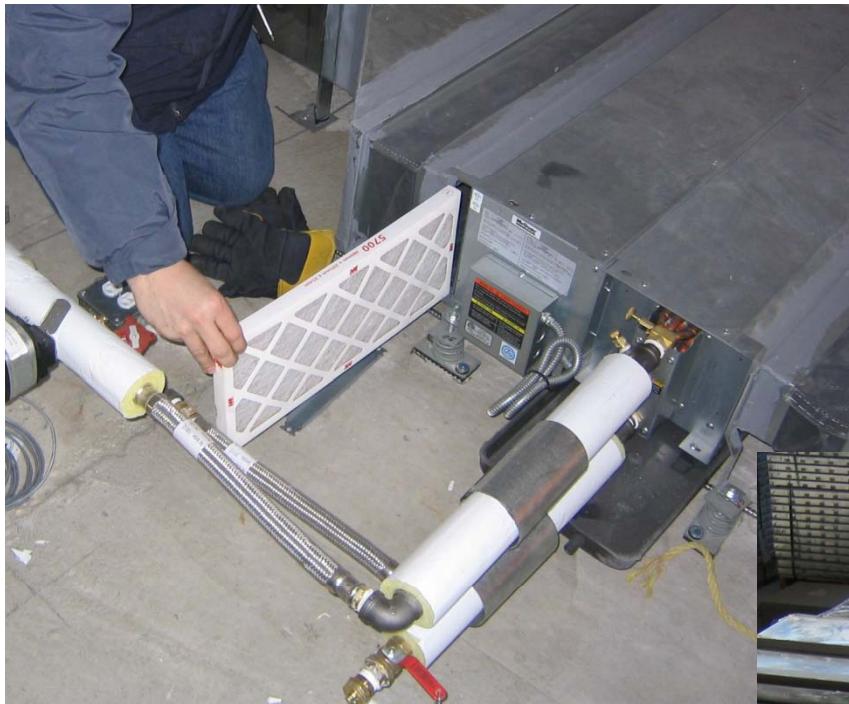
Static Checks-FCU (after)



Static Checks-Control Valve



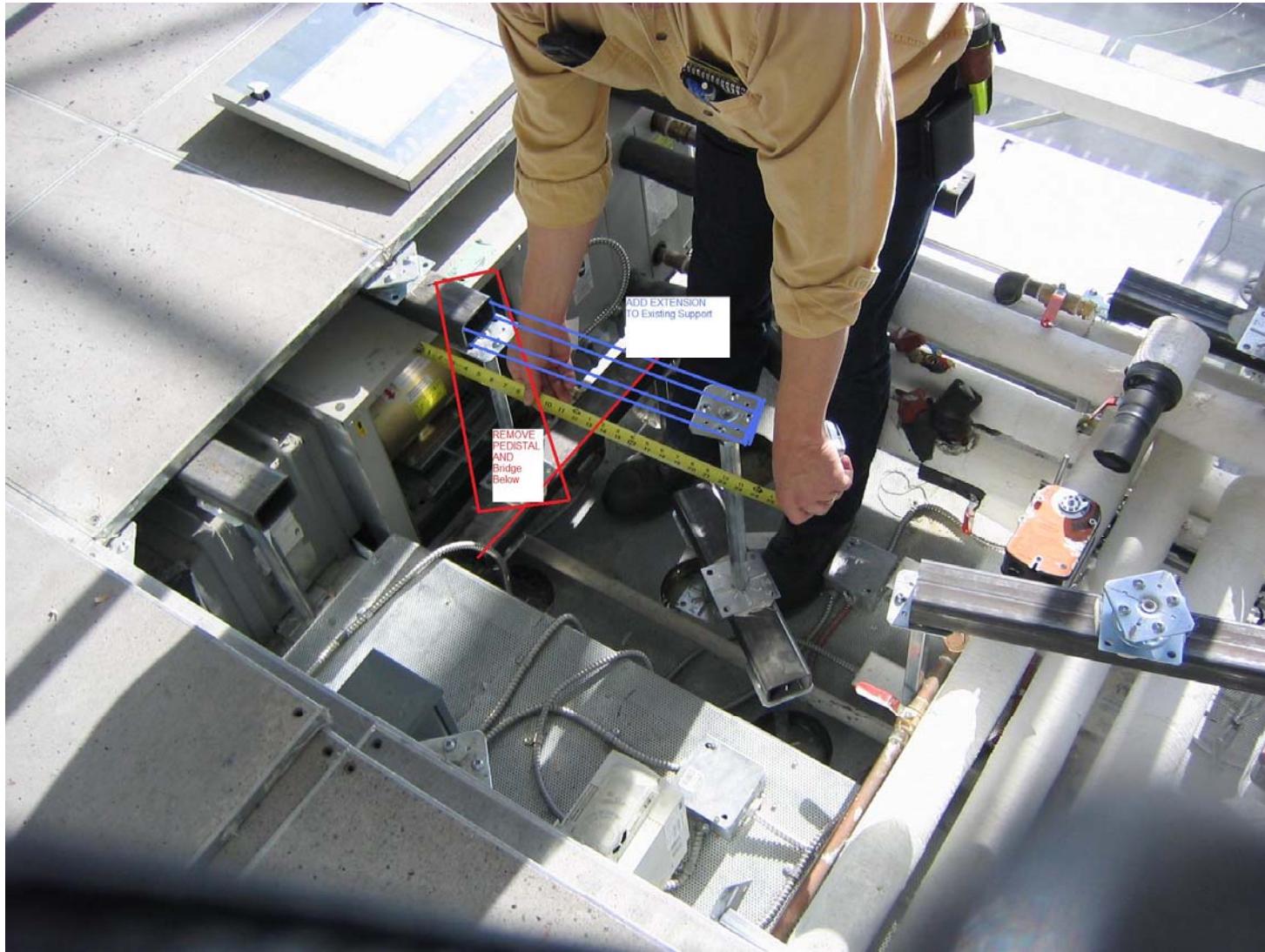
Static Checks- Filter Access



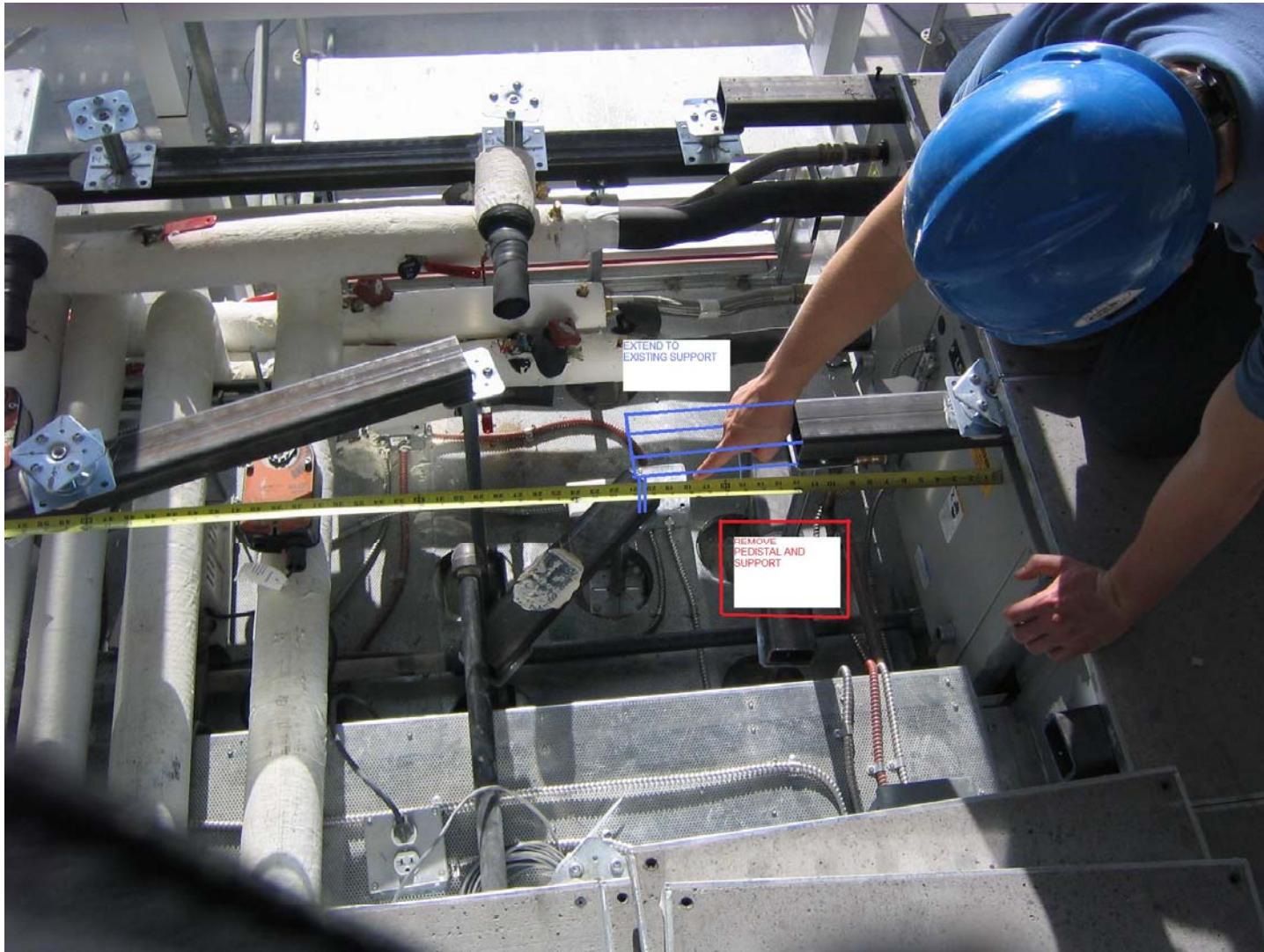
Static Checks-FCU Motor Access (now)



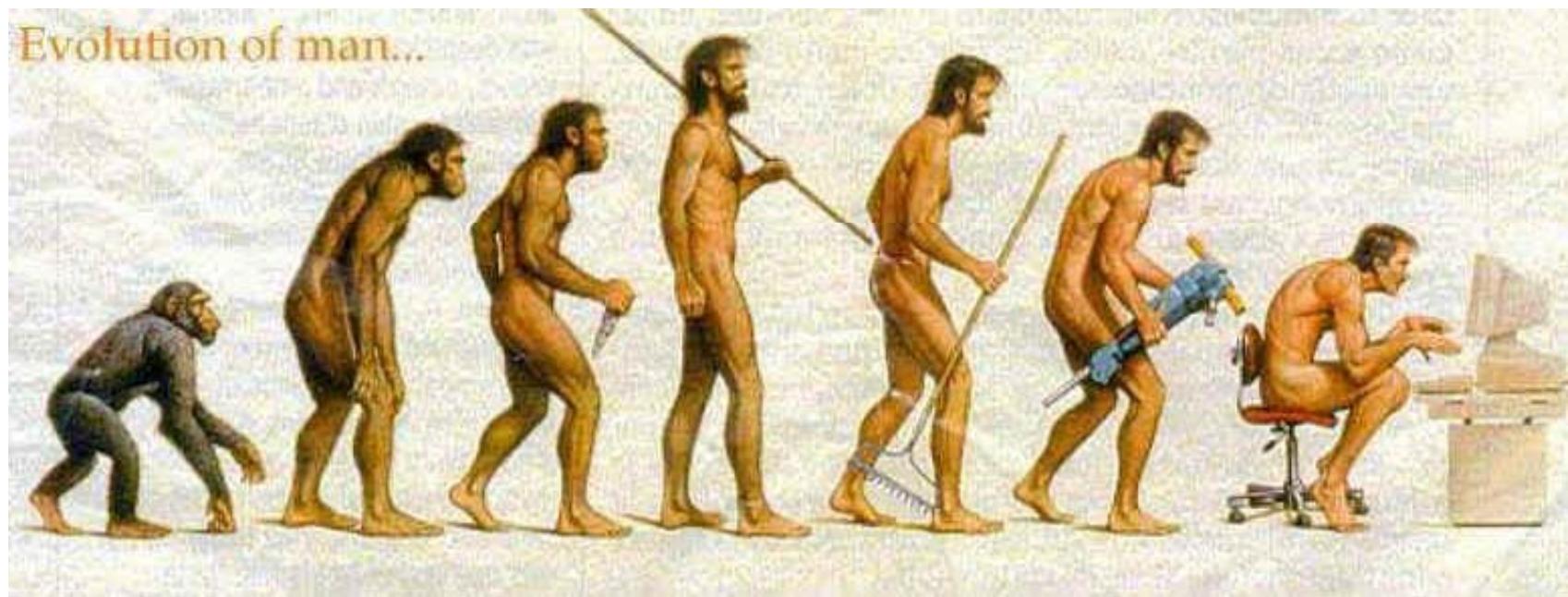
Motor Access (suggested)



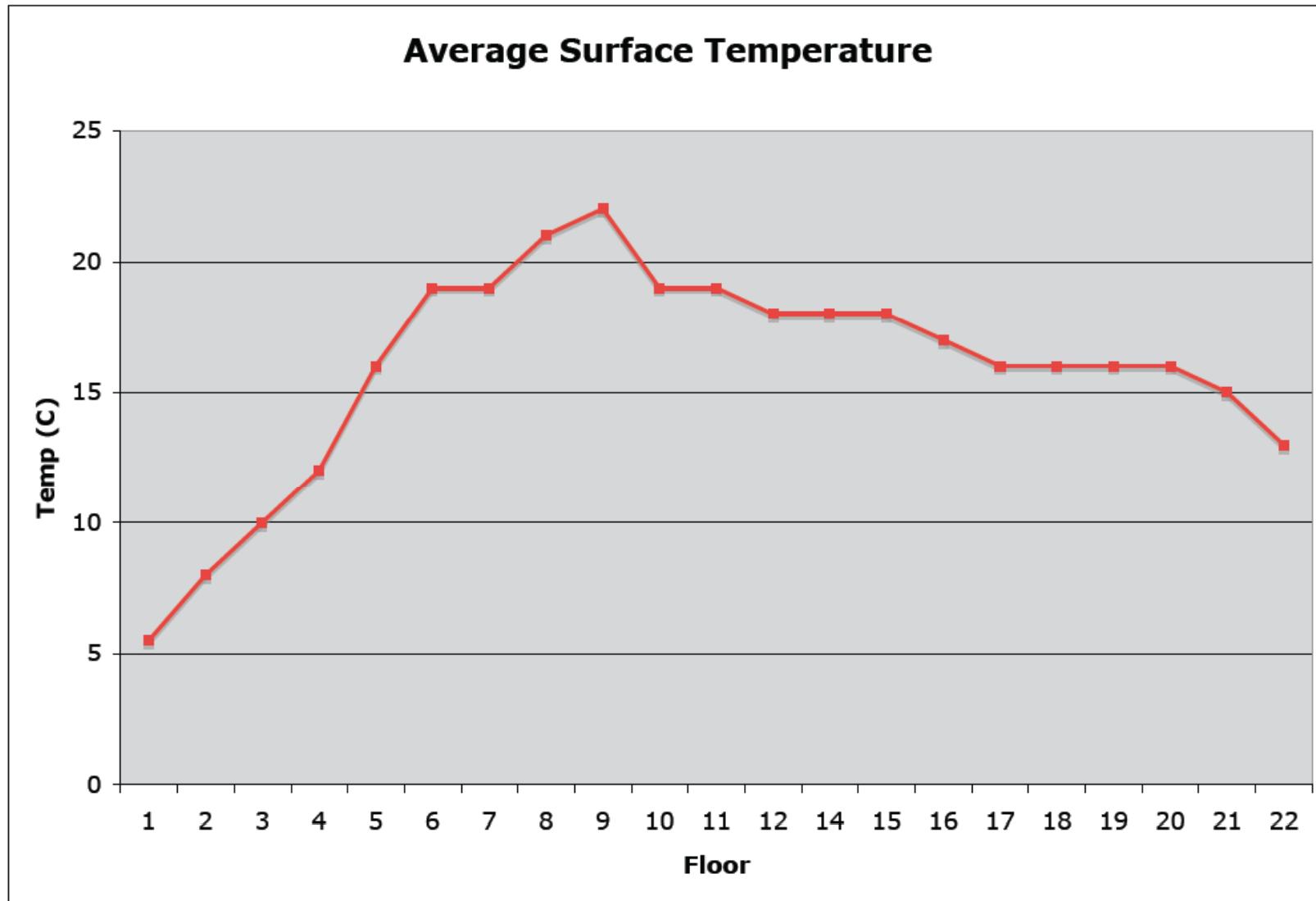
Motor Access (suggested)



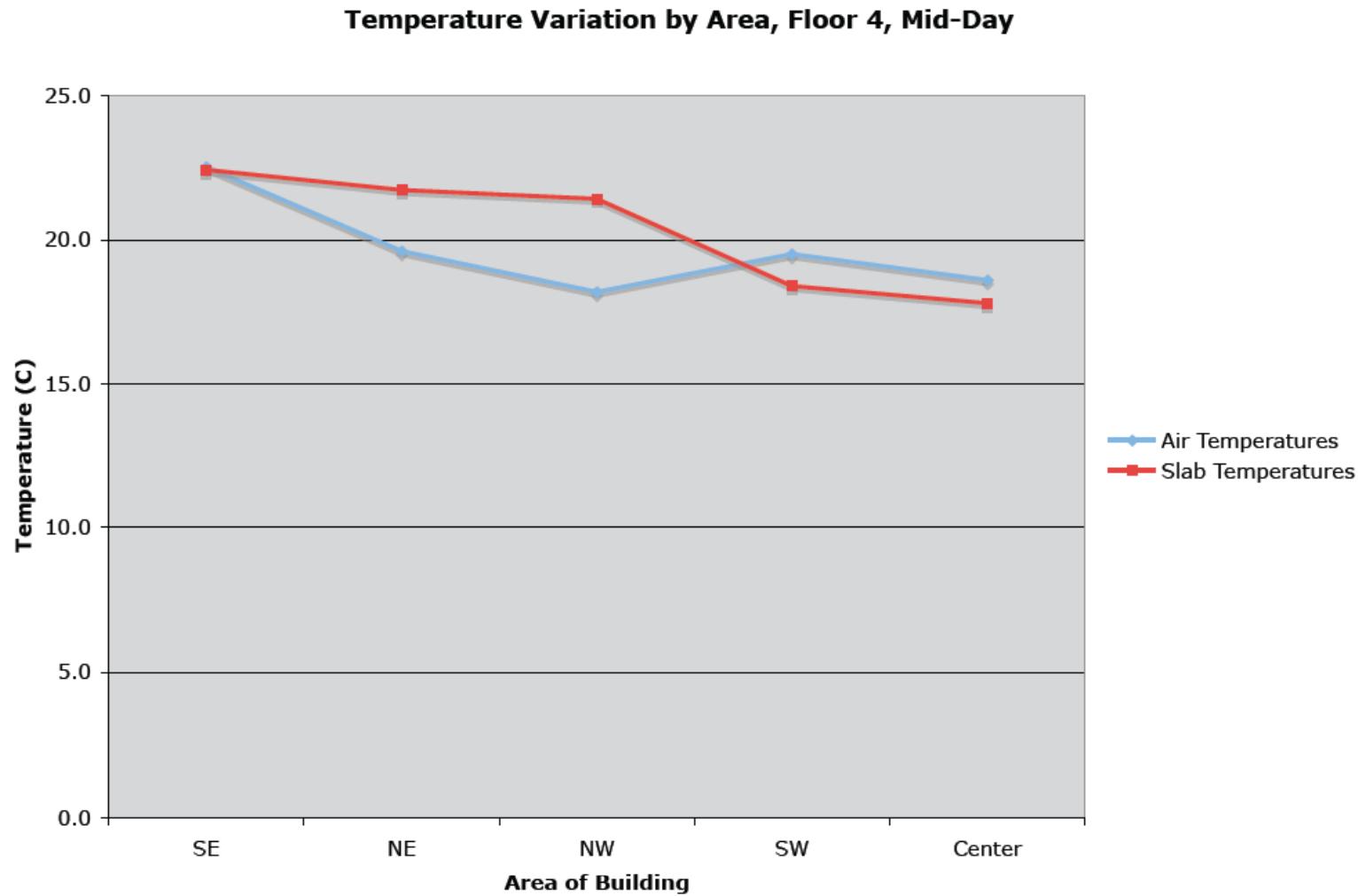
System Tests (STs) are just beginning



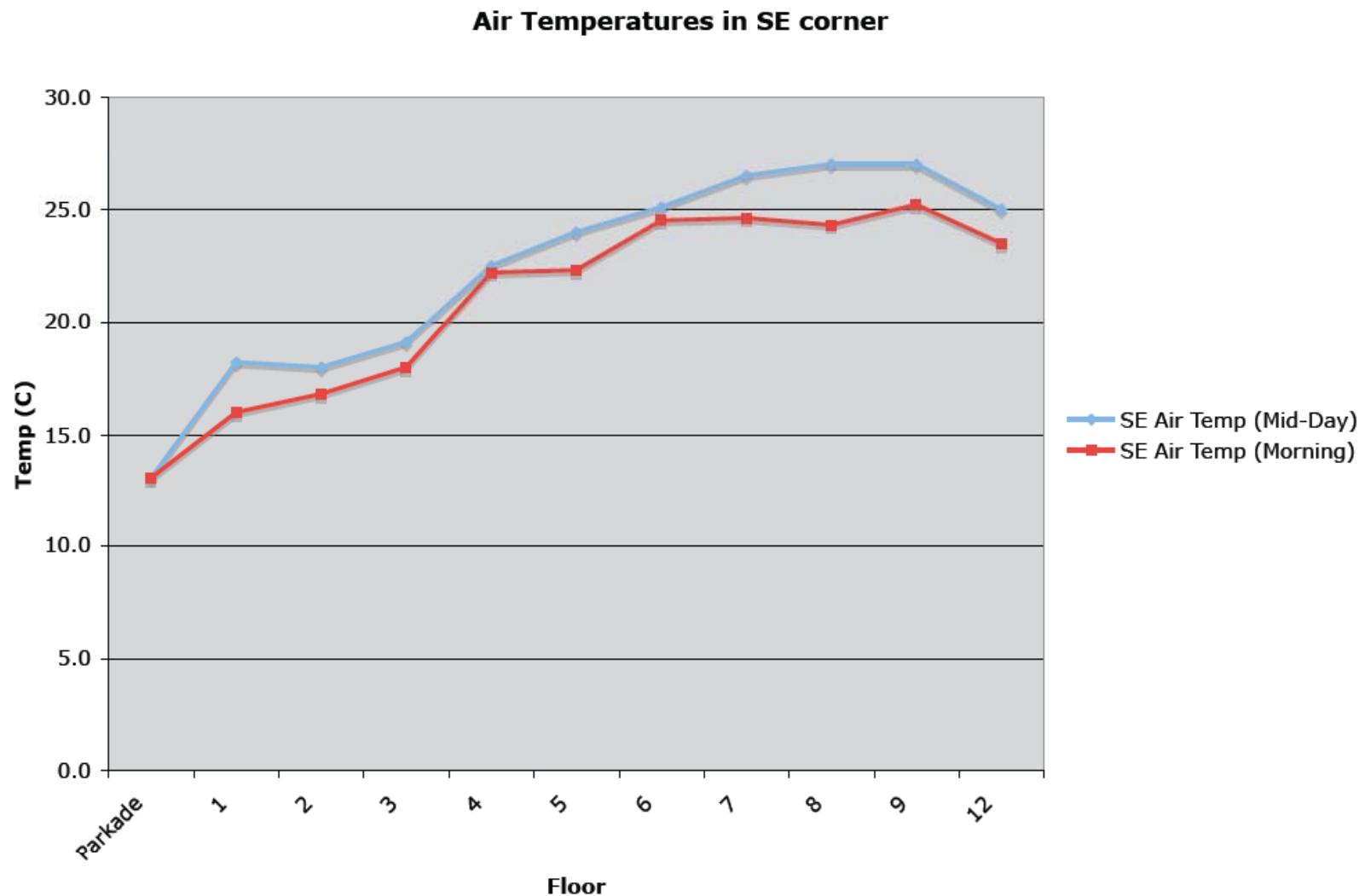
STs-Average Slab Temperature



STs-Temperature variation by Area

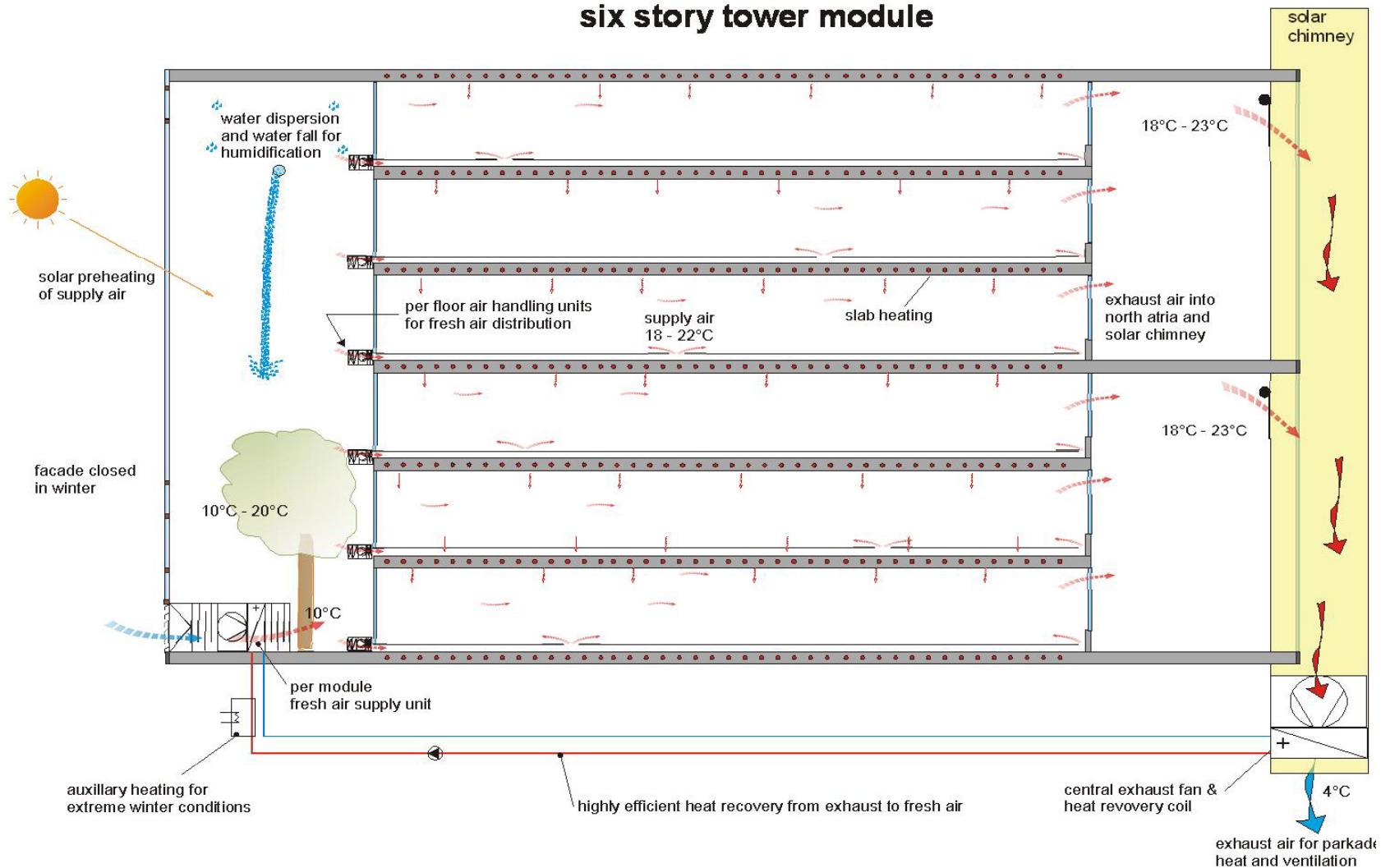


STs-Air Temperature variation



Seasonal Commissioning

**Climate and energy concept: winter
six story tower module**



Sustainable Operations



Training Staff ensures Continued Sustainable Operations



Educating the tenants



Properly operating this living entity



**THANK
YOU**

The image features the words "THANK YOU" in a bold, three-dimensional font. The letters are primarily a light blue color with white highlights, giving them a metallic or polished appearance. They are set against a solid black rectangular background. The "T" and "H" are stacked vertically, while "A", "N", "K", "Y", and "O" are arranged horizontally. The "U" is a separate, larger letter positioned below the others, characterized by a large, hollow circular cutout in its center. The entire graphic is oriented diagonally, creating a sense of depth and perspective.