Power Flow Analysis Report

Sample One-Line Diagram Project

Date: December 18, 2020
Format: ANSI
Engineer: XENDEE User

Table of Contents

Network Summary

Project Settings	
Type	Distribution
Format	ANSI
Units	Imperial (kV) kilovolts (kA) kiloamps (MVA) mvolt-amp
Frequency	60 Hz
Temperature	(F) Fahrenheit

Equipment	Total
Symbols	17
Nodes	9
Branches	8
Sources	4
Motors	0
Loads	2
Busbars	2
Cables	1
Transformers	3

Power Flow Simulation Summary	
Status	SOLVED
Number of Iterations	2
Total Network MW	0.699007
Total Network MVAR	0.311449
Total Network kW Loss	19.981100
Total Network kVAR Loss	67.788200

Sources

Utilities

Utility **phasing: abc** **12 kV**

Catalog name:	default power utility		
Description:		operating voltage:	12 kV
3-phase short circuit:	4,000 MVA	R(+):	0.00249 P.U.
line-ground short circuit:	4,000 MVA	X(+):	0.02488 P.U.
Voltage angle:	0 degrees	R(0):	0.00249 P.U.
Base MVA:	100 MVA	X(0):	0.02488 P.U.
X/R(+):	10		
X/R(0):	10	Stiffness:	On
Voltage (a/b/c):	1 / 1 / 1 P.U. 12 / 12 / 12 kV	Voltage drop: Voltage angle (deg):	0.0 / 0.0 / 0.0 % 0 / -120 / 120 (L-N)

Generators

gen 01 **phasing: abc** **4.16 kV**

Catalog name:	CAT D80-6 (80kW)		
Description:			
Rated power:	80 kW	Rated RPM:	1,800
Power factor:	80.0 %	Poles:	4
Connection:	wye-solidly	R:	
Steady state reactance:	269.0 %	X:	
Transient reactance:	9.0 %	Max power delivery:	-60 kVAR
Subtransient reactance:	4.5 %	Max power absorption:	60 kVAR
X/R ratio:	3.02	Stiffness:	Off
Voltage (a/b/c):	0.9875 / 0.9875 / 0.9875 P.U. 4.108 / 4.108 / 4.108 kV	Voltage drop: Voltage angle (deg):	1.3 / 1.3 / 1.3 % -30.8 / -150.8 / 89.2 (L-N

Wind Turbines

wind 01 **phasing: abc** **4.16 kV**

Catalog name:	custom		
Description:			
Rated power:	0.5 MW	Type:	squirrel-cage induction
Power factor full load:	97.0 %	Shunt capacitor stages:	
Power factor correction:		Shunt capacitor rating:	
Steady state reactance:	397.0 %	Max power delivery:	-0.251 MVAR
Transient reactance:	15.2 %	Max power absorption:	0.251 MVAR
Subtransient reactance:	15.2 %		
X/R ratio:			
Voltage (a/b/c):	0.9909 / 0.9909 / 0.9909 P.U. 4.122 / 4.122 / 4.122 kV	Voltage drop: Voltage angle (deg):	0.9 / 0.9 / 0.9 % -30.9 / -150.9 / 89.1 (L-N

Solar Panels

solar 01 **phasing: abc** **4.16 kV**

Catalog name:	custom		
Description:			
Rated power:	50 MW	Rated power factor:	1 kVAR
Force Seq (+):	yes	Connection:	wye-solidly
v max:	1.05 P.U.	v min:	0.95 P.U.
Voltage (a/b/c):	0.9875 / 0.9875 / 0.9875 P.U. 4.108 / 4.108 / 4.108 kV	Voltage drop: Voltage angle (deg):	1.3 / 1.3 / 1.3 % -30.8 / -150.8 / 89.2 (L-N

Static Var Compensation

Loads and Motors

Loads

Bldg1 phasing: abc

Catalog name:	custom		
Description:		Rated voltage:	0.23 kV
Rated power:	500,000 watts	Power factor:	95.00 % lag
Connection:	wye-solidly	Load model:	constant kVA
Voltage (a/b/c):	0.9641 / 0.9641 / 0.9641 P.U. 0.231 / 0.231 / 0.231 kV	Voltage drop: Voltage angle (deg):	3.6 / 3.6 / 3.6 % -62.6 / 177.4 / 57.4 (L-N

Bldg3 phasing: abc

Catalog name:	custom		
Description:		Rated voltage:	0.23 kV
Rated power:	805,000 watts	Power factor:	95.00 % lag
Connection:	wye-solidly	Load model:	constant kVA
Voltage (a/b/c):	0.9671 / 0.9671 / 0.9671 P.U. 0.232 / 0.232 / 0.232 kV	Voltage drop: Voltage angle (deg):	3.3 / 3.3 / 3.3 % -62.8 / 177.2 / 57.2 (L-N

Busbars

bus 04 **phasing: abc**

Description:

Voltage (a/b/c):	0.9909 / 0.9909 / 0.9909 P.U. 4.122 / 4.122 / 4.122 kV	Voltage drop: Voltage angle (deg):	0.9 / 0.9 / 0.9 % -30.9 / -150.9 / 89.1 (L-N

bus 08 **phasing: abc**

Description:

Voltage (a/b/c):	0.9875 / 0.9875 / 0.9875 P.U. 4.108 / 4.108 / 4.108 kV	Voltage drop: Voltage angle (deg):	1.3 / 1.3 / 1.3 % -30.8 / -150.8 / 89.2 (L-N

Transformers

2-Winding

t 01

Primary side voltage: 12 kV
Secondary side voltage: 4.16 kV
phasing: abc

Catalog name:	2500kVA Standard D		
Description:			
Primary bus name:	Utility	Primary side winding:	delta
Secondary bus name:	bus 04	Scndry side winding:	wye-solidly
Cooled:	2.5 MVA	Primary side protection:	
Impedance:	5.75 %	Scndry side protection:	
X/R ratio:	7.5	Cooling factor/class:	1.00 -
Tap:	100 %	Tap side:	secondary
Maximum tap setting:	110 %	Number of taps:	32
Minimum tap setting:	90 %	Manufacturer:	Standard
LTC control:	Off		

Current:

input (a/b/c):	0.0368 / 0.0368 / 0.0368 kA	% loaded:	30.6 %
output (a/b/c):	0.1062 / 0.1062 / 0.1062 kA		

2-Winding

T_Bldg1

Primary side voltage: 4.16 kV
Secondary side voltage: 0.24 kV
phasing: abc

Catalog name:	750kVA Standard D		
Description:			
Primary bus name:	bus 08	Primary side winding:	delta
Secondary bus name:	Bldg1	Scndry side winding:	wye-solidly
Cooled:	0.75 MVA	Primary side protection:	
Impedance:	5.20 %	Scndry side protection:	
X/R ratio:	2.88	Cooling factor/class:	1.00 -
Tap:	100 %	Tap side:	secondary
Maximum tap setting:	110 %	Number of taps:	32
Minimum tap setting:	90 %	Manufacturer:	Standard
LTC control:	Off		

Current:

input (a/b/c):	0.0758 / 0.0758 / 0.0758 kA	% loaded:	72.8 %
output (a/b/c):	1.3135 / 1.3135 / 1.3135 kA		

2-Winding

T_Bldg3

Primary side voltage: 4.16 kV
Secondary side voltage: 0.24 kV
phasing: abc

Catalog name:	1000kVA Standard D		
Description:			
Primary bus name:	bus 04	Primary side winding:	delta
Secondary bus name:	Bldg3	Scndry side winding:	wye-solidly
Cooled:	1 MVA	Primary side protection:	
Impedance:	4.70 %	Scndry side protection:	
X/R ratio:	3.46	Cooling factor/class:	1.00 -
Tap:	100 %	Tap side:	secondary
Maximum tap setting:	110 %	Number of taps:	32
Minimum tap setting:	90 %	Manufacturer:	Standard
LTC control:	Off		

Current:

input (a/b/c):	0.1216 / 0.1216 / 0.1216 kA	% loaded:	87.6 %
output (a/b/c):	2.1081 / 2.1081 / 2.1081 kA		

Feeders

Cables

cable 03 **phasing: abc** **length: 522 ft**

Catalog name:	5kV 1 AWG AL DOUBLESEAL 105c In Duct 1/3 Neutral		
Description:		Cables in parallel:	1
From bus name:	bus 04	To bus name:	bus 08
From bus protection:		To bus protection:	
Cable size:	1	Cable material:	aluminum
Ampacity:	0.153 kA	Insulation type:	EPR
Insulation rated temp:	221 F	Insulation rating:	5 kV
Cable configuration:	1/C	Manufacturer:	Prysmian
R(0):	0.851	R(+):	0.279
X(0):	0.022	X(+):	0.044
C(0):		C(+):	
Current (a/b/c):	0.0563 / 0.0563 / 0.0563 kA	% loaded:	36.8 %

Protective Devices

There are no protective devices in this project.