OUTLINE OF INITIAL FINDINGS FOR

The Nation Towers Comfort Issues

Chilled Water System Corrections & Adjustments Required to Achieve Expected Comfort Levels & Performance

Date: 20th July 2014

Revision 00

Project Overview

The Nation Towers is a high end mixed used development with its own dedicated chiller plant.

The Nation Towers comprises two towers with a G+4 podium which jointly house a St Regis hotel, loft apartments, office spaces, two (2) levels of retail area, recreational amenities, beach club and two (2) levels of basement parking for residents and visitors under the podium.

Tower 1 is 64 stories high and accommodates 360 residential units. Tower 2 is 51 stories high and accommodates the St Regis hotel on the top 17 floors. The remaining floors in Tower 2 are for class A leasable office space. Connecting the two towers between levels 50 to 54 is the worlds highest sky bridge.

A boutique retail shopping complex includes food & beverage outlets is distributed over two levels around a large central multi-storey galleria space in the podium. The balance of the podium is associated to hotel back of house and banqueting facilities. The shopping area connects to the office area and hotel components of the project along with the beach club via a tunnel under the Corniche road. The design of the HVAC system was by KEO.

Adjacent to the building is a 12,500TR chiller plant with six (6) electric driven water cooled chillers & a thermal energy storage tank. The design of the chiller plant was by DCPro.

Cooling is supplied to the development by chilled water from the adjacent chiller plant through a bulk energy transfer station (indirect type) located in basement 2 of the podium.

Project Design / Contract Conditions

The basis of the KEO Building & DCPro Chiller Plant design as defined by the ETS.

KEO

DC PRO ENGINEERING

The Building Side conditions:

Cooling Coil Inlet Temperature **5.5°C**

Cooling Coil Outlet Temperature **14.4°C**

The Building Side conditions:

Chiller Plant Outlet Temperature **4.4°C**

Chiller Plant Inlet Temperature **13.3°C**

This is an integrated system, it is important to realize the chiller plant cannot function in isolation if the building is to maintain its comfort levels. The buildings need the chiller plant for supply temperature control. Chilled water return temperature effecting ΔT is determined by the various terminal units of the building and not by the chiller plant. The chiller plant needs maximum chilled water ΔT to function efficiently. So both systems need to find harmony to function effectively – ***give & take***.

GEA ECOFLEX Plate Heat Exchanger: NX250L B-16

Thermal data for 1 unit(s) in parallel and 1 unit(s) in series

	hot side	cold side	
Media:	Building Side	Plant Side	
Media group acc. PED 97/23/EC:	Group 2 - others	Group 2 - others	
Heat exchanged:	1500.00		TR
Mass flow:	141.21	141.11	kg/s
Volume flow:	141.15	141.02	l/s
Temperature inlet:	14.40	4.40	°C
Temperature outlet:	5.50	13.30	°C
Pressure drop:	0.60	0.60	bar
Working pressure inlet:	10.00	10.00	barg
Product properties			
Density:	1000.42	1000.67	kg/m³
Heat capacity:	4202.54	4205.51	J/kgK
Thermal conductivity:	0.58113	0.57874	W/mK
Dyn. viscosity inlet:	1.162	1.552	cP
Dyn. viscosity outlet:	1.500	1.197	cP

Unit Data

Plate Type:	NX250L H			
Heat transfer area (total / per unit):	665.55		665.55	m²
Number of plates (total / per unit):	461		461	
Plate thickness:	0.50			mm
LMTD:	1.10			K
Plate material:	AISI316			
Gasket material / Gasket type:	NBR		glueless	
Internal flow (passes x channels):	1 x 230	1 x 230		
No. of frames (par. / ser. / total):	1	1	1	
Frame material und surface:	S235-JRG2	painted	RAL5002	

The connection types and positions are defined in the attached dimension sheet.

Design temperature:	**Min.:**	0.00 / 0.00	**Max.:**	100.00 / 100.00	°C
Design pressure:	**Min.:**	0.00 / 0.00	**Max.:**	16.00 / 16.00	barg
Test pressure:	20.80 / 20.80	barg	**Design code:**	PED 97/23/EC AD-2000 Checkfactor 1.3	

The Objective

To repair the image & enhance the comfort levels of the Nation Towers to satisfy its existing tenants so it can charge rent fairly, plus attract further business.

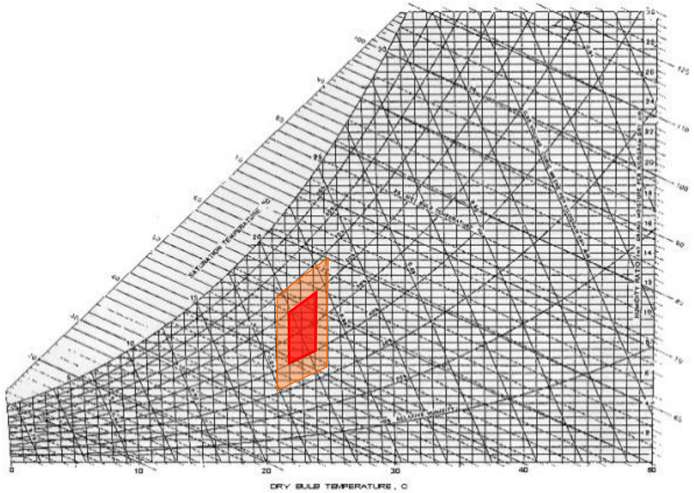
The prime objective of this independent review is to locate the root causes of lost comfort evident in the development & provide a clear path towards correcting them first and then look at a manner that supports long term energy efficiency & cost effective operation plus maintenance of the system.

The key indicators of comfort shall be low to zero complaints from the tenants by having space temperatures within industry norms of 22 to 24ºC, with indirect humidity control between 40 to 60%

From an energy perspective once effective comfort changes have been made we will know that the total integrated system is operating properly when the following conditions are achieved through a range of cooling load conditions:

- 14.4°C ±1.0°C is returned to the ETS from the building systems
- The chiller plant maintains 5.5°C ±0.5°C on the building side of the ETS

Achieving these results will provide far better comfort and humidity control within the Nation Towers *but will require system maintenance, equipment modifications and operational changes on both the building & chiller plant sides of the Energy Transfer Station (ETS).*



Providing controlled comfort is the number one priority at this point as it ensures revenue to pay for all the downstream services & keep the building open for business. Energy efficiency needs to be agreed as a secondary focus at this present time.

“...We only need to change where the problem is...”

LETS
Understand

To know where we are going we need to know what we are up against, as the solution is in the problem.

The Principles at Work

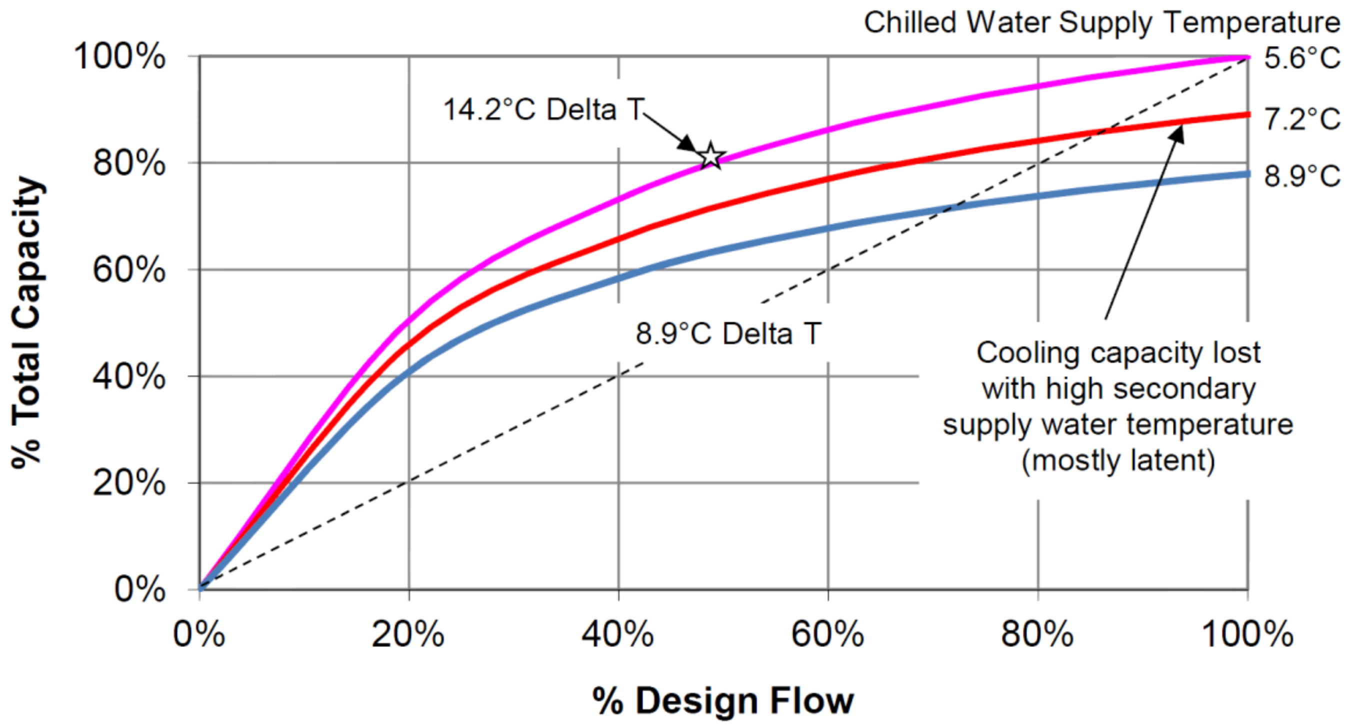
The terminal unit comprising of a cooling coil/heat exchanger & control valve is the most critical component in a chilled water air conditioning system.

Coil performance depends on supply temperature

The provision of 5.5ºC to the cooling coils of this project is the key element to allow the physics of the cooling coils to work and hence provide the capacity required to accomplish comfort conditions.

The chart adjacent reflects the capability of a typical cooling coil under project conditions and the capacity lost as a result of an increase in the supply water temperature from the ETS e.g. at 8.5ºC supply the coil is only capable of 80% of its capacity and at 10.3ºC supply this reduces to 65%.

Increasing the flow to the coil has negligible benefit e.g. a 200% increase in flow only yields a 8-10% increase in cooling but this excessive flow condition will result in a 40% lower then design ΔT, let alone starving other coils – further compounding the problem.



Maximizing cooling coil performance is crucial for the entire chilled water system operation & this is *directly related to the supply temperature it receives*.

FIRST

Observations

Based on 17 July 2014 site visit and preliminary data received for operations in early June

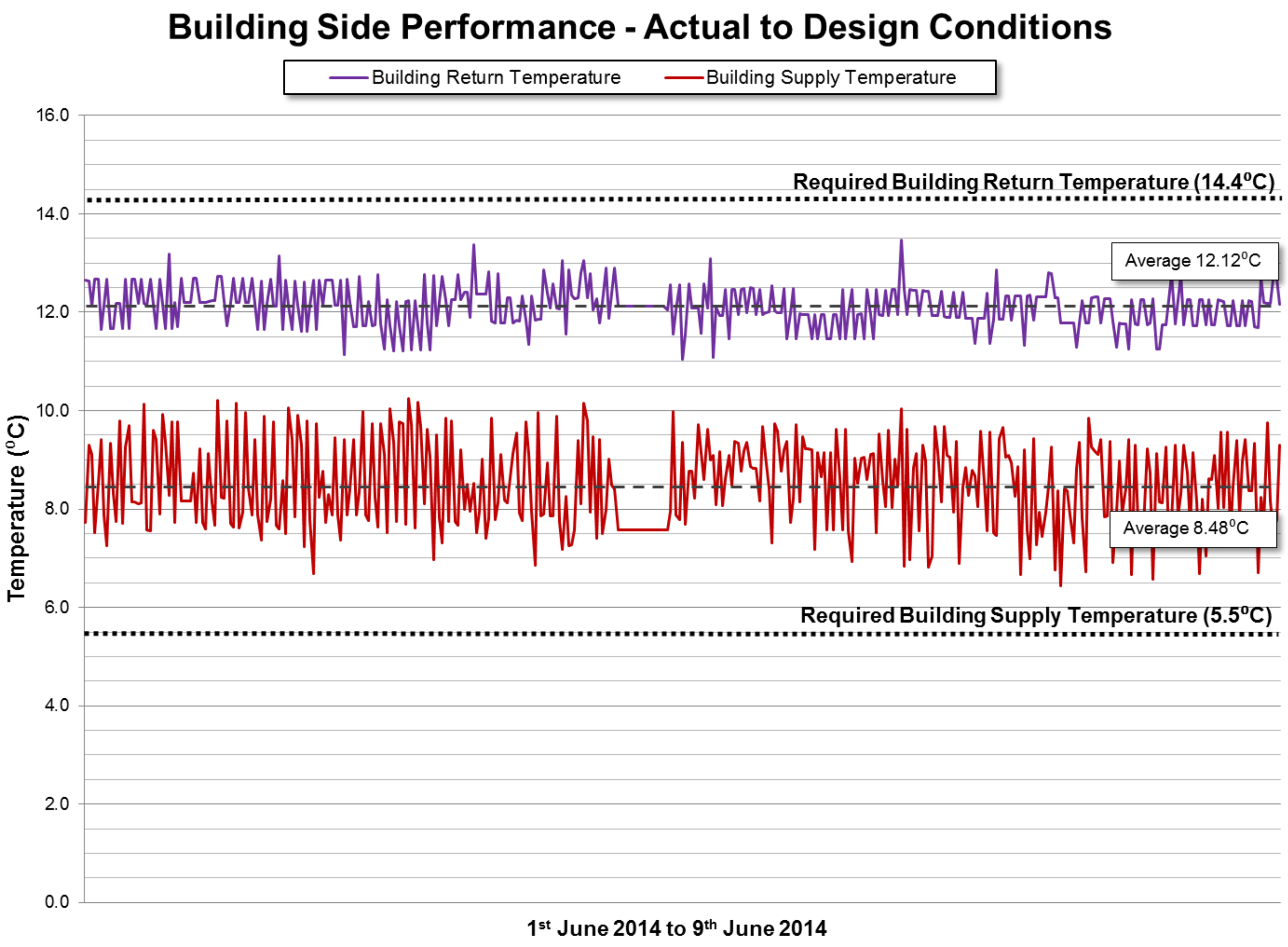
Building Performance

The Building is operating at 40.9% of its expected design level

There is on average 144% excess flow compared to design requirements & an *approximate 38.5% direct bypass*, which comes from a number of sources, the average ΔT is 3.64ºC.

The average supply temperature to the coils is 8.48ºC which reduces their cooling capacity to ±80% of its intended design, which effects comfort. Frequent extreme conditions of over 10.0ºC supply reduces this further to ±65%, which leads to loss of latent cooling & humidity issues. *Supply temperature has to be improved to bring back control, cooling capacity & comfort*.

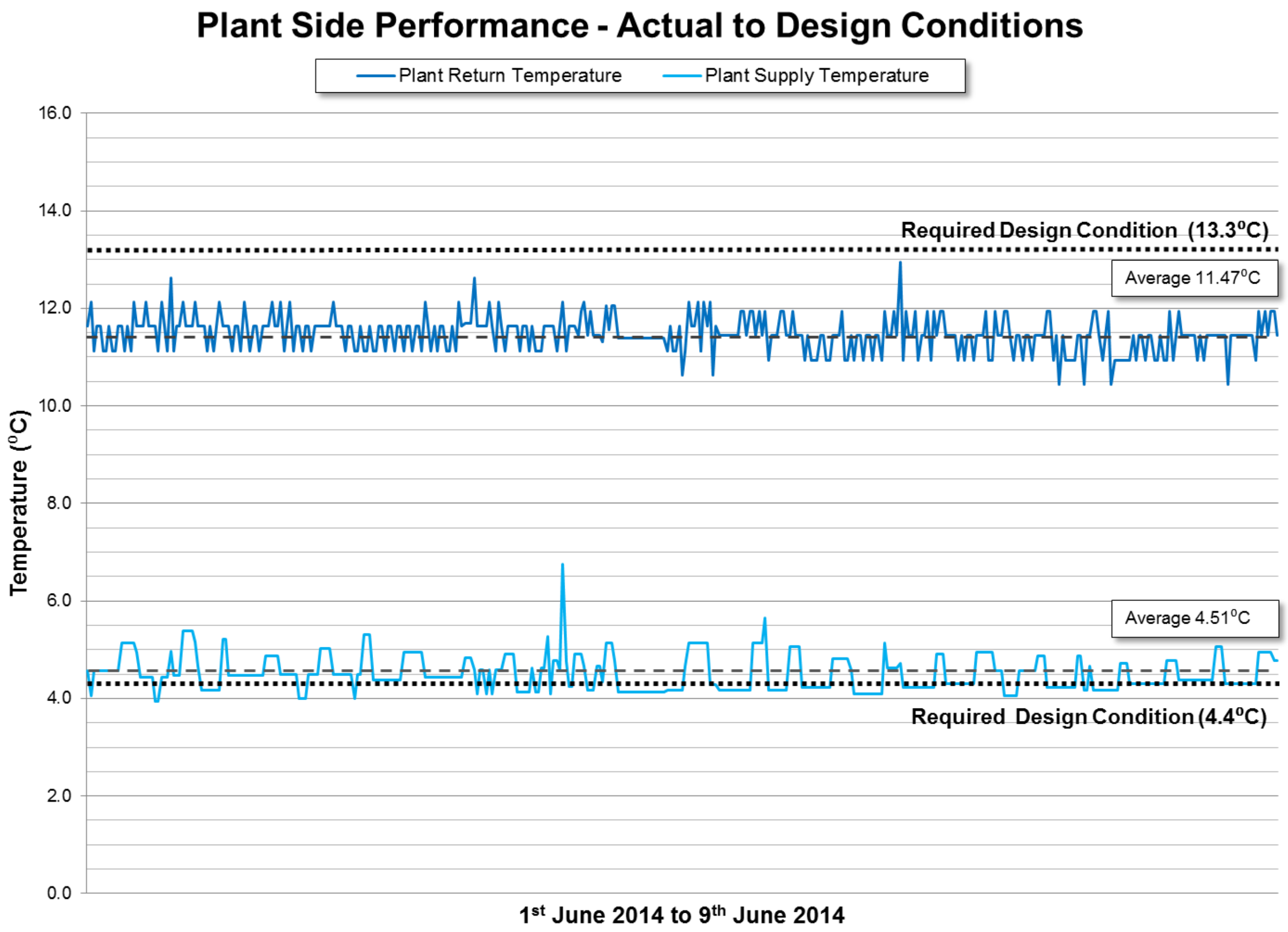
Parameter	ºC
Lowest Building Supply Temperature	6.43
Average Building Supply Temperature	8.48
Highest Building Supply Temperature	10.24
Average Building Return Temperature	12.12



Chiller Plant & ETS Performance

The Chiller Plant & ETS are operating at 78.3% of their expected design levels

The average supply temperature from the plant is virtually on design (4.51ºC) and the general chiller plant side control is stable. This system is only limited in achieving its design performance by the poor return temperature from the building. This condition however will not be met if the building does not get its required supply temperature to the cooling coils. Presently this condition is constricted due to excess flow & bypass in the building which must be corrected, however the ETS controls provided by the plant operator has an operating sequence that is maximizing the ΔT from the available conditions, average ΔT is 6.97ºC. This is creating an imbalance in flows between the building and plant sides at the ETS. If the ETS control was reset to balance flows with the building in the uncorrected worst case state (19,500GPM) there would be a demand to run all the chillers & pumps installed at the plant. However this would allow the supply temperature of 5.5ºC to be reached in the building *(correcting comfort – the objective),* which in turn would provide relief back to the chiller plant to reduce the overall flow demand. This state is achievable but energy inefficient if bypassing remains in the building .



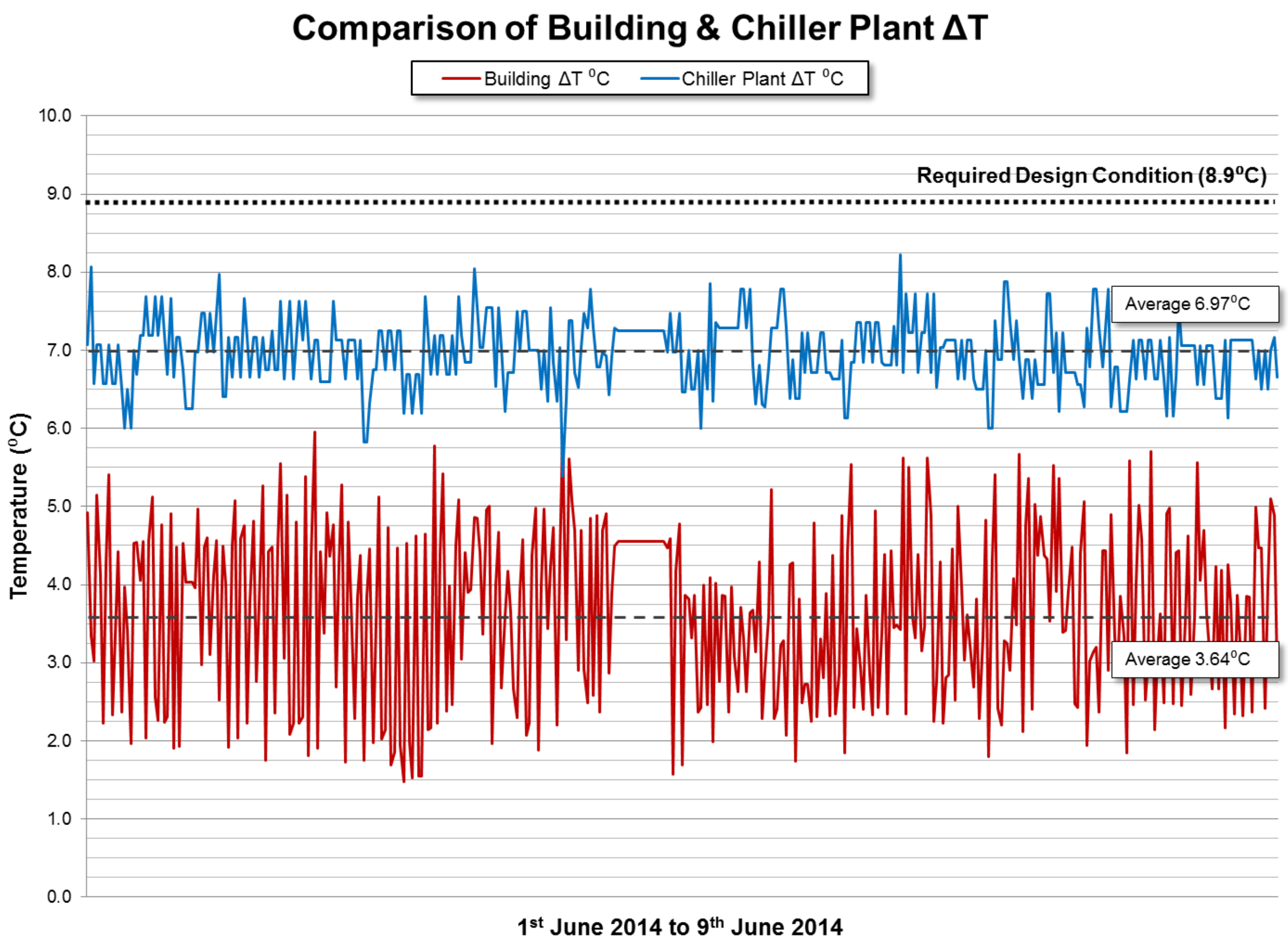
Comparison of Plant & Building

When control is lacking on supply ΔT falls

Controlling for ΔT on the chiller plant side of the ETS is not compatible for good process control of the cooling capacity on the building side as there is no active control of the supply water temperature, leading to instability in the building which is evident in the data.

This strategy appears to have been adopted to protect the interests of the chiller plant from an energy efficiency point of view. Which requires the building to create supply temperature control solely through flow restriction which is not possible, the control functionality needs to be adjusted so that there is active supply water temperature control from the ETS.

Prioritizing chiller plant efficiency over customer comfort has a direct impact on rental revenue for the development. As per the defined objective before the inspection, controlled comfort should be the number one priority.



Present ETS Control

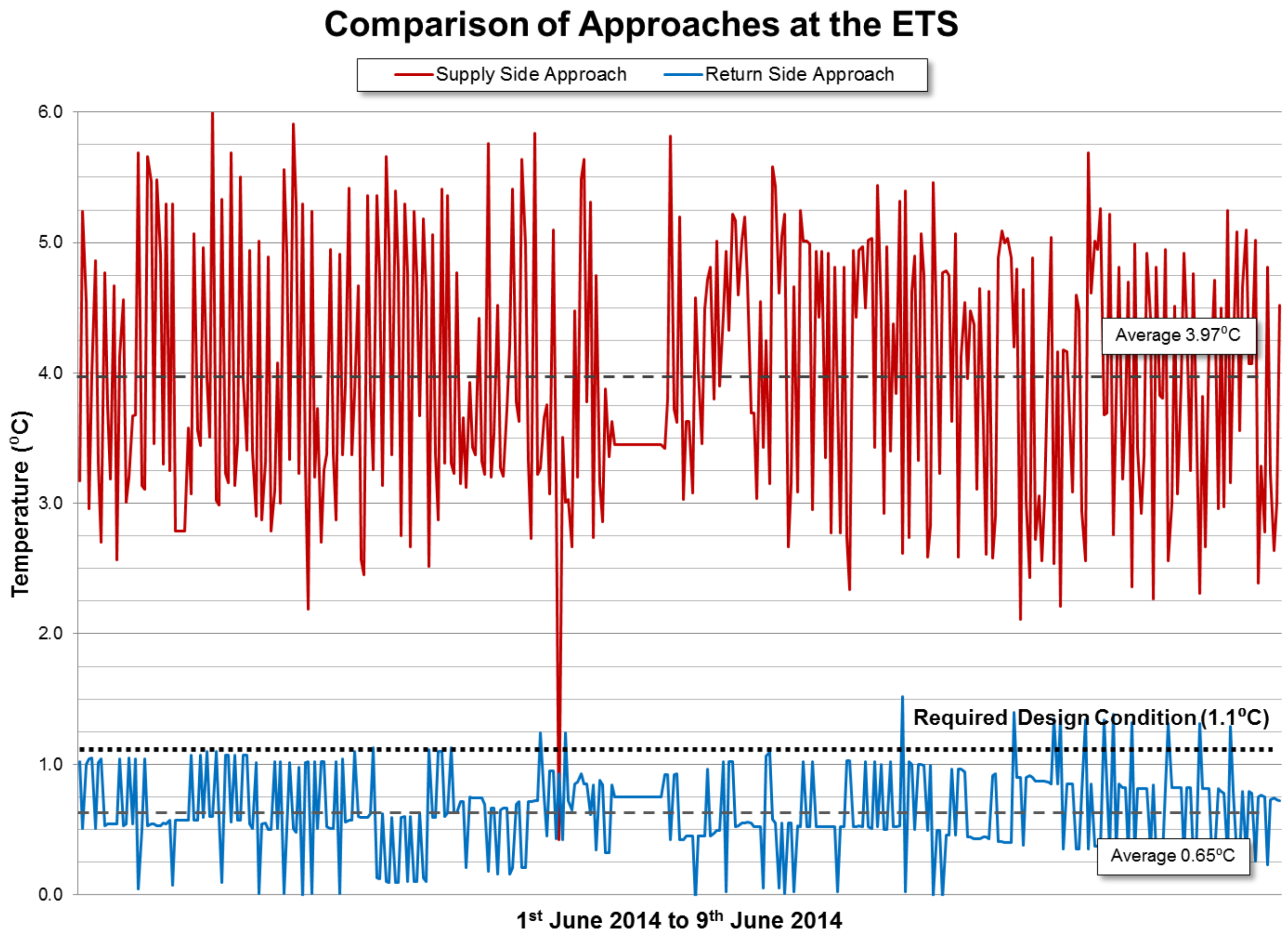
The ETS appears to be controlled by a ΔT logic presently, instead of building supply temperature.

This has created confusion for the building operators and consultant (KEO) as the standard industry practice as applied by Tabreed, Empower etc. in the region, is the ETS controls the supply temperature to the building at 5.5ºC not for maximum ΔT that can be obtained from the Building's return conditions.

This is a apparent due to the tight control on the return temperature to the chiller plant and average 0.65ºC return approach for the heat exchangers. Full advantage of the total 12,000TR installed heat exchanger surface area has been taken. The control philosophy of the ETS needs to be qualified by DCPro or the plant operator.

Even with this philosophy it was noticed in the data that the building *supply temperature & approach improved when the flows were balanced on the plate heat exchangers*.

The flow & temperature sensors calibration also needs to be checked for the ETS as there are a number of anomaly points in the June 1st to 9th data.

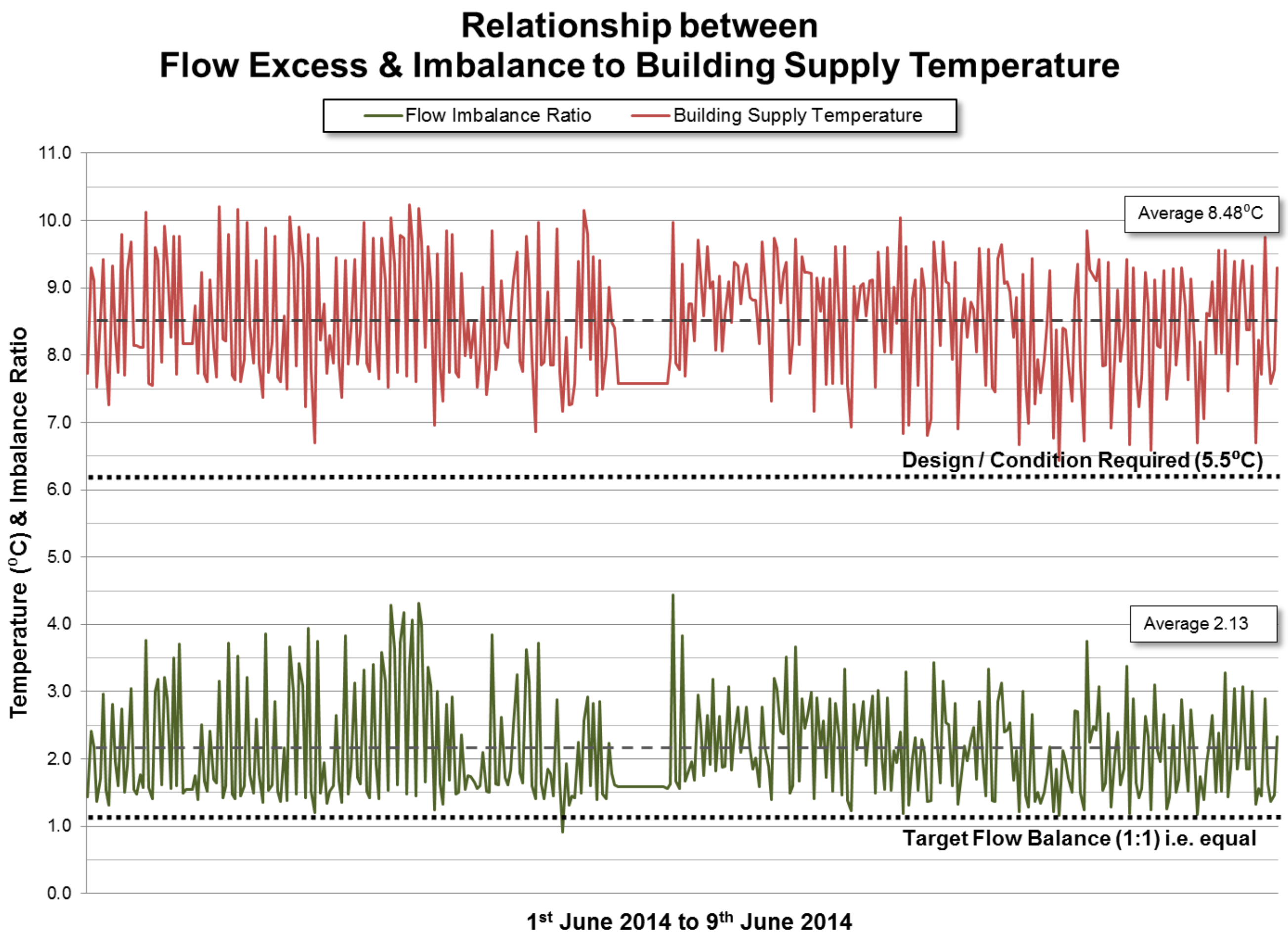


Source of Poor Conditions

Excess flow on the building side compounds the ΔT control of the ETS mentioned earlier as it is working against the physics of the cooling coils. Excess flow needs to be brought under as much control as possible based on what can be achieved on site, once the bare minimum flow reduction has been achieved.

The client should then instruct the chiller plant operator to convert the ETS to supply temperature control to the building with balanced flow across the active heat exchangers. Noting the amount of installed capacity to actual tonnage used for this project it is unlikely that the chiller plant will run out of pumps and chillers to operate. (this state will be energy inefficient until full pressure independent hydraulic balancing & no bypassing is achieved in the building).

Alternatively as the ETS has very good control & we should take care not to do irreversible changes to soon, the chiller plant operator could look to progressively reduce the parameters in their ETS logic to allow for better Builing supply temperature conditions & manually balance flows on the heat exchangers

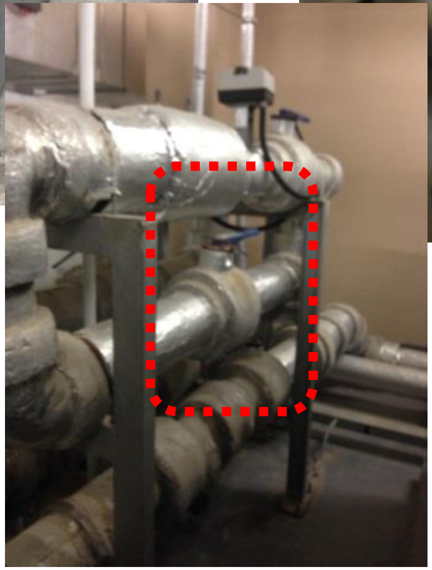


Sources of Bypass Flow

One of the principle issues affecting excess flow and poor temperature control.

Multiple uncontrolled bypasses source are noticed in the present installation, which are:-

- No control valves on the pressure break heat exchangers, direct short circuit
- Use of three way valves
- Open bypass lines on the two way valves & possibly ETS
- No control interlocking to AHU/FCU operation
- Oversized or leaking valves plus low set points as people try to correct comport issues

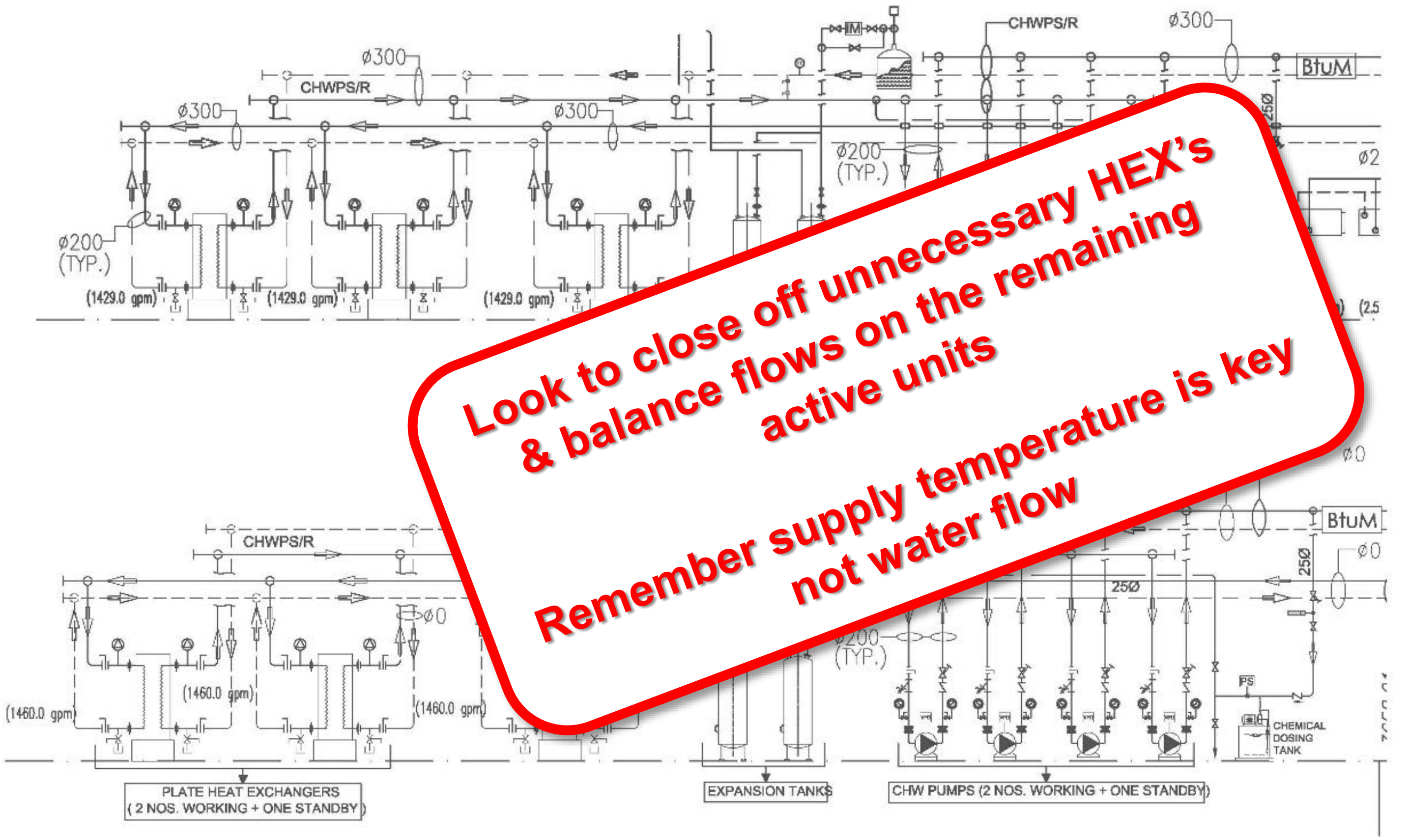


Pressure Break Heat Exchangers

Uncontrolled flow – short circuiting

This appears to be the prime culprit behind the bypassing, compounded by excessive flow caused by over pumping. It is understood that six (6) pressure independent control valves are being procured for the pressure break ETS's on levels 24 & 21. There has so far been not factoring to ensure balanced flow across these heat exchangers which will be essential for supply temperature control, so on the quaternary pump side the isolation valves of each plate heat exchanger need to be motorized (ON/OFF) to match the active tertiary side PICV's. Supply temperature control for the upper levels will need to be by the VFD driven pumps, (updated controls or new controller is required.

Also these PICV's will need to be checked for operation at the minimum differential pressure expected at this level to ensure Pressure Independent action. Site readings should be taken with the various commissioning activities to confirm the present state and then adjusted for the expected future controlled condition, which should higher than the present readings.



Three Way Valves

A common misapplication for “end of line” duty

There is no need for instantaneous supply of chilled water to any space within the development as the AHU’s are responding to thermal inertia of the internal loads and structure, which typically have 10 or more minutes (slow) response time & lag.

Only in rare circumstances where major chilled water supply temperature degradation is expected due to long pipe line residency or major external heat gain to a pipe is a small bypass necessary.

Typically the actuators of three way valves do have as high a rating as a two valve unit so care needs to be taken when we close the divert line of the three way valve that there is a working upstream AFB to absorb the extra pressure and prevent the valve seat from being lifted and bleeding unnecessary flow.

NEXT

Corrections

Reign in all the excessive building side flow area & get control on the supply temperature

Corrective Measures

Check set points are not out of range

1. **Slow down & stage off tertiary pumps + delay response time** excessive flow is compounding the problem,
2. **Eliminate all short circuit flows** which is deteriorating return temperature & wasting energy (L24 & L21 ETS's)
3. **Close all bypass flows** close & lock all bypass line valves
4. **Eliminate all three way valves** their function is unnecessary convert to two way duty instead
5. **Convert the ETS to supply temperature control for 5.5 ºC to the building** so that the coils can deliver their cooling capacity for the necessary comfort
6. **Install PICV's to the Pressure Brake ETS's** to prevent short circuiting
7. **Ensure balanced flow on each heat exchanger** to ensure the lowest supply temperature possible
8. **Allow the chiller plant to load up more chillers and pumps** to match the flow of the building while maintaining 4.4 ºC supply to the ETS
9. **Correct and lock out all set points** to prevent uncontrolled human interference that will take valves out of range as they are trying to resolve their comfort issues.
10. **Replace clogged filters, clean coils & repair fins** to improve the effectiveness of cooling coils
11. **Repair or replace all leaky valves** as they bypass flow
12. **Recalibrate all sensors** to prevent faulty signals over driving coils
13. **Add ΔP sensors to the ends of all the chilled water circuits** to provide better indication of the building characteristics & improve circulation pump control

Corrective Measures cont.

Note present minimum tertiary pumping limit is three (3) pumps for L20 & cold-rooms

14. **Repair or replace all AAV's** faulty units will introduce air into the system reducing flow & causing air pockets
15. **Improvement to cold room water supply** re-pipe to use return water as supply and add in a N+1 variable speed pump set to maintain flow with a motorized valve from the supply side for extra temperature trimming if required. These pumps need to be on UPS power supply. *(details of the cold room condensers to be reviewed)*
16. **Strainers & instruments are needed on each HEX** on the building side to improve maintenance &check performance
17. **Pumps should draw through heat exchangers** not push through
18. **Possibly add a bypass or three way valve to the L24 & L21 levels** so the FCU's at this level are not starved by the short circuiting ETS's above as the tertiary pumping is reduced.
19. **Control valves to be interlocked with the units** to prevent bypassing with the fans are switched off
20. **Review the water treatment for biocide and iron content levels** to see if there is potential internal fouling
21. **Review piping of FCU's directly with AHU's**, FCU's to be put on separate piping circuit.
22. **Adjust piping for better & more uniform ΔP**, creating reverse return or ring main connections.

Inspections Required

Note fins account for 2/3rd of the performance of the cooling coils

A. **Record all the present set points & isolation + control valve positions plus every change subsequently**
B. **Check coils are piped correctly** if parallel flow arrangement desired ΔT will be impossible to maintain
C. **Review adequacy of existing AFB & controls valves** all “leaky” or oversized valves need to be repaired & replaced
D. **Check for damaged cooling coil fins,** as they account for 2/3rds of the thermal performance of a coil.
E. **Review the airflow distribution across all coils,** as this effects coil effectiveness & air side bypass.
F. **Remove unnecessary fresh air losses** but maintain building pressurization
G. **Check that no coils are provided for a lower ΔT** than the project conditions – limits their effectiveness
H. **Check offset & drift in all the control systems** for loss in effectiveness
I. **Check for possibilities of using return water “twice”** such as precooling incoming fresh air streams & increase ΔT

Equipment & Other Duties Required

Multiple industrial grade & recently calibrated portable pressure & temperature instruments are required along with strap on ultrasonic flow meters to check the operability and accuracy of all the manual and electronic instruments on the project.

The BTU meters in the development will also be used to track and monitor site performance. These units will need to be connected to the BMS or cloud space to record & trend the data.

Trends need to be started for all the ΔP sensors around the site as well as the supply temperature to the building and return temperatures from each AHU & FCU group. So efforts can be honed in on the most defective units.

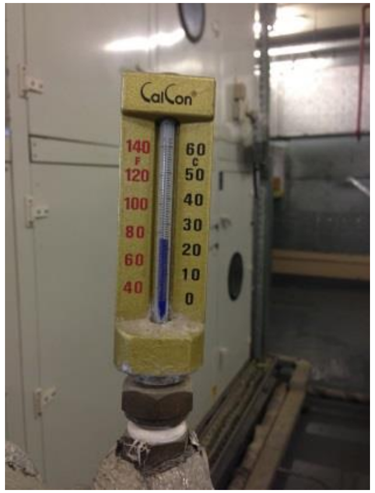
All drawings will need to be updated to reflect the as built situation and *find alternative routes for improving the piping reticulation for reverse return or ring main supplies*, which shall improve hydraulics.

Data loggers for temperature & humidity will need to be installed in all key customer compliant areas.

Tenant Fit-Out Installations & Equipment details will need to be reviewed for compliance with project requirements.

Perform regular heat transfer efficiency calculations on each cooling coil and heat exchanger to quantify the extent of degradation or blockage may be present.

Certain FAHU coils are performing well even with the poor supply chilled water conditions

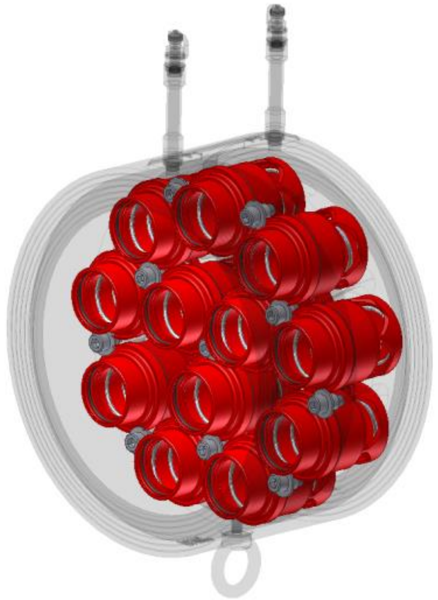


AFB & Control Valve Effectiveness

This matter is still under review from the literature of the products provided it would appear that they are suitable for the intended purpose – however closer review and site performance will tell.

Selection & performance of the existing combination of AFB's + control valves needs to be looked at closely for size, rangeability & dynamic rating of the actuators in order to provide smooth full stroke movement within the set points for the associated units. The maximum pressure rating of 400kPa for the smaller units is questionable for the present operation of the tertiary pumps as typically there should be a safety allowance of 50% for this type of commercial grade equipment.

No P/T plugs appear to be provided with the FCU arrangements so the down stream BTU meters will need to be used in checking their effectiveness. It is also a concern that no strainers were typically evident upstream of the AFB's which is necessary to prevent them from becoming blocked & hindering their intended operation. Repair & replacement will need to occur where this is found to be true in the building.



"...Further issues are under investigation..."

This was just from the first inspection

NEXT

Other Findings

Apart from comfort and energy efficiency improvements, there are other factors

General Issues

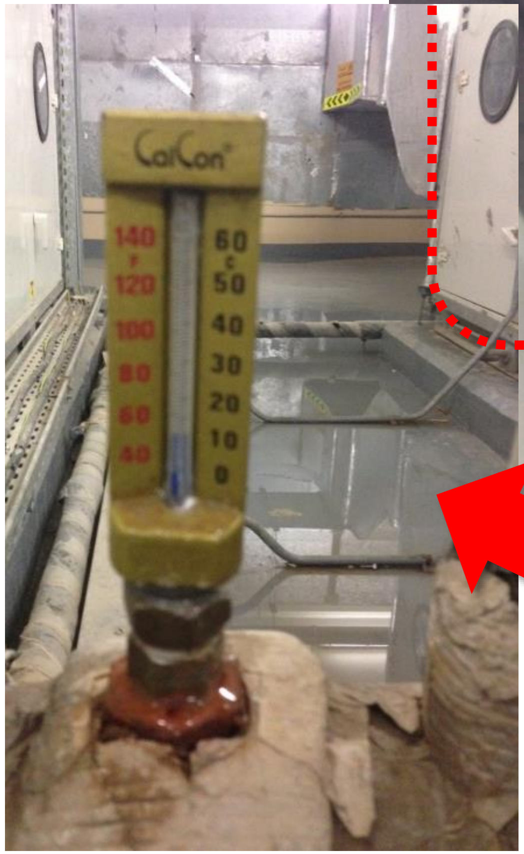
1. Life & safety

Fall prevention barriers are required at certain locations in the plant rooms, during inspection of the Wafi Gourmet retail space, an unlocked door way lead directly to a large drop and false ceiling beneath ! All area in the development should be checked for life & safety issues.

2. Water build-up in the plant rooms

The majority of plant rooms visited during the 17th July have in adequate floor falls & drainage points so water from condensate is pooling on the floor, which hinders access and is a work safety concern.

This is not an exhaustive list other issues shall more than likely follow from further inspections.



FINAL

Conclusion

Key elements in order to attain comfort &
prevent excessive flow in the building

There are two main issues at play:

1. Excess & uncontrolled flow in the building
2. No supply temperature control of the chilled water to the building

Main Steps to be Taken

The Building needs to create a return temperature of 14.4ºC & the Chiller Plant needs to produce a 5.5 ºC on the supply to the building.

1. **Slow down & stage off tertiary pumps** excessive flow is compounding the problem, it has no productive use
2. **Eliminate all short circuiting & bypass flows** which is deteriorating return temperature & wasting energy (L24 & L21 ETS's)
3. ***Convert the ETS to supply temperature control for 5.5 ºC to the building*** so that the coils can deliver their cooling capacity for the necessary comfort
4. **Install PICV's to the Pressure Brake ETS's** to prevent short circuiting *(in the interim balance flows & only use the minimum no. of HEX's)*
5. **Ensure balanced flow on each heat exchanger** to ensure the lowest supply temperature possible
6. **Allow the chiller plant to load up more chillers and pumps** to match the flow of the building while maintaining 4.4 ºC supply to the ETS
7. **Correct and lock out all set points** to prevent uncontrolled human interference that will take valves out of range
8. **Replace clogged filters, clean coils & repair fins** to improve the effectiveness of cooling coils
9. **Repair or replace all leaky valves** as they bypass flow
10. **Recalibrate all sensors** to prevent faulty signals over driving coils
11. **Add ΔP sensors to the ends of all the chilled water circuits** to provide better indication of the building characteristics & improve circulation pump control

Further points shall be added as operations and re-commissioning evolves

All to bring about stable comfort then as building operations become better understood, maximizing of return temperature will then need to be focused on to improve energy efficiency.

NEXT

Optimisation

Essential continuous auditing & commissioning

“... continuously audit the existing SCADA & BMS plus expand its capability by improving communication & visualisation of the problems...”

Enhance Business Success

Generally, the majority of time & focus is in the development period which is of a fast track nature

But **75%+** of expenses occur in the operating period, which supports the need for solutions that continuously optimize to ***improve returns.***

Development Period

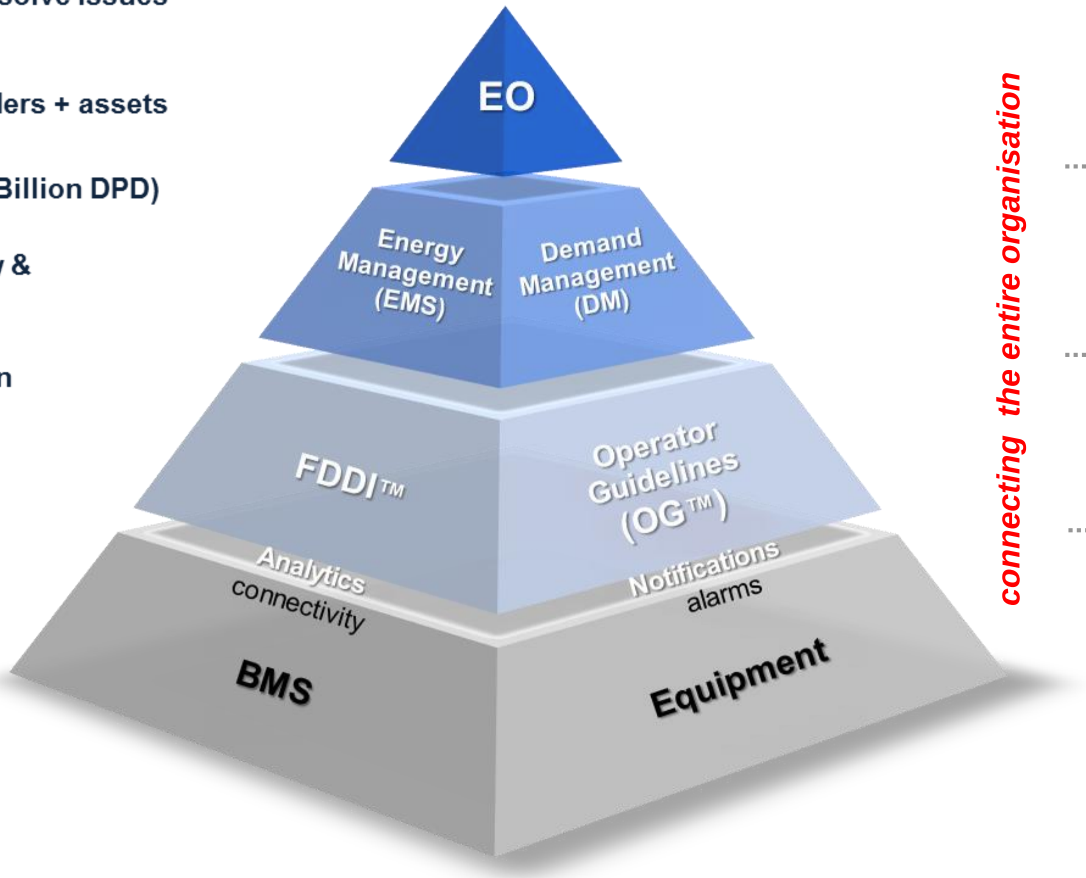
Operation Period

2% **23%** **75%+** ***The Purpose***

Enterprise Optimisation Platform

Powerful continuous analytics of equipment, sensors & processes giving real time impacts & results, to improve operational performance.

- Automatically detect, diagnose & solve issues before they fail
- Remotely track & update work orders + assets
- Proven impact & scalability (4.6+ Billion DPD)
- Enhance organisational efficiency & productivity
- Track & improve comfort based on standards
- Decrease maintenance costs & extend life
- Optimise energy consumption in real time
- Prioritise funds for best impact
- Secure 33 LEED® EB points



connecting the entire organisation

Shareholders

Executives correctly direct funds for the best returns & impacts

Directors insight & real time adjustment of strategies & plant to optimise energy use

Managers day to day control to optimise maintenance efforts & extend equipment life

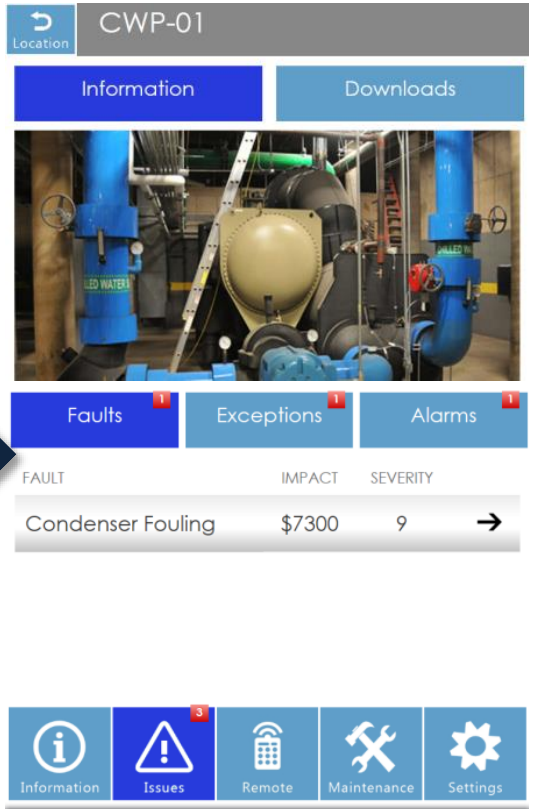
Operators day to day functions carrying out work orders

in real time

EOP & FDDI™ User Interface

From building level, right down to the individual piece of equipment

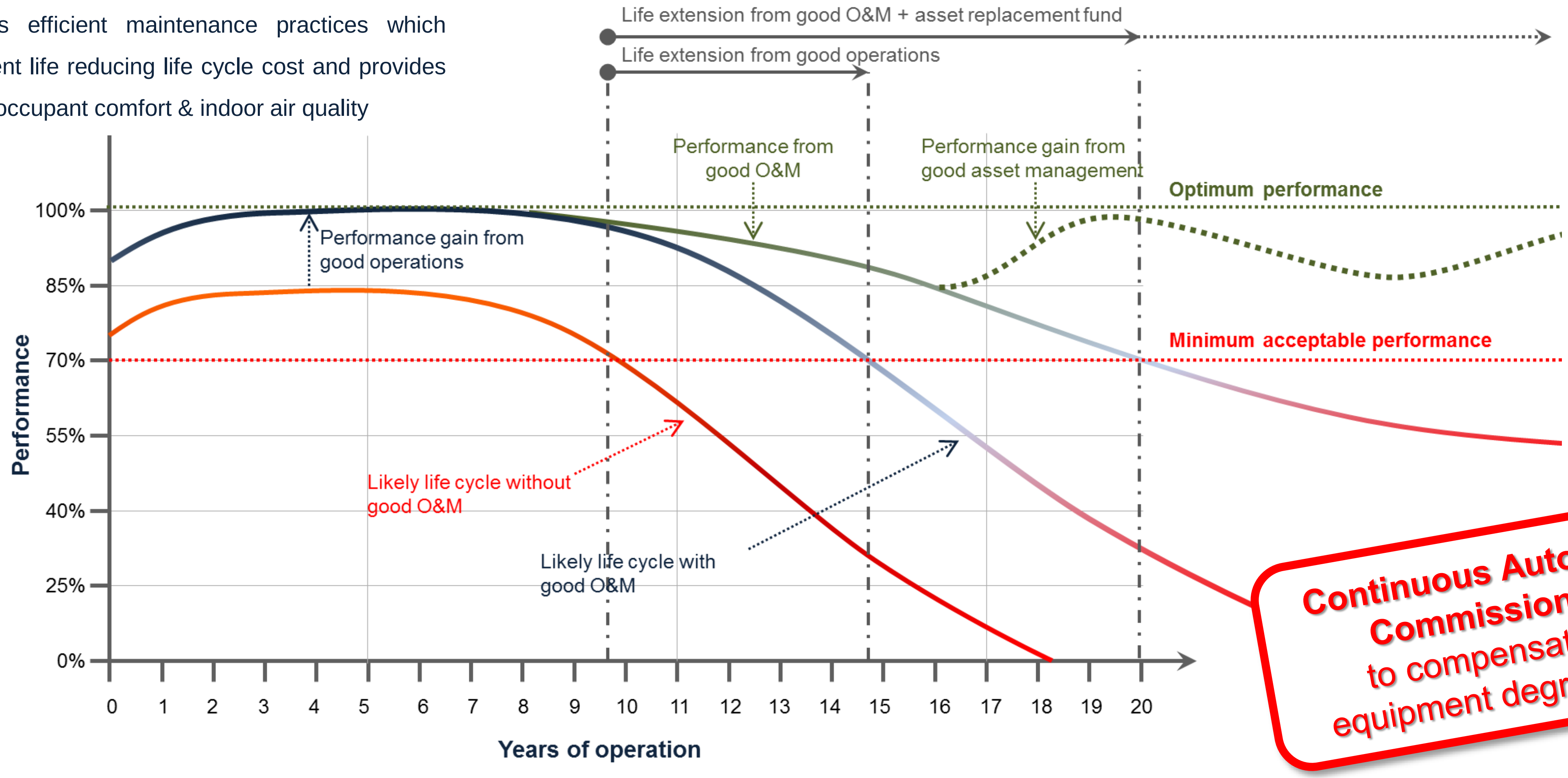
"FDD can result in a
10-30%
energy savings,
support efficient maintenance practices, extend equipment life, and provide more consistent occupant comfort and indoor air quality." – New Buildings Institute



Extend Equipment Life

By not operating the equipment as hard & only using when needed its life can be increased.

FDDI™ supports efficient maintenance practices which extends equipment life reducing life cycle cost and provides more consistent occupant comfort & indoor air quality



Continuous Automated Commissioning to compensate for equipment degradation.

A closer look at FDDI™

FDDI™ stands for Fault, Detection, Diagnostics & Impact Assessment

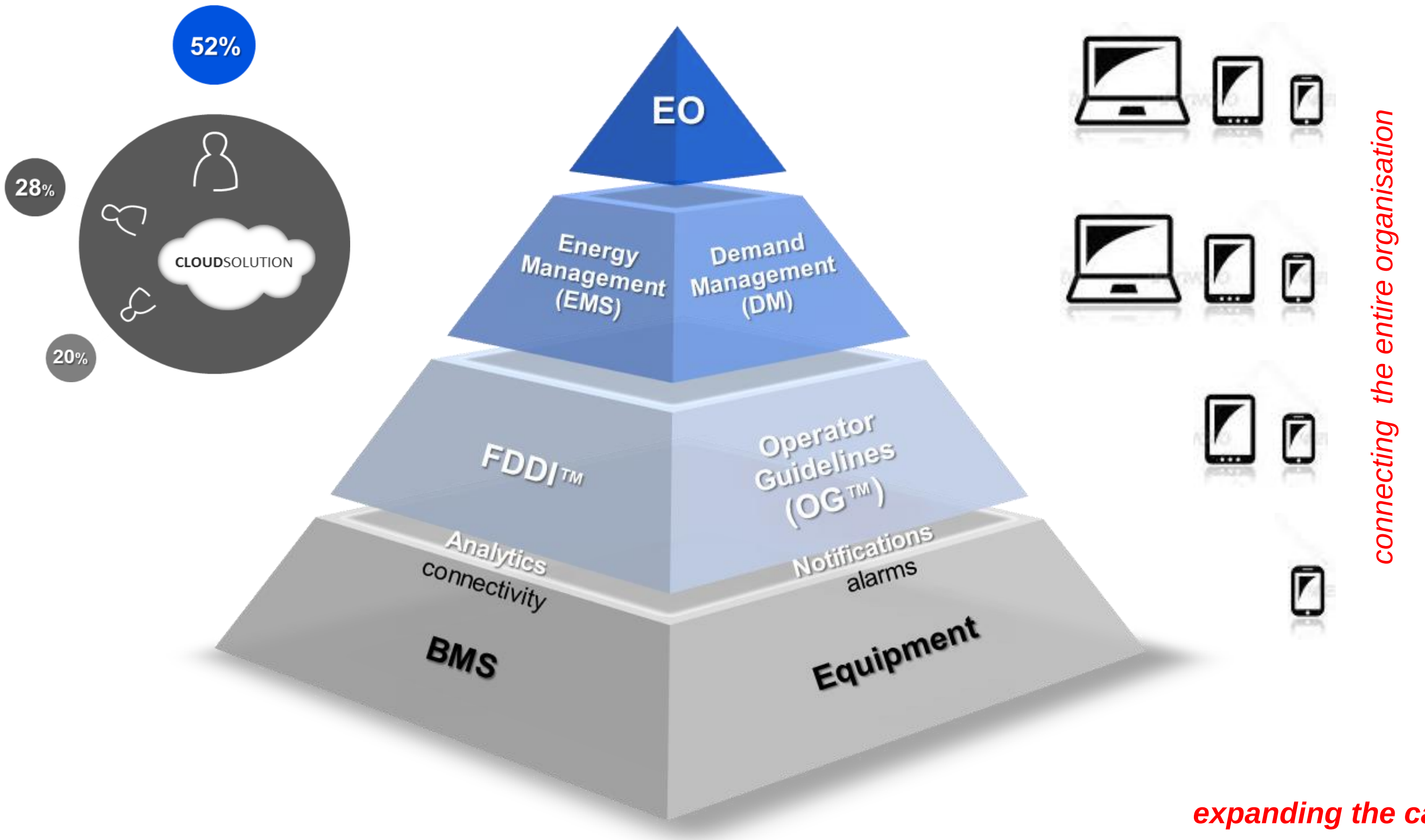
MACHINE			DIAGNOSIS			TIME			Impact (USD)	Info
Location	machine	Circuit	diagnosis	Rank	Qty.	First	Last	Span		
UniCredit Fineco	Plt04 R13	0	Controller Offline	3.00	2	07/13/2013 23:12	07/13/2013 23:27	0d 0h 15m	0	
UniCredit Fineco	Plt04 R14	0	Controller Offline	3.00	21	07/10/2013 00:11	07/13/2013 23:57	3d 23h 46m	0	
UniCredit Fineco	Plt04 R15	0	Setpoint Not Met - ZAT - Under Cooling	9.00	3	07/12/2013 16:27	07/12/2013 17:27	0d 1h 0m	0	
UniCredit Fineco	Plt04 R15	0	Controller Offline	3.23	26	07/07/2013 23:40	07/08/2013 05:55	0d 6h 15m	0	
UniCredit Fineco	Plt04 R16	0	Setpoint Not Met - ZAT - Under Cooling	8.73	15	07/05/2013 16:38	07/11/2013 18:56	6d 2h 18m	0	
UniCredit Fineco	Plt04 R17	0	Controller Offline	3.00	33	07/07/2013 23:40	07/13/2013 09:27	5d 9h 47m	0	
UniCredit Fineco	Plt04 R18	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt04 R18	0	Controller Offline							
UniCredit Fineco	Plt04 R18	0	ZAT Drift: Cooling Not Activ							
UniCredit Fineco	Plt04 R19	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt04 R20	0	Controller Offline							
UniCredit Fineco	Plt04 R20	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt04 R21	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt04 R22	0	Controller Offline							
UniCredit Fineco	Plt04 R22	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt04 R23	0	Controller Offline							
UniCredit Fineco	Plt04 R23	0	Setpoint Not Met - ZAT - Unc							
UniCredit Fineco	Plt05 R01	0	Controller Offline							
UniCredit Fineco	Plt05 R01	0	Setpoint Not Met - ZAT - Unc							

FDDI™ Customised Reports

FDDI™ stands for Fault, Detection, Diagnostics & Impact Assessment

Device Connectivity

Enabling real time communication, response & auditing from board room to plant room & back, without the need of extra BMS software.



Shareholders

Executives correctly direct funds for the best returns & impacts

Directors insight & real time adjustment of strategies & plant to optimise energy use

Managers day to day control to optimise maintenance efforts & extend equipment life

Operators day to day functions carrying out work orders

expanding the capability of the existing BMS

Smart Phone Mobility

Strengthening the vision & enhancing the delivery

Engaging anywhere is must in this digital world fast track world, where benefits come from:

- **Reduce overheads**
- **Reduce cost of operations**
- **Enhance service provision & resources**
- **Real time tracking, reporting & auditing**
- **Unified communication & mobility**
- **Keeping budgets in check**

Enhancing the Nation Towers service level & opening new markets by expanding the reach of knowledge & experience gained from the visualization of the buildings usage.

MOVING TOWARDS

Total Comfort®

ΔT Correction in Chilled Water Systems