



AUTODESK UNIVERSITY 2015

ES11201

BIMelec, the BIM Electrical Process

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Learning Objectives

- Explain the BIM electrical process in your electrical design
- Learn how to develop a BIM electrical process in your building project
- Learn how to design and manage electrical installation in Revit MEP
- Learn how to create schematics and get electrical calculation results into your BIM model,

Description

In this class we will present the process of integrating Building Information Modeling (BIM) in order to manage the electrical design of a building project—what we call, “BIMelec.”

Your AU Experts

*Product manager in ALPI, an European software editor in the field of Electrical design, **Marseille Beltrey** is an expert in Electrical design in BIM models. He uses to speak in differences conferences in Europe, to spread the word on Alpi and Autodesk offering. He provides BIM implementation and training for the company's engineering design software, including Autodesk Revit, AutoCAD MEP, and AutoCAD Electrical. He has 10 years of experience in both the electrical design and Autodesk VAR, spending 6 years working as an instructor consultant for ALPI's solutions based on the Autodesk building design product. After his first experience as an Autodesk Speaker in Las Vegas in 2012, proposing a class on electrical design on revit; **Marseille**, has also contributed in 2013, as an author to an official French treaty book, outlining the different aspects of the ongoing revolution in the building.*

Yannick Poupon is an Electrical Engineer based in Boston, Massachusetts.

He has over nine years of electrical engineering, design and project management experience working for multi-discipline engineering contractors.

Responsible for providing technical guidance to engineering with regard to complex risk, alternative analysis studies and conceptual design.

He also collaborated with ALPI International to develop a Revit-Caneco (Electrical Engineering Solution).

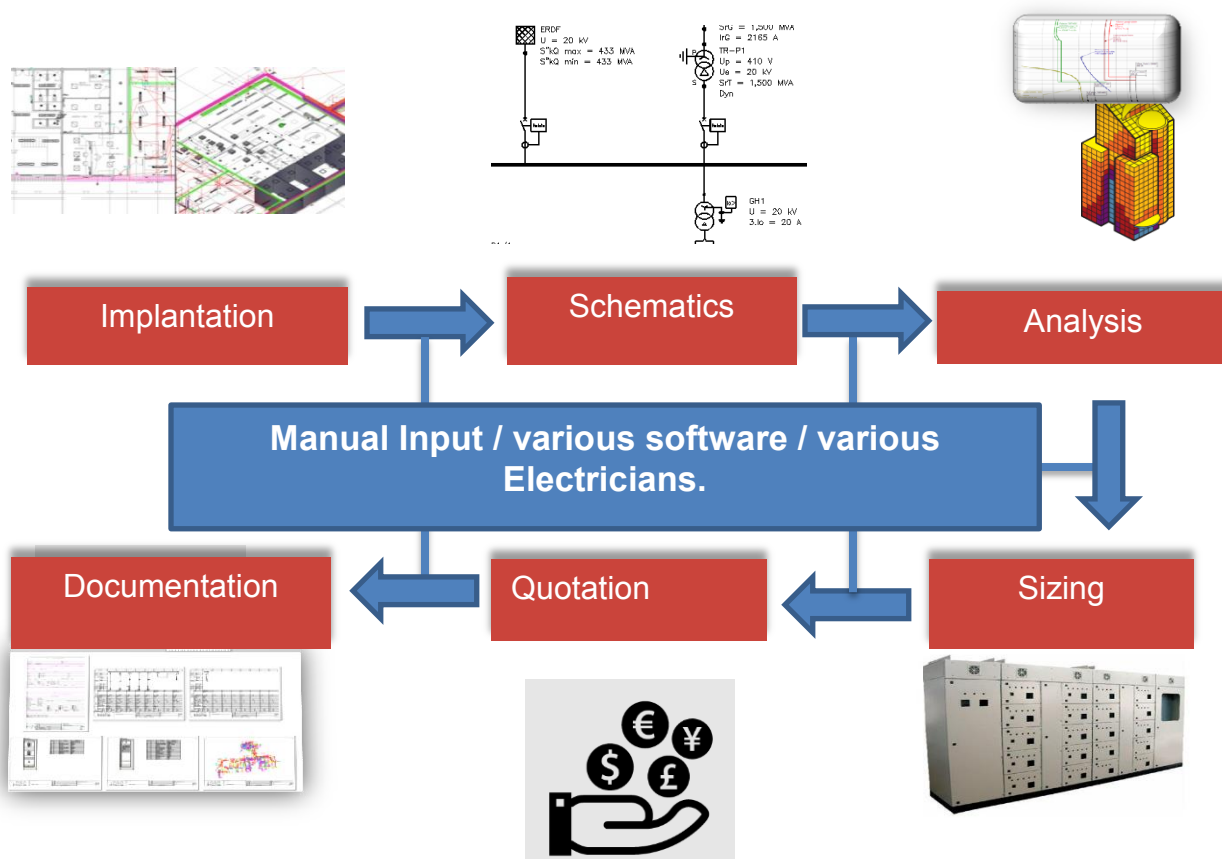
1. Talk about the BIM electrical process in your electrical design

What do we call BIMelec?

BIMelec is a process defined by Alpi, which allows engineers to share information and work on the same system, analyze the project continuously, without interruption in the design phase. It enables engineers and designers to focus on the profession value and not waste time rekeying the same information several times with risk to input errors. So the Electrical data of a BIM project should ideally pass into different phases without rekeying.

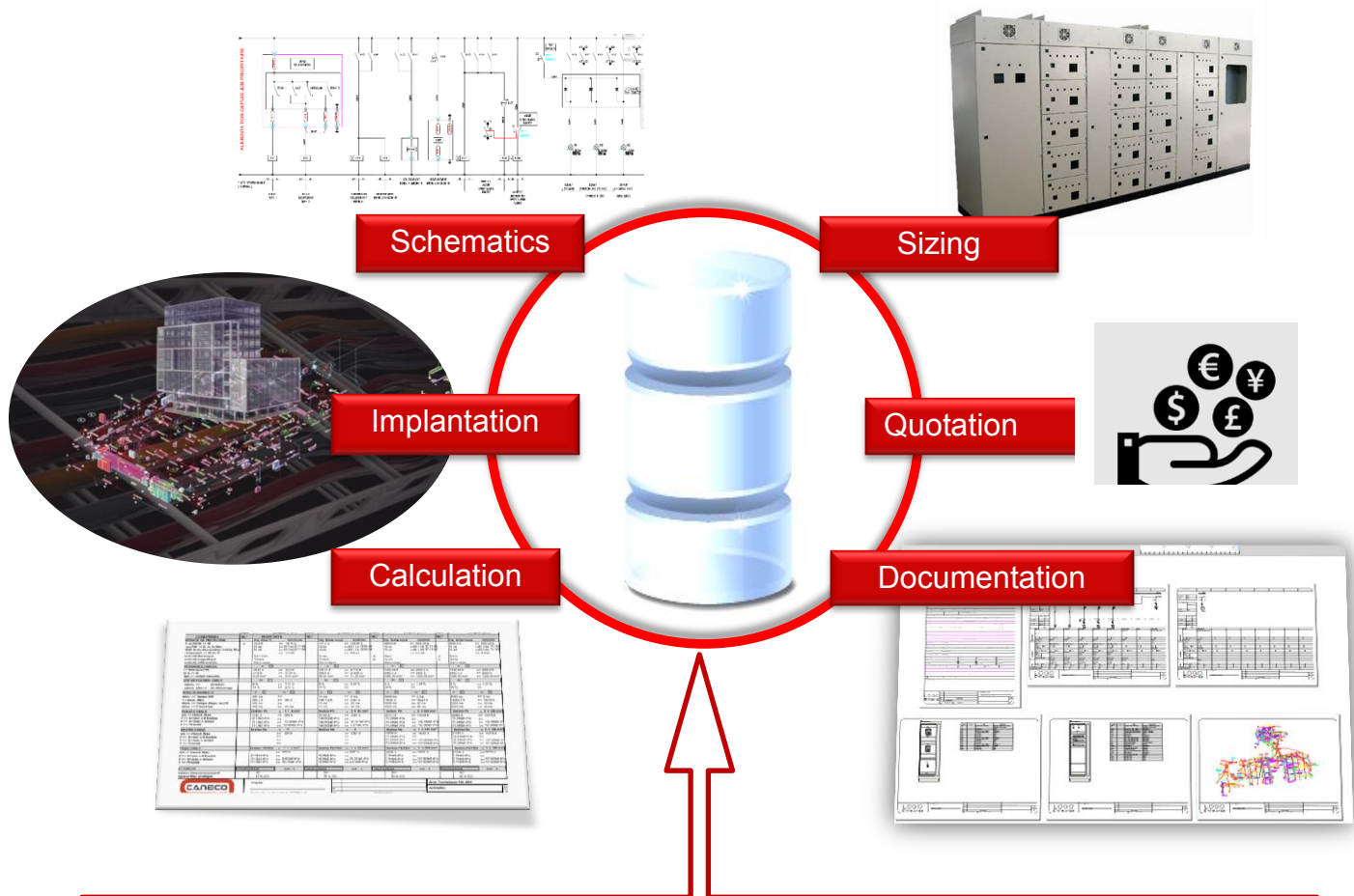
The main difficulty to have a continuous process is that the same information is treated in electricity under different aspects: From Implantation in the 3D model or in an electrical cabinet, to the calculation and sizing, costing, quotation, order, the schematic and finally all the documentations related to the different phases. In all these aspects, one object can be approached, described and treated differently by various software and electricians.

Working in the traditional CAD method = manual input in every step = input errors = Wasted time = more verification = less efficiency



Adopting a BIMelec process = Maintain the continuity and integrity of the data all through the analysis phases of the electrical installation.

The ALPI software solution reads and analyses a BIM model. It studies very quickly using an automated design process, compares and offers major electrical manufacturers on the market: ABB, Legrand, Schneider Electric, Siemens based on the specifications of the model.



Partnership with mains manufacturers:



Local standards usability:

International IEC 364, European HD 384
 French NFC15-100, UK BS 7671, German VDE,
 Italian CEI 64-8,
 Spanish REBT & A 20460, Austrian ÖNORM,
 Belgian RGIE / RINA and Swiss NIBT-NIN,
 Marine IEC 60092

NEC support is in progress and is not available today

How the interface between Autodesk and Alpi cover the main needs of the BIM Electrical Process?

Today to completely describe an electrical installation we need several software and several business profiles. This separation between software and business profiles is the hurdle to overcome in the Bim electrical design.

The solutions proposed by Autodesk and Alpi "Caneco BT connected to Revit " will remove any repetition or re-keying of information, source of unnecessary costs and more costly mistakes.

It paves the way for a strong promotion of the profession of the designer of electrical installations, which will have to master alone all the different aspects of his craft.



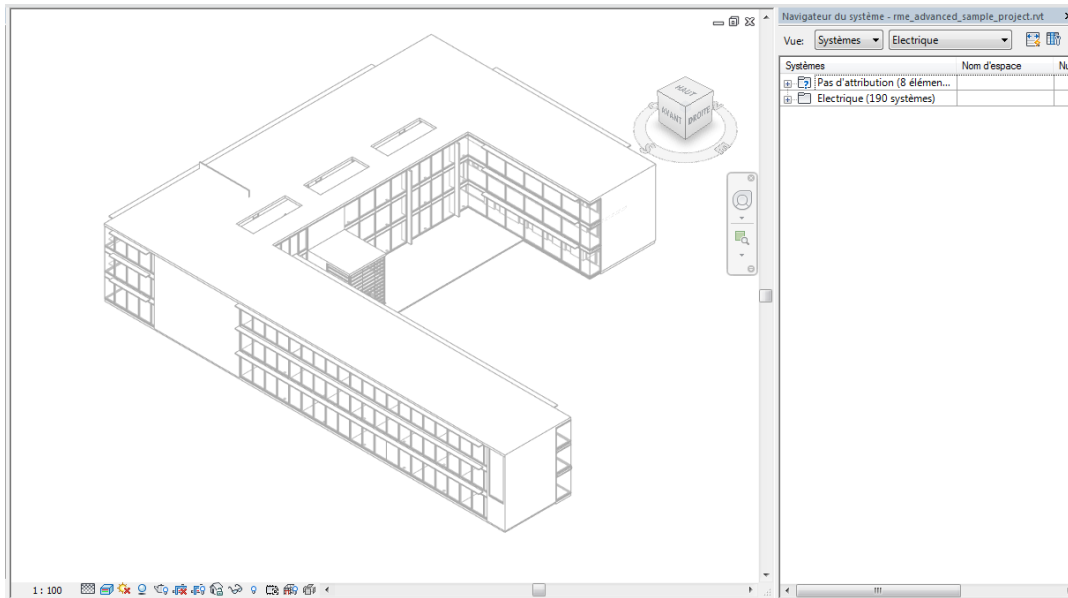
Define your electrical installation in Revit then use the ALPI solution to analyze and generates all the documentation necessary.

The ALPI solution operates a BIM modeling, with a generic and neutral view of the building. It studies very quickly the needs in a fully automated design process.

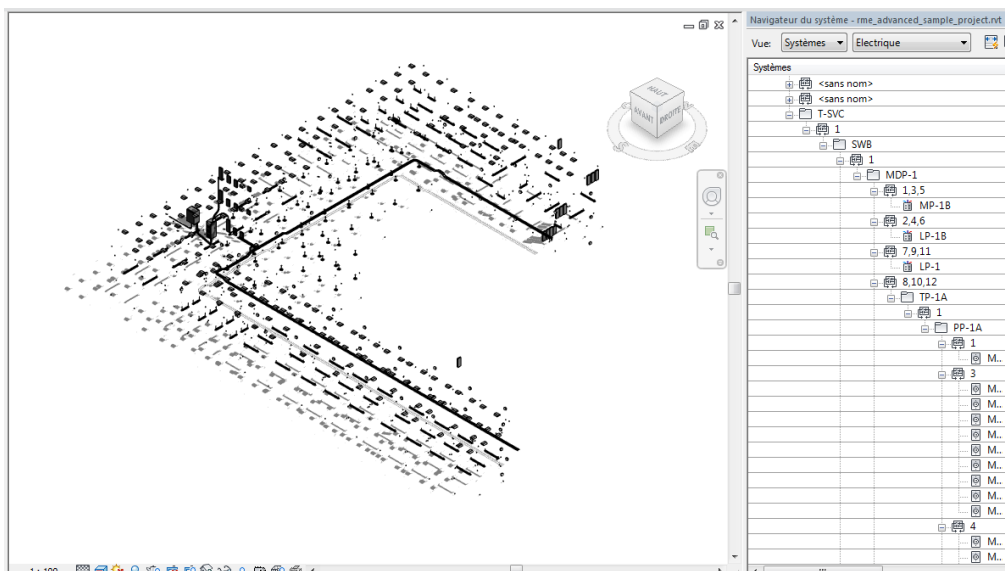
<i>Autodesk Revit</i>	<i>Alpi Caneco</i>
<i>Describe and manage Electrical systems</i>	<i>Check, and Control, the Revit Electrical network.</i>
<i>Update the Revit Model, Create new values properties as Project Parameters Resize Cable Trays Complete the Revit project with all the documentations as details view</i>	<i>Analyze the Cable routing more accurate definition of cable length Automatically Generate the single line diagram corresponding Calculation based on local Standards predetermination of cabinets Cost Estimation Generate automatically: Legends Details Cables list nomenclature Synoptic Cable trays calculation Power and control Schematic Flexibility in the choice of manufacturers</i>

Cables routing

Define electrical design in Revit

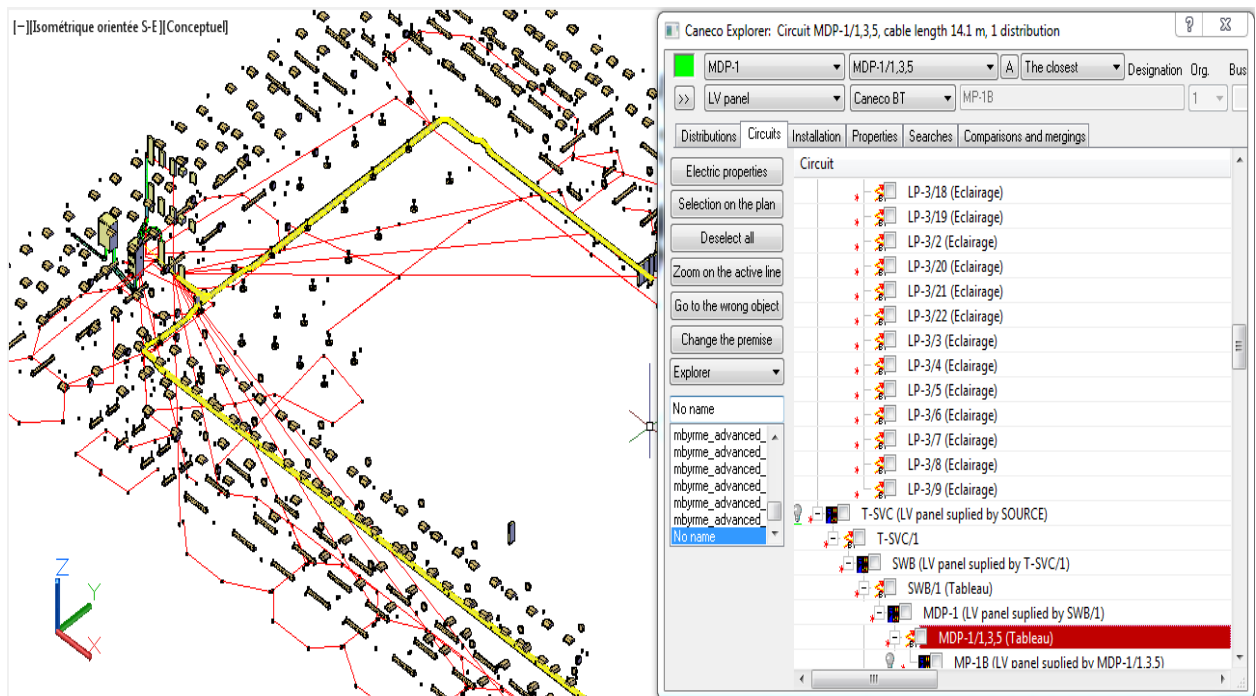


Caneco recognizes every Revit families, equipped with electric connectors,

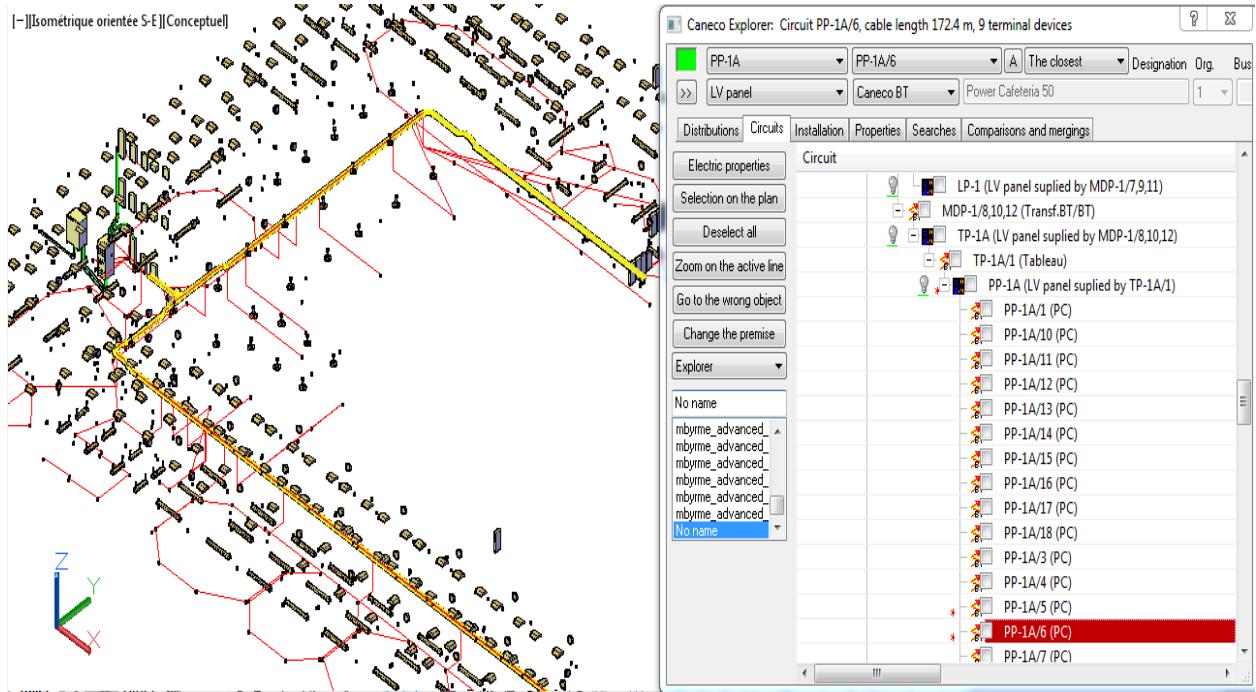


Caneco Generate automatically all the cables corresponding to the revit systems

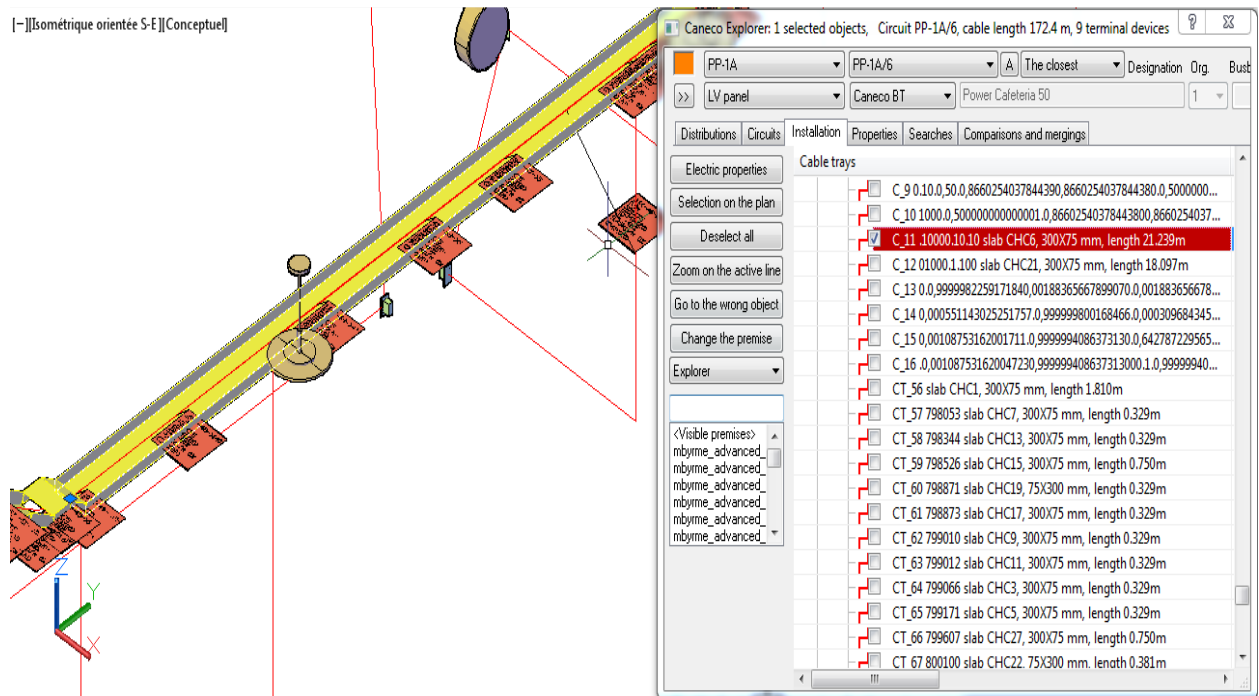




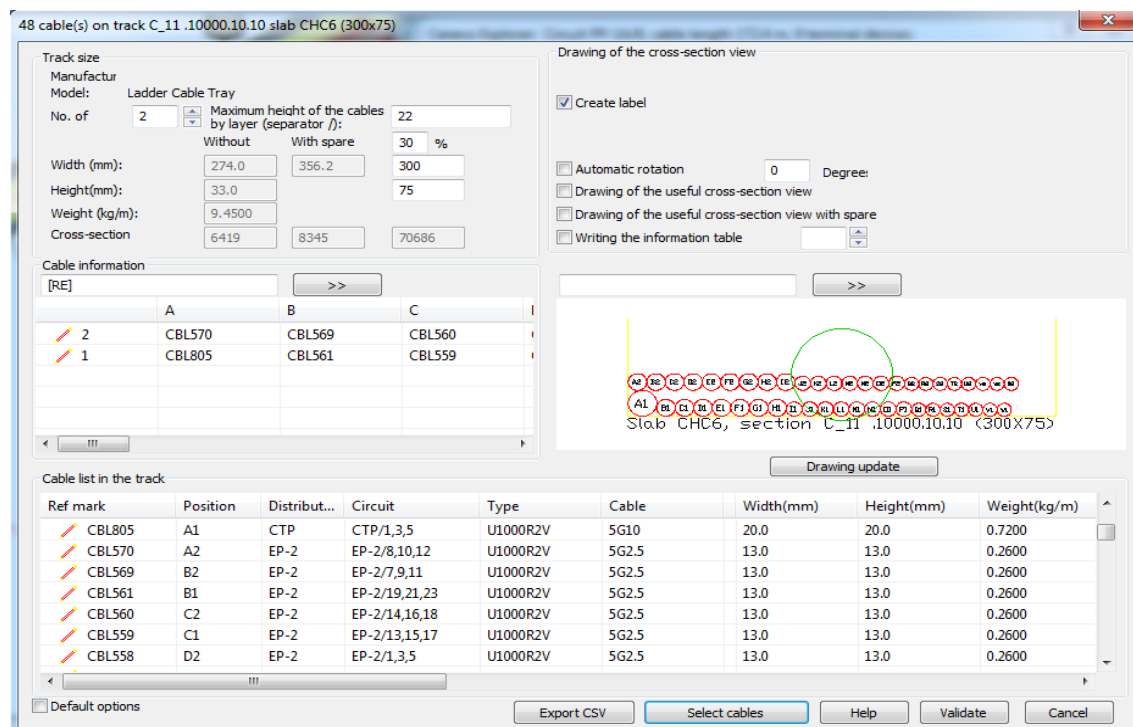
All Cables are automatically routing through Cables trays



Cable trays can be analyzed to define the right size corresponding to the needs

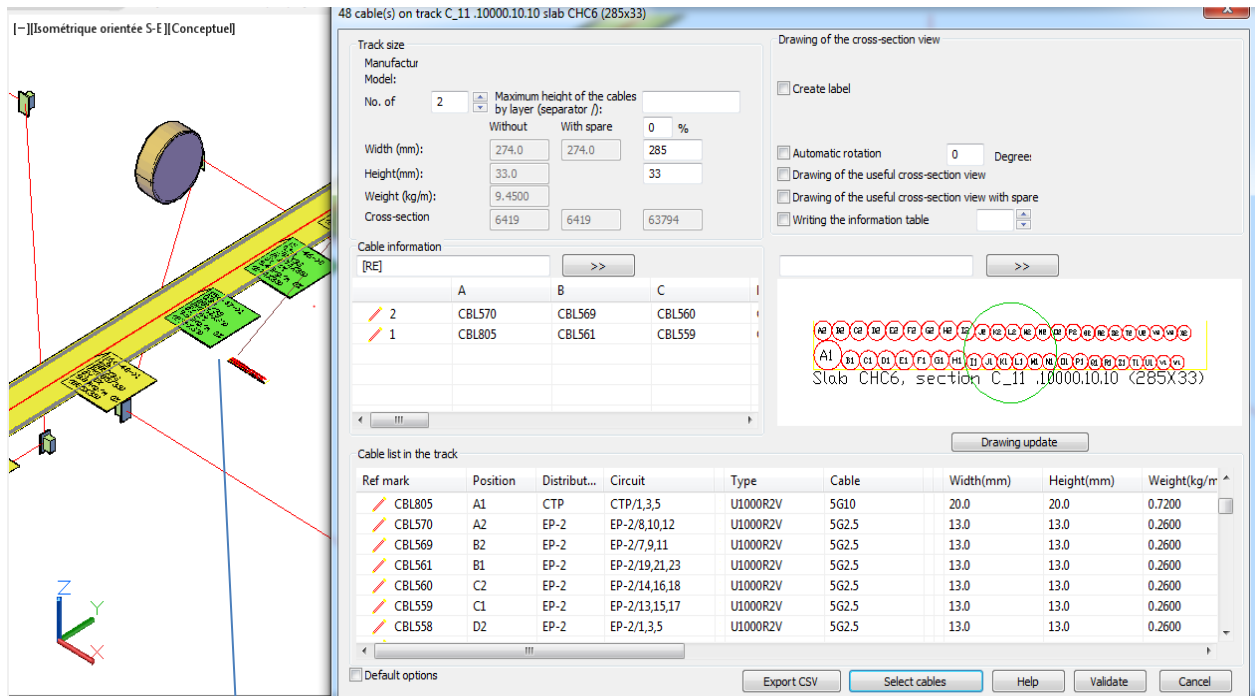


Define rules to organize automatically cables inside their tracking



Resize automatically the cable trays, basing in manufacturers' parameters



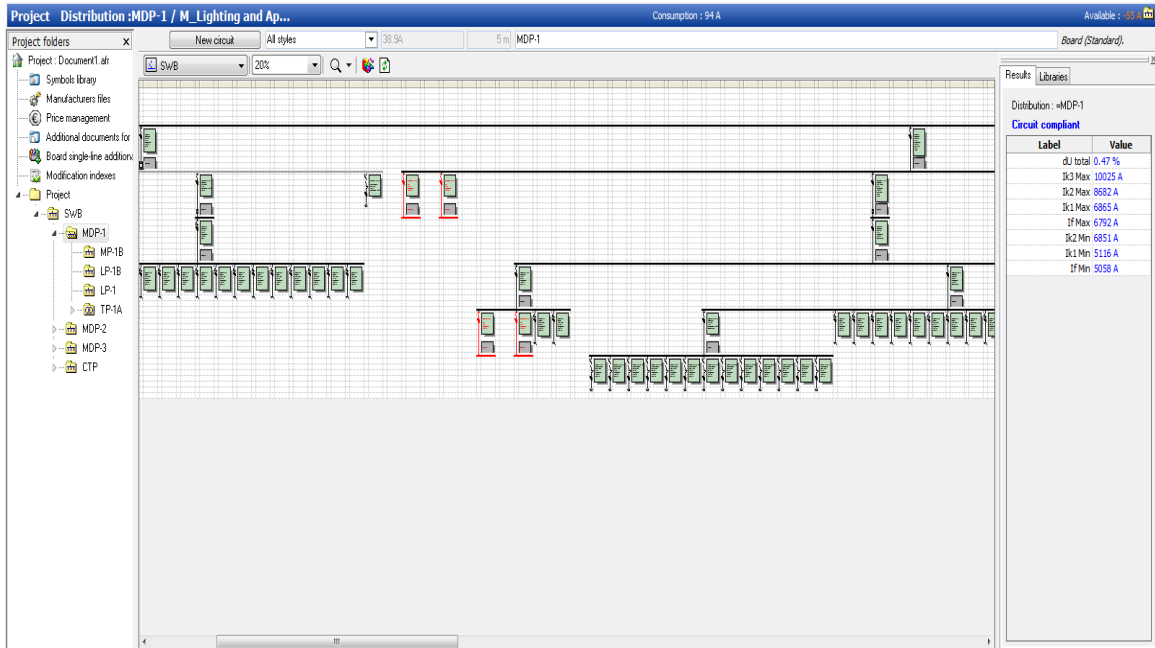


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9.45kg/m 0%
(274X33)

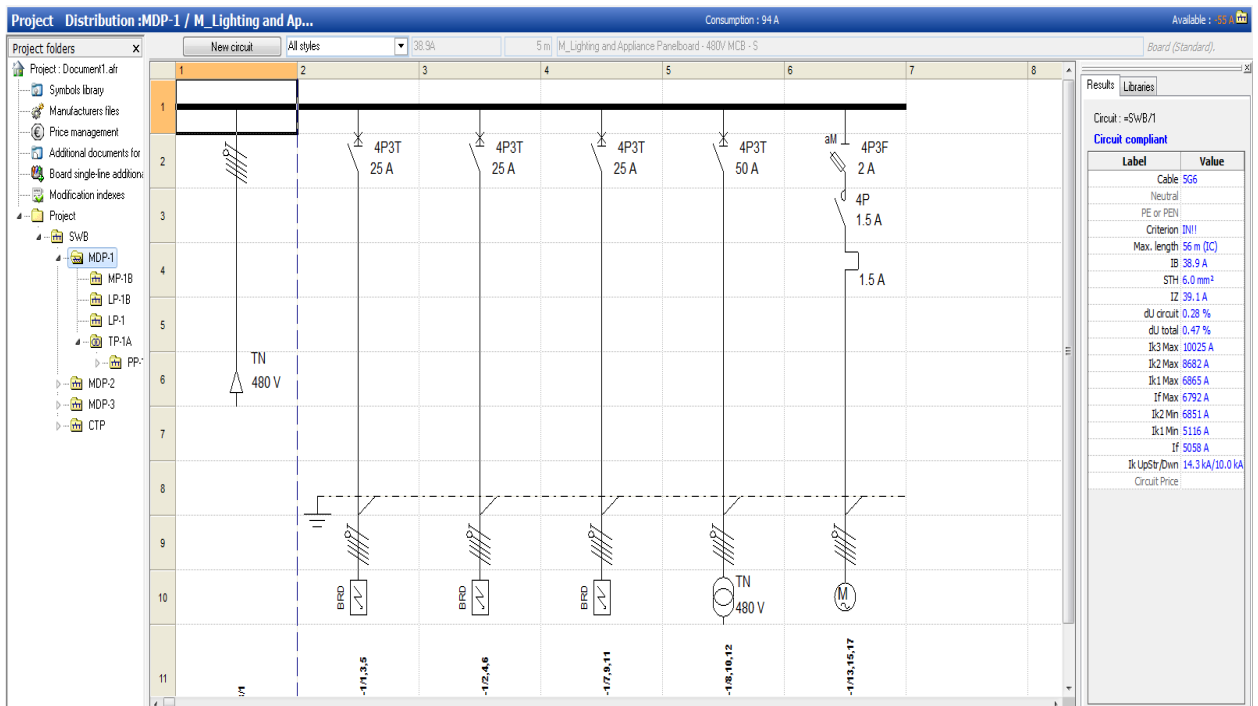
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Analysis, Schematics, quotation, sizing

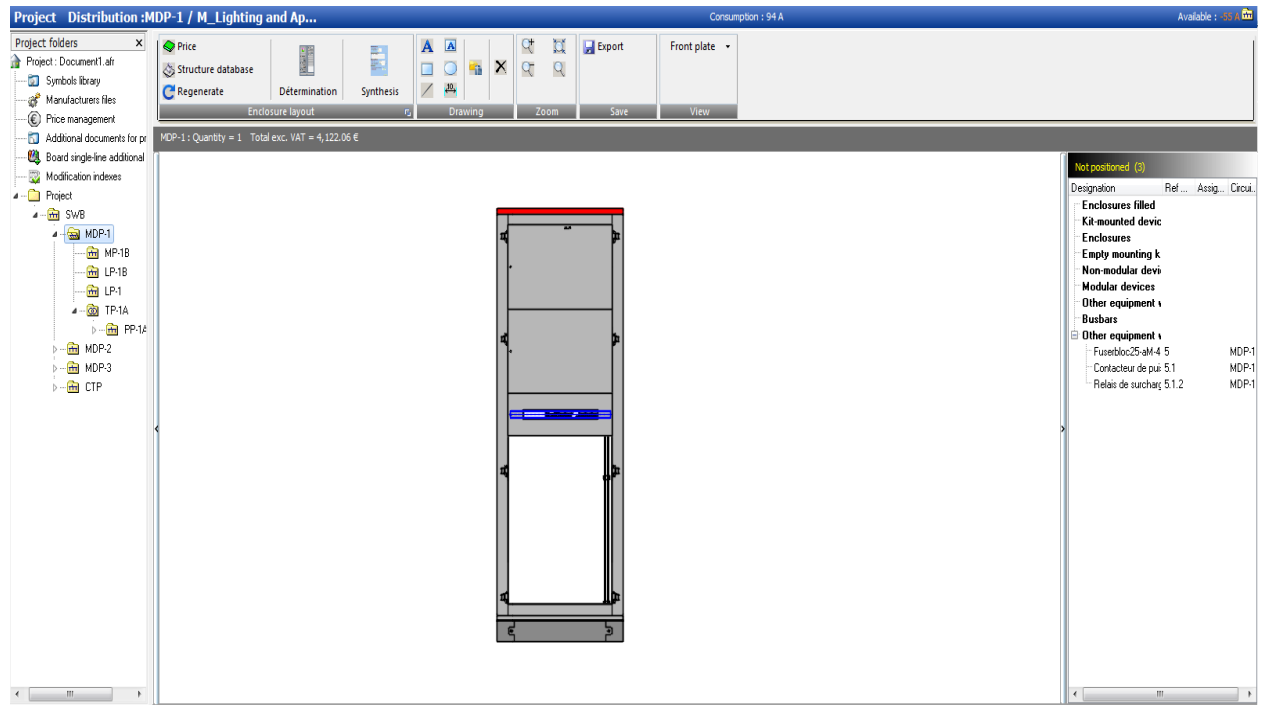
The single line diagram is automatically generate



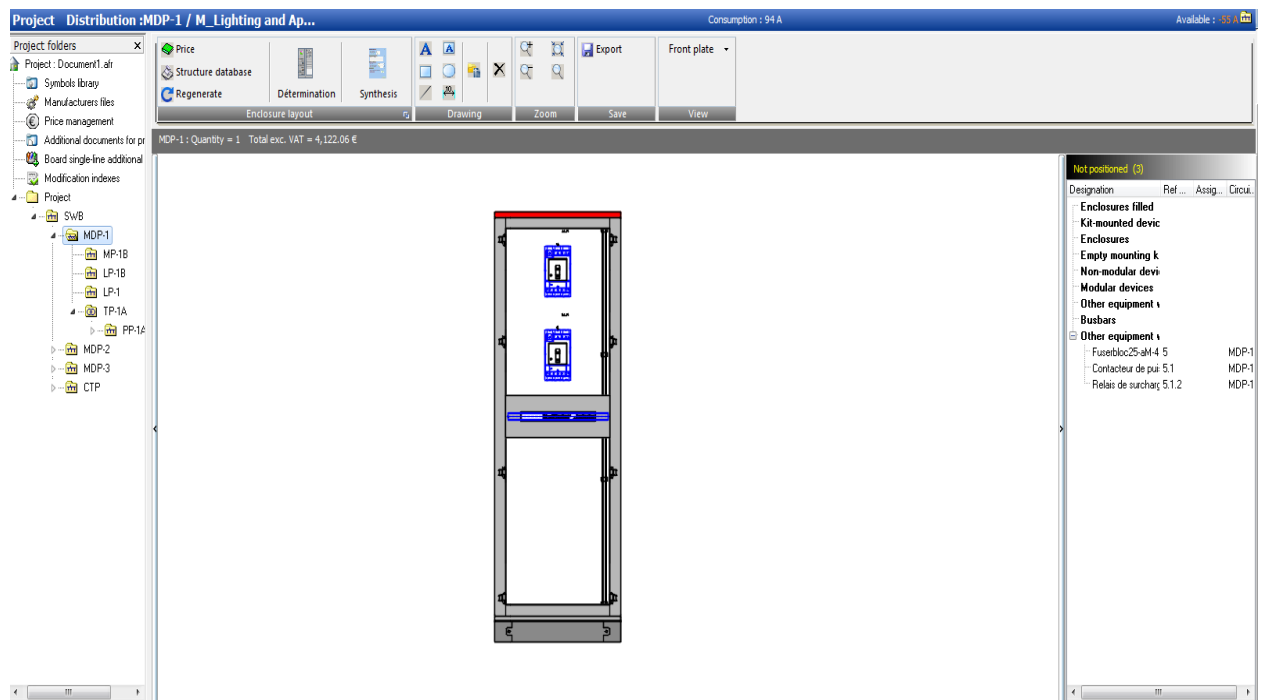
All the protection device can be automatically define, base on multi manufacturers debases



Electrical Cabinets can be predetermined

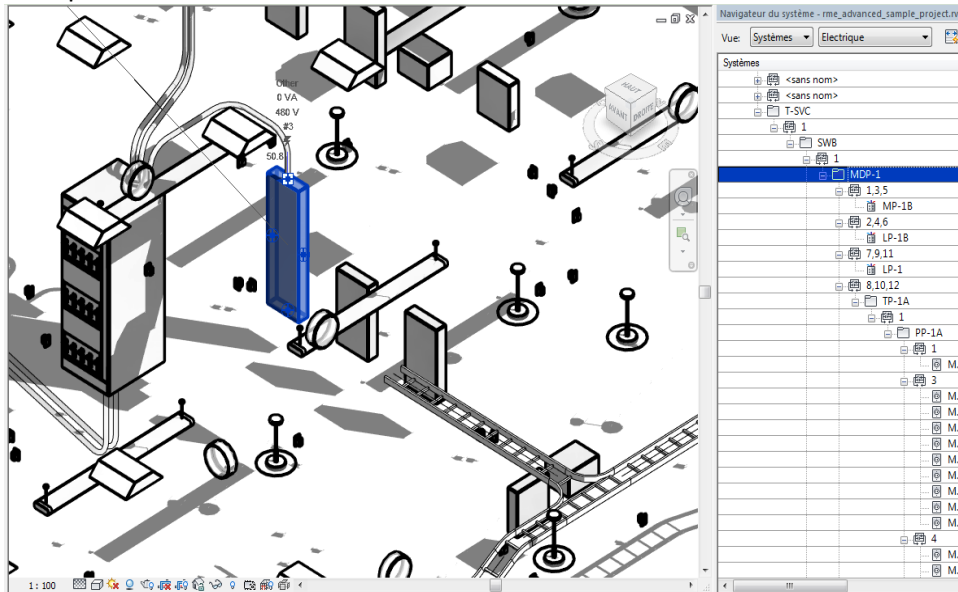


Display different view of the cabinets

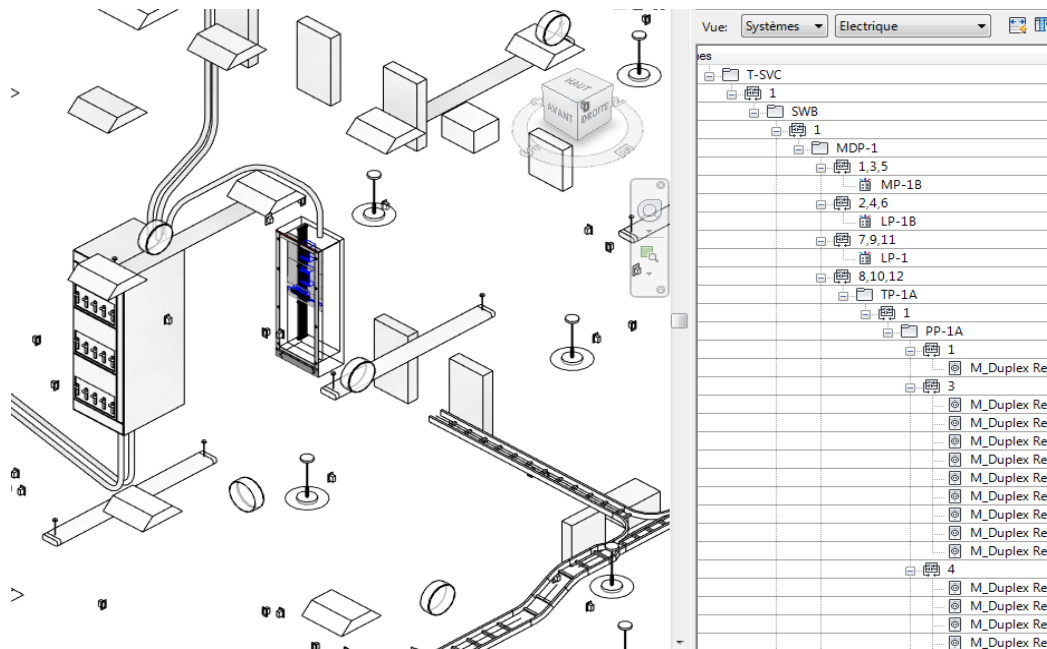


Update the Revit Model

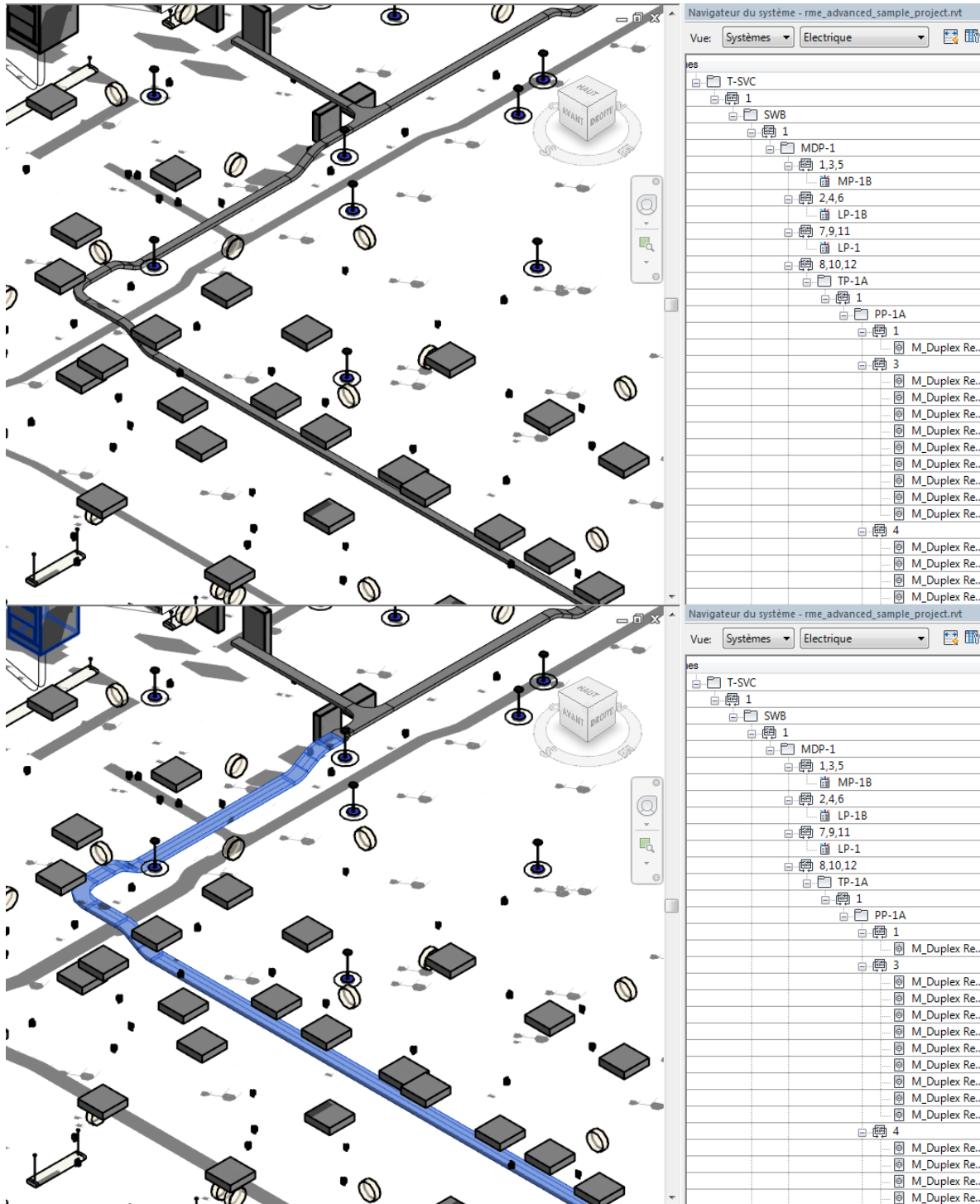
Panels would have to be updated in the Revit model, this functionality is on progress
 But to keep the logic of the Bimelec process, it would have to be proposed in the next release.
 However, the important is, we would have to have the possibility to define equipment size to define their place in the model.



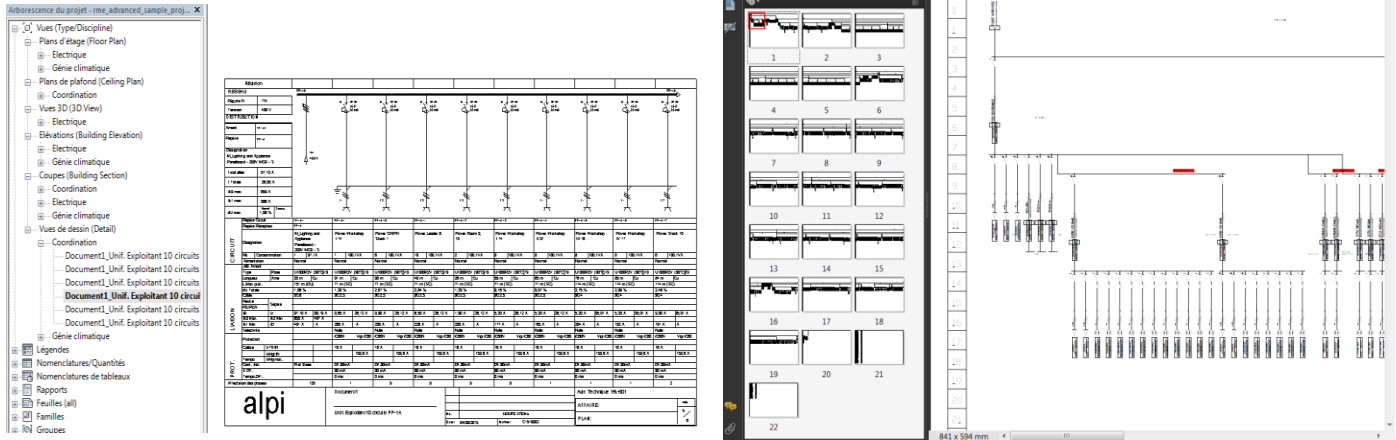
Panel size should be updated in the model



Cable trays are updated after cables routing analysis



Manage all the documentation into the Revit Model



Schematics / synoptic

Repère du Câble: **CBL2**

N° de Lot Fournisseur	Modification	Modél	Genre	Type de Câble	Ame	Section (en mm²)	Longueur extérieure du câble (en mm)	Hauteur extérieure du câble (en mm)
			Principal	U1000R2V	OU			
						TextPhase4G4	14	14
						Repère tenant	Désignation du tenant	Salle du tenant
						022YBL09902		022YBL09902
						Longueur (logicielle) du câble(en mètre)	Désignation de l'aboutissant	Salle de l'aboutissant
						021TBS22030	Moteur 400V1.1kW Tri	NEVEAU-2METRE
						Poids du câble en Kg/km	Pouvoir calorifique du câble en kJ/kg	Longueur (logicielle) du câble (en mètre)
						0.3		91,7055

Observations :

Repère du Câble: **CBL3**

N° de Lot Fournisseur	Modification	Modél	Genre	Type de Câble	Ame	Section (en mm²)	Longueur extérieure du câble (en mm)	Hauteur extérieure du câble (en mm)
			Principal	U1000R2V	OU			
						TextPhase3X(1X120)	56	40
						Repère tenant	Désignation du tenant	Salle du tenant
						022YBL09902		022YBL09902
						Longueur (logicielle) du câble(en mètre)	Désignation de l'aboutissant	Salle de l'aboutissant
						022YBL09902		022YBL09902
						Poids du câble en Kg/km	Pouvoir calorifique du câble en kJ/kg	Longueur (logicielle) du câble (en mètre)
						5.44		3,9036

Observations :

Cable lists

Récepteurs	Quantité	Non	Non du symbole
1. Equipement de génie climatique M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Back Discharge:11 kW	1		
1. Equipement électrique M.Dry Type Transformer - 480-208Y120 - NEMA Type 2 - T-SVC	1		
1. Equipement électrique M.Lighting and Appliance Panelboard - 480V MCB - Surface:MDP-3	1		
6. Installations électriques M.Duplex Receptacle:Standard	6		
1. M.Centrifugal Fan - RoofTop - Upblast1383-2808 LPS	1		
1. M.Cooling Tower - Closed Circuit - CounterFlow - 67-189 kW/177 kW	1		
8. M.Duplex Receptacle/GFCI	8		
409. M.Duplex Receptacle:Standard	409		
6. M.Lighting Switches:Single Pole	6		
1. M.Outdoor AHU - Horizontal:5.7 Square Meters of Coil	1		
38. M.Pendant Light - Disk:100W - 277V	38		
8. M.Pendant Light - Linear - 2 Lamp:1200mm - 277V	8		
6. M.Pendant Light - Linear - 2 Lamp:2400mm - 277V	6		
195. M.Plan Recessed Lighting Fixture:600x600 - 277	195		
1. M.Quadruplex Receptacle:Plain	1		
44. M.Sconce Light - Flat Round:60W - 277V	44		
1. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Back Discharge:11 kW	1		
5. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Back Discharge:14 kW	5		
5. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Right Discharge:11 kW	5		
5. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Right Discharge:14 kW	5		
6. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Right Discharge:10 kW	6		
4. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Left Return - Right Discharge:7 kW	4		
3. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Right Return - Back Discharge:11 kW	3		
1. M.WSHP - Horizontal - High Efficiency - 7-18 kW - Right Return - Back Discharge:7 kW	1		
36. M.Wall Occupancy Sensor - Regular Voltage:Passive Infrared - 277 V	36		
1. M.Water Heater - Tankless:2.3 L	1		
6. M.Sprinklers M.Sprinkler - Pendant - Hosted - 15 mm Pendant on Drop with Guard	6		
1. Symboles de cote d'élévation M.Spot Elevation - Target Filled	1		

Legend



2 How David Bremec the Manager of SNEF Paris has developed a BIM electrical process in his Agency around large building project.

What about Snek ?

The SNEF Group is one of the French leaders contractors in the electrical field, with over 9000 people, the group achieved in 2012 a turnover of 929 million euros and employs more than 9000 people worldwide.

SNEF Group operates on Medium and Low voltage installations for industry, building, naval, healthcare, infrastructure and public projects. SNEF covers projects from pre design to implementation and maintenance.

Due to its history and experience, SNEF group is a driving force in terms of technical innovation, but also in terms of work process organization at the service of expertise in major tertiary projects.

Snek always searches to increase the efficiency for electrical and HVAC design that's why we've build a strong partnership with to ALPI.

The use of Caneco software offers a significant time saving, a better reliability of data, flexibility in the software use and a suitable solution to meet requirements of all kind of installations.

Significant time gains were recorded; however the time-executions are mainly due to the poor definition of the initial project. This fact emphasizes the advent of the digital model what allows to define to its best, a project before its encryption phases and execution.

Visit the website: <http://www.snef.fr/index.php?lang=fr>

What was the workflow in David Bremec agency when the design was based on a CAD PROCESS?

Working with a CAD process requires minimum hardware and software means.

This method involves preparation of tasks independent of each other.

These tasks are performed with a large risk of errors and imply important non-added value times.

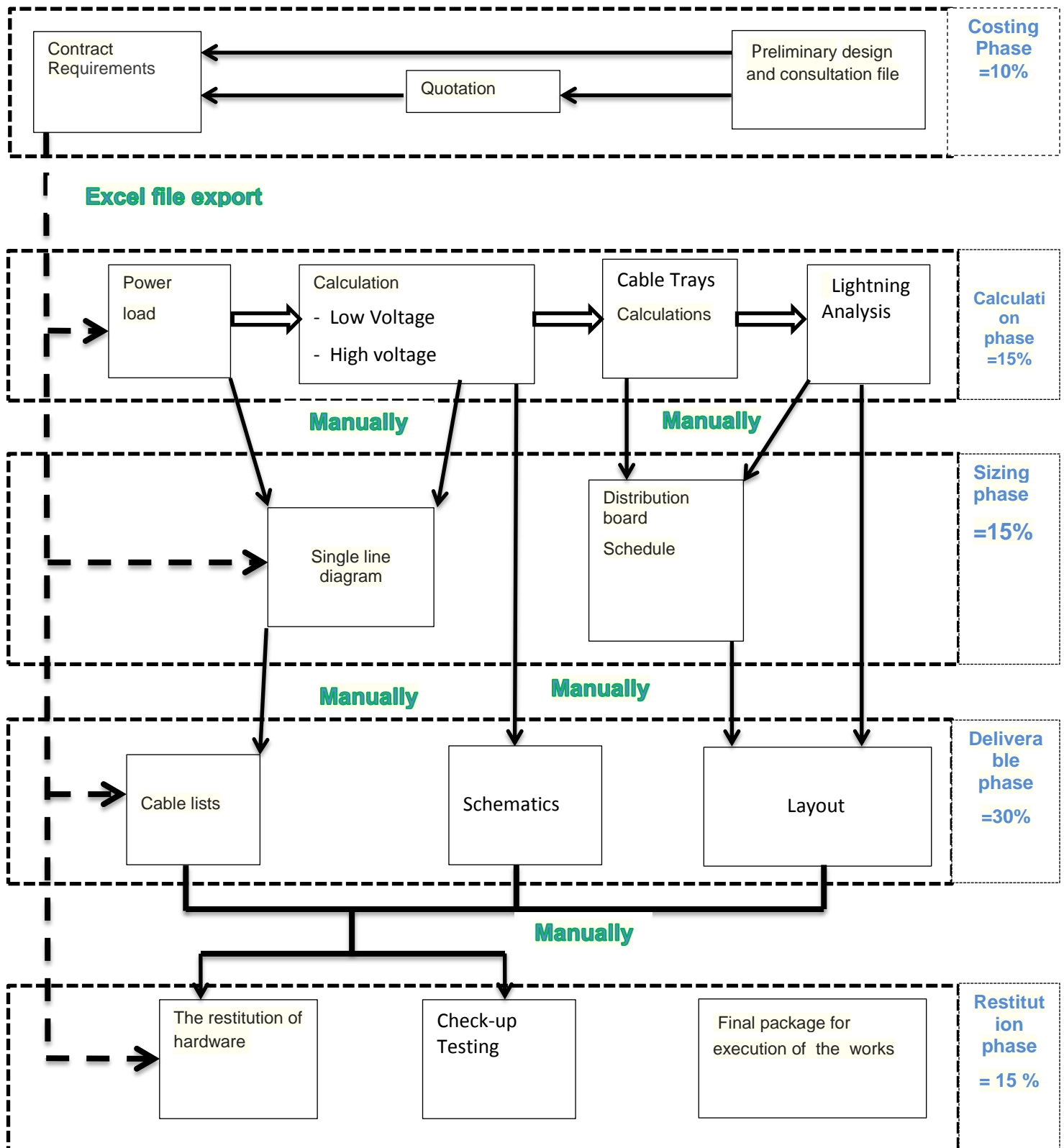
The reason is because each output data has to be put manually as input data of another task.

A calculations result has to be updated manual update on many documents because there is no interaction between the different spots.

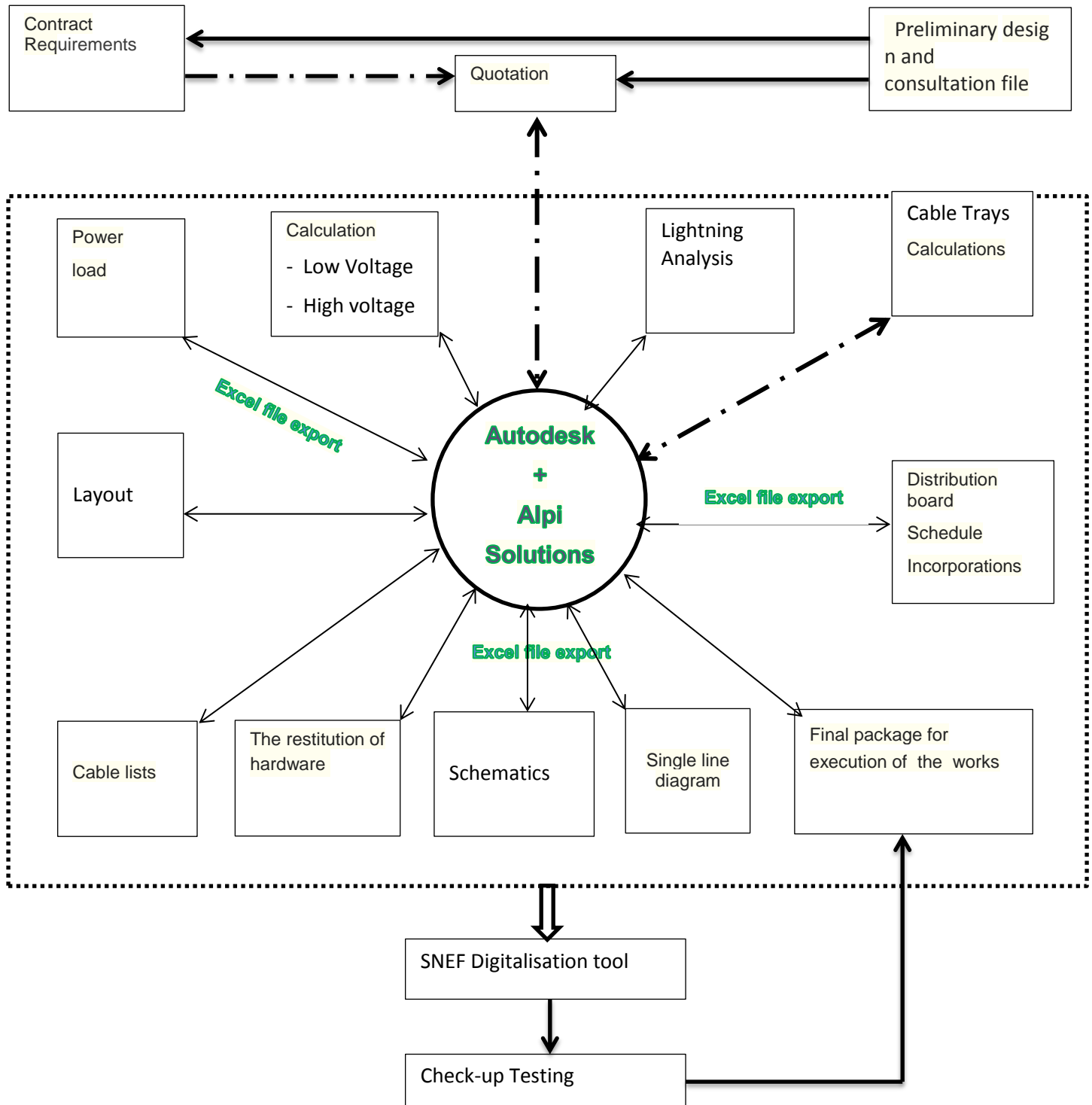
This method involves several different software and manual entries. (See diagram 1)



Diagram 1: WorkFlow based on CAD.



How did David BREMEC decided to improve their methodology adopting a BIMelec Process



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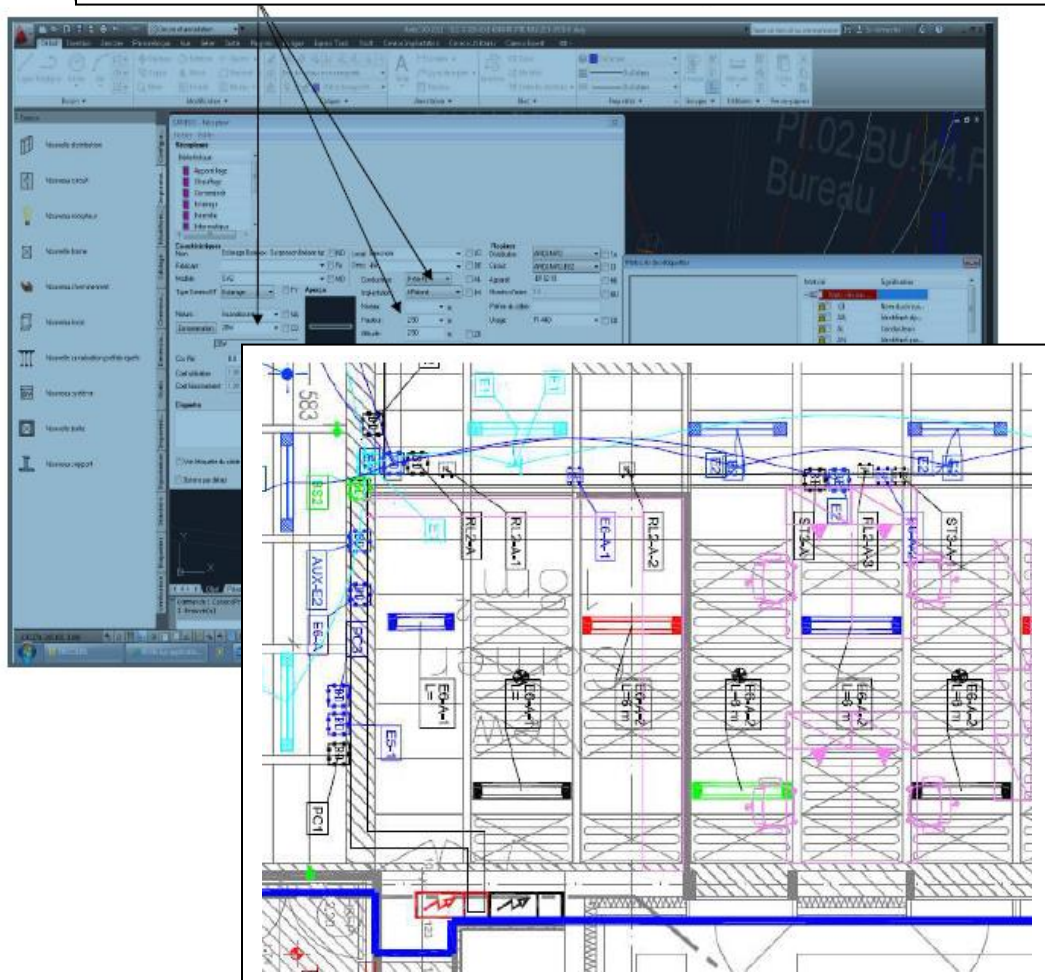


Some points that definitely change the way we analyze an electrical Project

- **Implantation** : The principle fundamentally adopted by SNEF is the collection of electrical and Physical data regarding all the equipment from the 3D model

We identified each equipment by its:

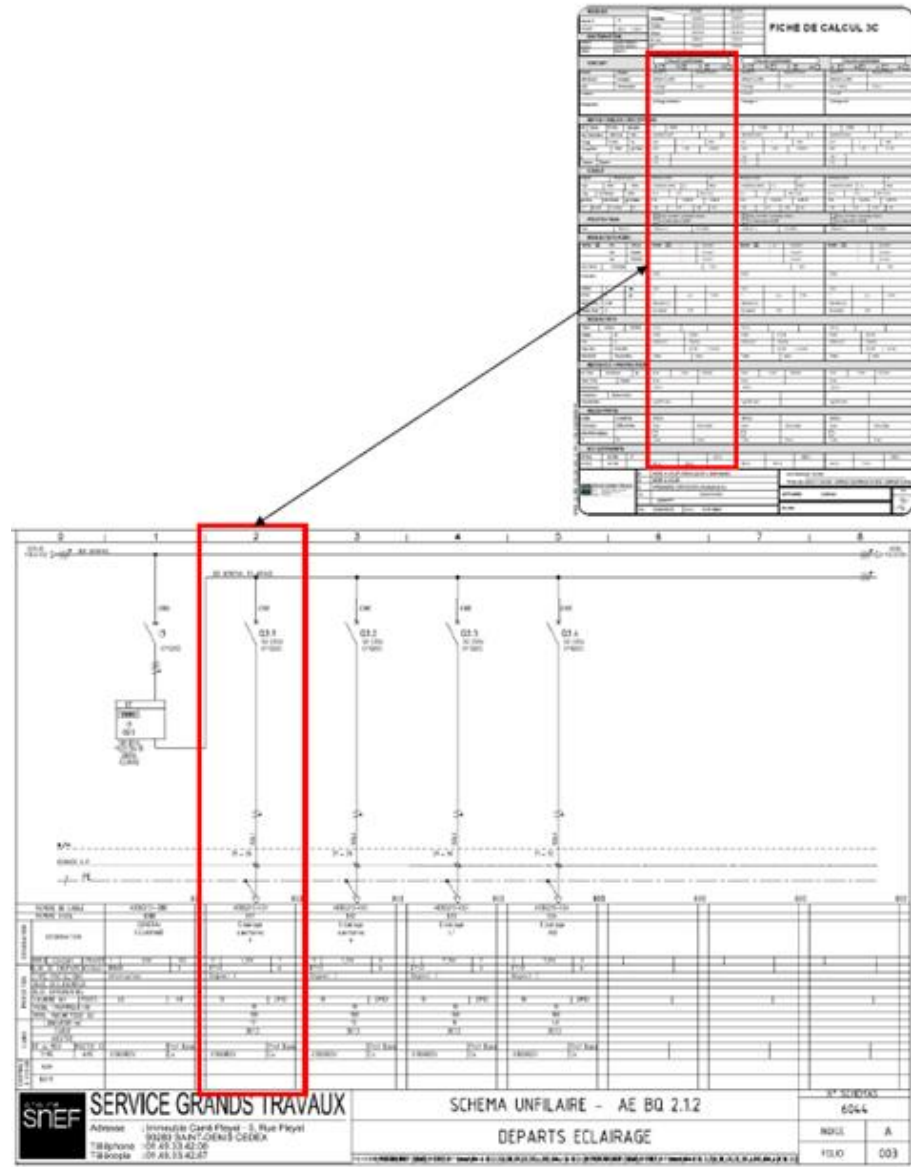
- Unique name - Tag
- Description
- Electrical characteristic needed



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- Low Voltage calculation reports
- Unlike traditional study a method, the information needs to define Low Voltage calculation reports are taken directly from previous actions without manual inputs.

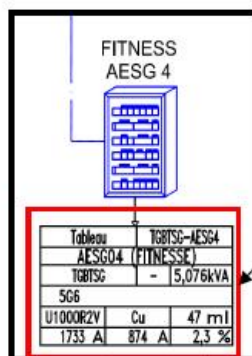
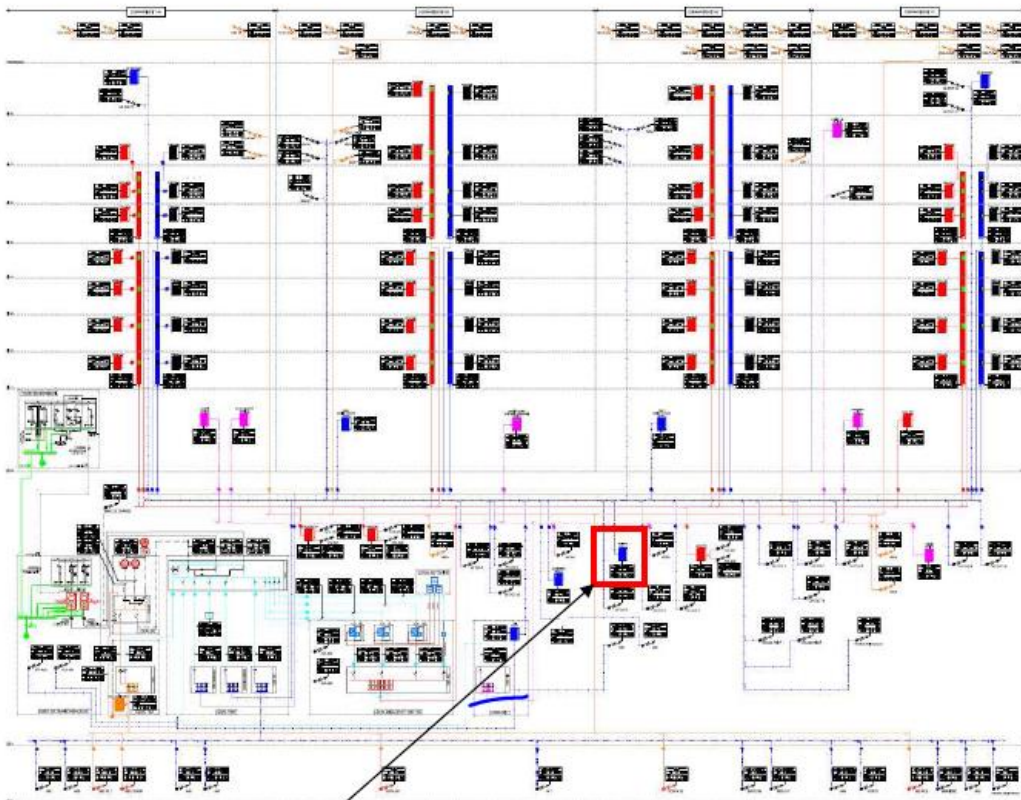


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- Synoptic generation

Unlike traditional study methods the input data required for developing the electrical distribution block are derived directly from the calculation reports.



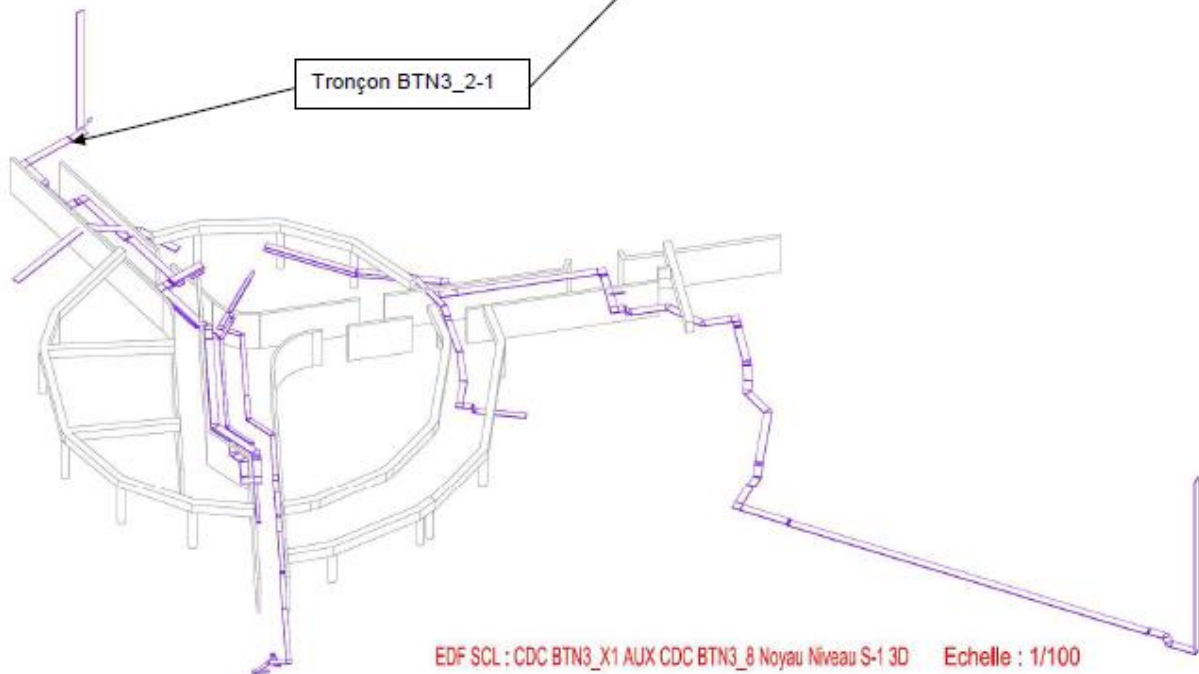
50 % of time saving compared to the traditional method

→ Pour un document de cet ordre le gain de temps est de 50%

- **Routing of Cable and List of Cables**

The routing cable list identifies the passage of cables from the start to the end point. Cable trays are codified and sequence of sections determines the cable routing

Rapèle du câble	Type de câble	Arm	Section (en mm²)	Longueur extérieure du câble (en mm)	Hauteur extérieure du câble (en mm)	Rapèle tenant	Poids du câble en kg/m	Longueur (logicielle) du câble (en mètres)	Rapèle de dalle (du chemin de câble)	Type de cheminement	Dimension du cheminement (largeur x hauteur (mm))	Longueur du tronçon (en mètres)
PAC1	UI000R2V	AL	3X0,6(X=50)+1X65	112	43	TOBT-23	7220	47,8		Estimation Cheminement terminal hors boucle		0,5
									BTN3_2-1	BTN3_2	500x54	21,8
									BTN3_2-4	BTN3_2	500x54	25,2
										Estimation Cheminement terminal hors boucle		0,5



- **Cable trays**

Provide better visibility for understanding 2D drawings and therefore facilitates the realization of construction site.

