



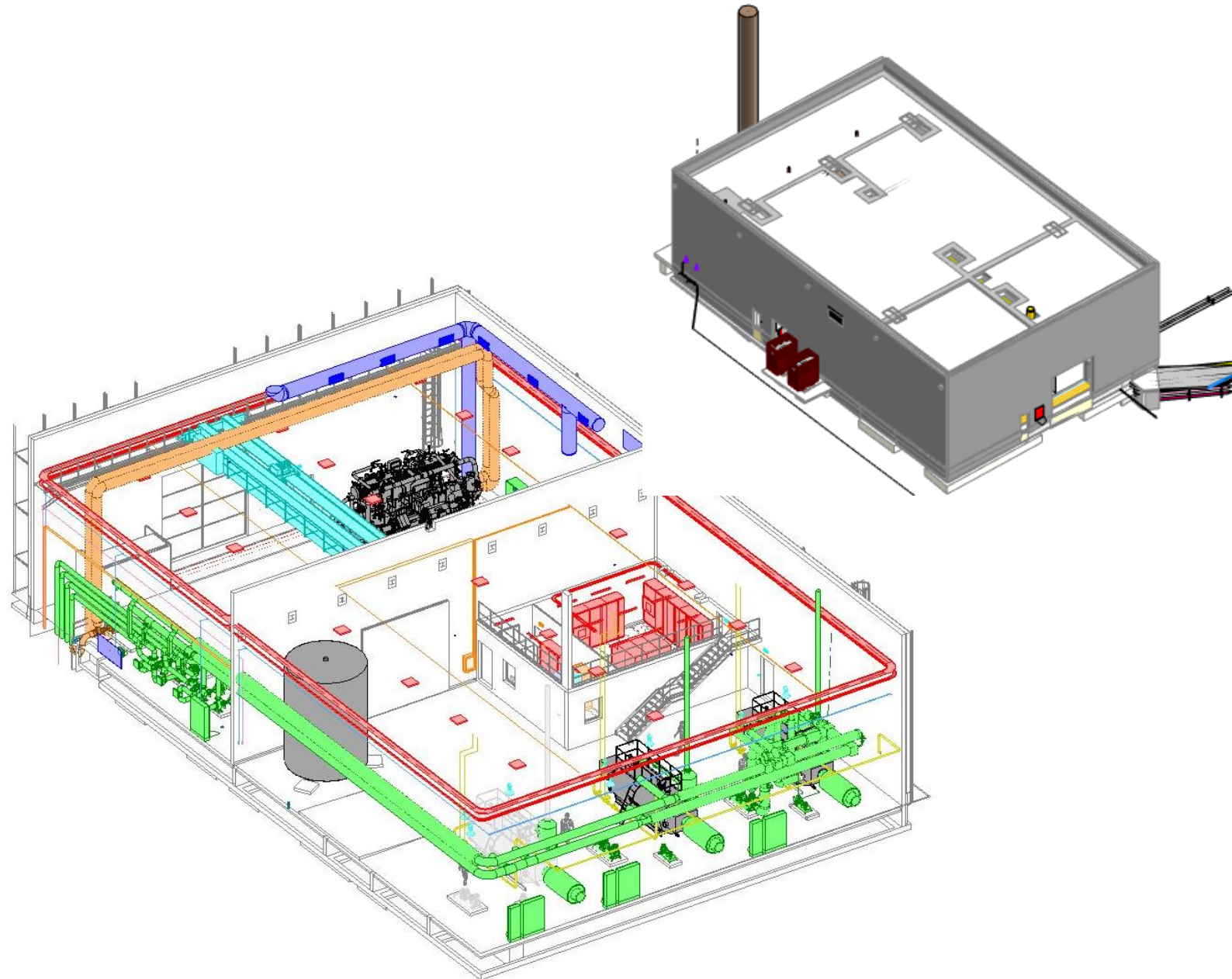
Sustainable Heating Plant in Prévessin (B.776) SCE Coordination meeting n1

G. Rouge

Apr 2024

Outline

- Technical description
- Project strategy
- Organisation
- CERN Standards
- Documentation
- Schedule
- Questions



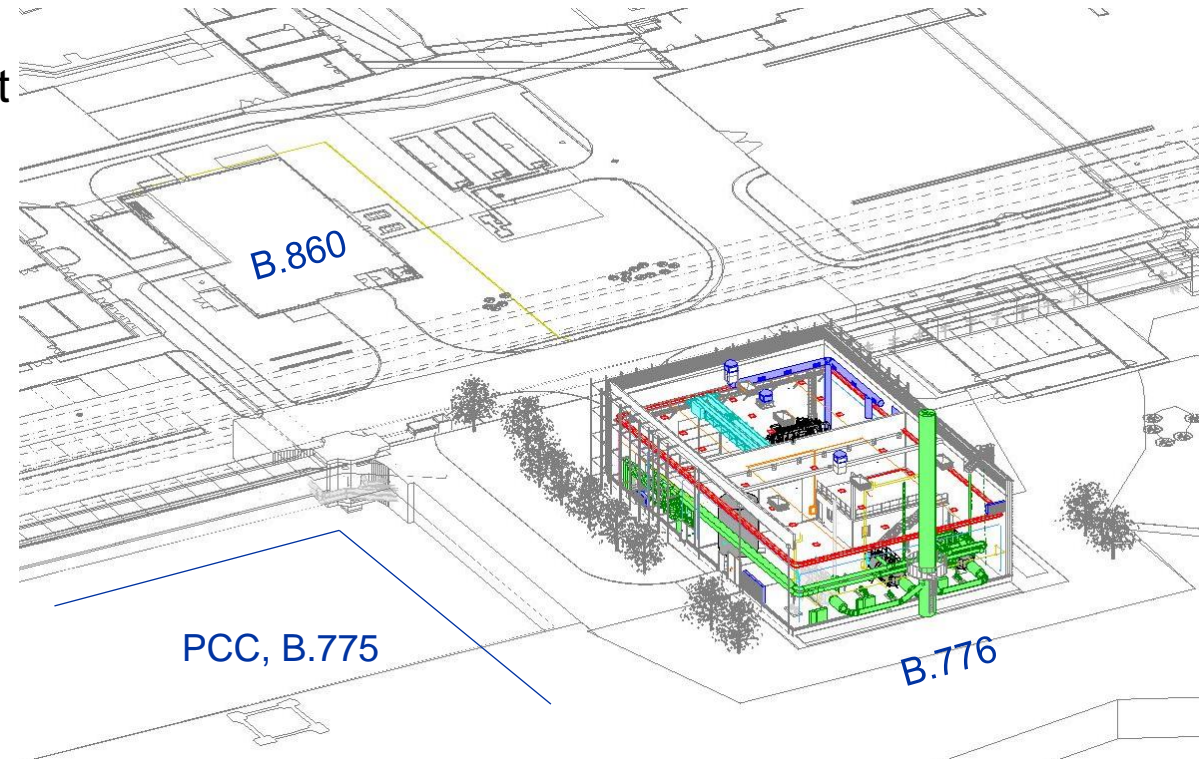
Technical Description

Objectives:

1. Create the new B.776 for housing the heating plant
2. Install the new heating plant with gas boilers and heat pump
3. Dismantle the current heating installation in B.860

B.776 main works :

- Earthmoving and roads
- Building construction.
- Ventilation (ATEX)
- Gas boilers and heat pump
- Sanitary block
- Electricity: cubicles, distribution, sockets, lighting
- Travelling crane for HP maintenance (if budget)
- Connection gallery to GT818.
- Connection to PCC (B.775) for energy recovery



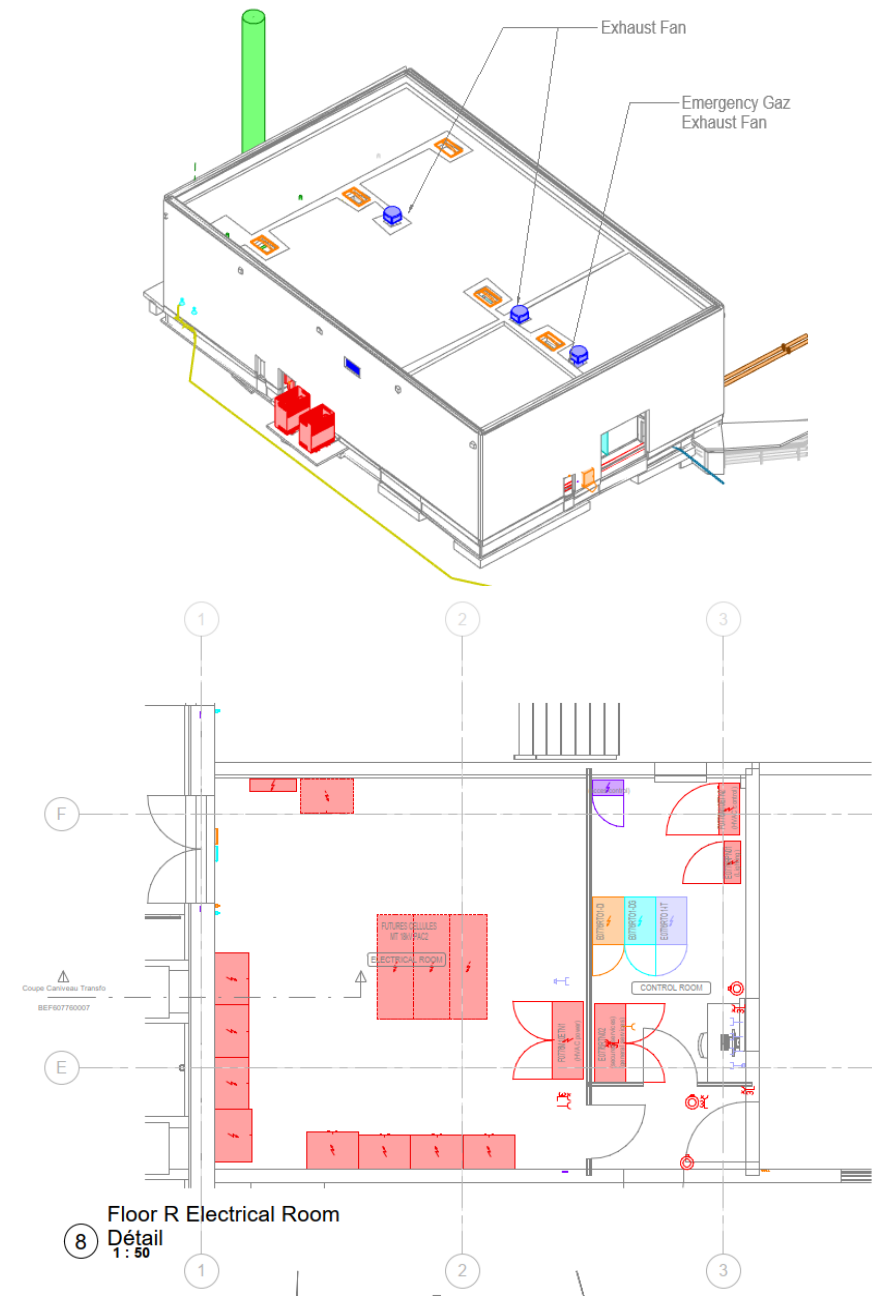
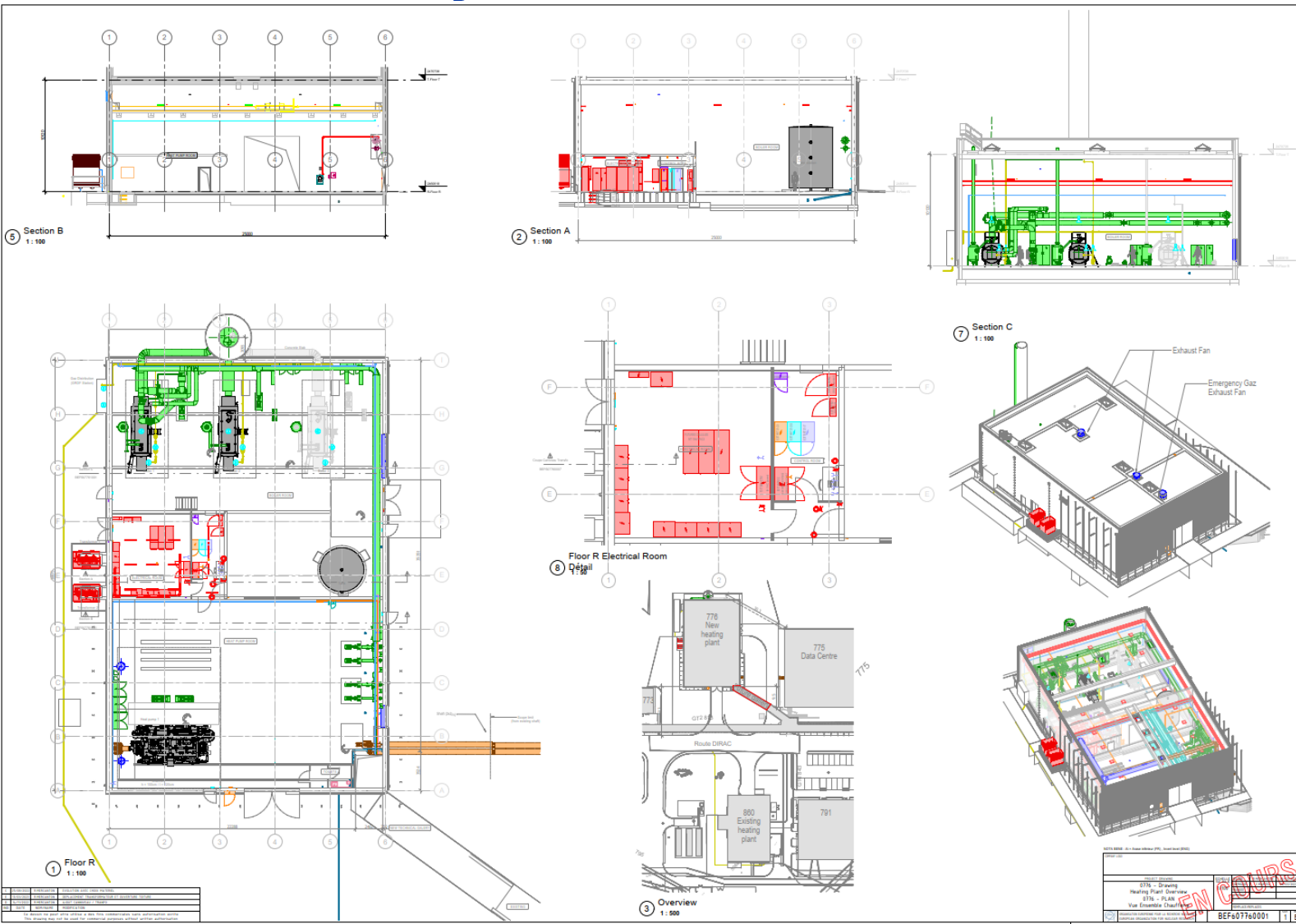
Presentation of the project WP1

Heating plant Preveessin WP1

- Reuse fatal energy from the new PCC with heat pumps powered by electricity,
- much-reduced carbon emission and raise of the renewable energy rate,
- Within the SITE-CONS programme
- Total surface = 950 m²
 - Gas Boilers room (m²): 460
 - Electrical room (m²): 75
 - Heat pump room (m²): 415
- Height = 11 m
- Two access roads
- Rainwater storage (10 m³)
- Green façade and roof
- Connection to existing TG
- IRP study – EDMS 2820036



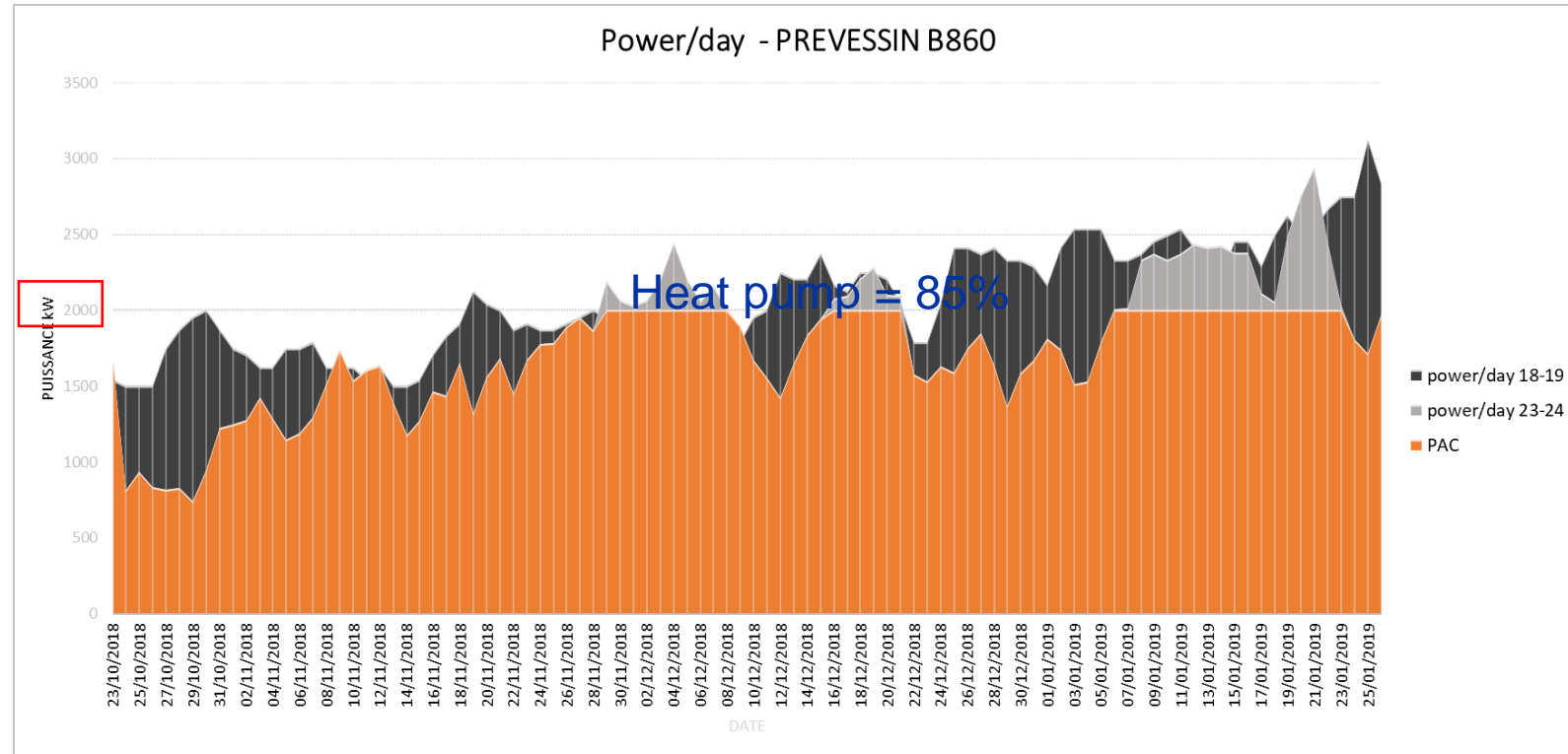
General layout



Energy consumption

- **Heating plant configuration:**

- 2 boilers, 2MW+4MW Gas&Fuel
- 1 heat pump 2 MW.
- Space for future heat pump.



- **Objectives:**

- Basis: winter 2021-2022
- Flexibility with gas boilers.
- 1 heat pump 2 MW heating capacity (1.6 MW evaporator = IT load).
- Space for future heat pump.

775 PCC Commissioning test

Phase 1: 3MW - 2 exchangers of 1.5 MW each

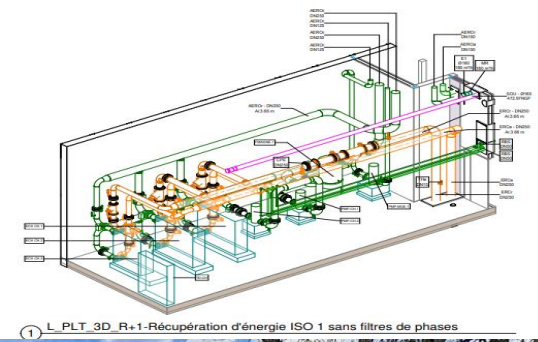
Phase 2: +1MW - 1 exchanger ✓

Primary circuit : 32/22°C, 270 m3/h.

Secondary circuit : 30/20°C

Tableau de fonctionnement des paliers, configuration à 2 échangeurs de 1,5 MW

Palier	Echangeurs actifs	Nombre pompes actives	Palier bas non paramétrable (kW)	Palier haut variable paramétrable (kW)	% commande pompe mini / maxi	Débit unitaire pompe mini / maxi (m³/h)	Débit cumulé pompes mini / maxi (m³/h)	Débit mini au secondaire sur chaque échangeur (m³/h)
1	1 ou 2	1	750	Entre 750 et 1500	42 / 75	76 / 136	76 / 136	65 ✓
2	1 et 2	2	1500	Entre 1550 et 2000	39 / 50	72 / 90	144 / 181	65 ✓
3	1 et 2	2	2000	Entre 2050 et 3000	52 / 75	95 / 136	190 / 272	90 ✓



776 CERN Project Organisation

DRAWING
R. Mercanton

BUDGET CONTROL
E. Weymaere
SCE-DOD

PROCUREMENT
S. Magnan
IPT-PI

ENVIRONMENT
S. Schadegg, J.P, Bergoeing
HSE-ENV

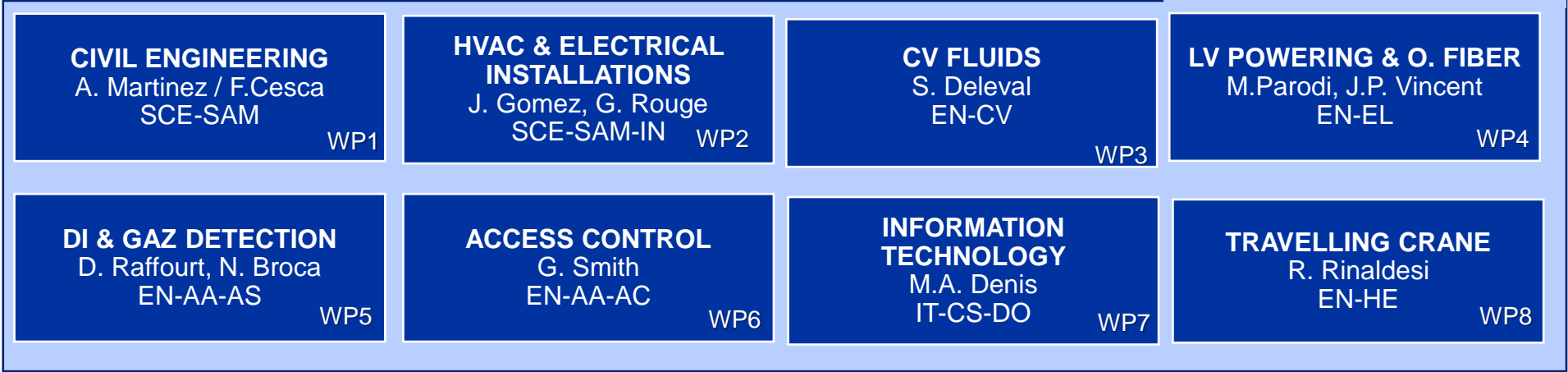
SAFETY
D. Tshilumba
HSE-OHS

SAFETY COORDINATOR
J,M. Jounin
APAVE

Steering Committee
M. Capeans (SCE) – Chair
W. Salter (IT/FA)
S.Deval (EN)
N. Bellegarde (ATS-DO)
M. Vadon (SCE/DOD)

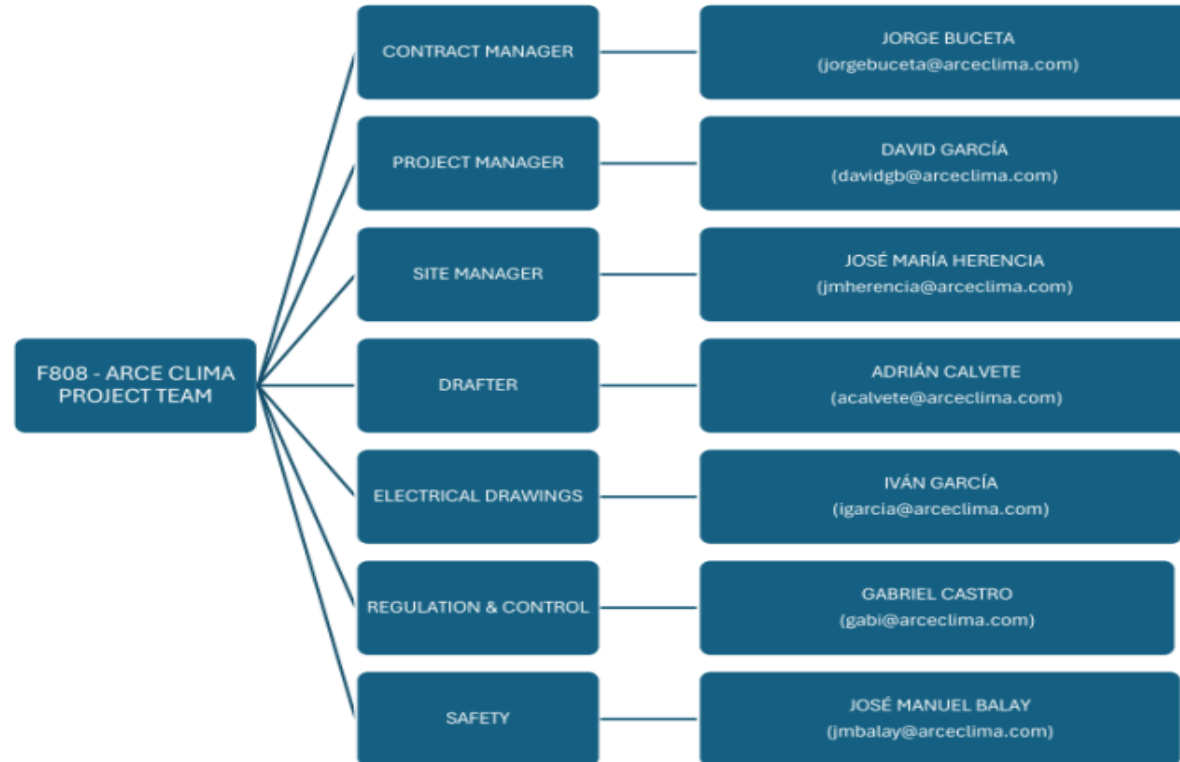
Steering Committee meetings (2/y) attended by:
Budget Control
PL, DPL, and invited WP leaders

PROJECT LEADER
G. Rouge
SCE-SAM-IN
DPL: A.Martinez



MAINTENANCE
G. Genamy
SCE-SAM
WP9

776 ARCECLIMA Project Organisation



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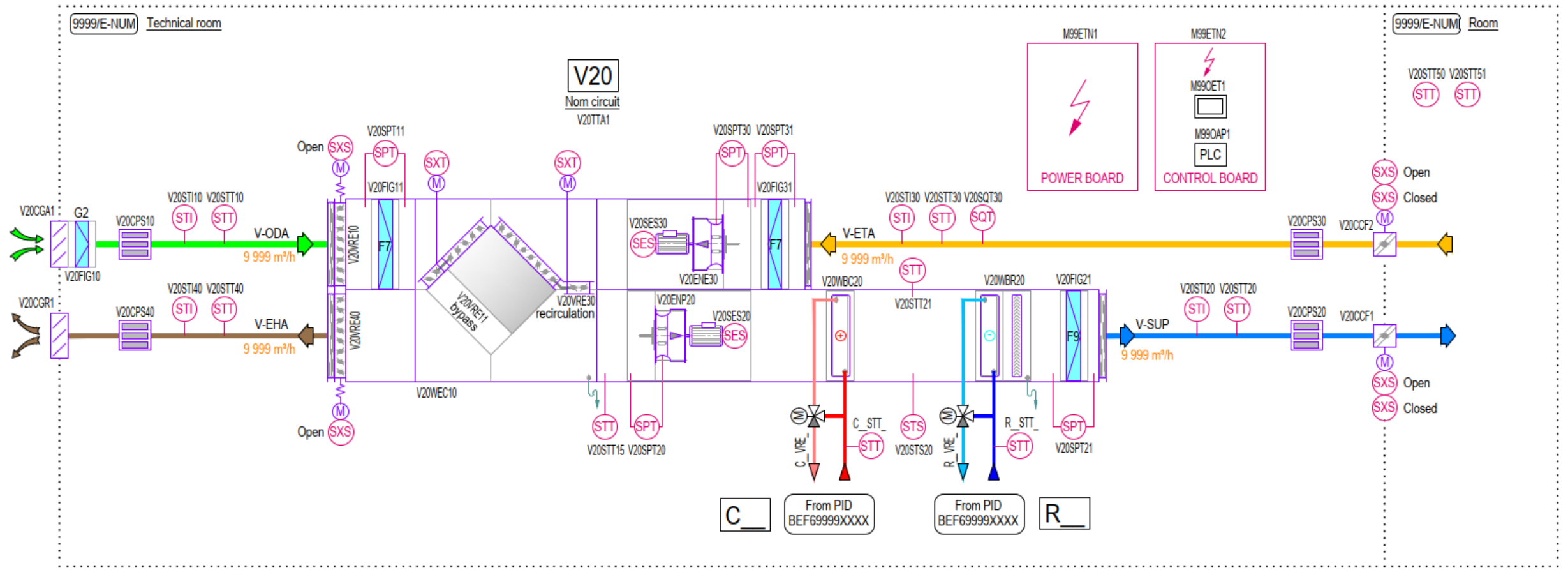
Tel.981976215 | Fax:981976223



climatización
contra incendios
energía solar
frío industrial
geotermia



Standards SAM IN



SAM IN

Classification

Systeme/parent/child/part

Système	Code
Réseau de chaleur	C
Chauffage	C
Ventilation	V
Refroidissement	R
Sanitaire	S
Incendie	I
Air Comprimé	A
Distribution de gaz	G
Electricité	E
Multi technique	M
Restauration	T

Methods

Codification

Building / parent = circuit / child = component



Marking = CAMM code



Quality Assurance Plan
 FX9999QA_510_reperage_V5_F
 Edms 126675 V5



CERN GS

Edms 126675 V5
 File name: FX9999QA_510_reperage_V5_F
 Date: 2013.05.22 Page 1 of 18

Méthode Maintenance

**REPERAGE ET IDENTIFICATION
 DES INSTALLATIONS CVCSSEA
 DES BATIMENTS TERTIAIRES DU CERN**

Abstract
 Le présent document a pour objet de décrire le système de repérage des équipements des installations CVCSSEA (Chauffage, Ventilation, Climatisation, Sanitaire, Electricité et Automatismes) des bâtiments tertiaires du CERN.

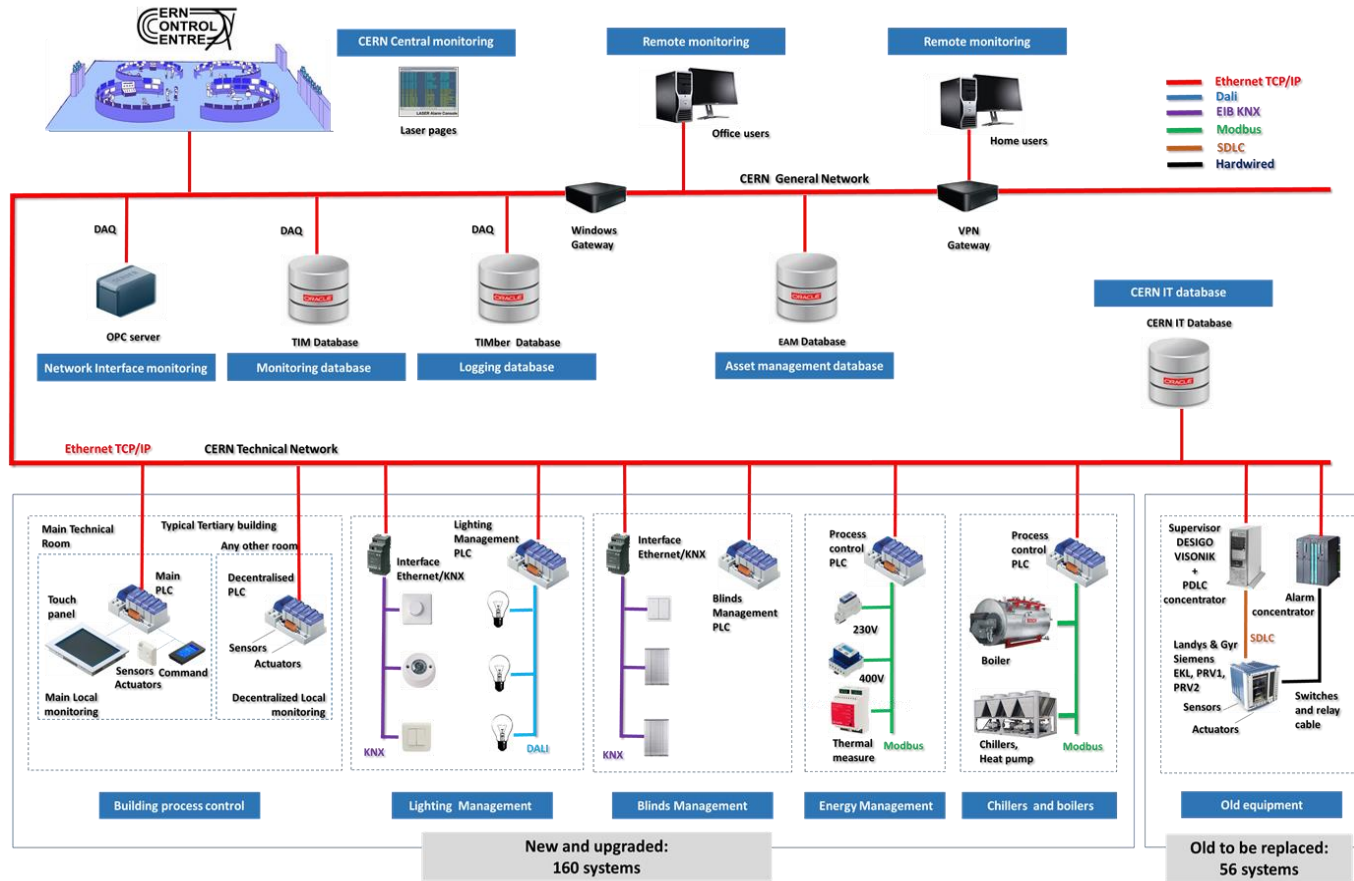
Elaboré	Approuvé
By: N. Ben Bouhaker, D. Potard, C. Martel	By: C. Martel
Date: 11.09.2011	Date: 24.07.2013

Distribution
 GS-SE-HE

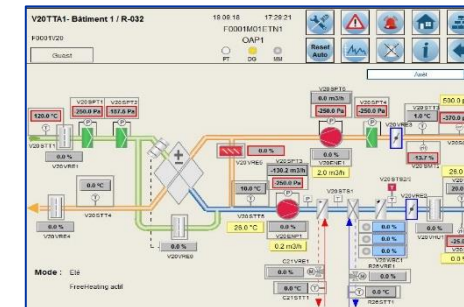
Historique des modifications

Rev. No.	Date	Pages	Description des modifications
1.0	10.03.2011		Création du document.
2.0	09.02.2013		Frairie repérage HVAC et Electricité, standardisation du type d'étiquettes.
3.0	22.05.2013	5, 17	Correction numérotation type étiquettes et ajout des exemples FID.
4.0	24.07.2013		Ajout forme étiquette pour origine alimentation électrique.

Architecture



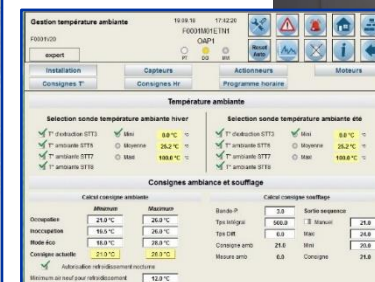
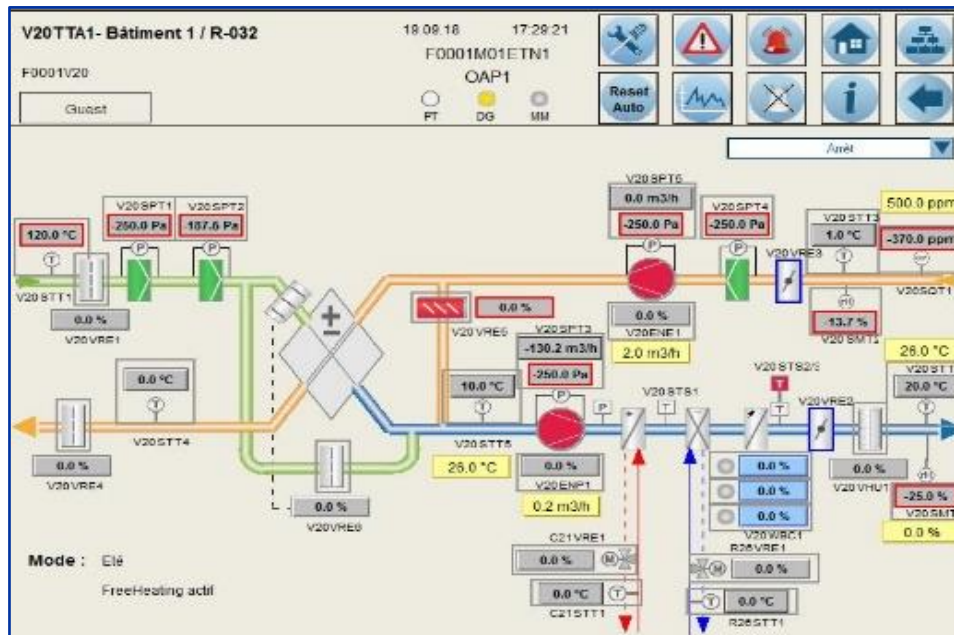
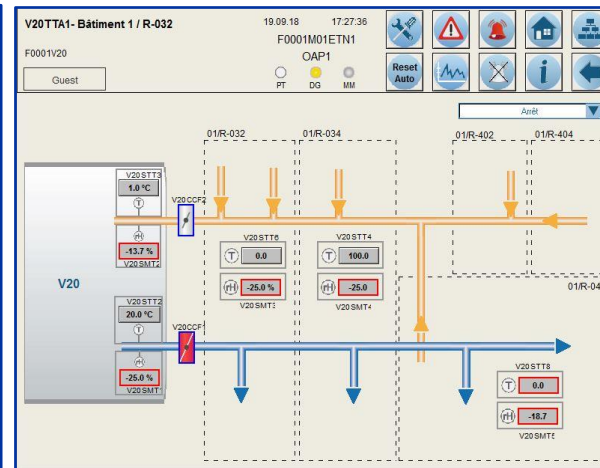
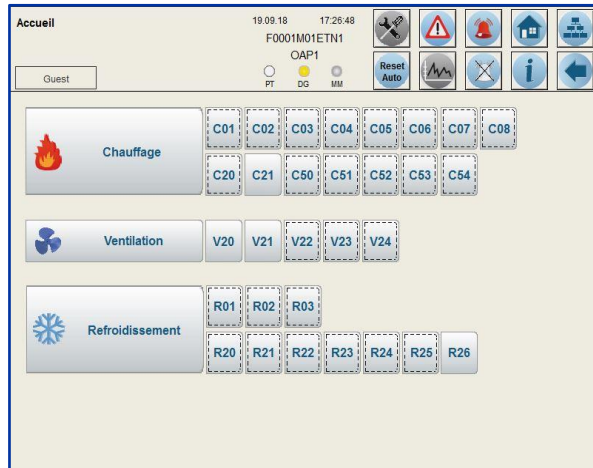
- Old system compatible.
- New concept : minimal design, direct connection to **Ethernet**, direct interface with the **field layer**, using **standard protocols: DALI, KNX, MODBUS**.
- **PLCs** from the Saia Burgess Controls (SBC) product line.
- **Local and remote monitoring**.
- **Standard control interface** for the technicians, for all the technics:



- **Integration with the CERN standard services: alarms, automatic maintenance orders, energy counting measures.**

SAM IN

Control & Regulation



Standards SAM IN

- CERN PTG HVAC
- CERN PTG ELEC
- CERN PTG SAN

9 STANDARDS CERN / CERN STANDARDS

Codification et gabarit GMAO / Maintenance codification and template :

- FX9999QA212 : CVCS / HVAC & SANITARY codification (Ref. [1816853](#)),
- FX9999QA213 : ELEC codification (Ref. [1262812](#)).
- FX9999QA409 : Maintenance format CVCS / HVAC & Sanitary (Ref. [1761416](#)),
- FX9999QA409 : Maintenance format ELEC (Ref. [1761419](#)).

Procédures / Procedures:

- FX9999QA510 : Repérage et étiquetage / Marking & labelling (Ref. [1266775](#)),
- FX9999QA513 : Documentation DIUO/ABF (Ref. [1357755](#)),
- FX9999QA555 : Consigne exploitation électrique (Ref. [2736616](#)).

CAO, plans et schémas standards / CAD, standard drawings and schematics:

- FX9999QA502: Format CAO BIM / BIM CAD format (Ref. [1262827](#)),
- FX9999QA210: Symboles graphiques PID / PID graphical symbols (Ref. [1322316](#)),
- FX9999QA548: Cartouche Autocad / Autocad titleblock (Ref. [2593341](#)),
- FX9999QA542 : Revit Gabarit projet MEP/ MEP Revit template (Ref. [2192621](#)),
- FX9999QA544 : Revit Bibliothèque de familles / Revit family biblio (Ref. [2253910](#)),
- BEF399990001: Schéma tableau puissance / power board schematic (Ref. [2736632](#)),
- BEF399990002: Schéma tableau contrôle / control board schematic (Ref. [2736636](#)),
- BEF399990003: Schéma tableau DTU / DTU board schematic (Ref. [2736640](#)),
- BEF399990004: Principe terre bâtiment- Building grounding principle (Ref. [2736642](#)),
- BEF399990005: Mise à la terre béton / Concrete grounding (Ref. [2736645](#)),
- BEF599990011: PID type sanitaire / typical sanitary PID (Ref. [2736610](#)),
- BEF699990050 PID production d'eau glacée / chilled water production (Ref. [1855963](#)),
- BEF699990010 PID sous-station de chauffage / heating sub-station (Ref. [1855960](#)),
- BEF699990059 PID CTA/AHU type 0 (Ref. [1855965](#)),
- BEF699990060 PID CTA/AHU type type 1 (Ref. [1855966](#)),
- BEF699990061 PID CTA/AHU type type 2 (Ref. [1855967](#)),
- BEF699990062 PID CTA/AHU type 3 (Ref. [1855968](#)),
- BEF699990063 PID CTA/AHU type 10 (Ref. [1855969](#)),
- BEF699990068 PID CTA/AHU type 15 (Ref. [1855970](#)).

Contrôle / control :

- FX9999QA601 : Automation plc control and regulation (Ref. [2736613](#)).
- FX9999QA601 : Test Automatisation / Automation test (Ref. [1814996](#)).

Documentation

Documents principaux:

- Annexe A: Prestation sur le site du CERN (Réf. [1155899](#)),
- Annexe B: PTG CVC
- Annexe C: PTG Electricité
- Annexe D: PTG Sanitaire
- Annexe E : Plan de coordination du travail et de la sécurité (PCTS)
- Annexe F: BEF607760005 PID de l'installation
- Annexe G: FM.0776.R23 Maquette Revit du projet. [2997431/1](#)

Annexe H : Documents et plans CVC [2997398/1](#)

- BEF607760001 776 Implantation chaufferie.
- BEF607760010 Plan réseau Air Comprimée.
- BEF607760011 Plan réseau Eau Chaude Chauffage.
- BEF607760012 Installation Eau déminéralisée.
- BEF607760013 Installation Eau Froide Sanitaire.
- BEF607760014 Installation Gaz Fioul.
- BEF607760017 Installation de ventilation.

Annexe I: Documents et plans Electricité. [2997416/1](#)

- BEF307760001 Installations Electriques-schema tableau E0776RTN02.Plan de pre-etude.
- BEF307760002 Installations Electriques-Plan d'eclairage.
- BEF307760004 Installations Electriques-Plan de mises à la terre. Plan de pre-etude.
- [BEF307760005](#) Installations Electriques-Plan de force.
- BEF301840006 Installations Electriques-Plan de cheminements. Plan de pre-etude.
- BEF301840007_Schema armoire (TGBT). Pour information.
- Note de calcul ELECALC MF_SPSEB__9010_Future chaufferie JAG

Main documents:

- Annex A: Working on the CERN site (Ref. [1155899](#)),
- Annexe B:PTG HVAC
- Annexe C: PTG Electricity
- Annexe D: PTG Sanitaire
- Annex E: Work and safety coordination plan (PCTS)
- Annex F: PID schema of the installation
- Annex G: Revit model of the project [2997431/1](#)

Annex H: HVAC Documents and drawing [2997398/1](#)

- BEF607760001 776 heating plant overview.
- BEF607760010 Compressed Air drawing.
- BEF607760011 Heating water piping drawing.
- BEF607760012 Demineralised water drawing.
- BEF607760013 Sanitary water drawing.
- BEF607760014 Gas and fuel drawing.
- BEF607760017 Ventilation drawing.

Annexe I: Documents and drawing Electricity. [2997416/1](#)

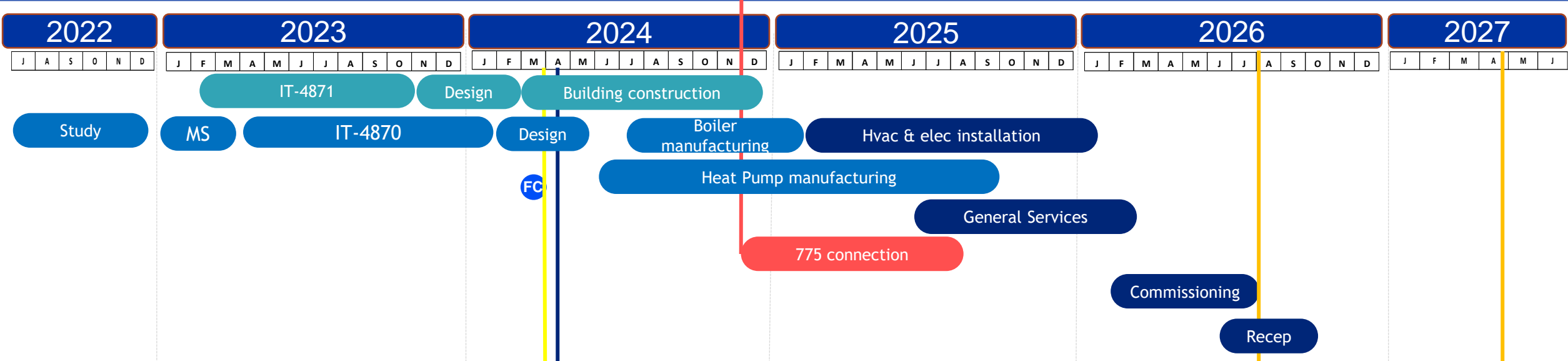
- BEF307760001 Electrical Installations-Board schema E0776RTN02. Preliminary study drawing.
- BEF307760002 Electrical installations – Lightning drawing.
- BEF307760004 Electrical installations – Earth connection drawing. Preliminary study drawing.
- BEF307760005 Electrical installations – Power supply drawing.
- BEF301840006 Electrical installations – Distribution drawing. Preliminary study drawing.
- BEF301840007_Board schema (TGBT). For information.
- Calculation note ELECALC MF_SPSEB__9010_Heating plant JAG.

BIM Track

<https://cern2020fm.bimtrackapp.com/Projects/36183/Models3D>

776 Project Schedule

775 Connection move according with the CE works.

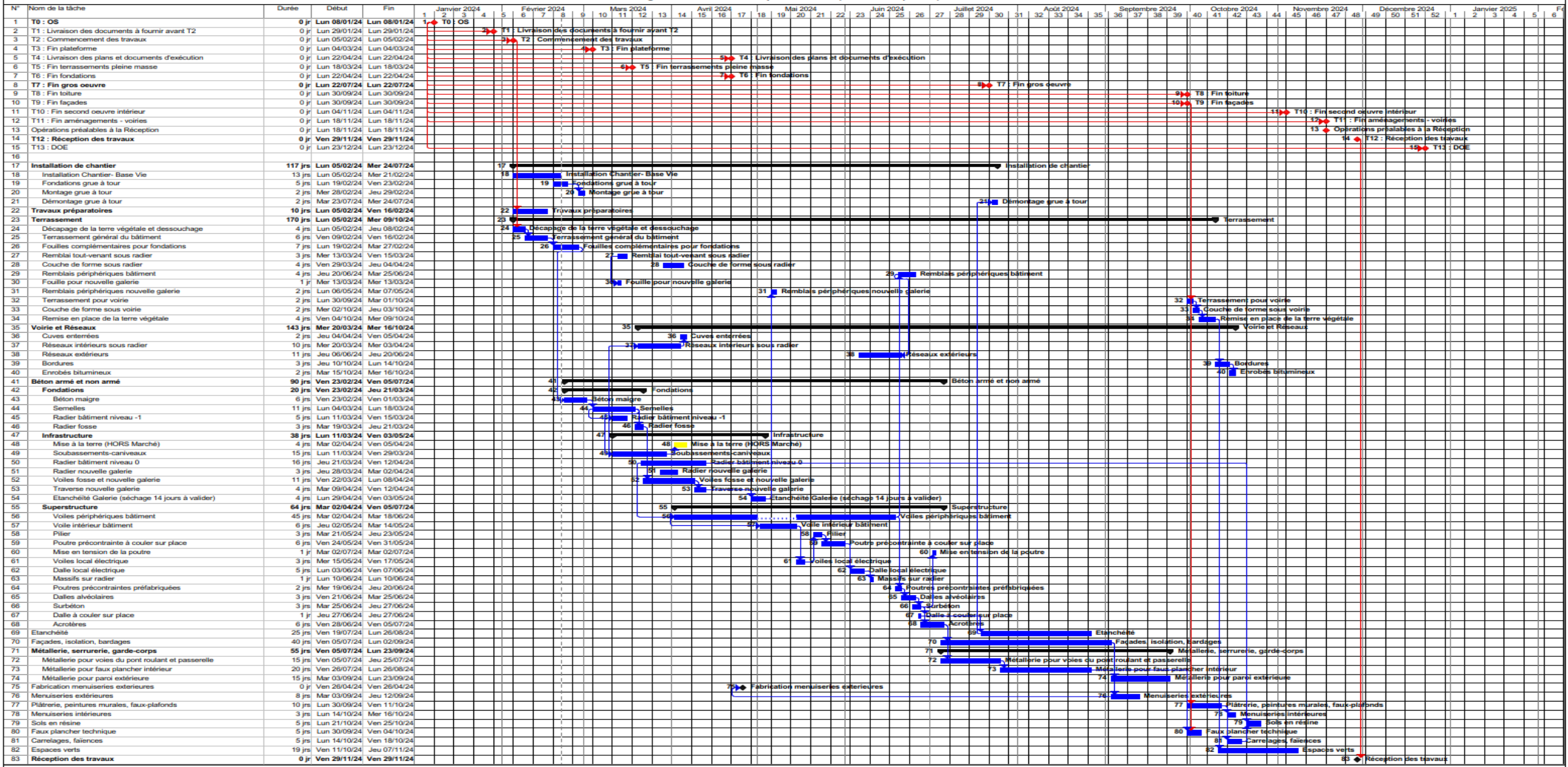


Today
 Installation of the anchor for the chimney.

775 Data Center should run with 2MW of heating recovery available.

860 Dismantling works should start after the last heating season 2026-2027.

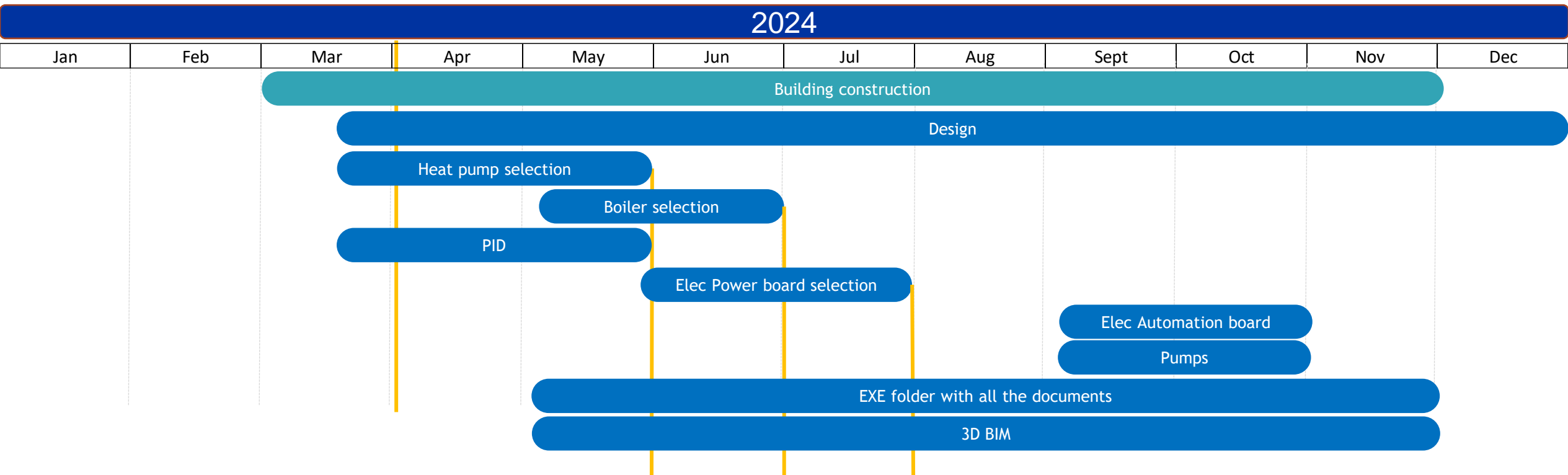
Programme des Travaux prévisionnel (Hors Intempéries)



776 Studies Schedule

FC

2024



Today

Power bord order.

Boiler order.

Heat pump order.

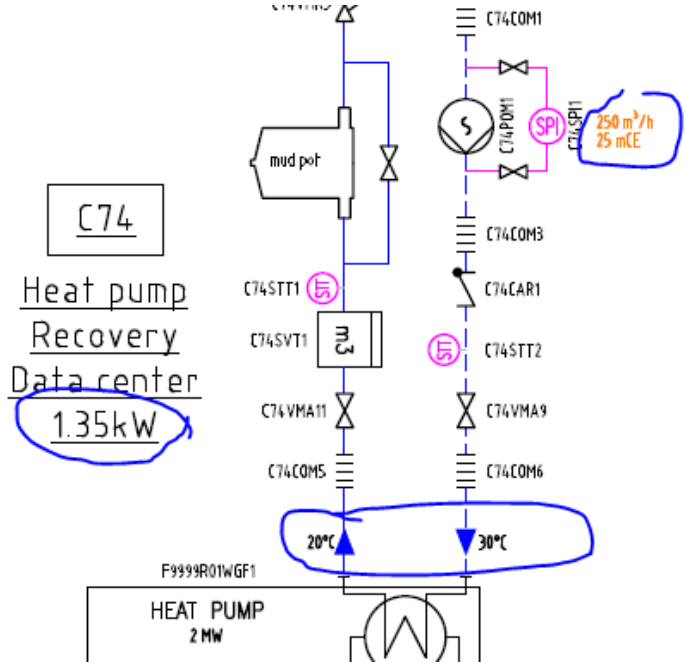


Questions ?

After a first simple calculus of heating power upstream and downstream of the Heat Pump based on PID data, something does not match:

			POWER (KW) KJ/s	DENSITY Kg/m ³	FLOW m ³ /h	SPECIFIC HEAT KJ/Kg/°K
outlet data center		30-20°C	1296,71217	997,13	112,0000	4
primary heat pump		30-20°C	2894,44681	997,13	250,0000	4
secondary heat pump		85-95°C	2029,03865	965,06	180,0000	4,

Seems that the trouble is on the heat pump primary circuit:



By the way, Friotherm suggests that the flow meter located on the secondary circuit of the heat pump should be downstream the 3-way valve

Next step

- Meeting on zoom every 2 weeks, next Tuesday 16th of April.
- Important meeting 21th of May.

Talk





home.cern