Tutorial

Apresentação e instruções de uso do modelo

JORDÃO
SOLUÇÕES EM ENERGIA

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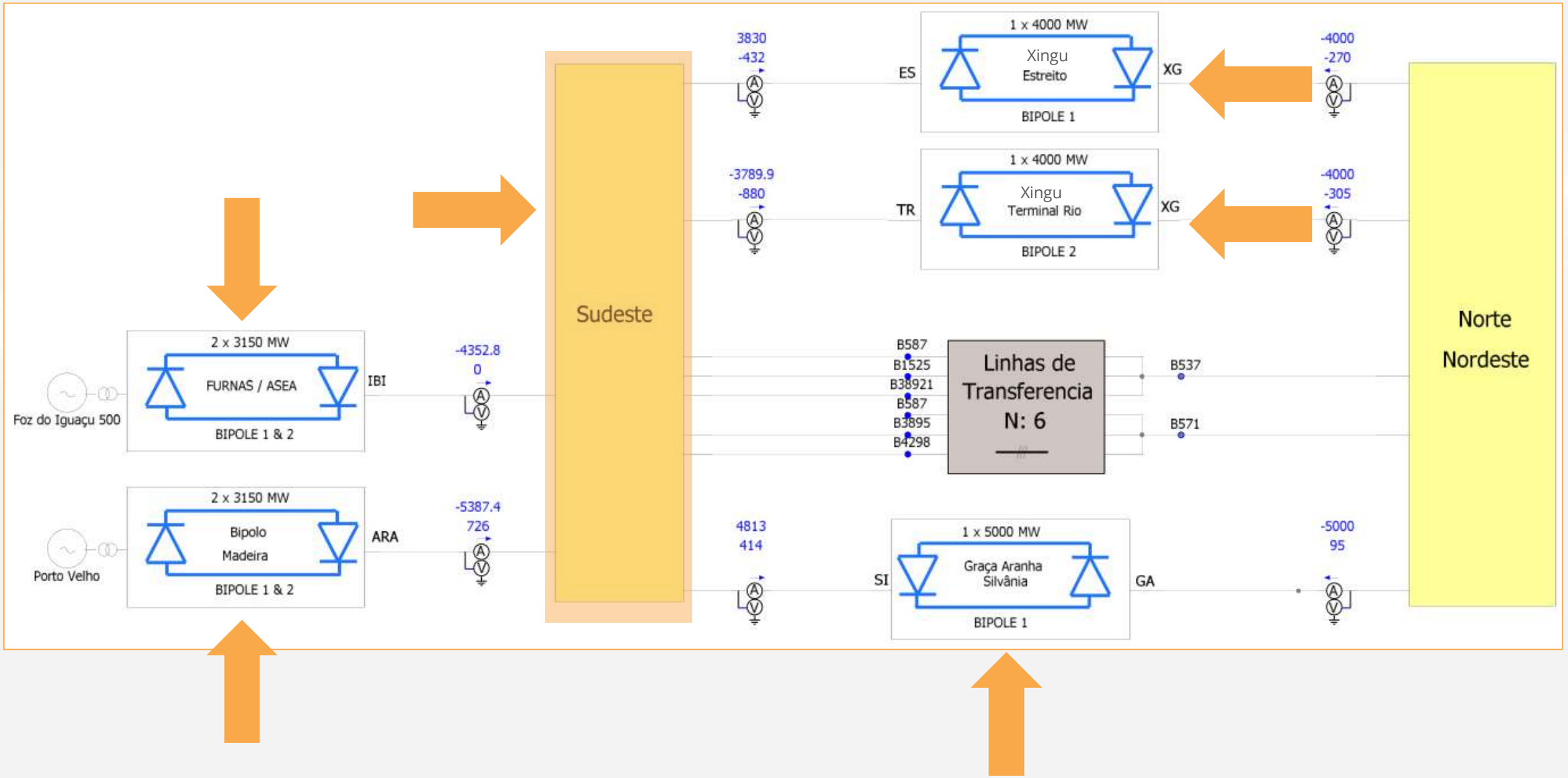
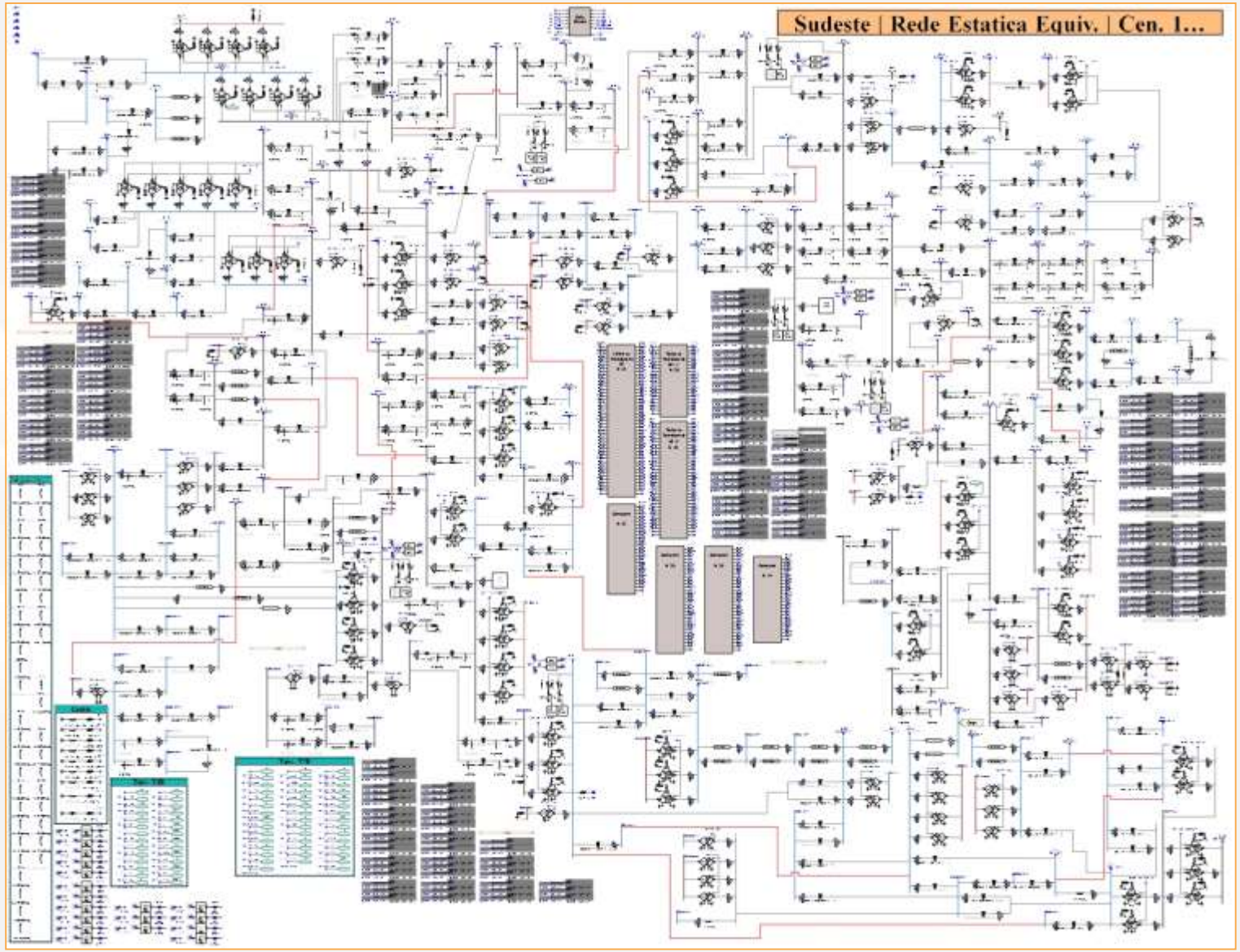
Rede desenvolvida no PSCAD



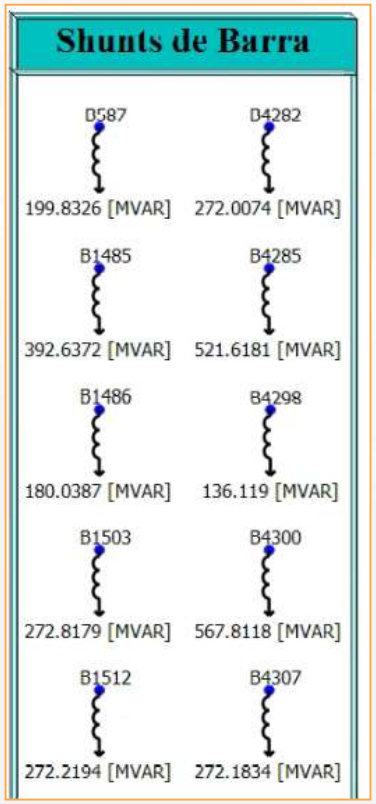
Rede desenvolvida no PSCAD

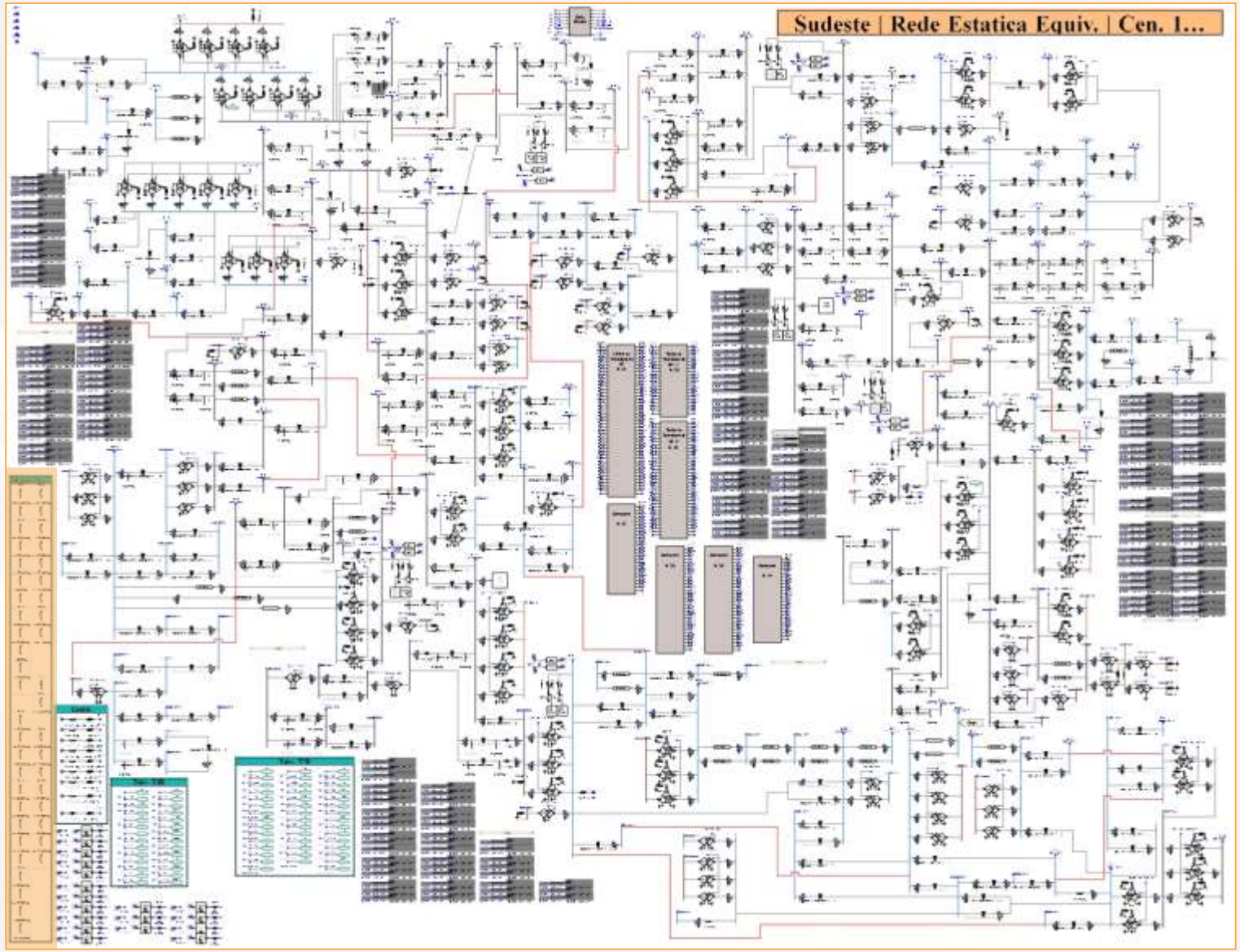
- Região Sudeste.



Rede desenvolvida no PSCAD

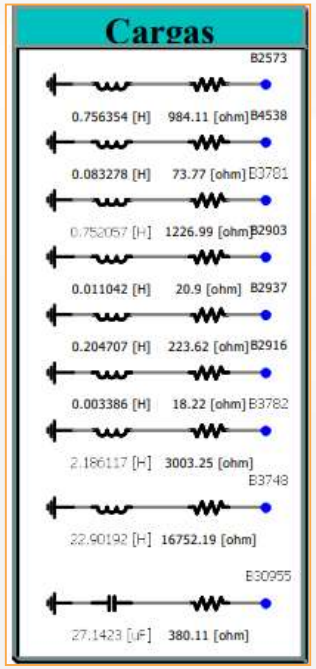
- Região Sudeste:
  - Shunts de barra.

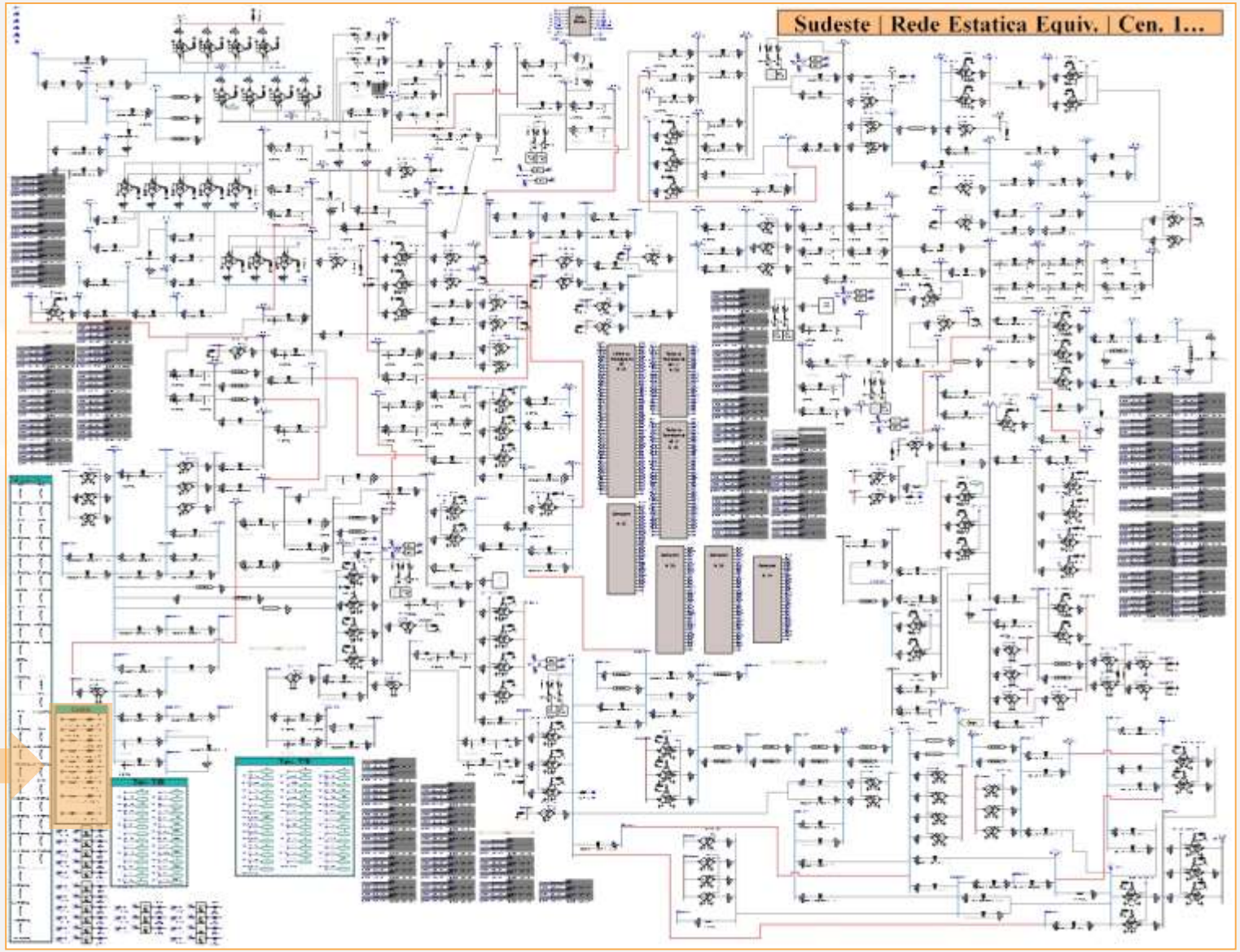




Rede desenvolvida no PSCAD

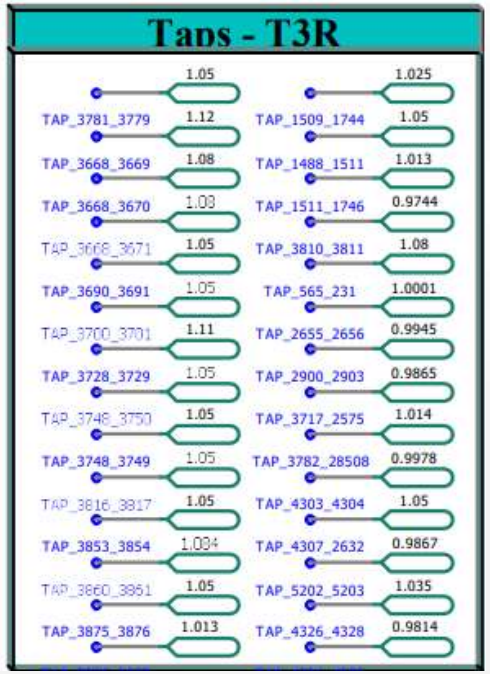
- Região Sudeste:
  - Cargas.

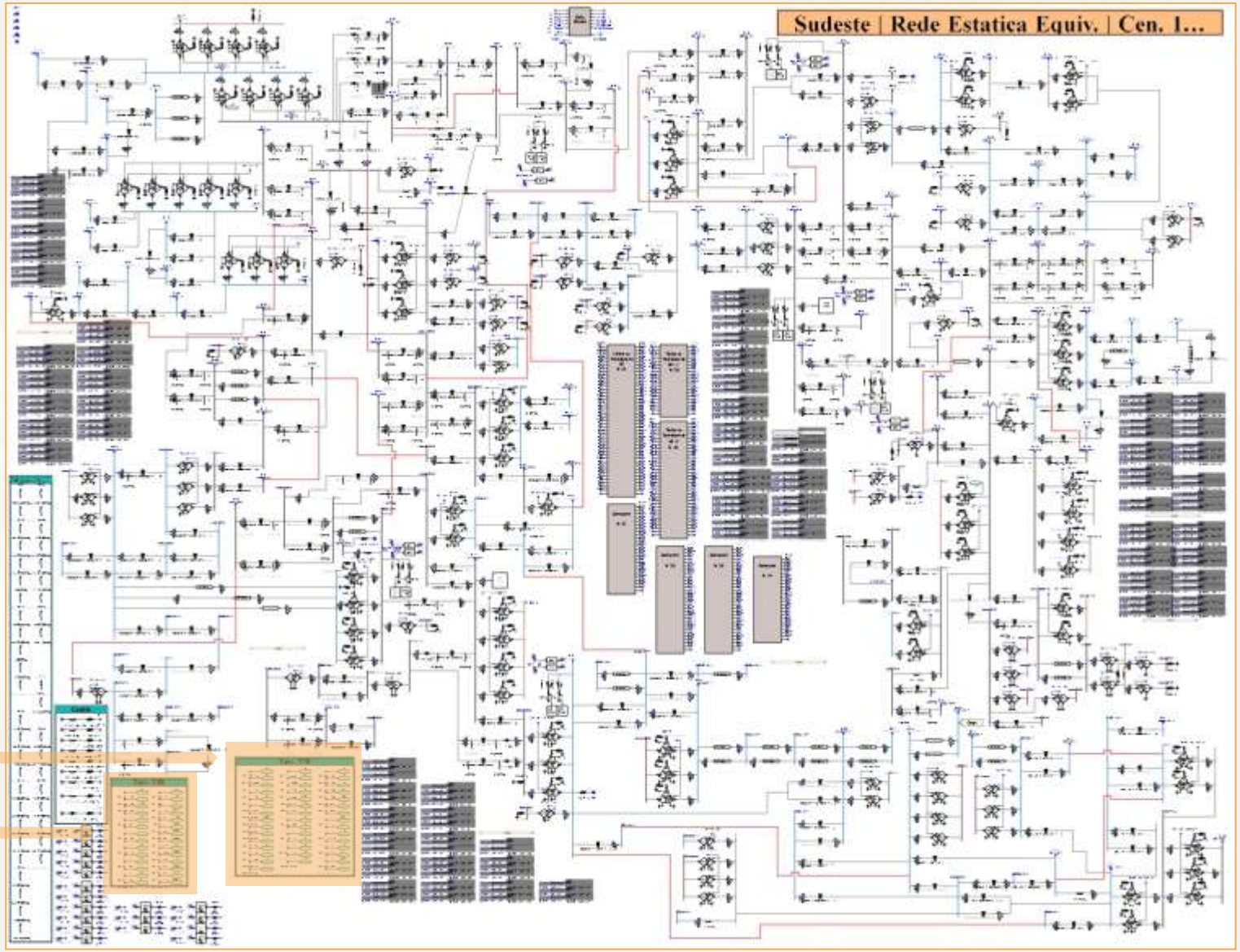




Rede desenvolvida no PSCAD

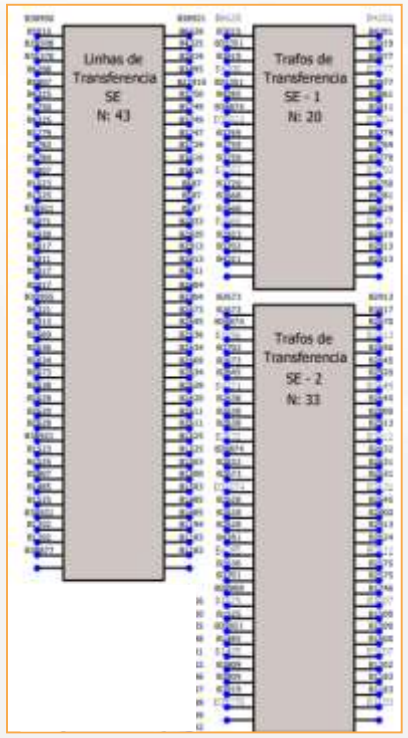
- Região Sudeste:
  - Taps dos transformadores.

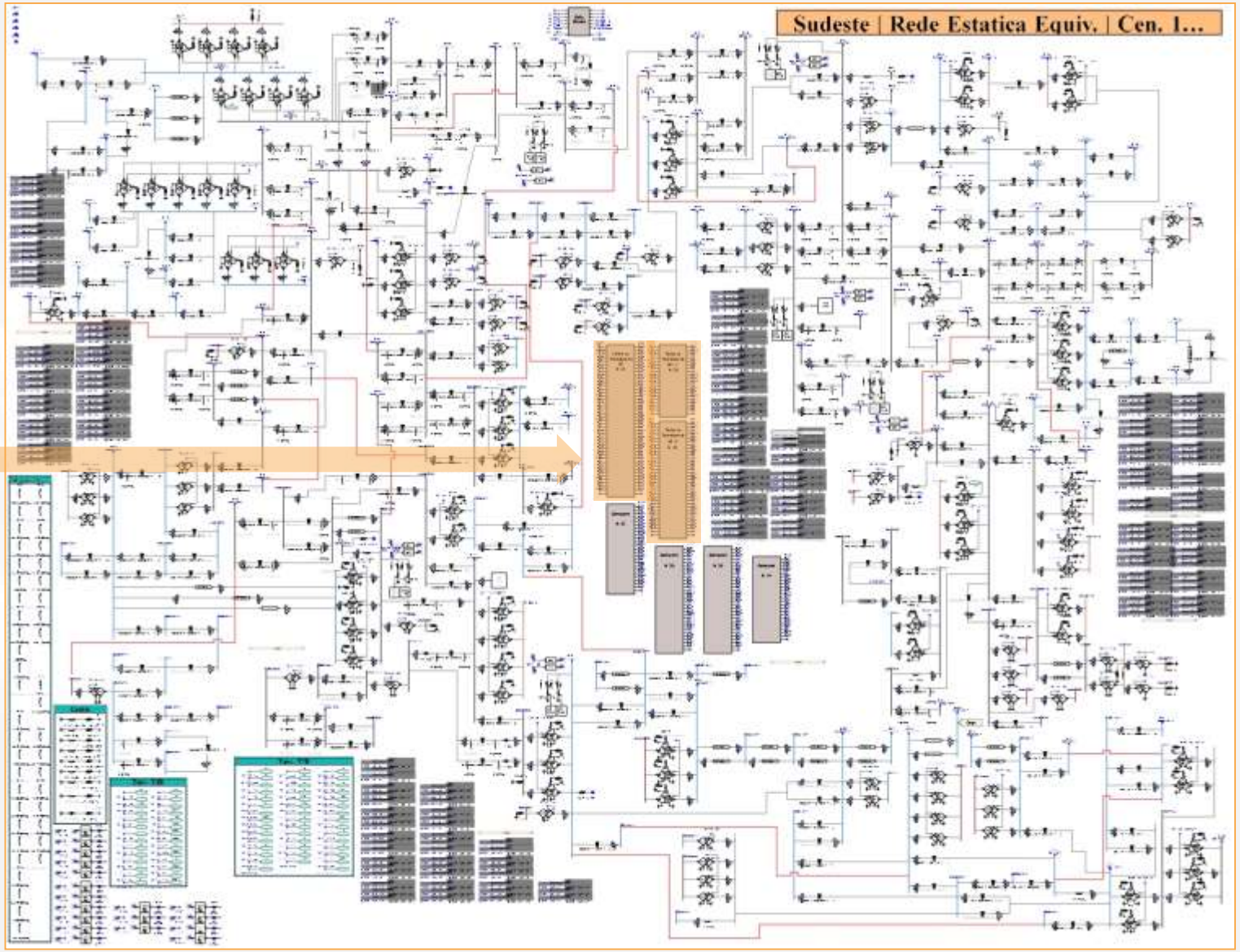




Rede desenvolvida no PSCAD

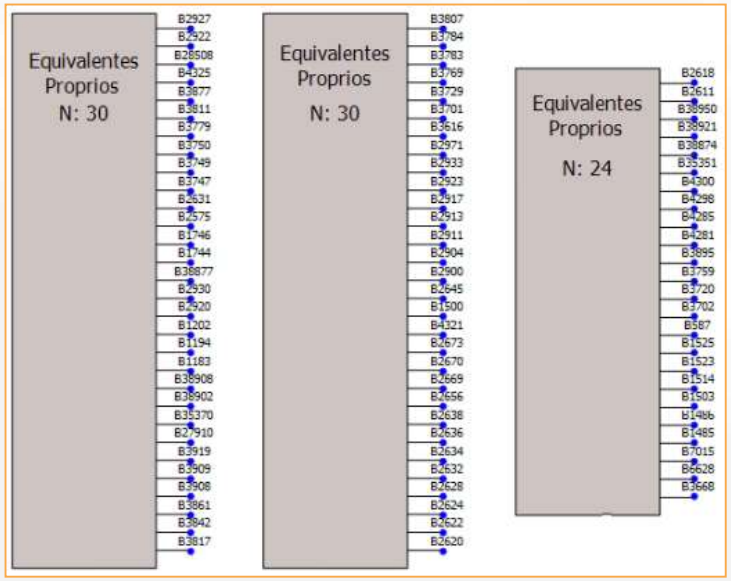
- Região Sudeste:
  - Linhas e transformadores de transferência.

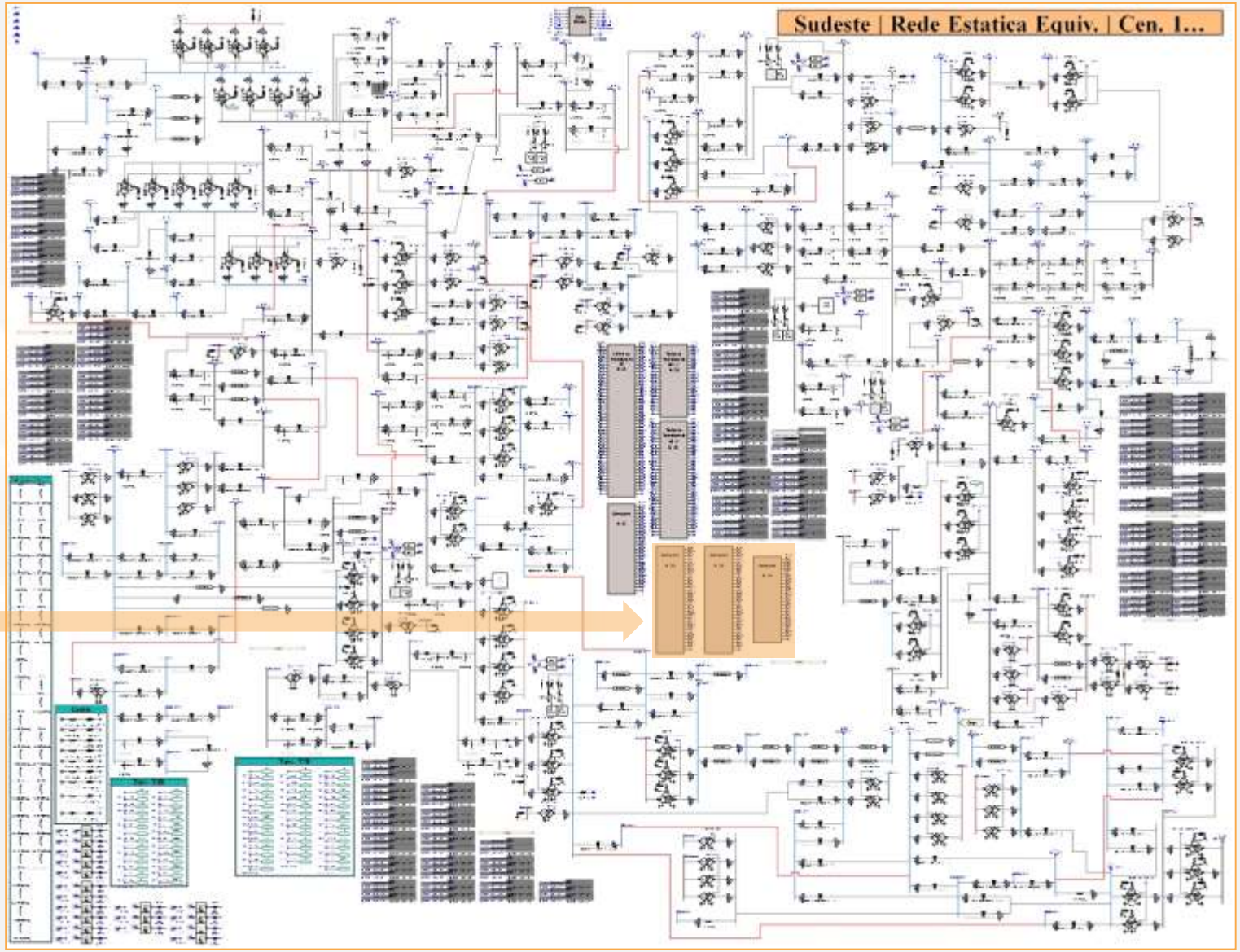




Rede desenvolvida no PSCAD

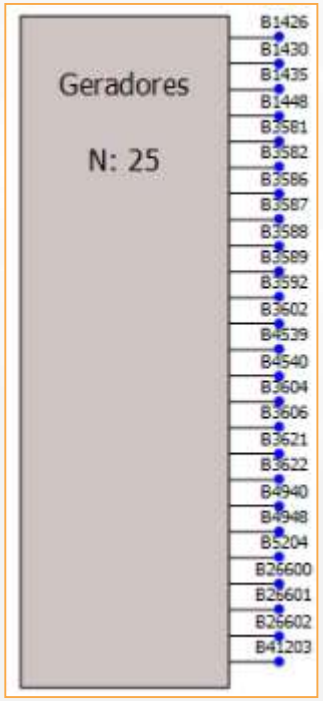
- Região Sudeste:
  - Equivalentes próprios.

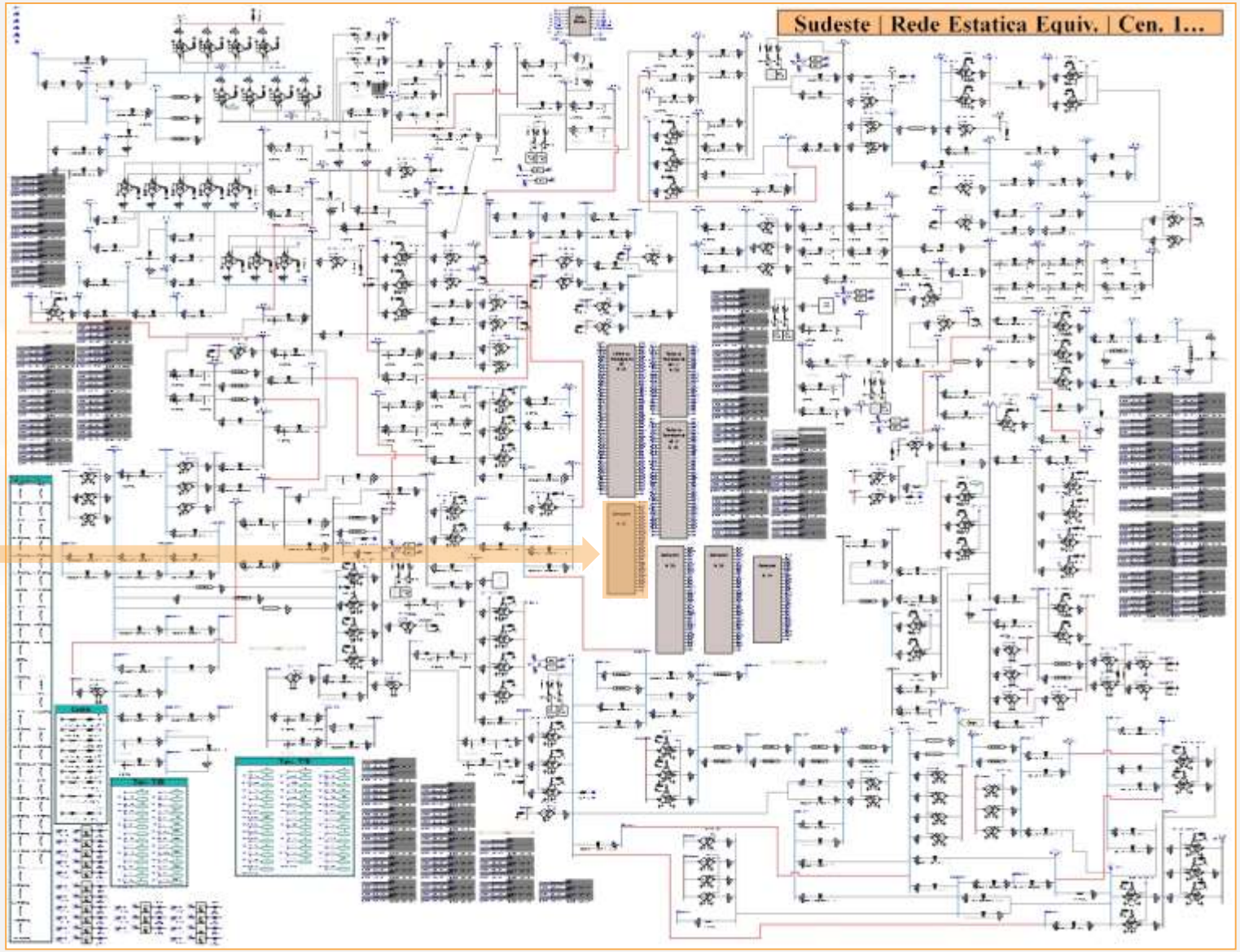




Rede desenvolvida no PSCAD

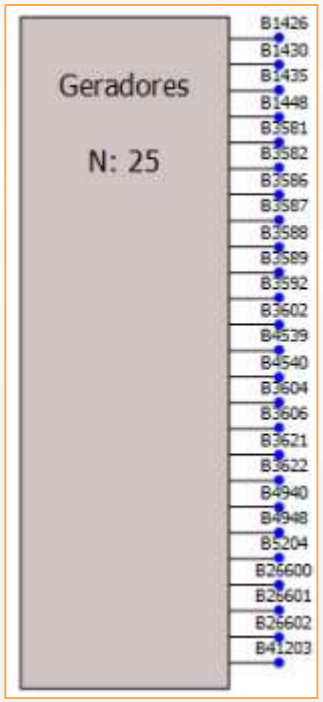
- Região Sudeste:
  - Geradores

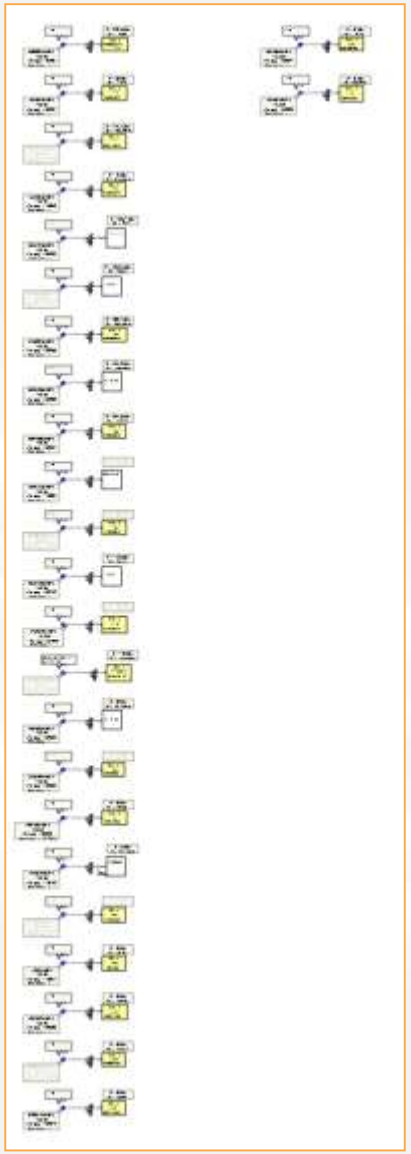


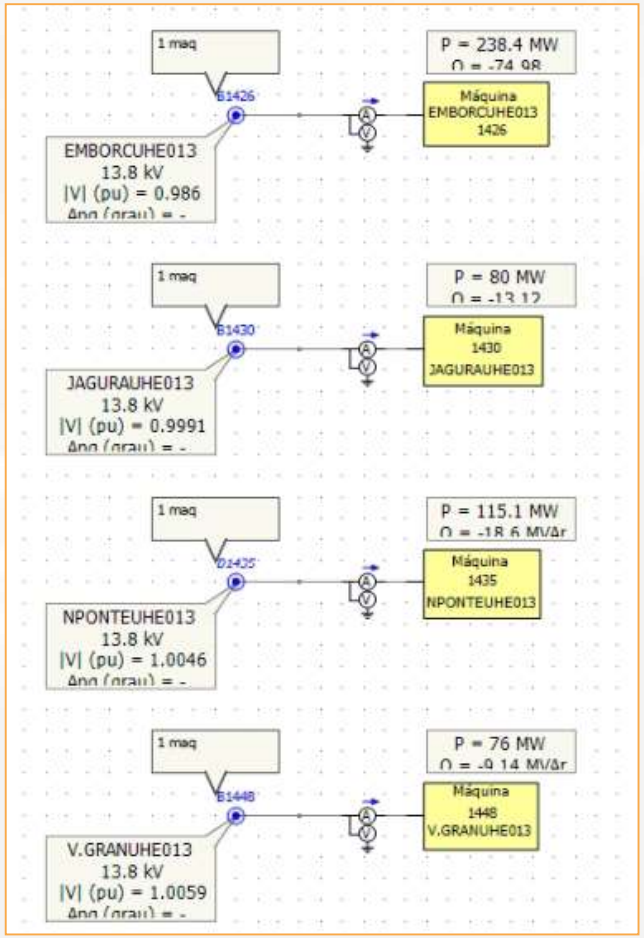


Rede desenvolvida no PSCAD

- Região Sudeste:
  - Geradores

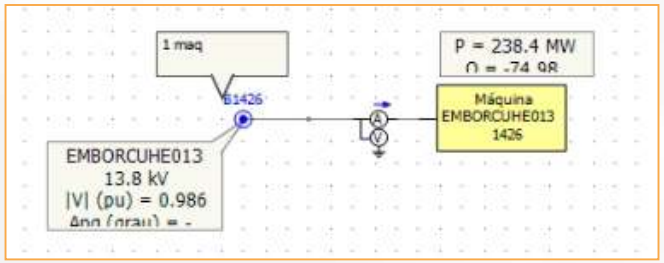




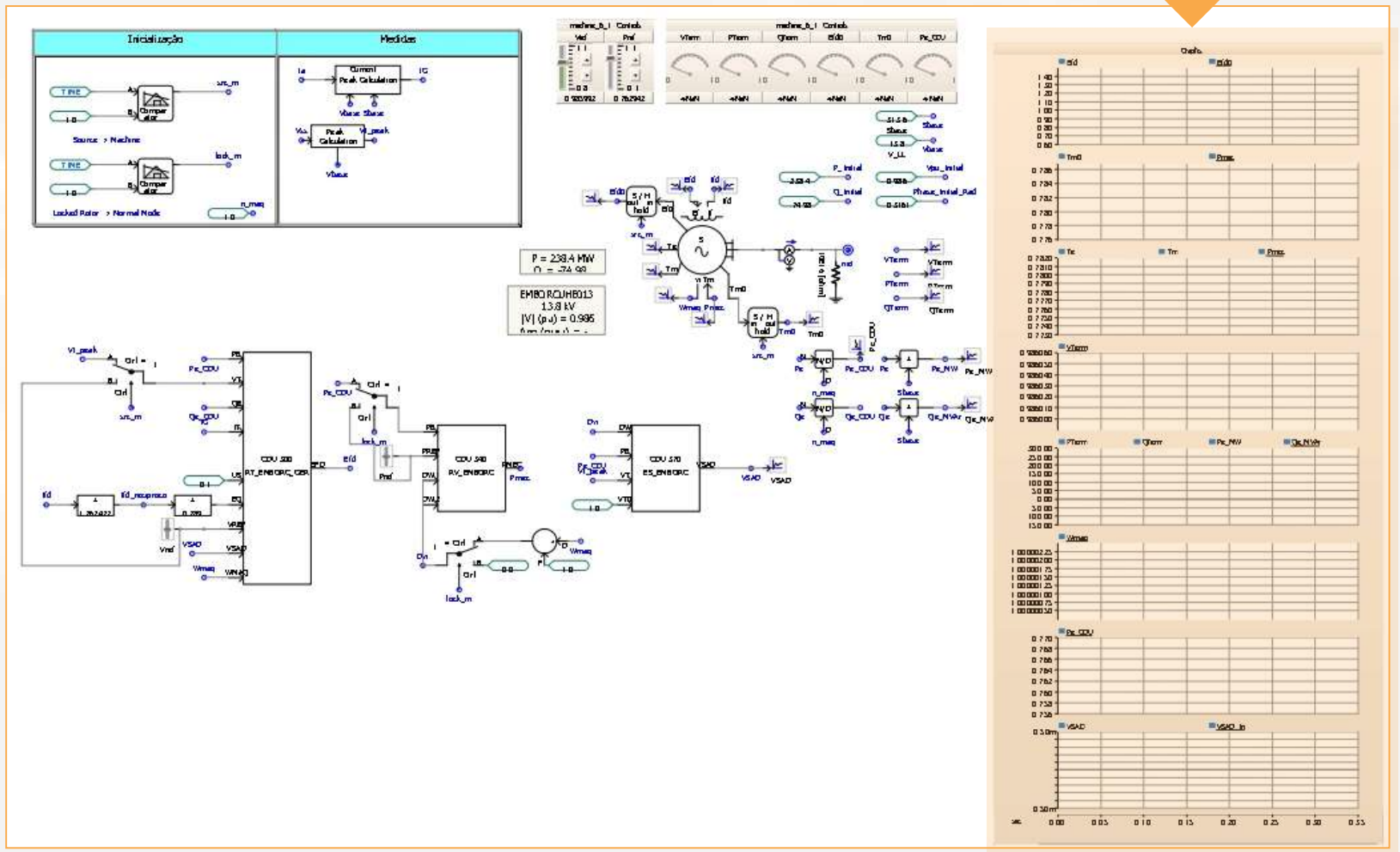


Rede desenvolvida no PSCAD

- Região Sudeste:
  - Geradores

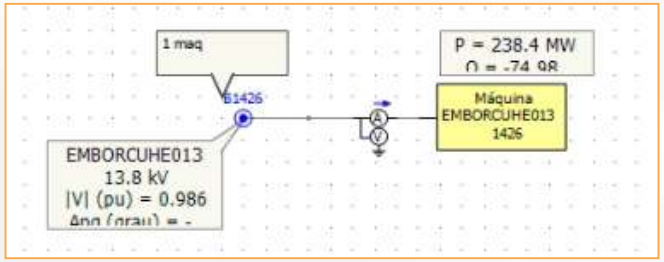


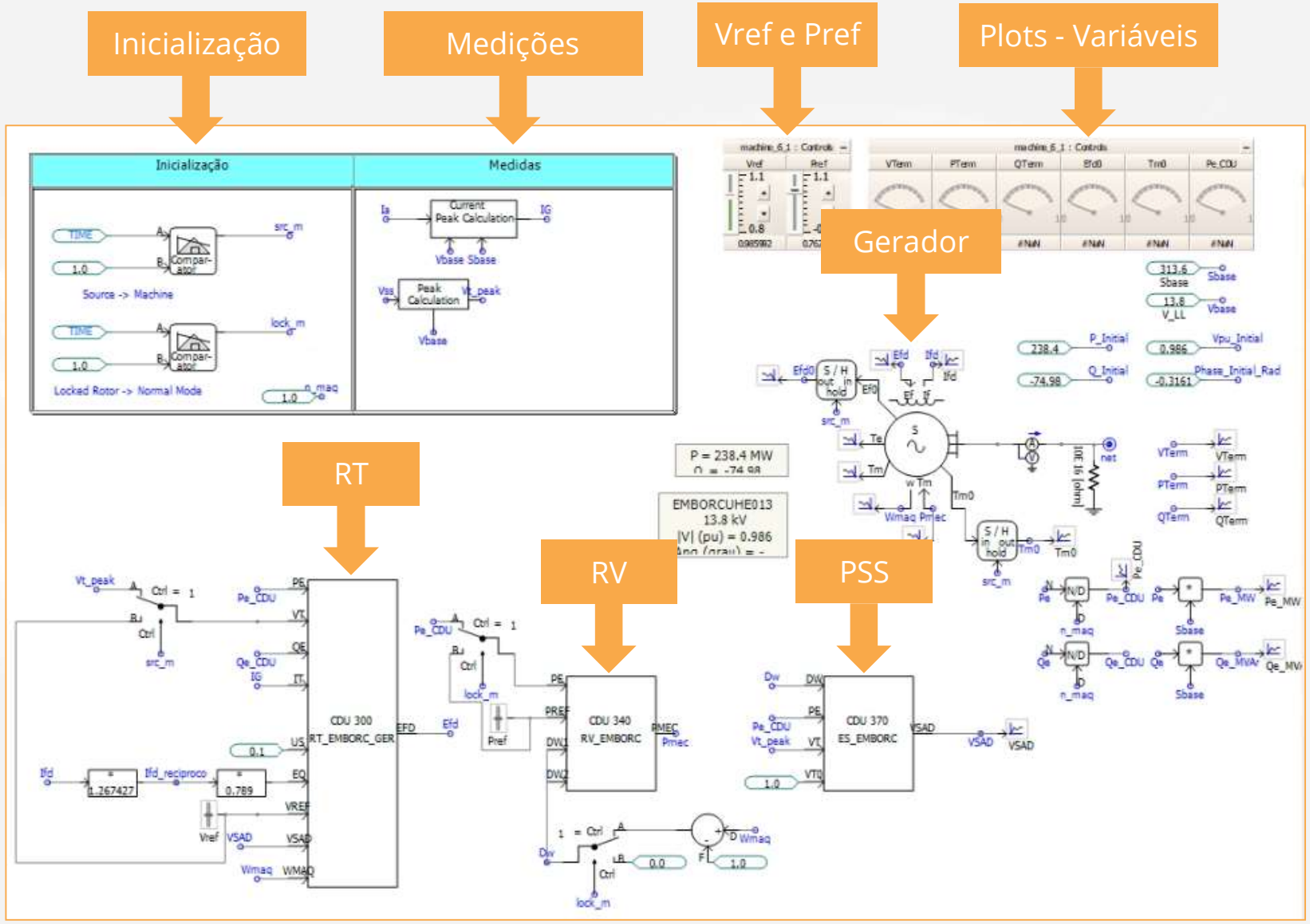
Plots



Rede desenvolvida no PSCAD

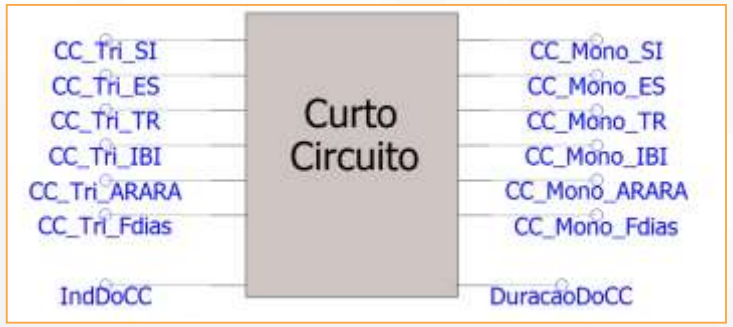
- Região Sudeste:
  - Geradores

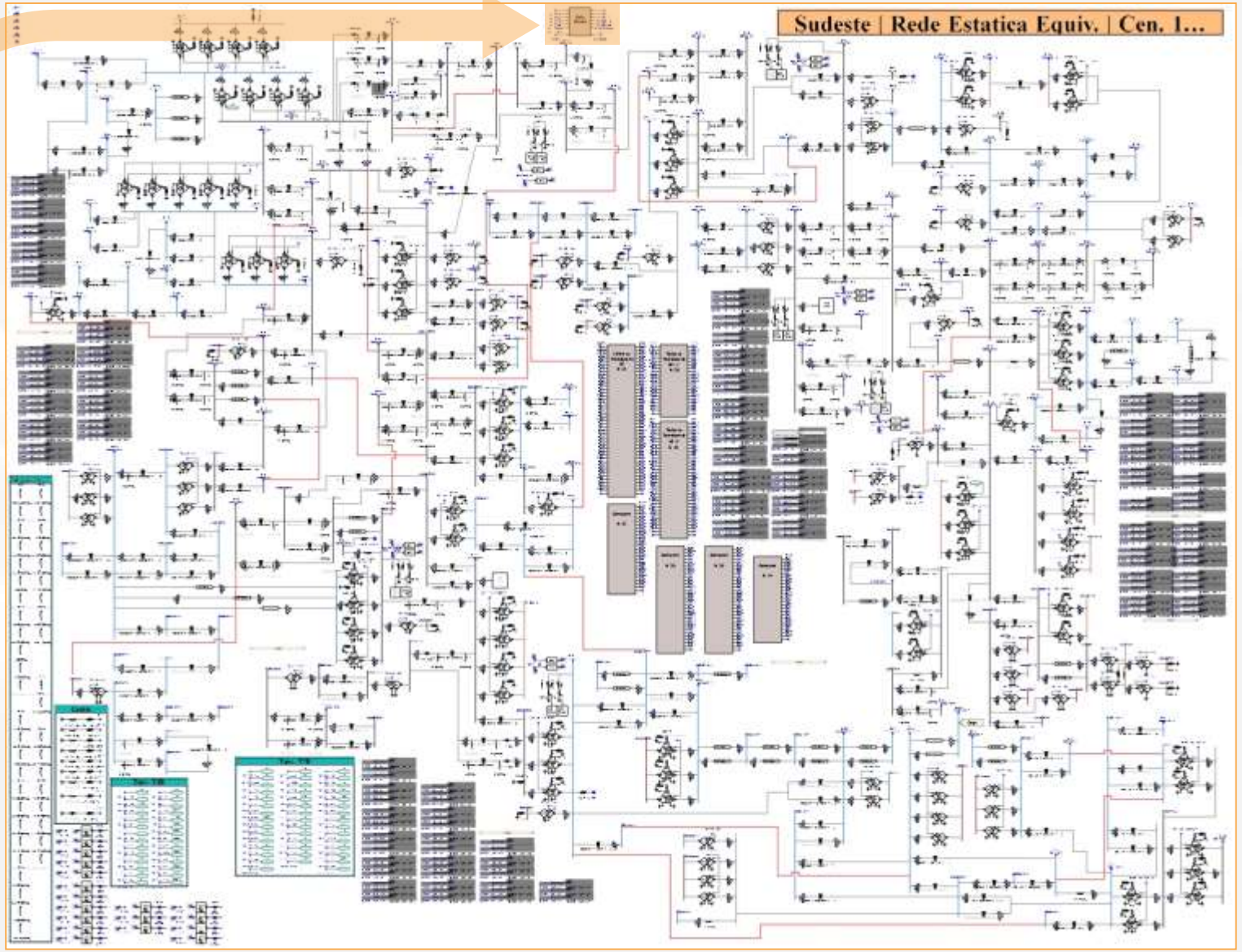




Rede desenvolvida no PSCAD

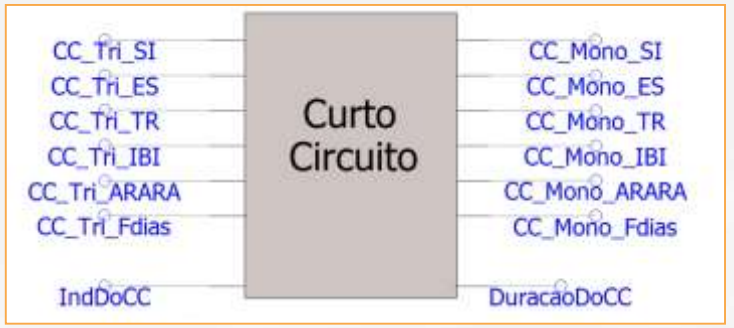
- Região Sudeste:
  - Curto-Circuito.

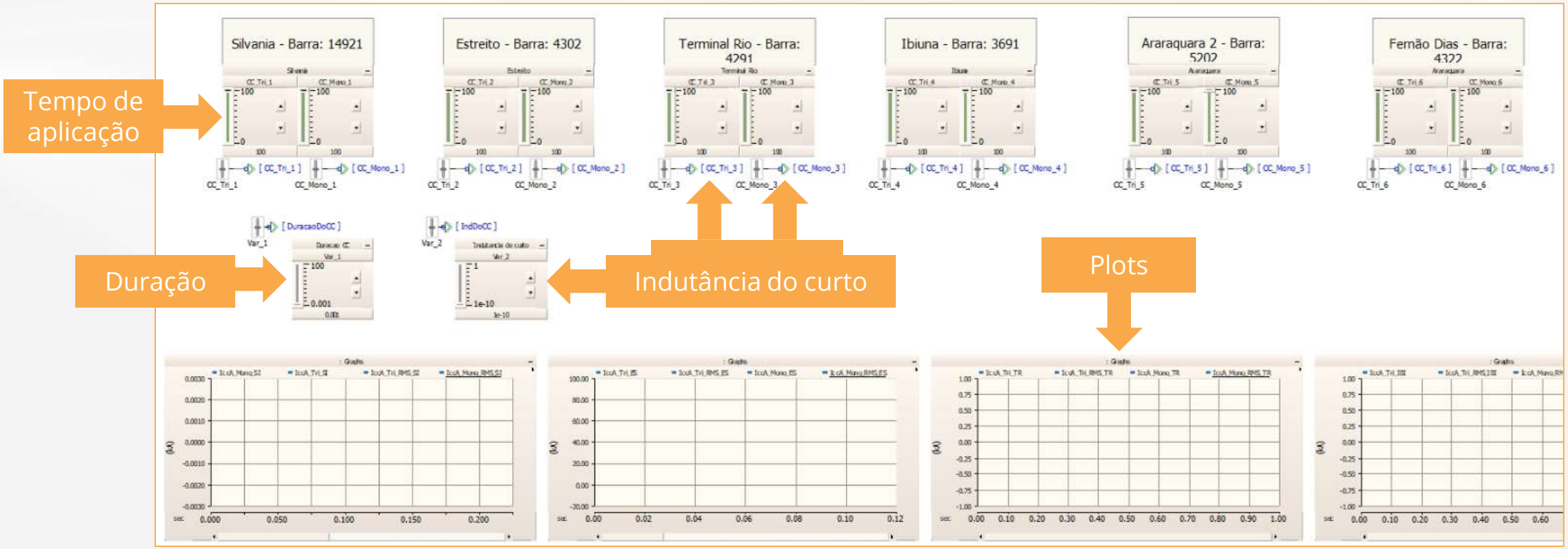




Rede desenvolvida no PSCAD

- Região Sudeste:
  - Curto-Circuito.





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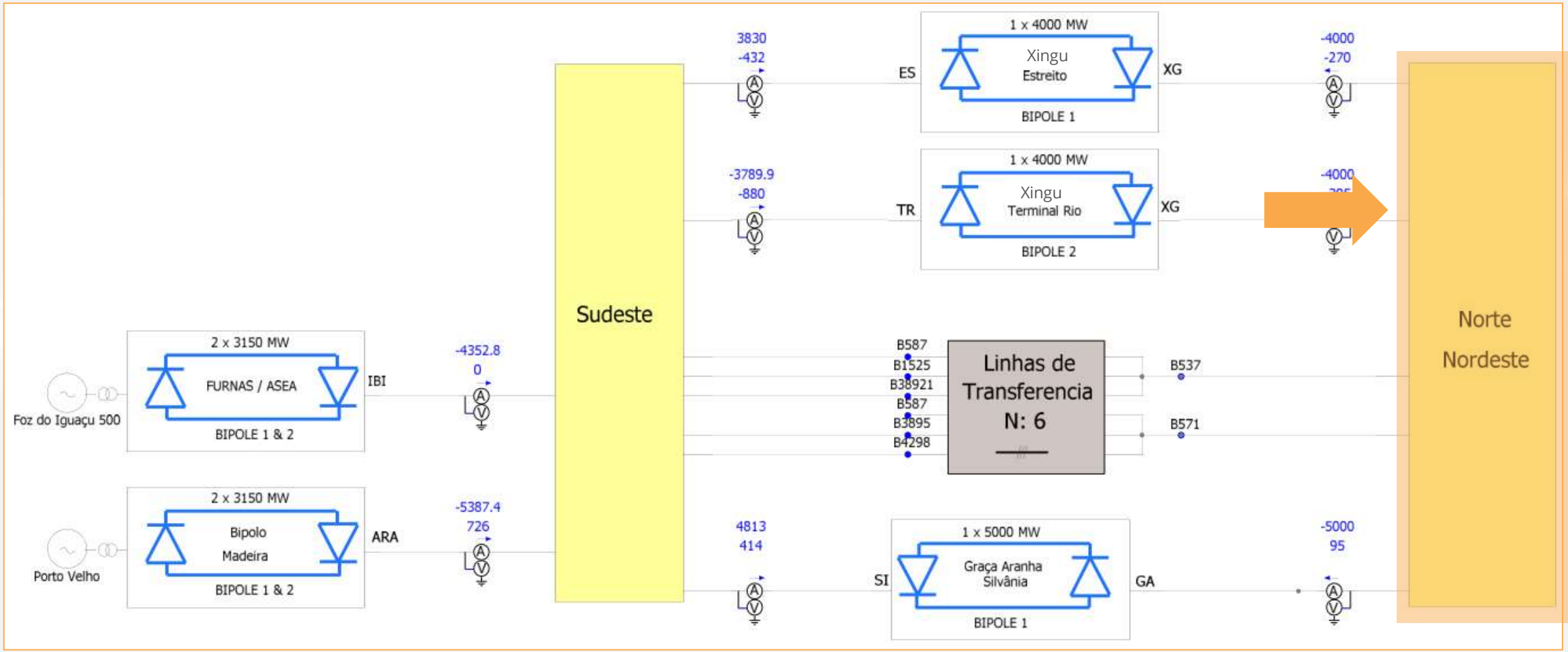
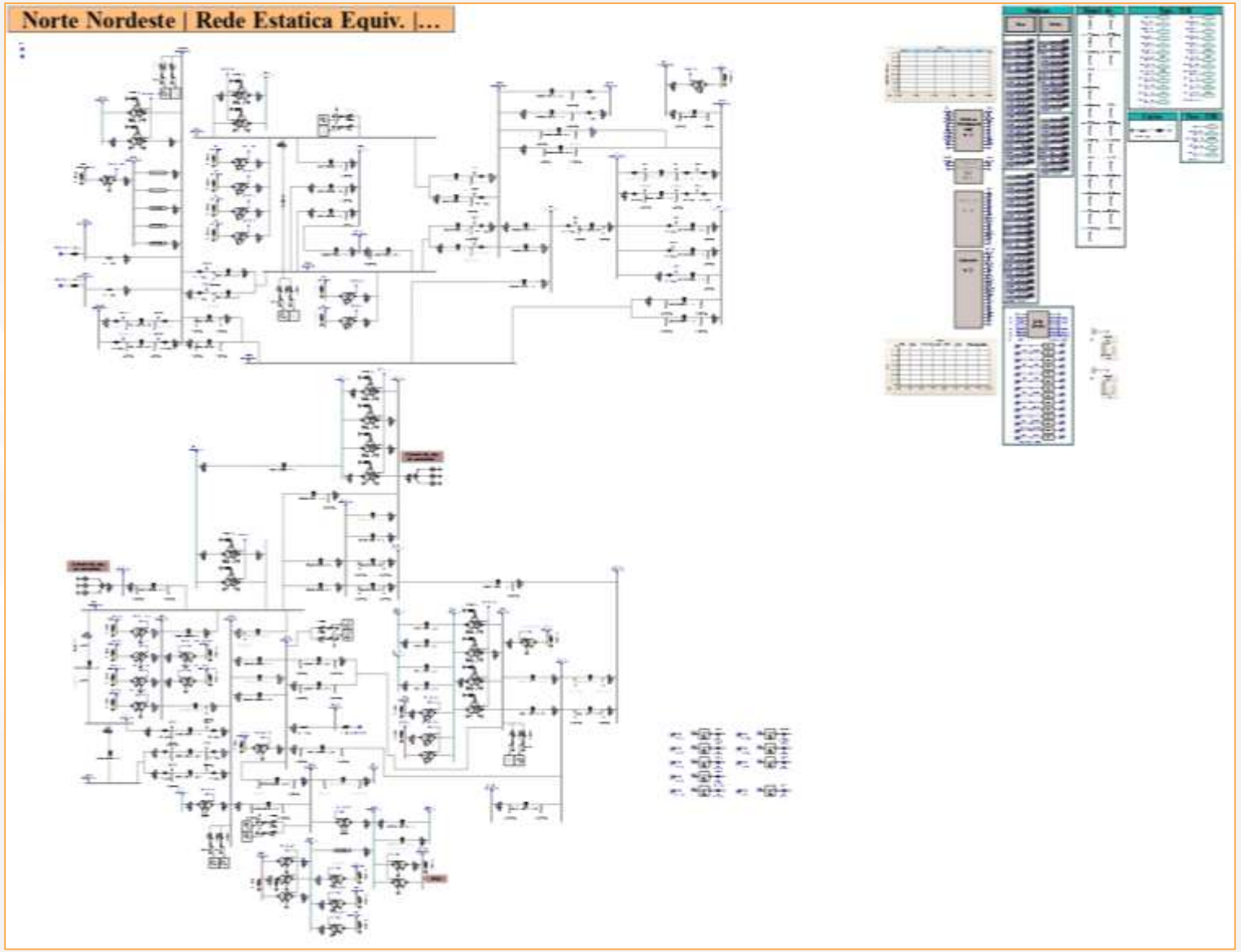


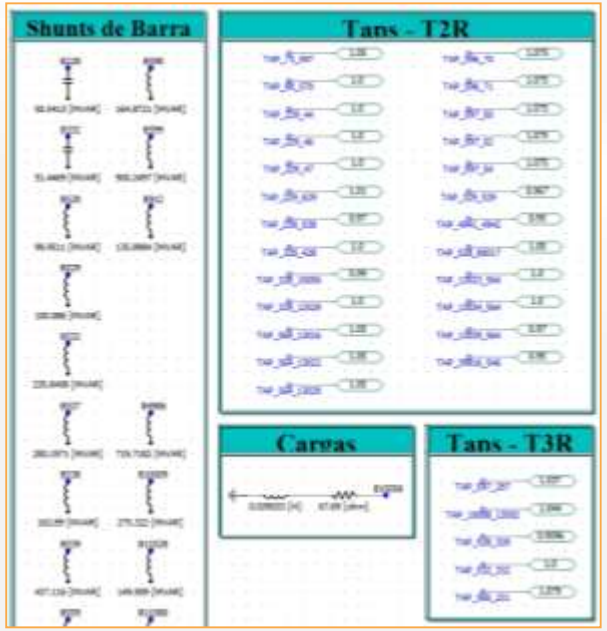
Rede desenvolvida no PSCAD

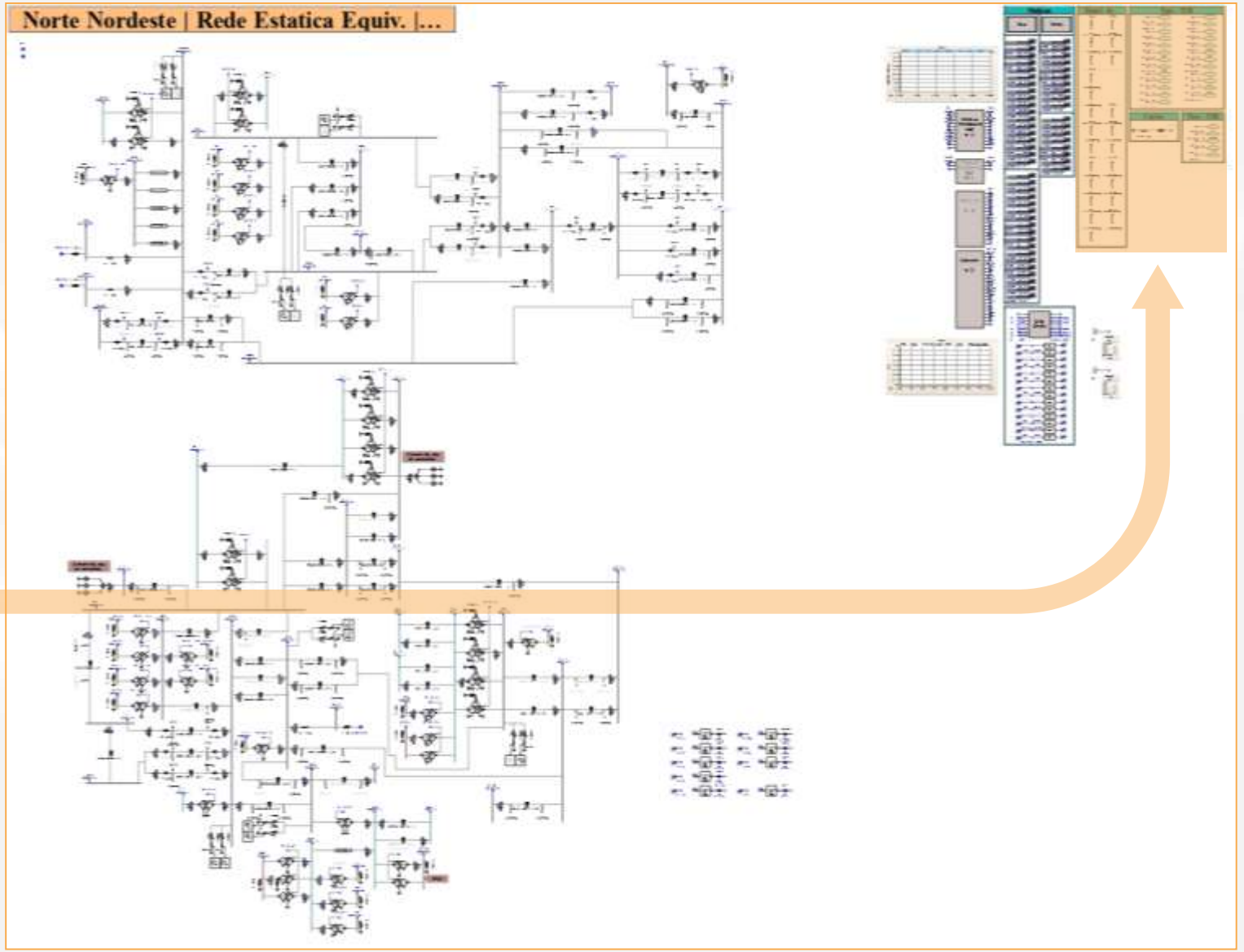
- Região Norte-Nordeste.



Rede desenvolvida no PSCAD

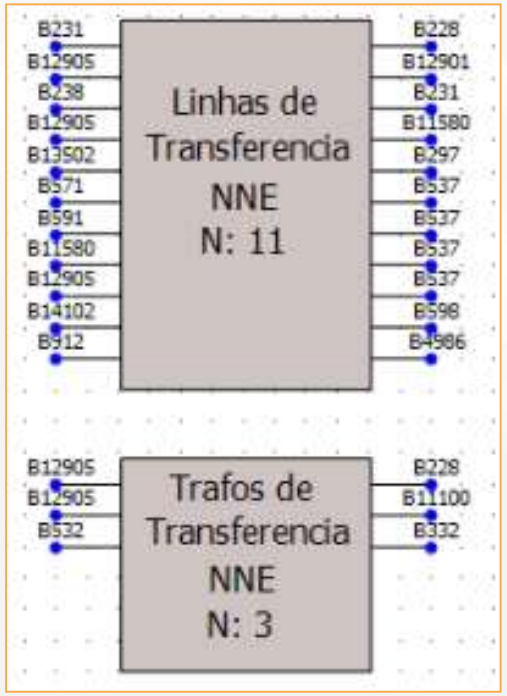
- Região Norte-Nordeste:
  - Shunts de barra;
  - Cargas;
  - Taps dos transformadores.

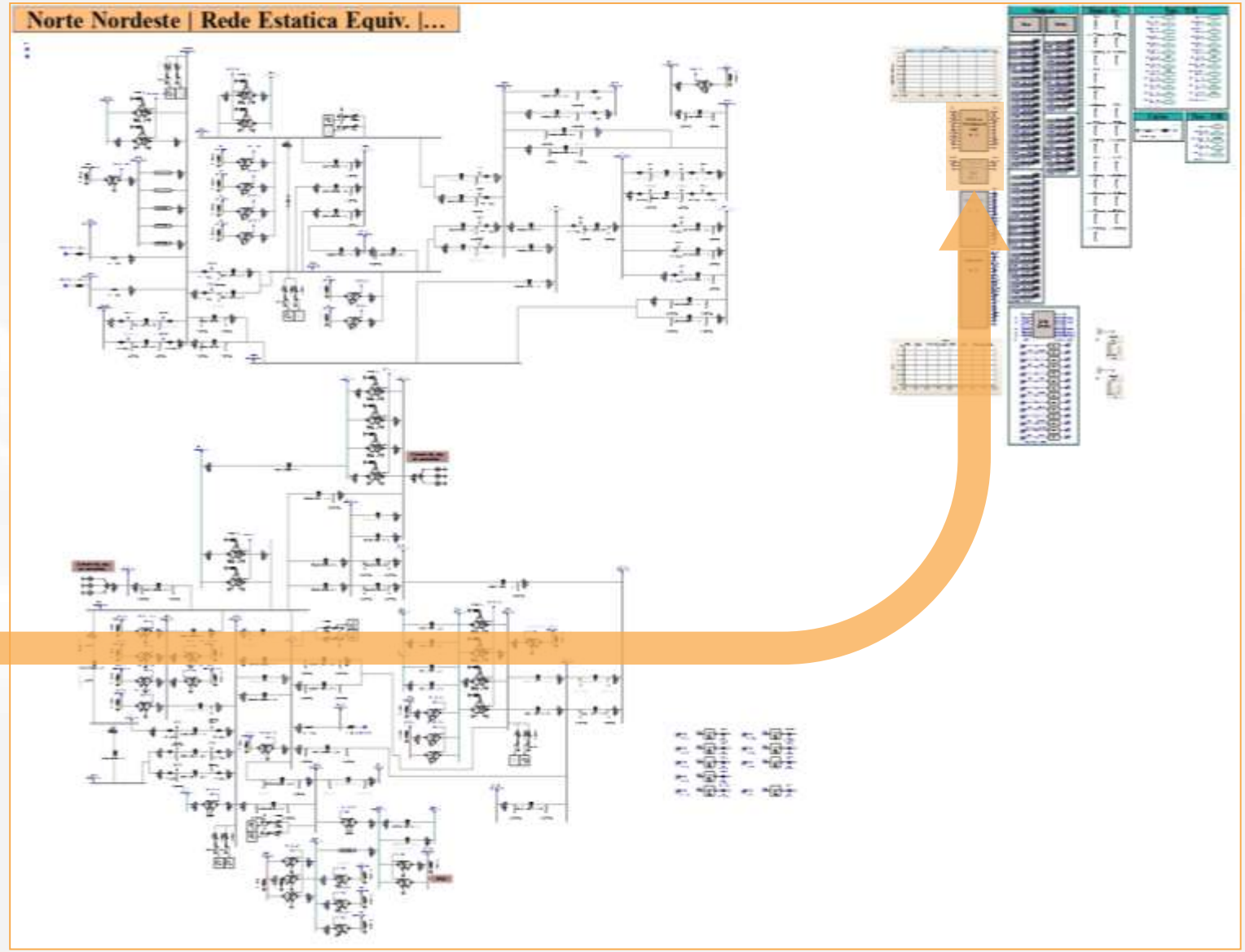




Rede desenvolvida no PSCAD

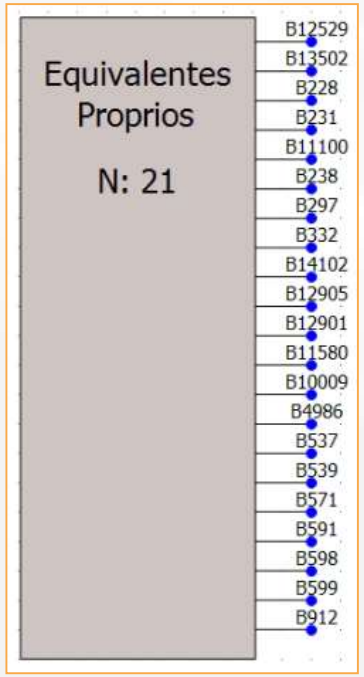
- Região Norte-Nordeste:
  - Linhas e transformadores de transferência.

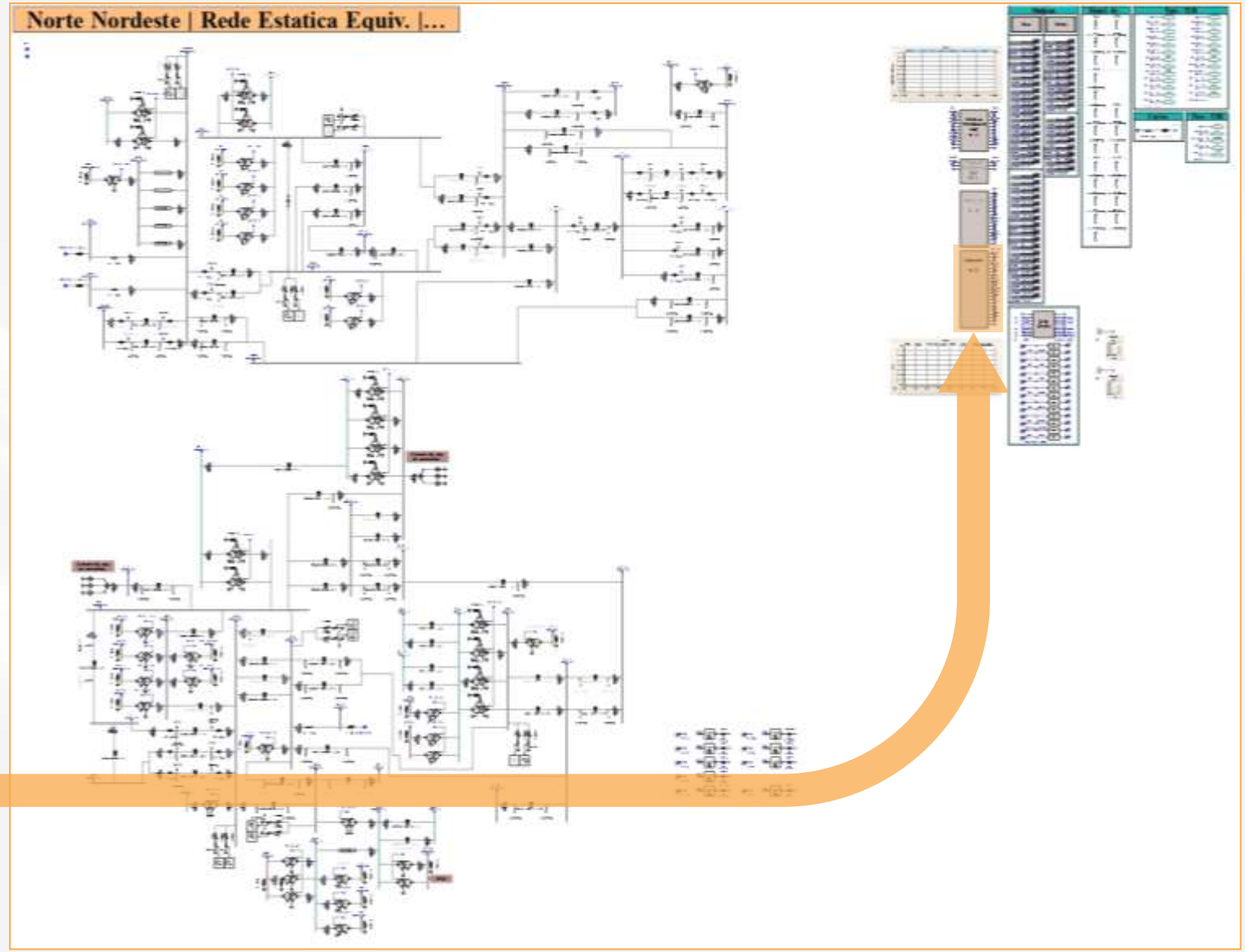




Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
  - Equivalentes próprios.





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- Região Norte-Nordeste:
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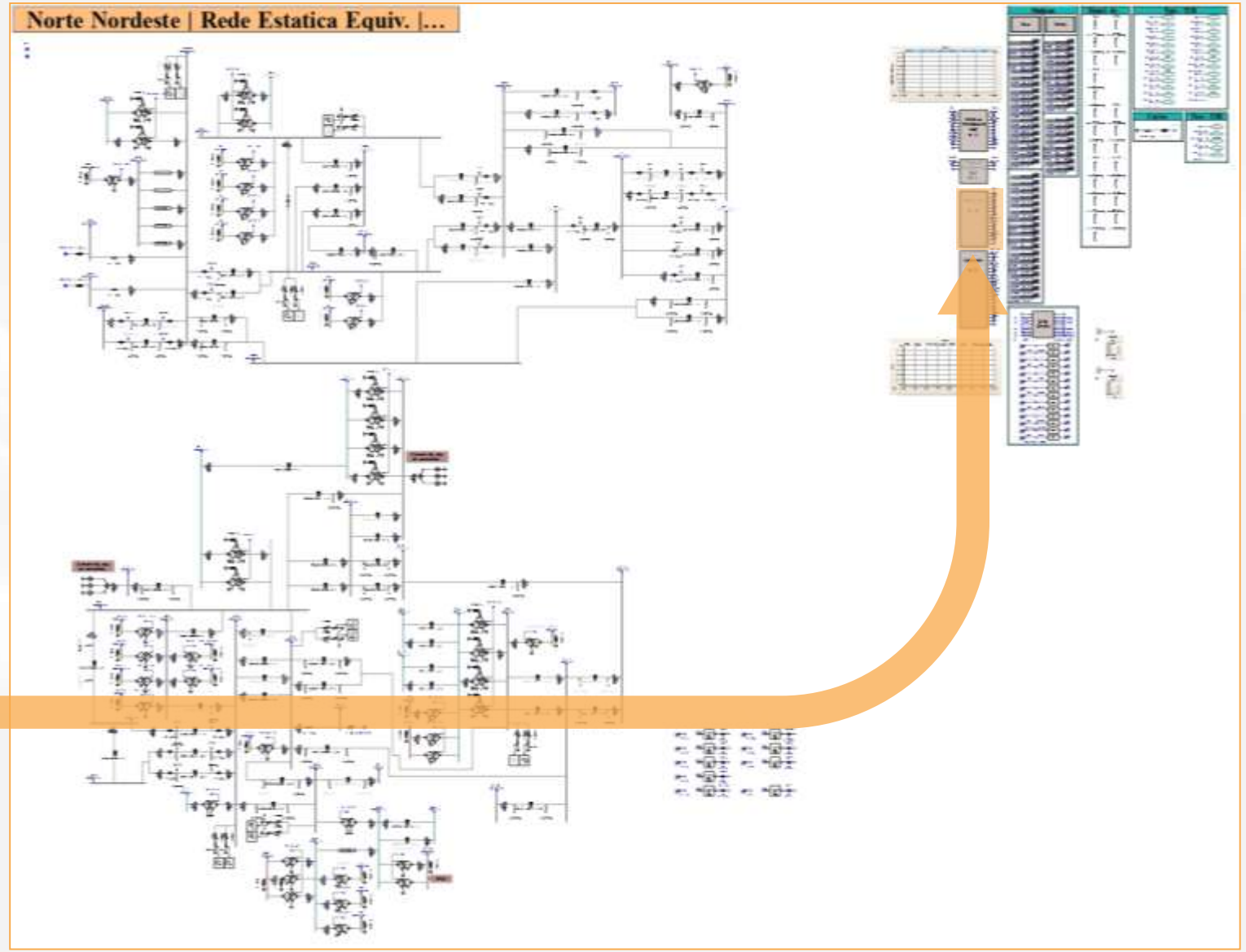

Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
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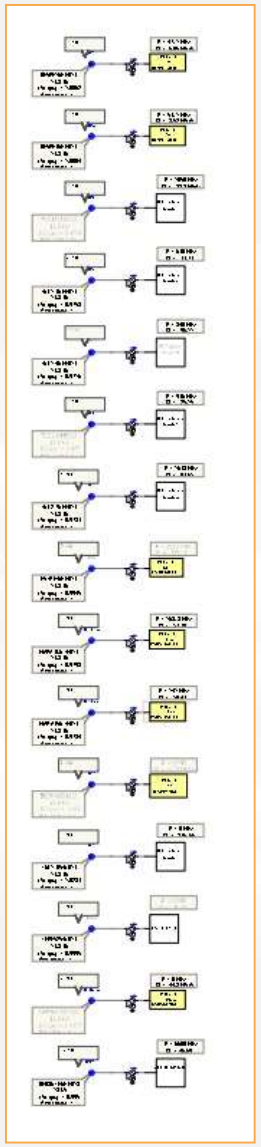
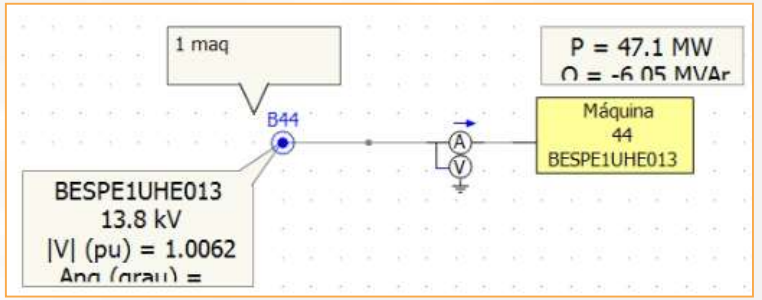
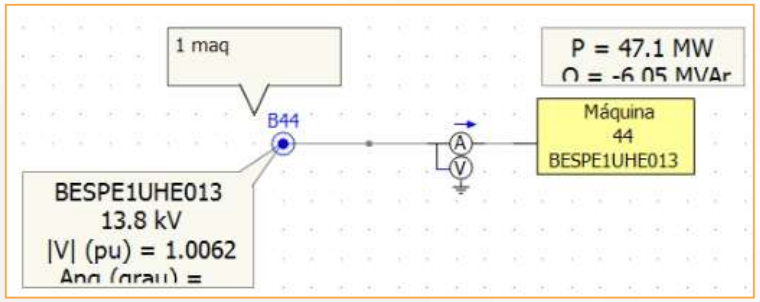
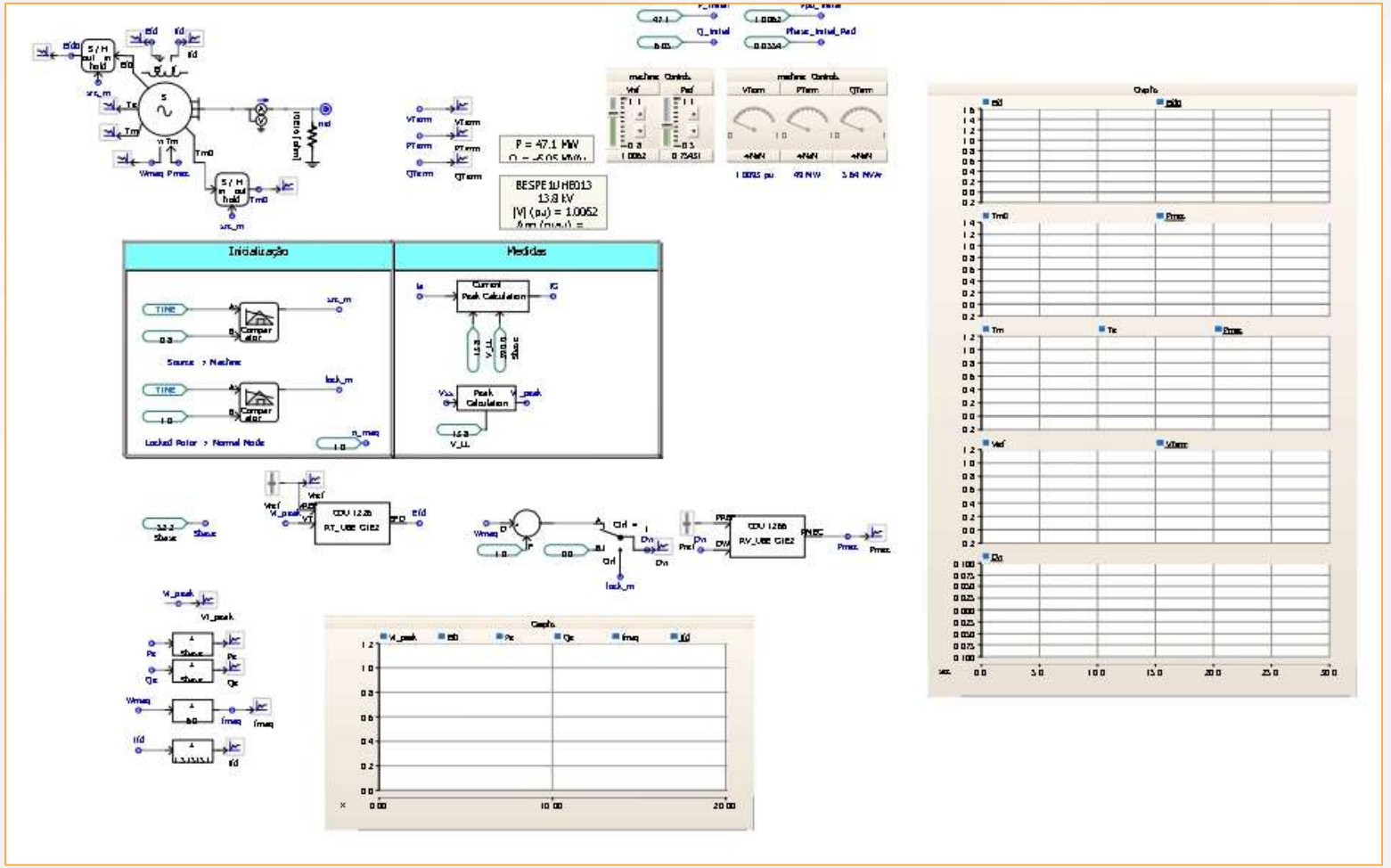




Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
  - Geradores.





Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
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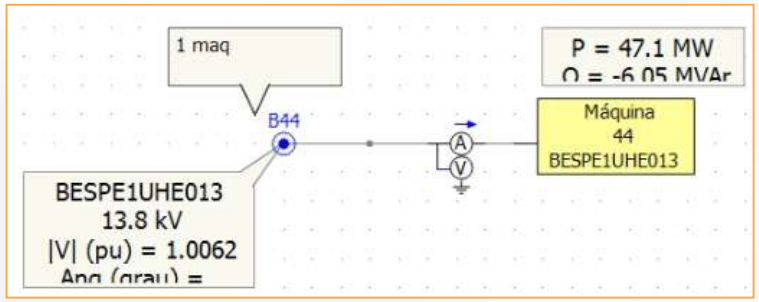
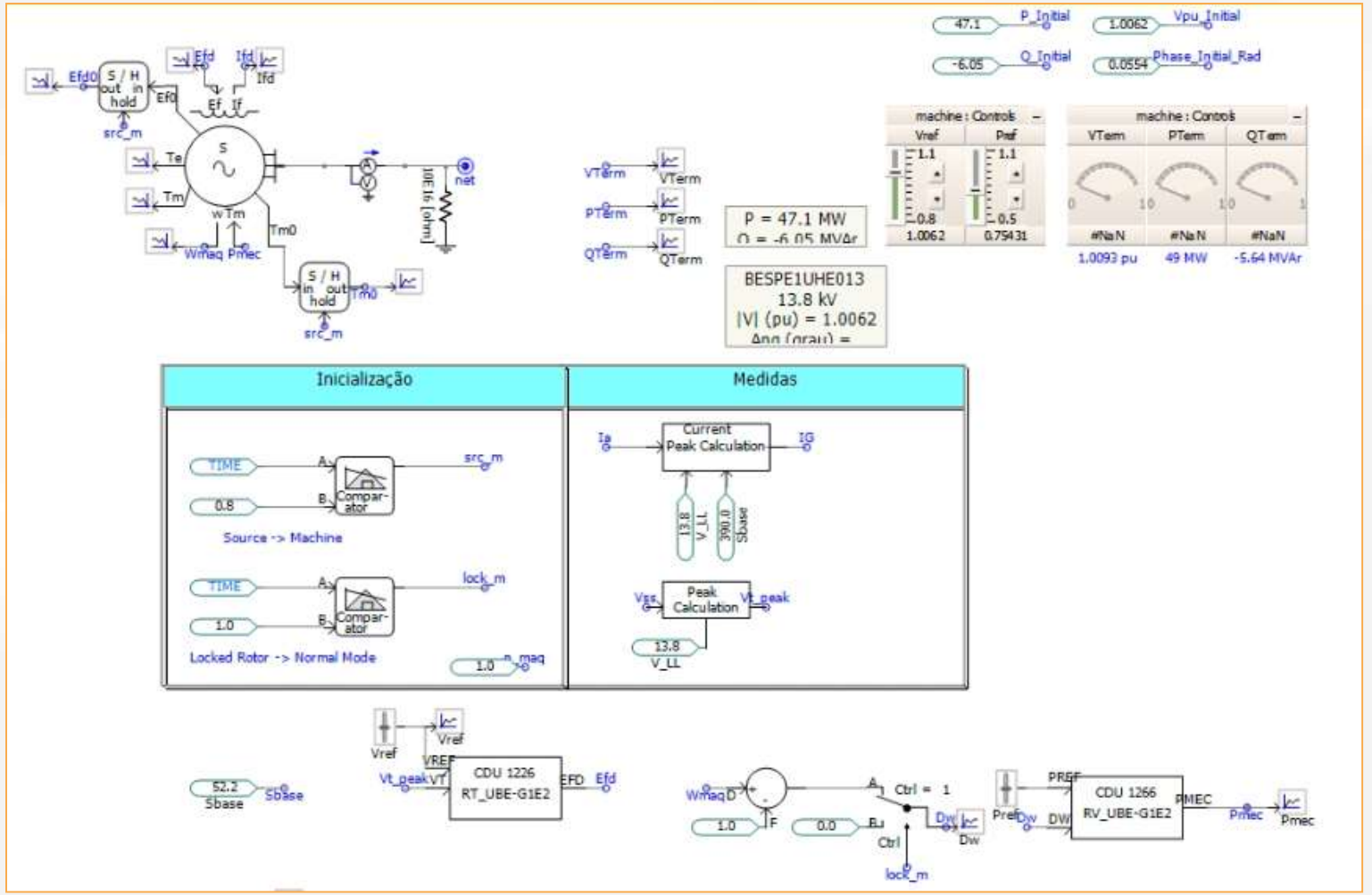
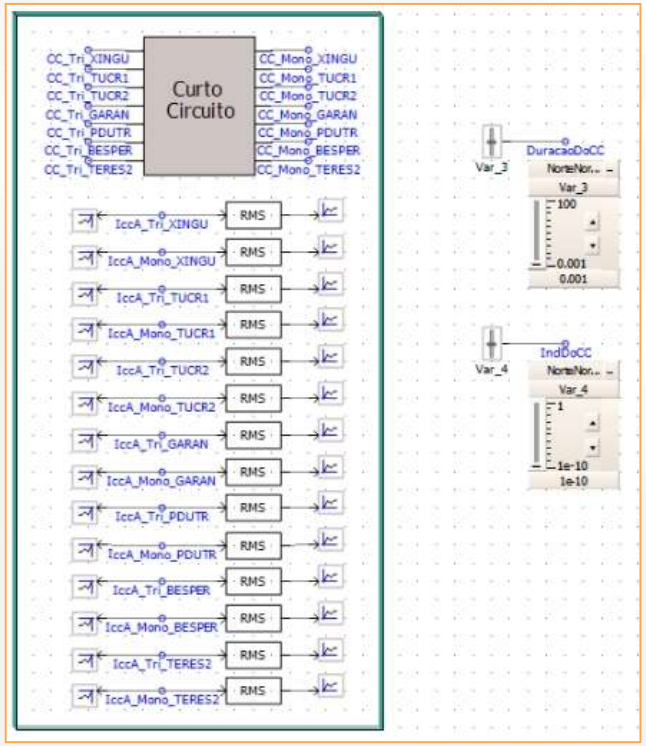
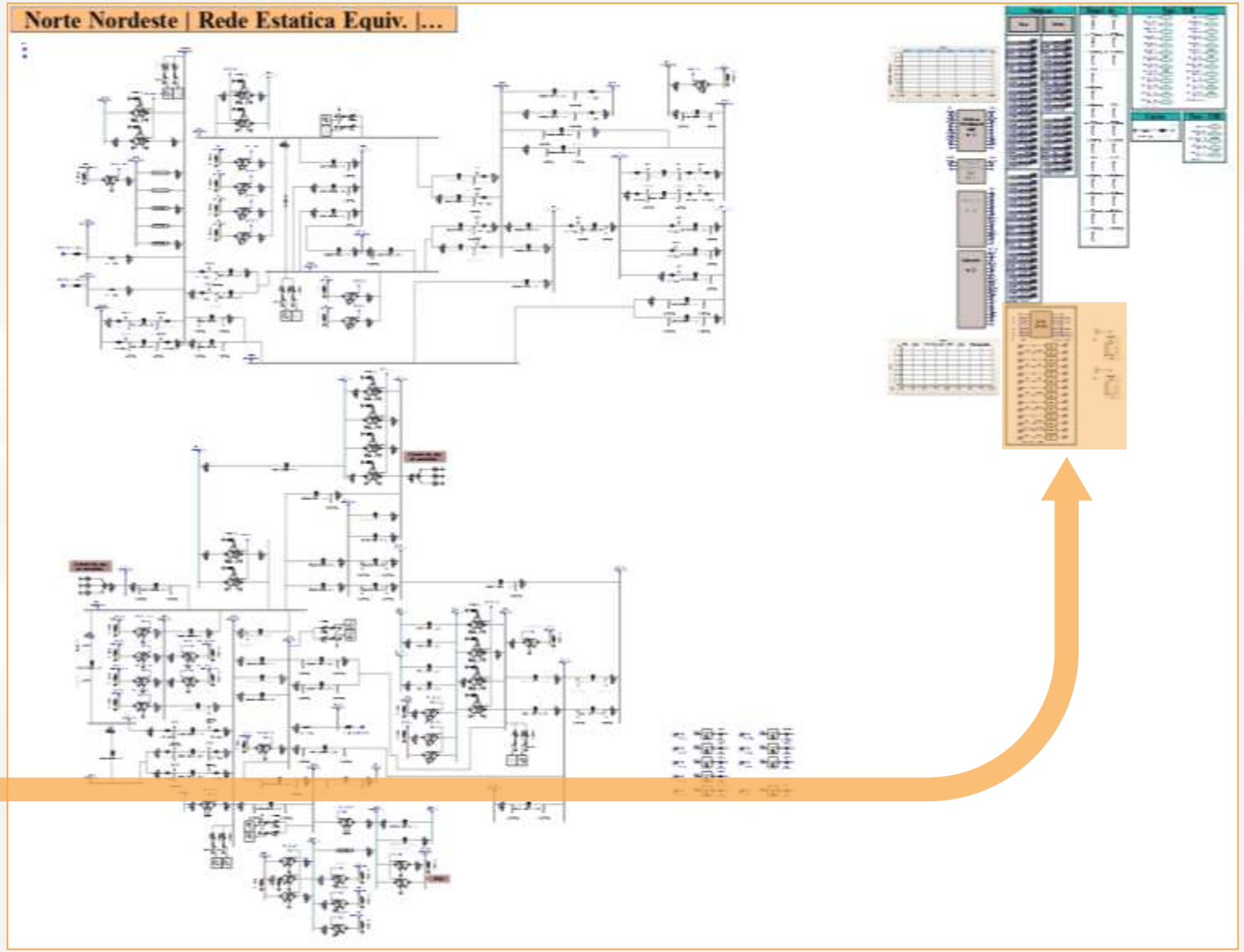




Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
  - Curto-Circuito.





Rede desenvolvida no PSCAD

- Região Norte-Nordeste:
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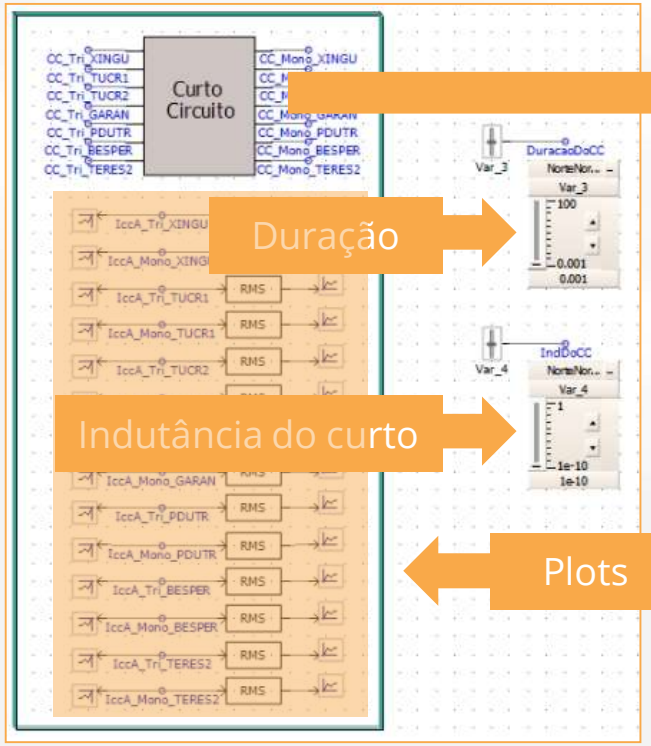
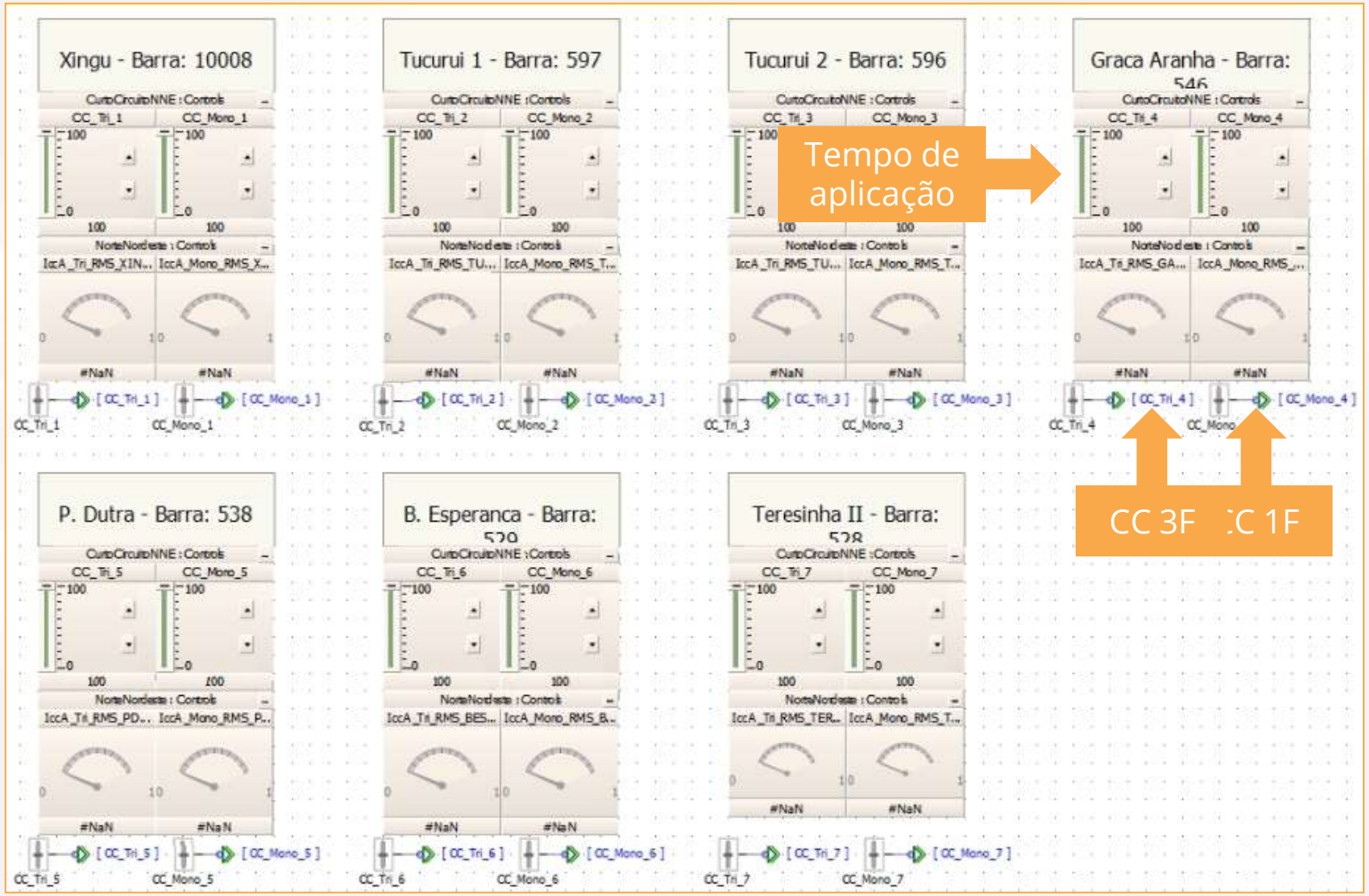
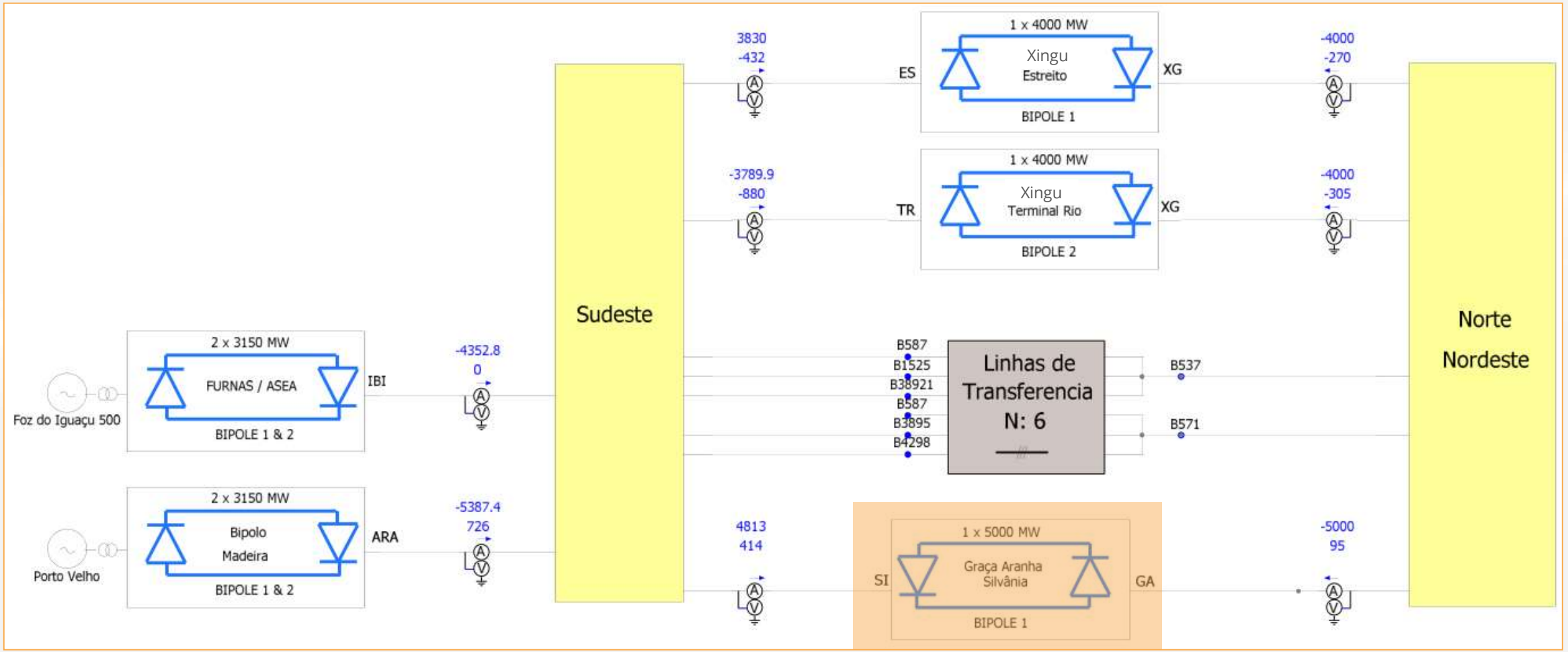




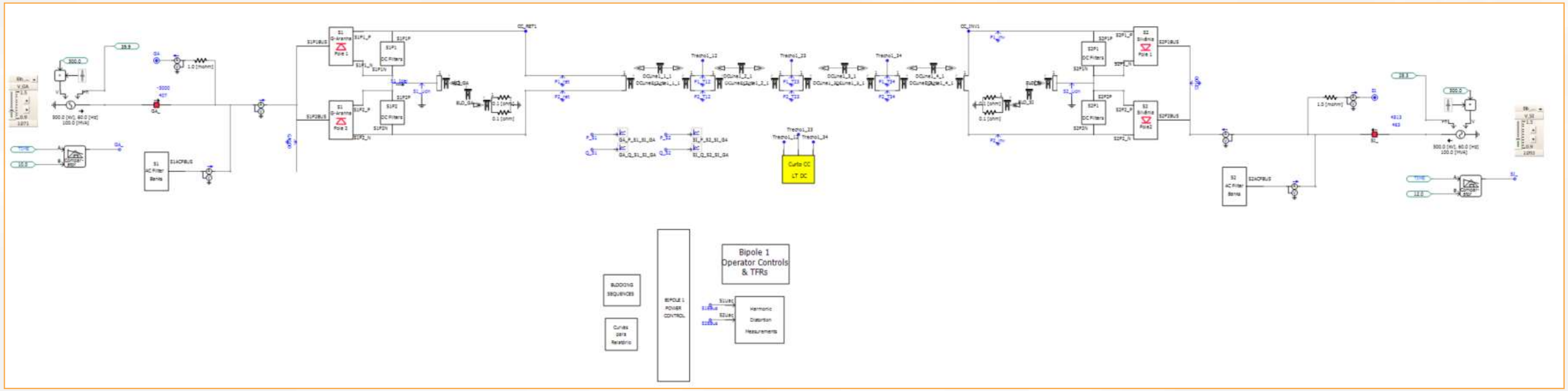
Elo Graça Aranha - Silvânia



Elo Graça Aranha - Silvânia

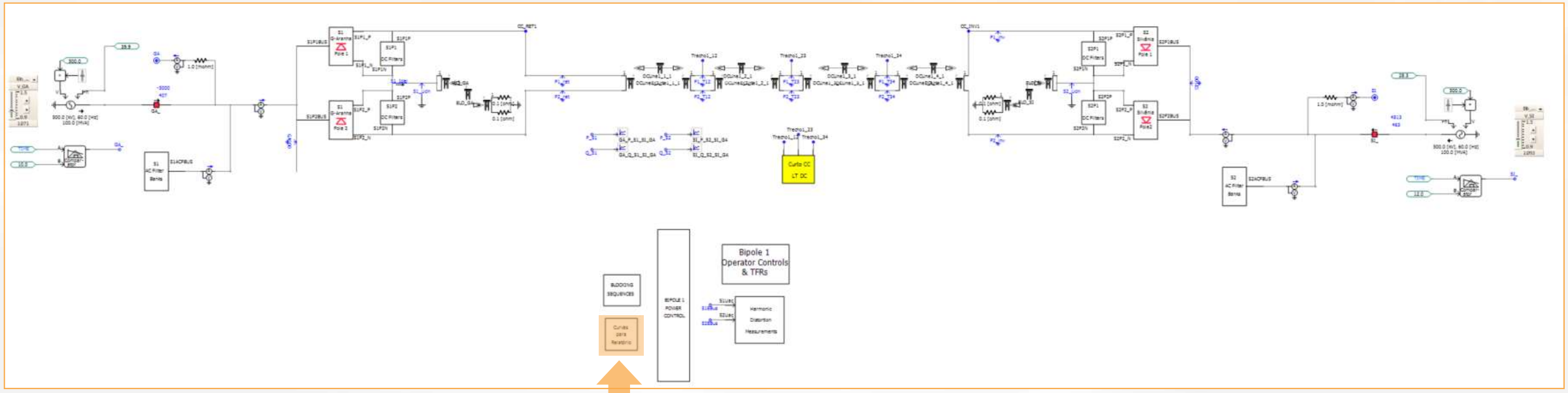
Elo Graça Aranha - Silvânia

- Modelo fornecido pela EPE.



Elo Graça Aranha - Silvânia

- Plots

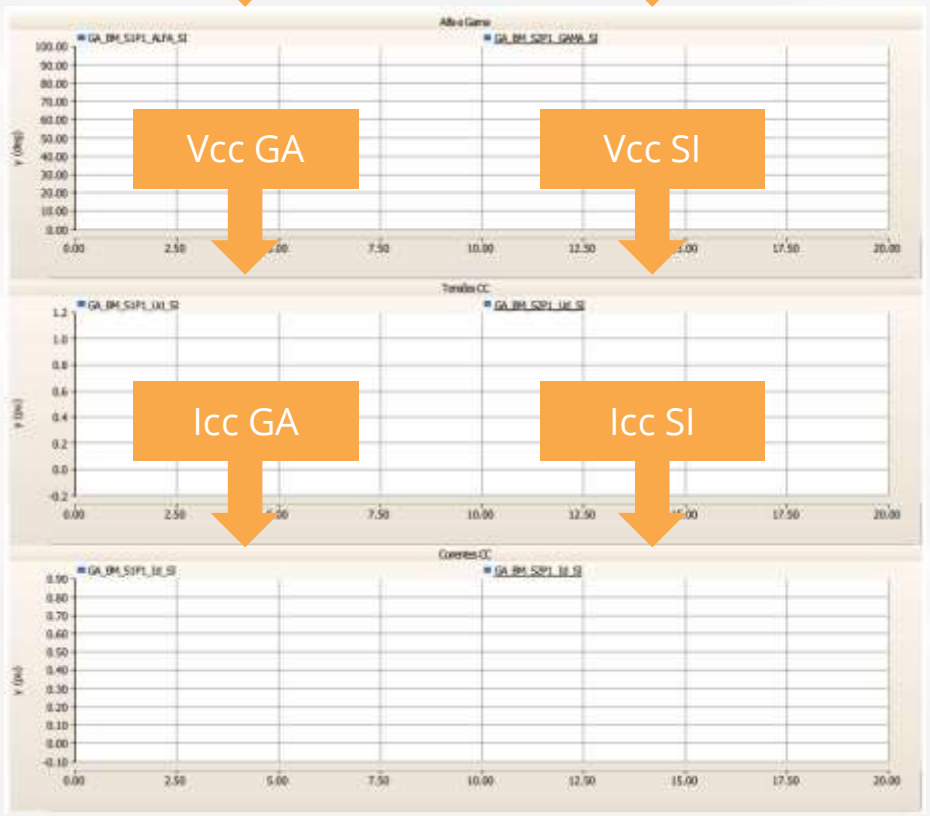


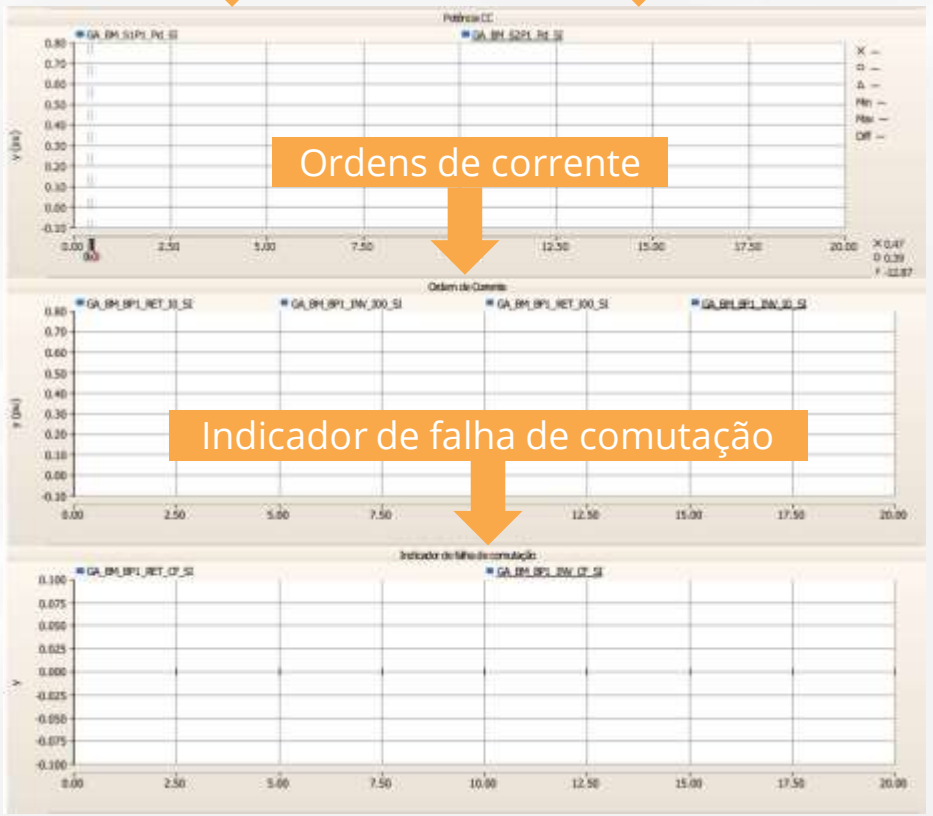
Curvas para Relatório

Elo Graça Aranha - Silvânia

- Plots.

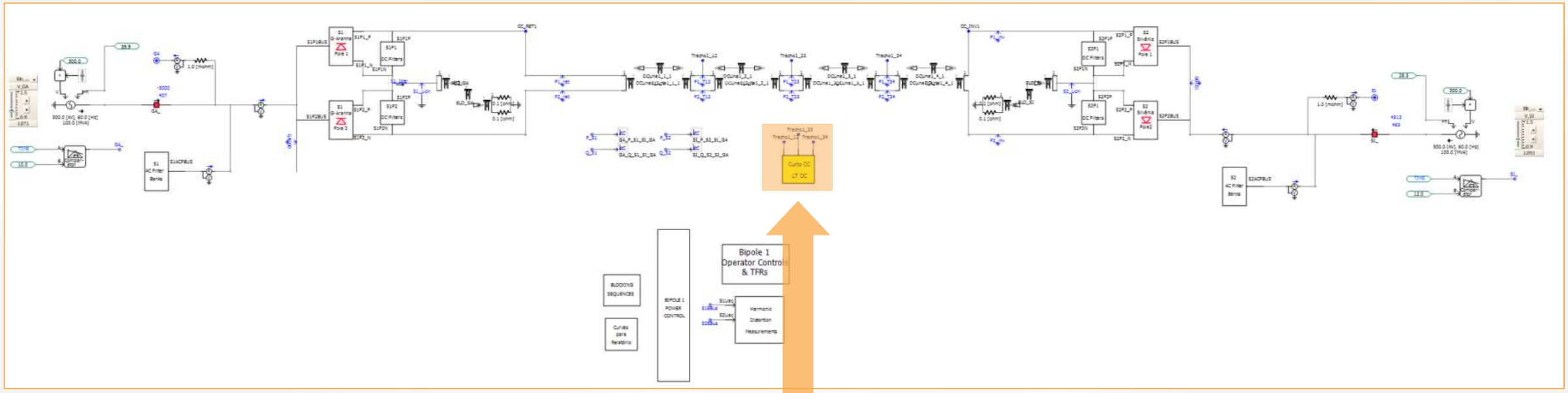
Curvas para Relatório

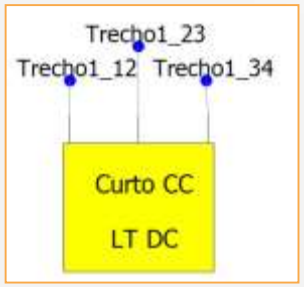




Elo Graça Aranha - Silvânia

- Curto-circuito na linha CC.

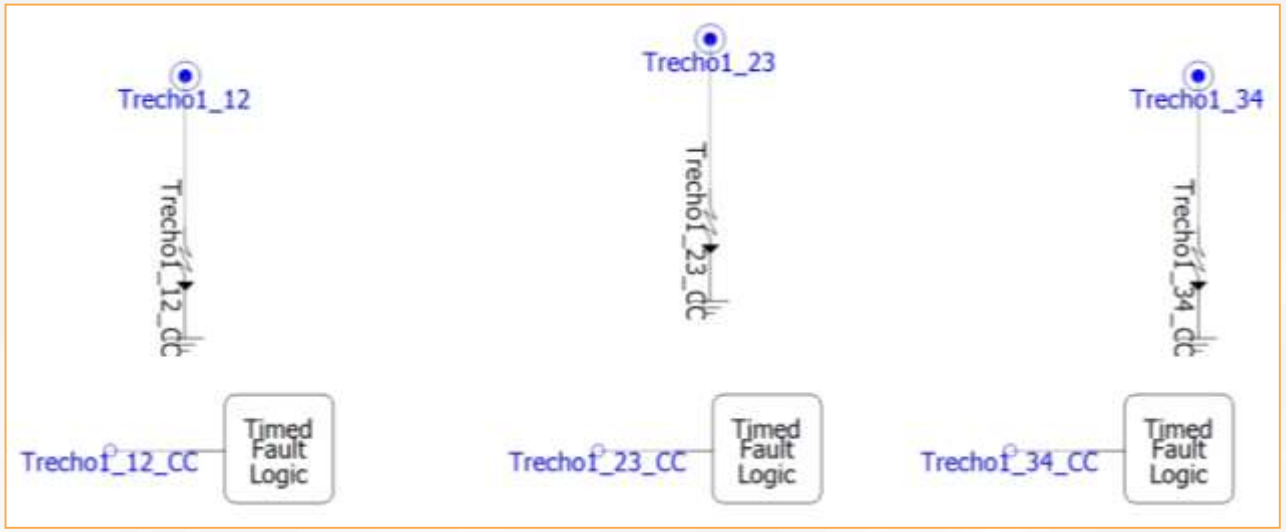


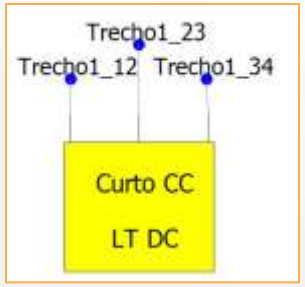


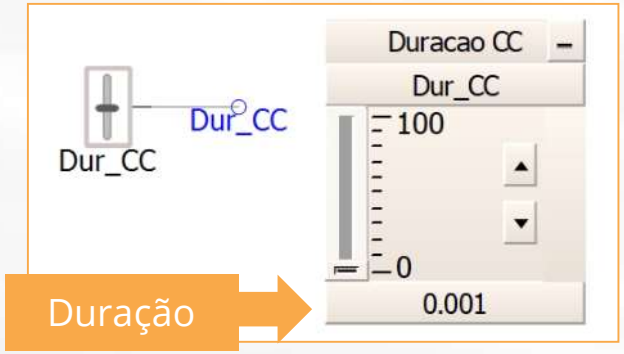
Elo Graça Aranha - Silvânia

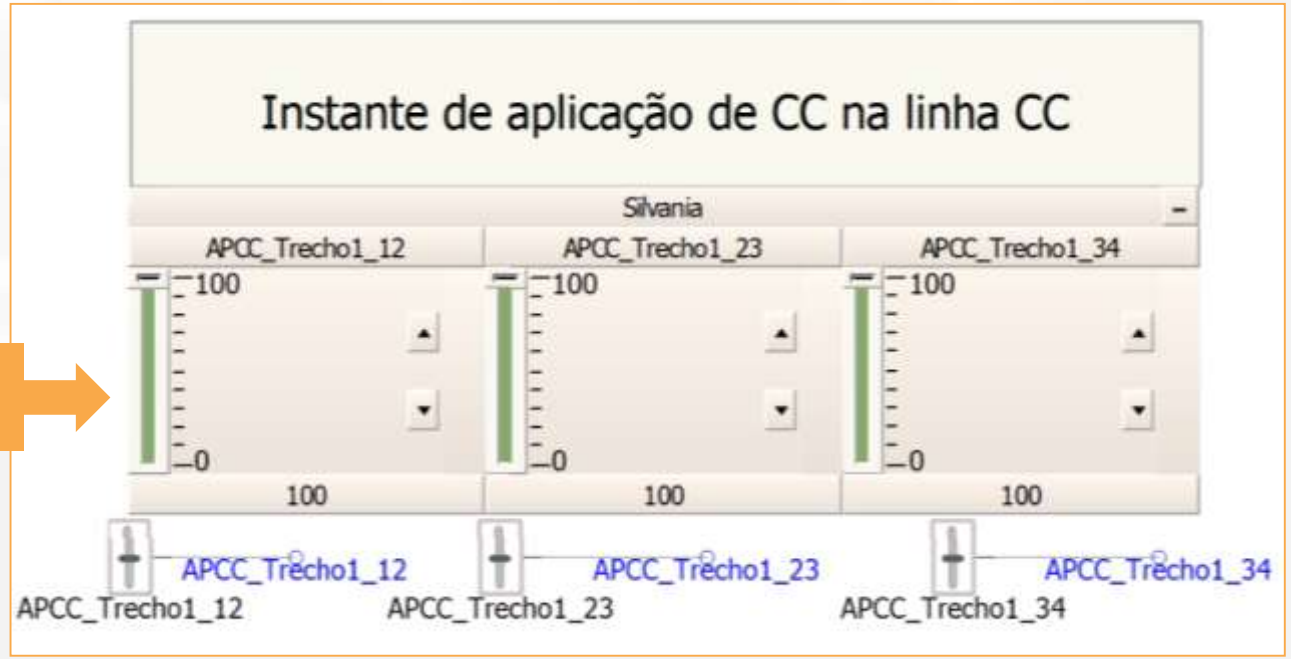
- Curto-circuito

  na linha CC.



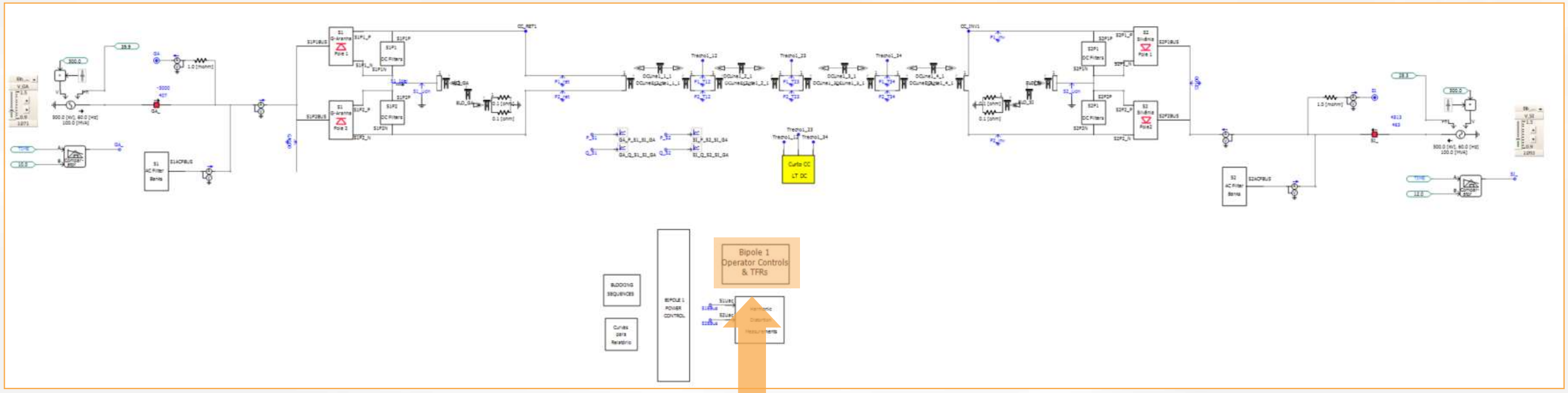






Elo Graça Aranha - Silvânia

- Controles.



Bipole 1
Operator Controls
& TFRs

Elo Graça Aranha - Silvânia

- Controles.

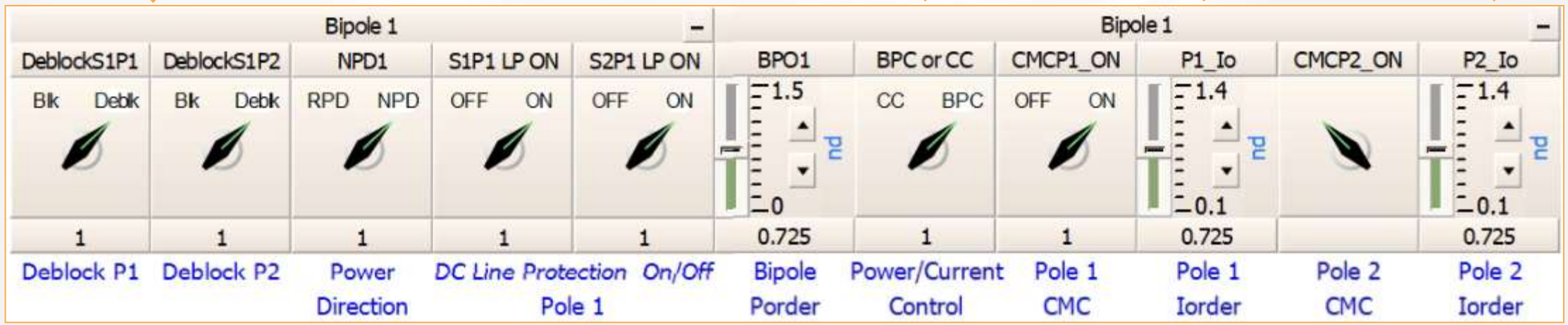
Bipole 1
Operator Controls
& TFRs

Bloqueio dos polos

Ordem de potência do bipolo

Tipo de controle

Ordem de corrente dos polos



Elo Graça Aranha - Silvânia

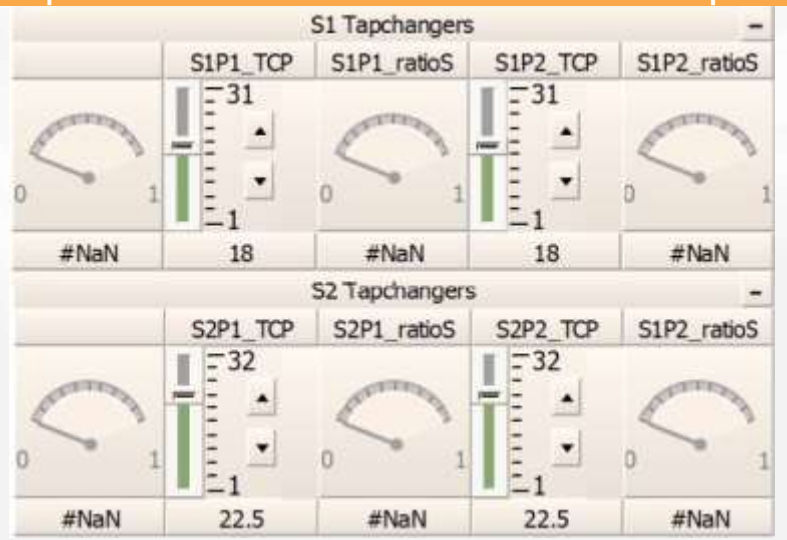
- Controles.

Bipole 1
Operator Controls
& TFRs

Taps dos transformadores do bipolo

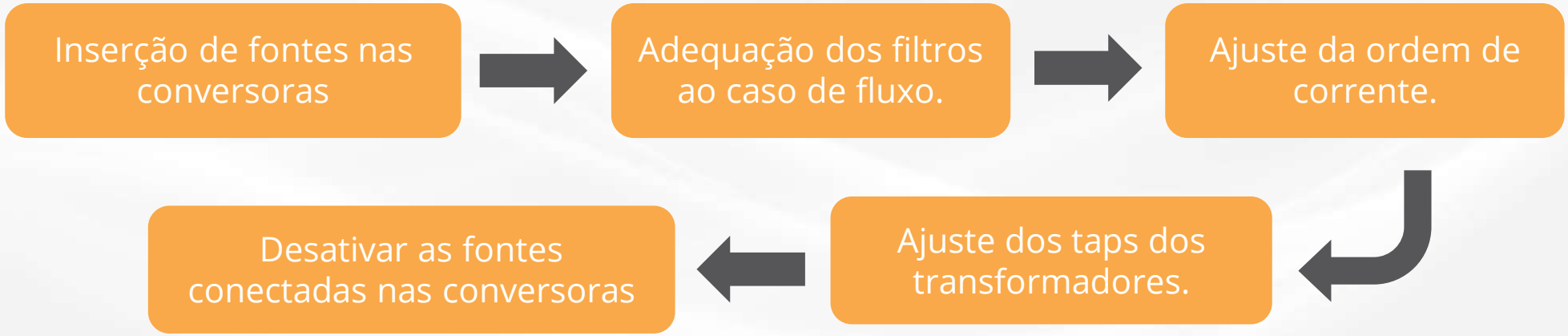
Taps dos transformadores da retificadora

Taps dos transformadores da inversora



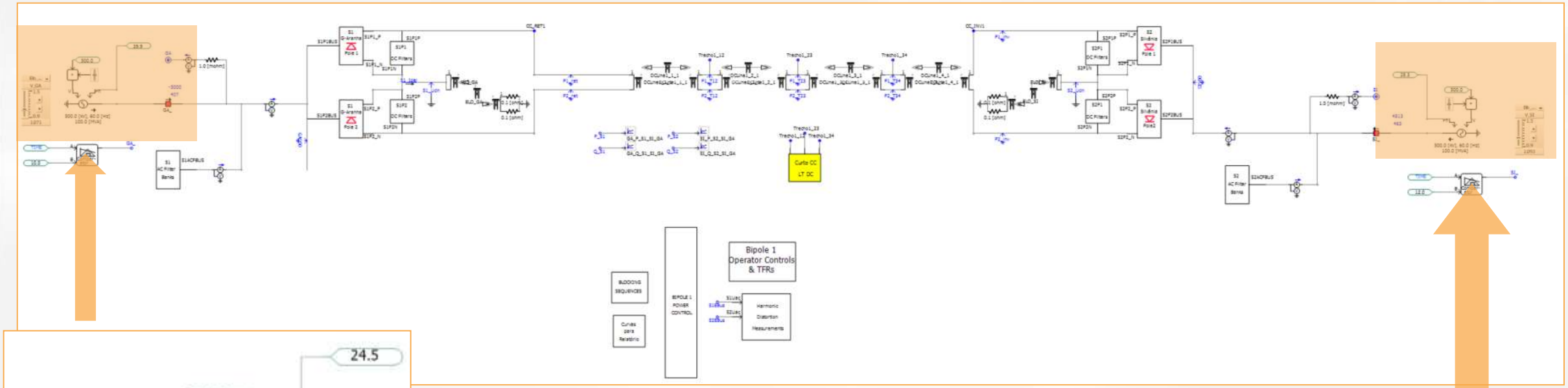
Configuração e Inicialização do Elo de GA - SI

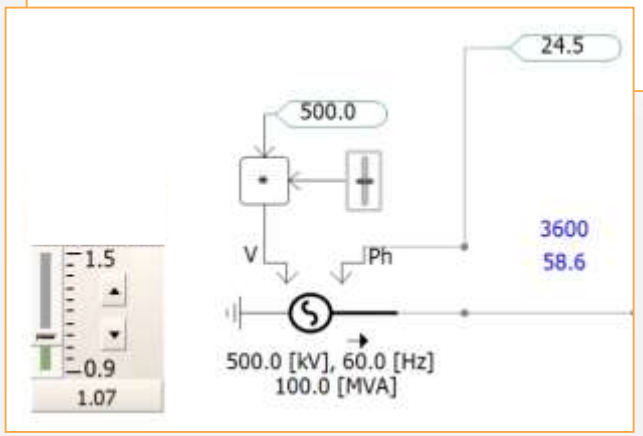
- 5 Etapas são utilizadas para configurar e inicializar o Elo.



Configuração e Inicialização do Elo de GA - SI

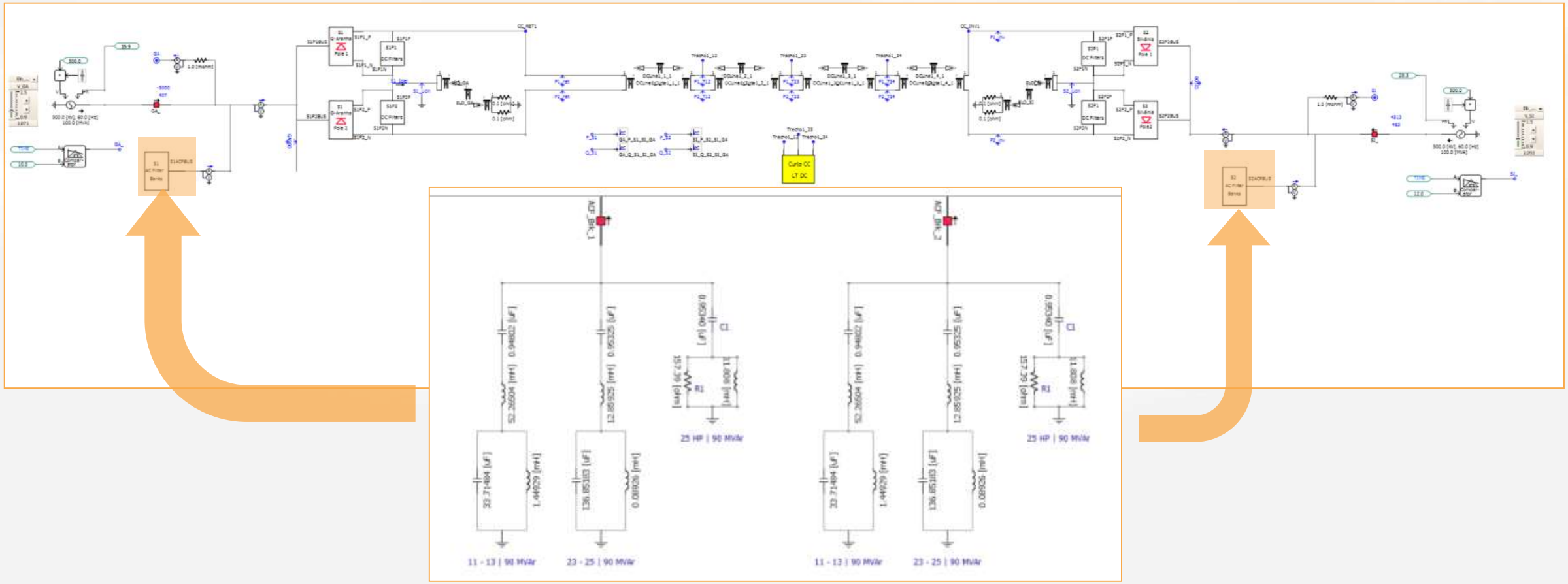
- Realizar ajustes nas fontes de tensão.





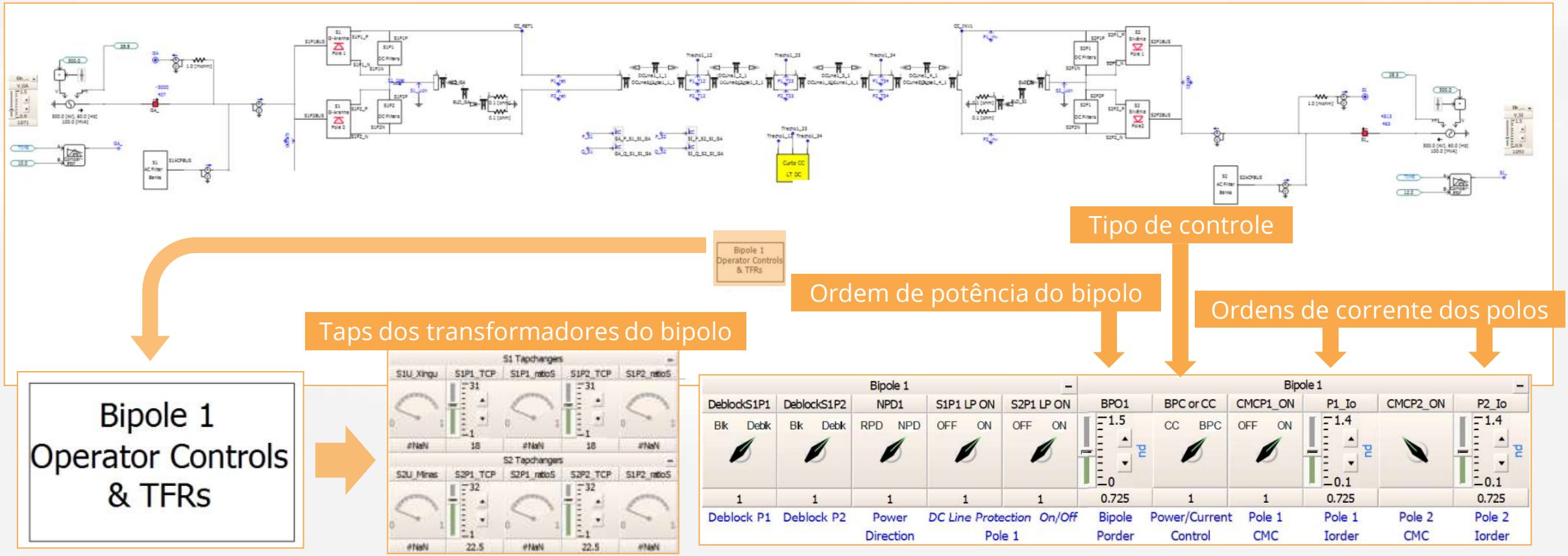
Configuração e Inicialização do Elo de GA - SI

- Realizar ajustes nos filtros.



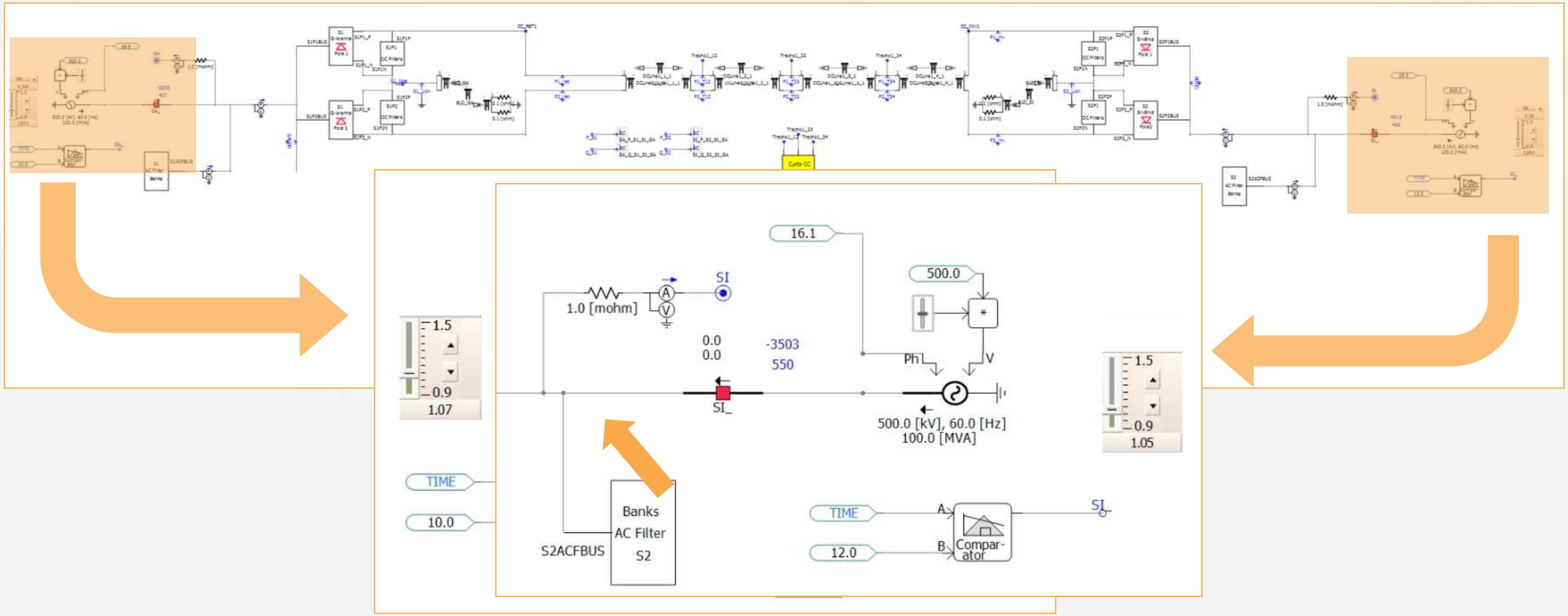
Configuração e Inicialização do Elo de GA - SI

- Realizar ajustes nas Iord e nos taps dos transformadores.



Configuração e Inicialização do Elo de GA - SI

- Desativar as fontes conectadas nas conversoras.



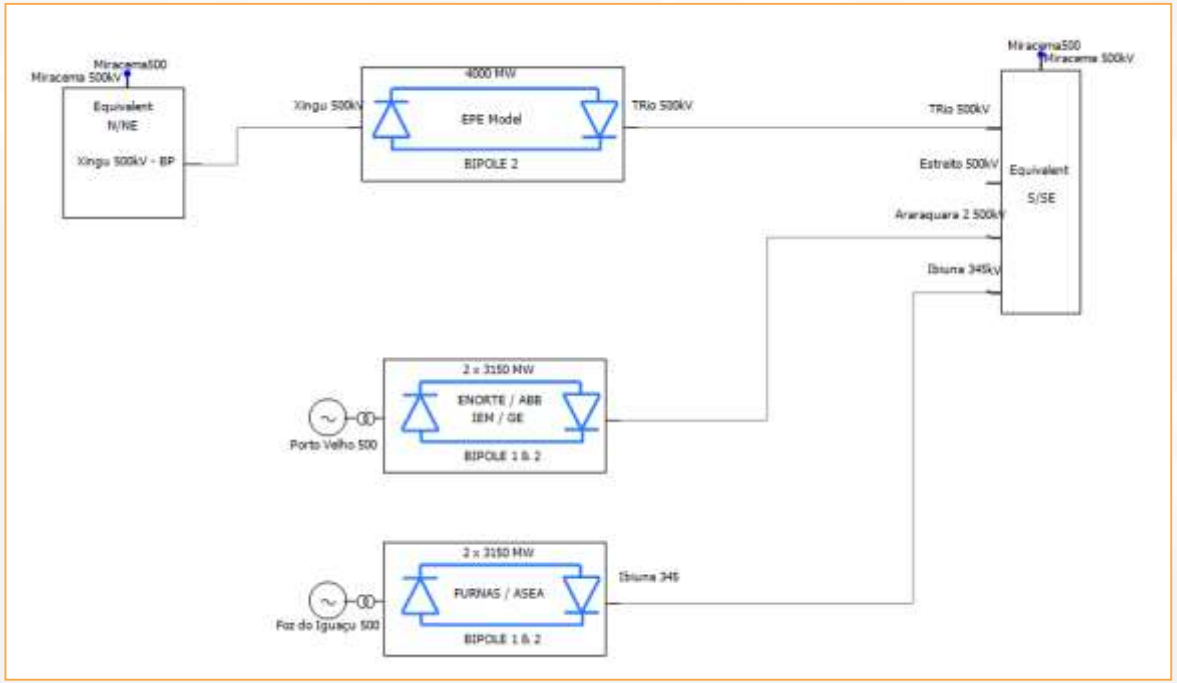
Configuração e Inicialização do Elo de GA - SI

- Comentários:
  - Ajustes nas ordens de corrente:
    - Ajuste da potência ativa do elo.
  - Ajustes nos taps dos transformadores e nos shunts:
    - Ajuste da potência reativa do elo.

Tempo de simulação: XG - ES e XG - TR

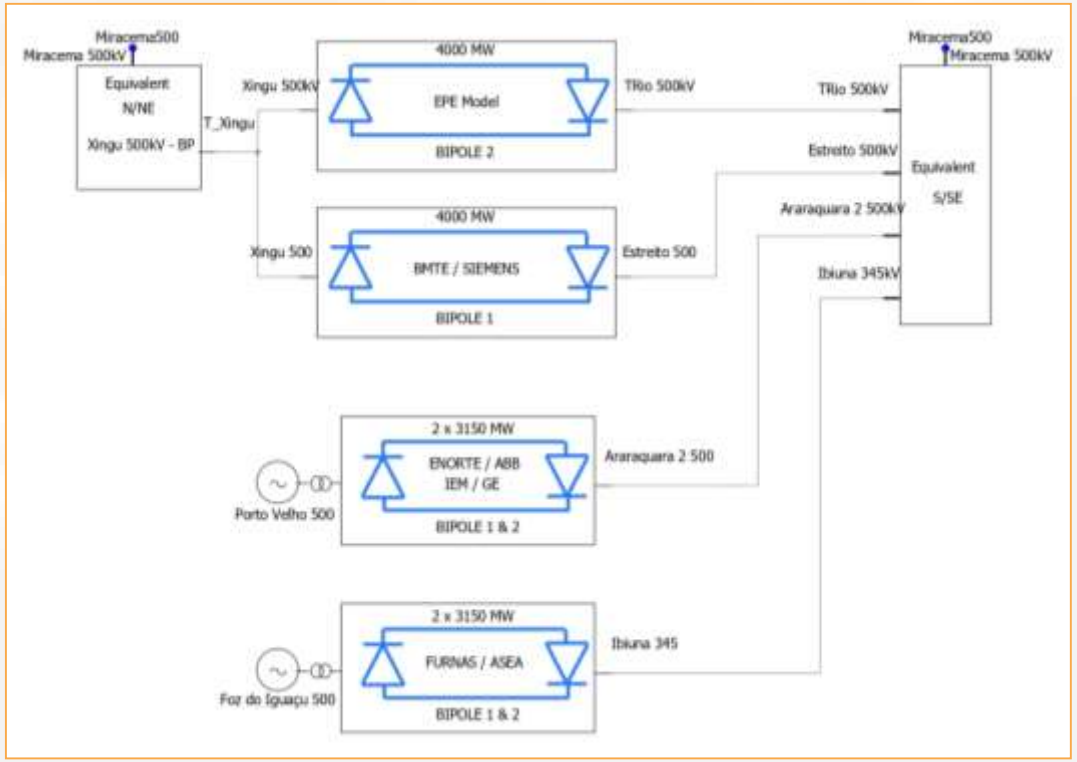
XG - TR:

- Snapshot: 30 segundos.
- Tempo: 13 horas.



XG - ES:

- Snapshot: 20 segundos.
- Tempo: 10 horas.



Tempo de simulação: Graça Aranha - Silvânia

- Snapshot: 20 segundos.
- Tempo:
  - I5: 18 horas e 20 minutos;
  - I9: 5 horas.

I5	I9	Diferença (%)
tempo (min)		
1100	300	267%

Tabela 16-1 – Testes de performance do modelo para simulação de 1 segundo de simulação

Configurações de máquina	Compilador	Tempo de execução
Processador: Intel® Core™ i5-7600T CPU @ 2.80 GHz 2.81 GHz RAM instalada: 16 GB	Intel® Fortran (oneAPI)	55 minutos
Processador: Intel® Core™ i9-12900K 3.19GHz RAM instalada: 16 GB	Intel® Fortran (oneAPI)	15 minutos

Comparação do tempo de simulação

- Interações entre as máquinas.
- Interações entre as máquinas e os elos.
- Interações entre as máquinas e a rede estática.

	Comparação			
	XG - ES	GA - SI	Diferença	Porcentagem
Barras	110	370	260	236%
Linhas	130	333	203	156%
Transformadores	60	171	111	185%
Geradores	20	47	27	135%
Estáticos	1	2	1	100%
Bipolos	5	7	2	40%

	Comparação			
	XG - TR	GA - SI	Diferença	Porcentagem
Barras	185	370	185	100%
Linhas	148	333	185	125%
Transformadores	75	171	96	128%
Geradores	33	47	14	42%
Estáticos	1	2	1	100%
Bipolos	4	7	3	75%

	GA - SI	XG - TR	XG - ES	Diferença (%) GA - SI x XG - TR	Diferença (%) GA - SI x XG - ES
Snapshot (s)	20	30	20	-33%	0%
Tempo (h)	18.33	13	10	41%	83%
Modelos de máquinas	46	20	13	130%	254%

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