Generator Parallel Operation and MVar loading

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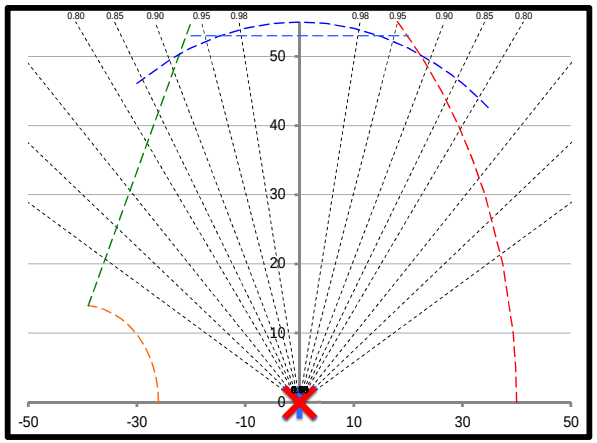
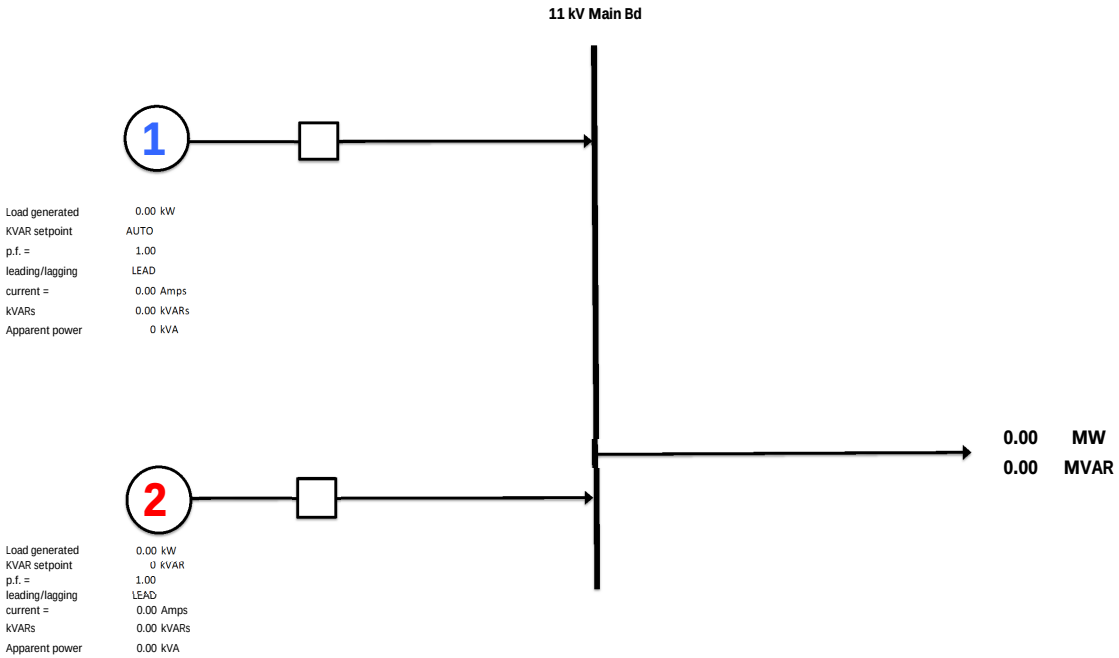
Introduction

- This presentation is designed to demonstrate the most efficient method of MVar sharing between multiple generators connected to a common busbar.
- It uses a mini grid with 2 generators and a system load (demand) of 56.5 MW +31.7 MVar.
- The 2 generating units are unevenly loaded at 39.5 and 17 MW respectively.

Multiple Generators supplying Reactive Power in Parallel



Imagine a mini power grid which supplies a single transmission feeder to a factory or similar load.



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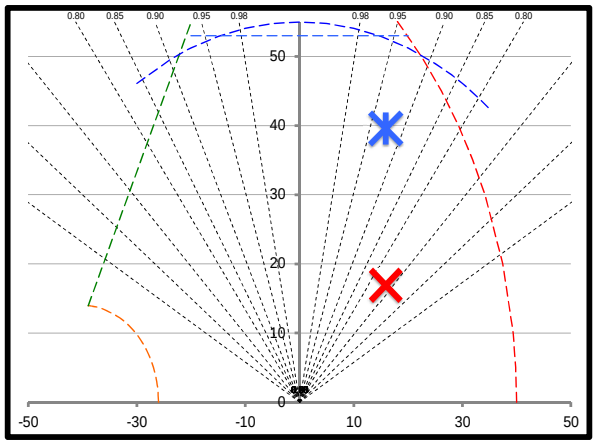
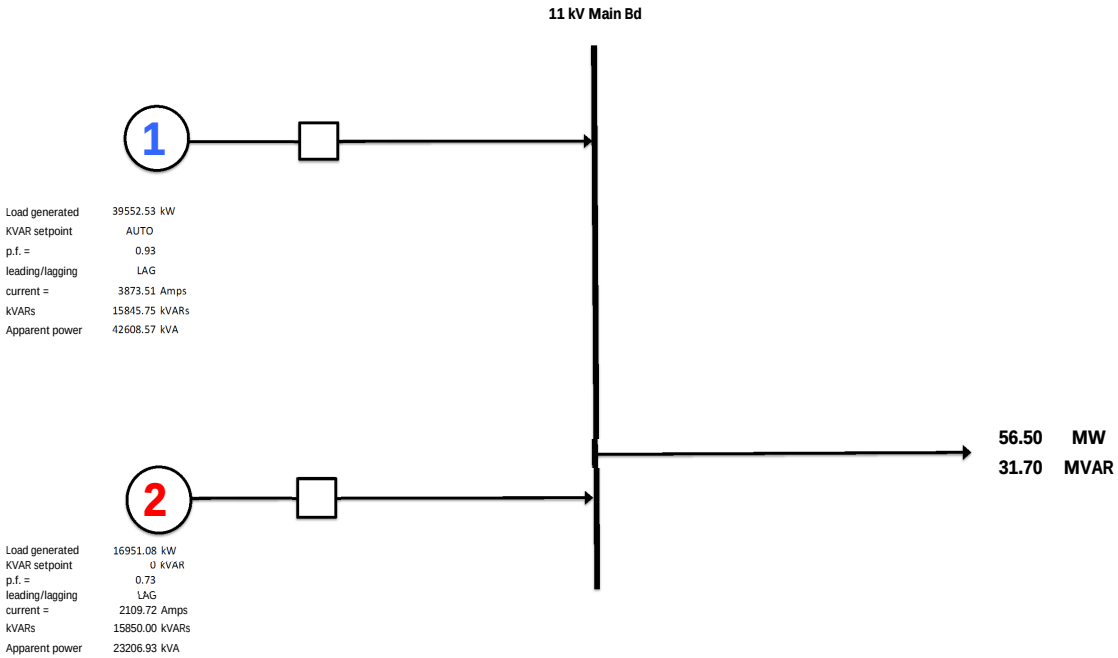


Assume we have a demand (Load) of 56.5 MW which also consumes 31.7 Mvar.



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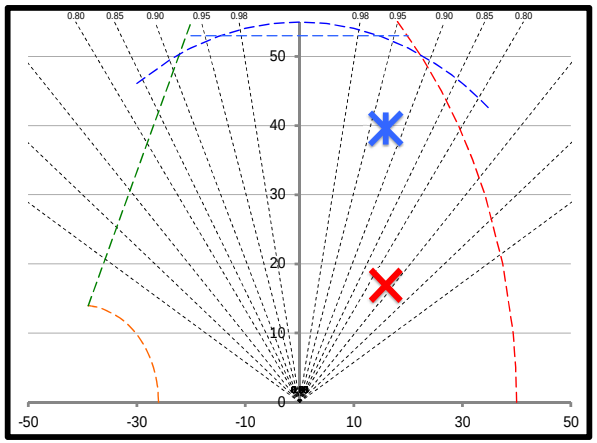
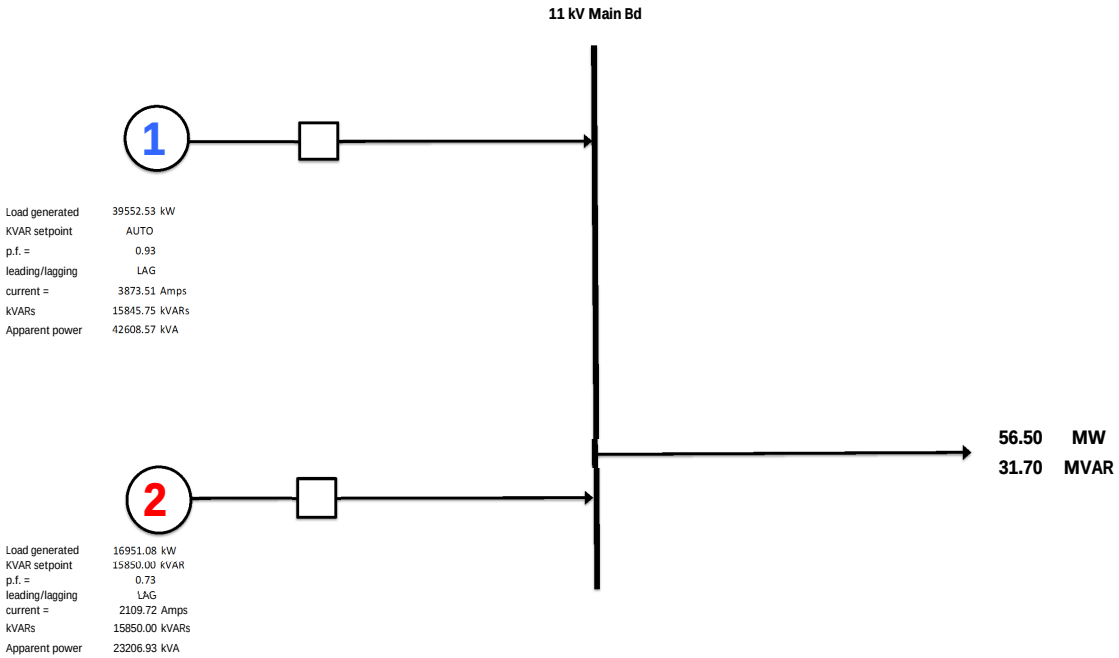


First step is given the real power (56.5 MW) and reactive power (31.7 Mvar) find the Apparent power (MVA)

$$\text{Apparent power} = \sqrt{\text{true power}^2 + \text{reactive power}^2}$$

$$\text{Apparent power} = \sqrt{56.50^2 + 31.70^2}$$

$$\text{Apparent power} = 64.78 \text{ MVa}$$



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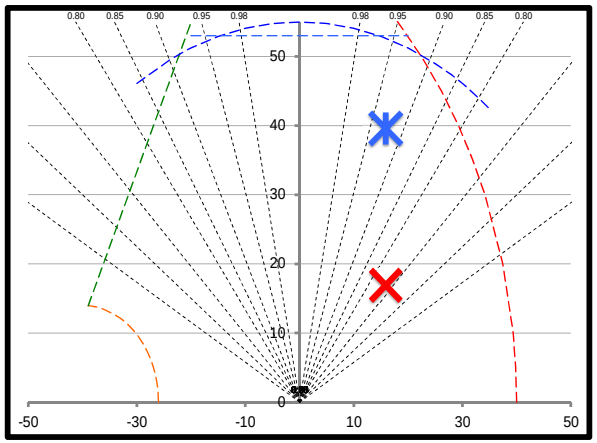
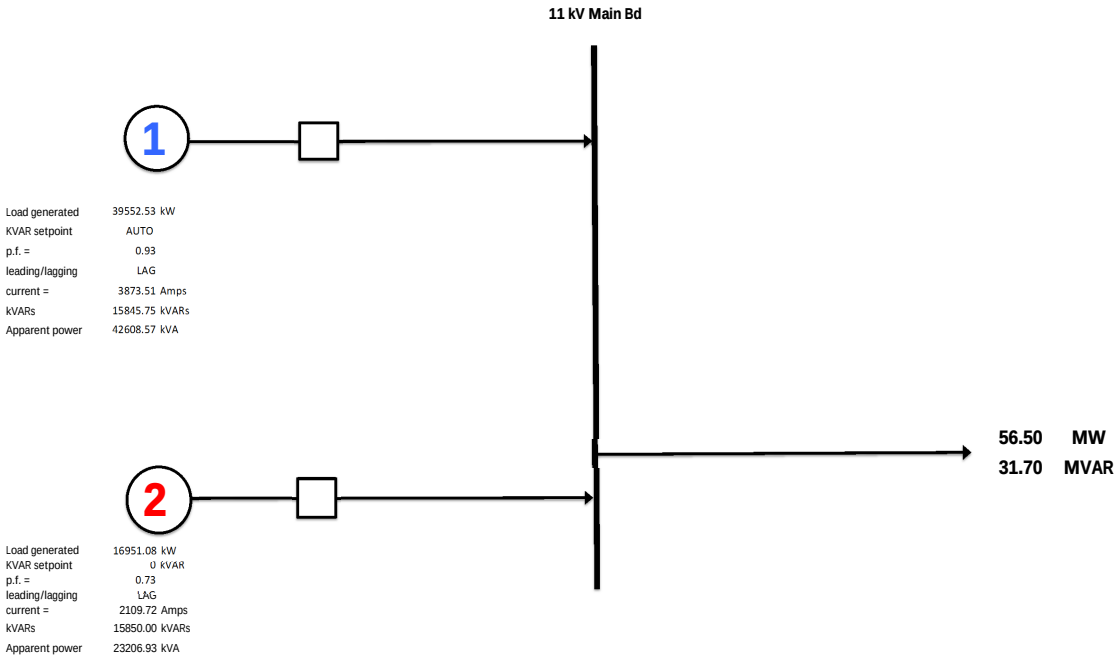


Second step take the Real Power (MW) and Apparent power (MVA) and find the Power Factor (p.f.)

$$\text{p.f.} = \frac{\text{Real power}}{\text{Apparent power}}$$

$$\text{p.f.} = \frac{56.50}{64.78}$$

$$\text{p.f.} = 0.872$$



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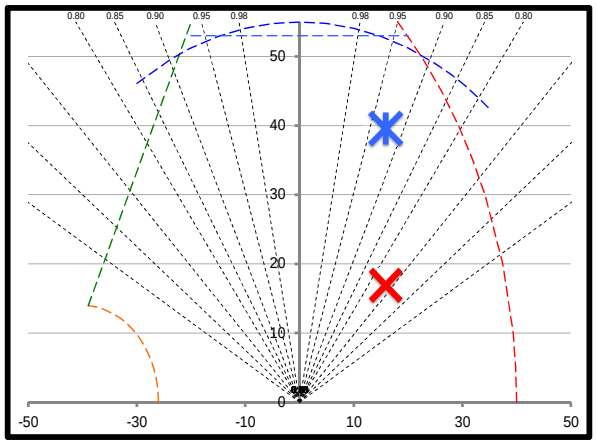
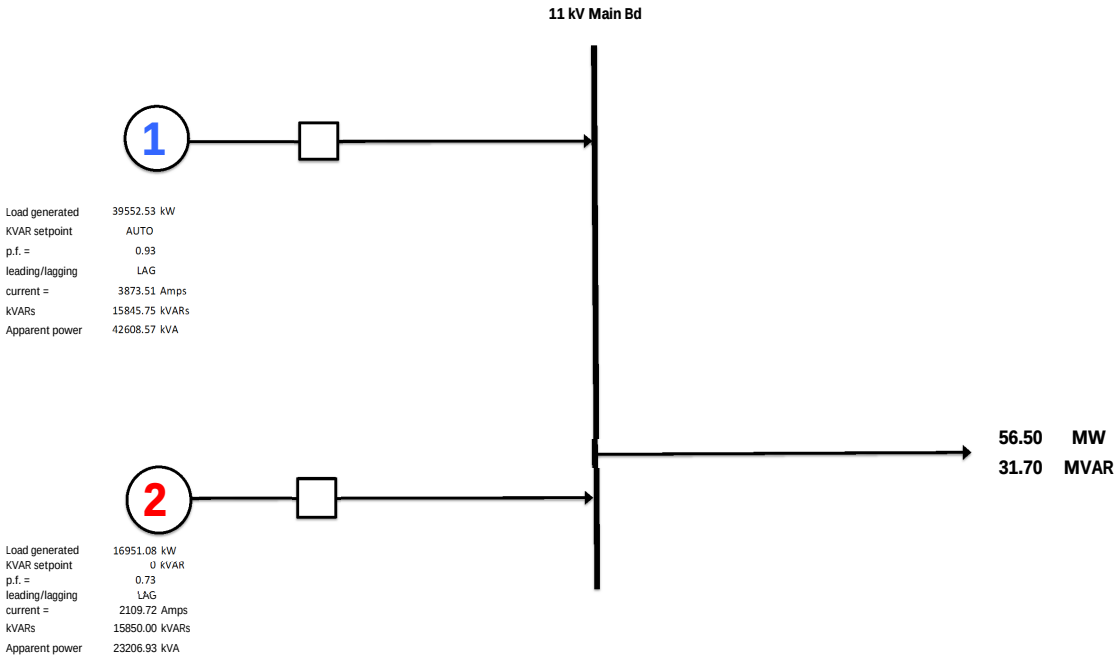


Third step is to use the above information and the system voltage (11000 V) to find the current flow (Amps) that must be supplied by the generators on line to meet demand.

$$\text{Current flow} = \frac{\text{Real power (W)}}{\text{voltage (V)} \times \text{p.f.}}$$

$$\text{Current flow} = \frac{56500000}{11000 \times 0.872}$$

$$\text{Current flow} = 5889.67 \text{ Amps}$$



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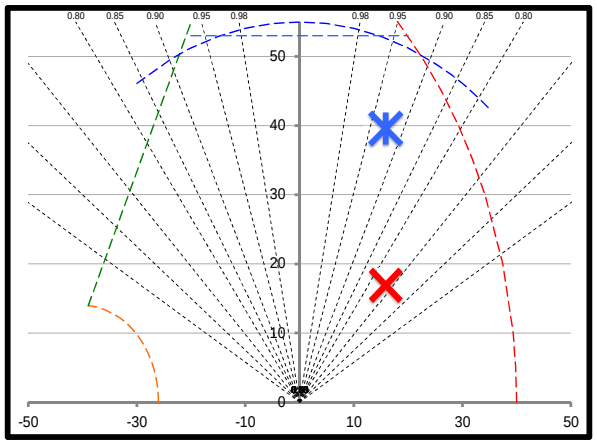
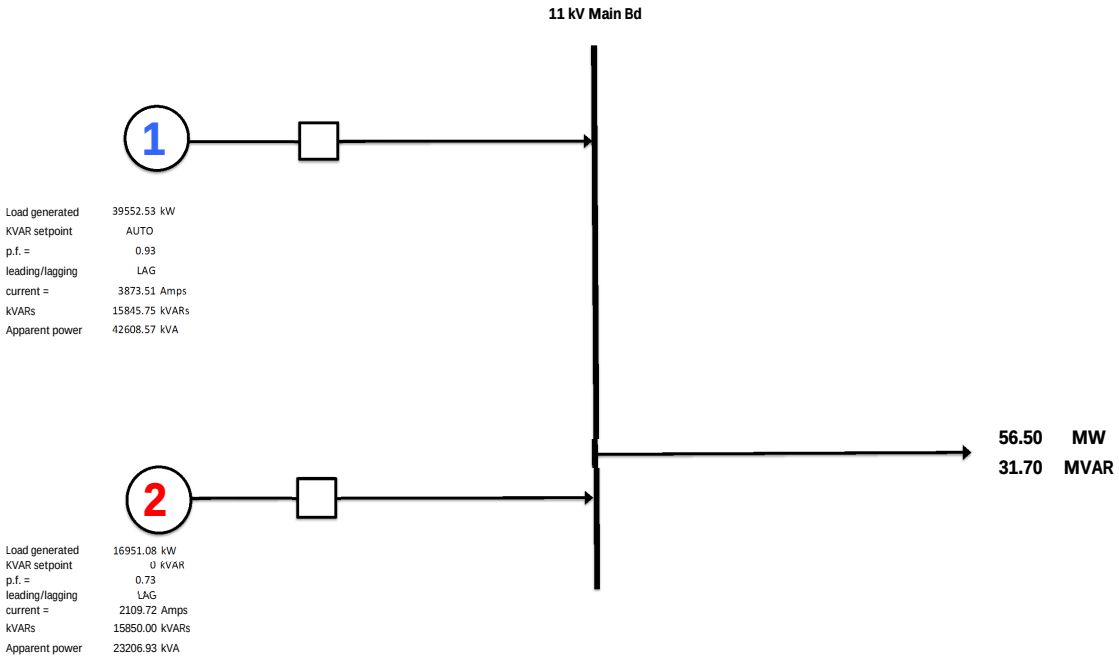


Therefore the real power demand (56.6 MW) and Reactive power demand (31.7 Mvar) can be met by generating 5889.67 Amps at 11000V.

$$\text{Current flow} = 5889.67 \text{ Amps}$$



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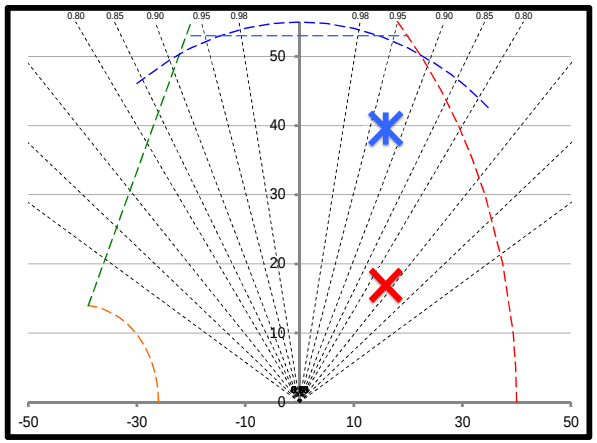
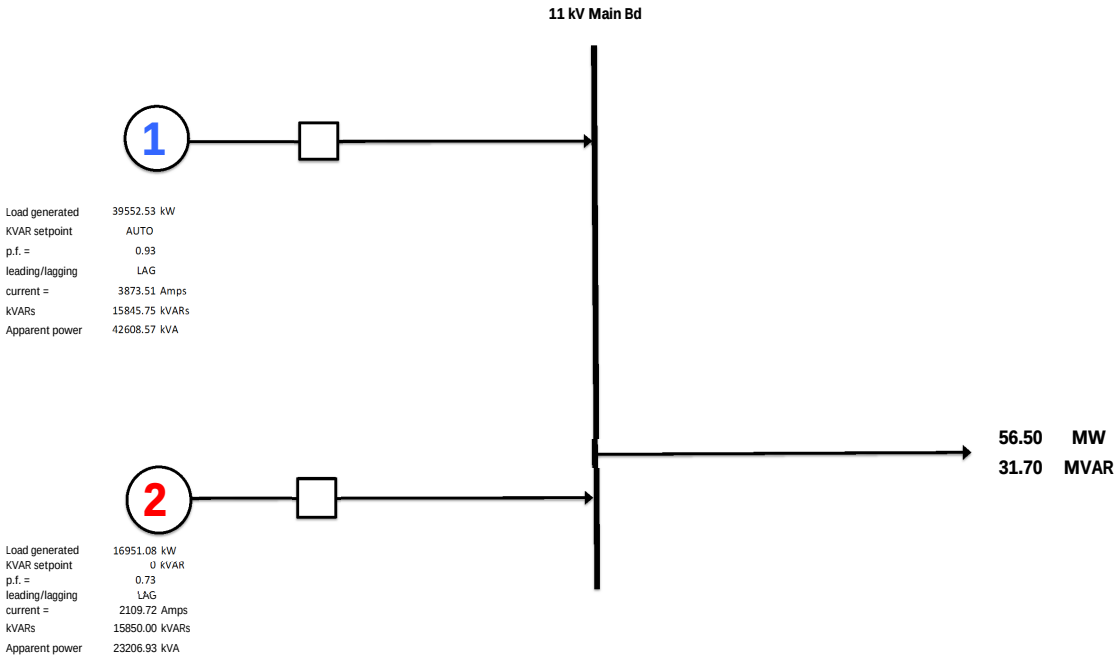
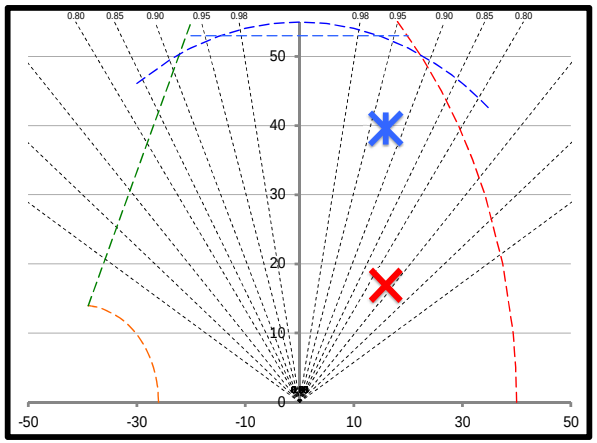


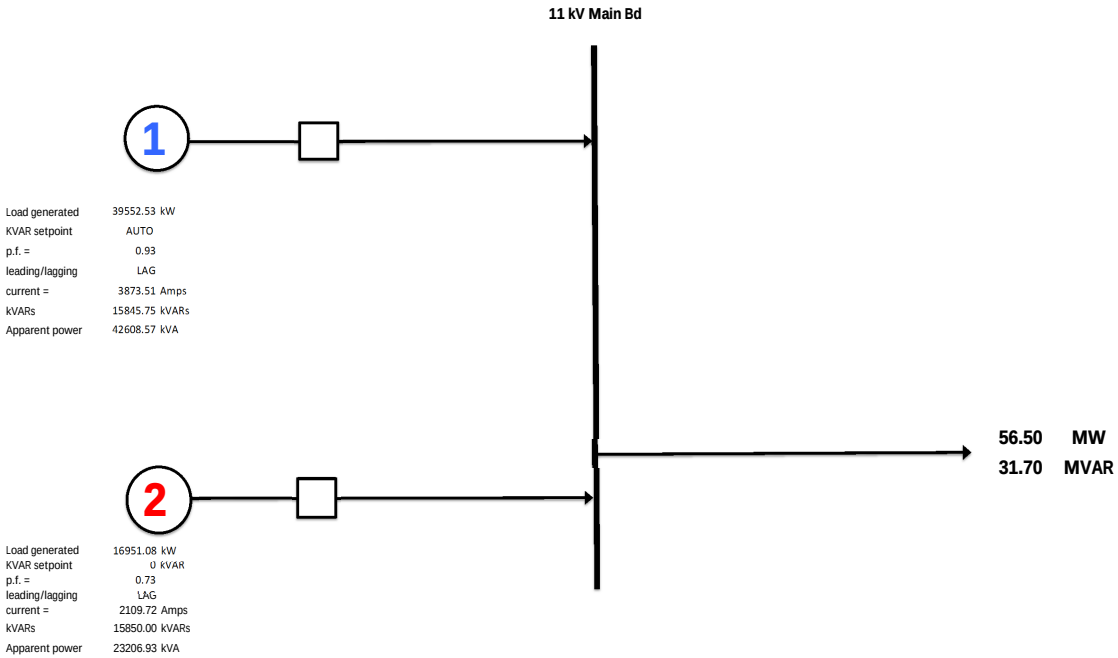
To provide this load we have 2 generators (Unit 1 and Unit 2).



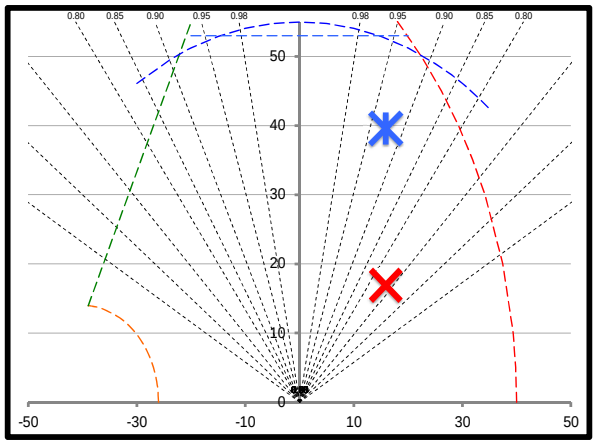
Multiple Generators supplying Reactive Power in Parallel



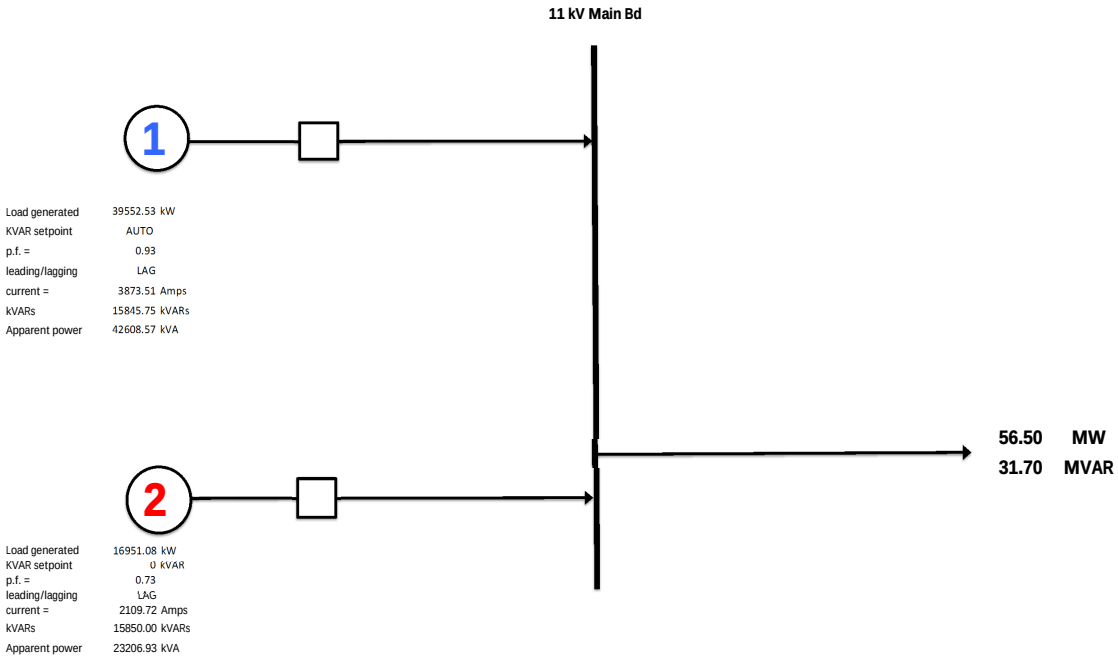
Unit 1 is generating 39.5 MW with AVR on AUTO.



Multiple Generators supplying Reactive Power in Parallel



Unit 2 is generating 17 MW with AVR on MANUAL.



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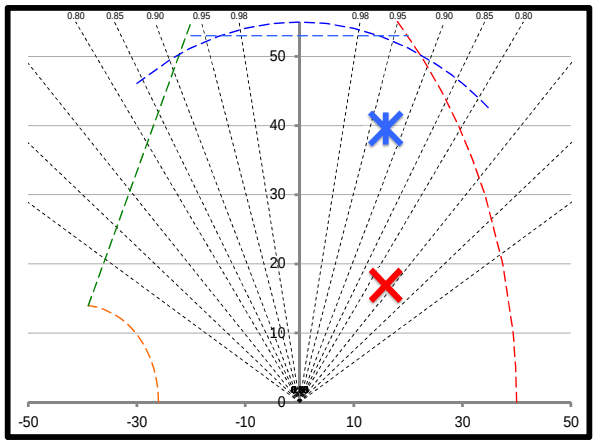
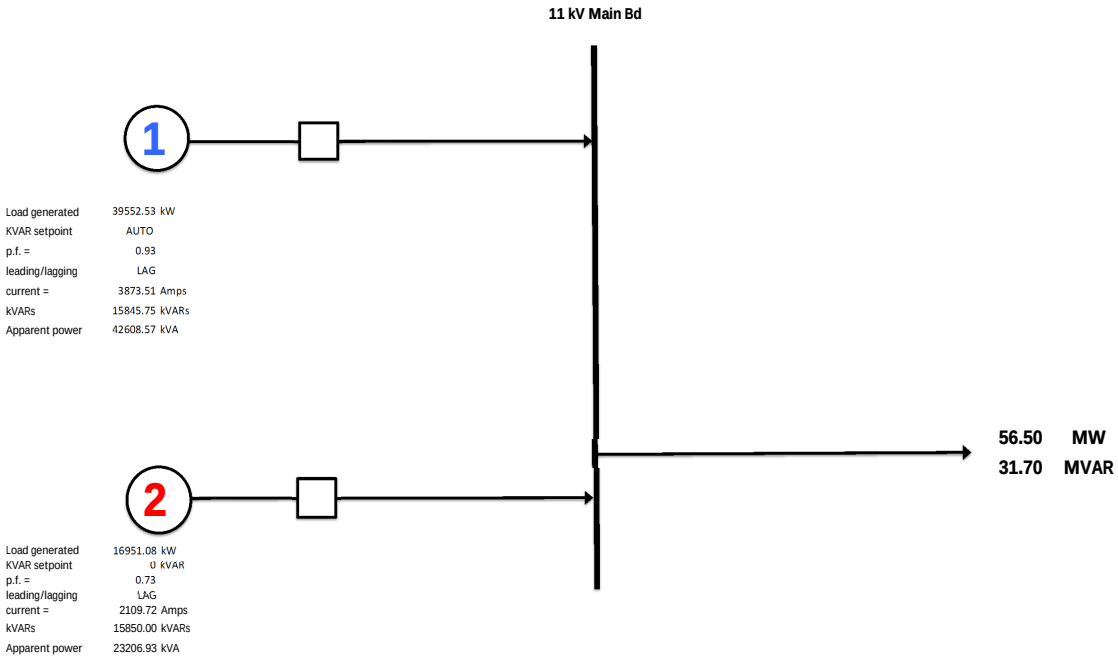


Between Unit 1 and Unit 2 - 31.7 Mvar must also be generated.



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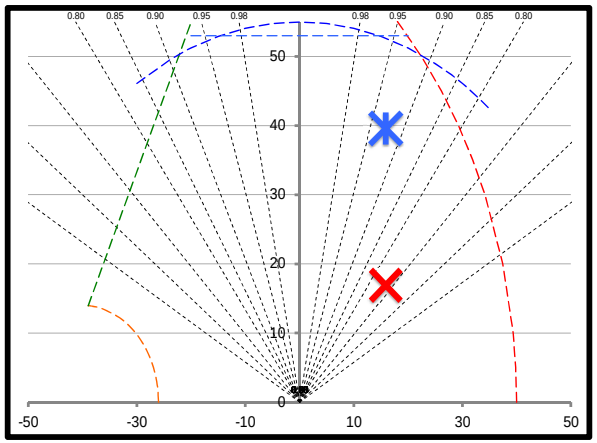
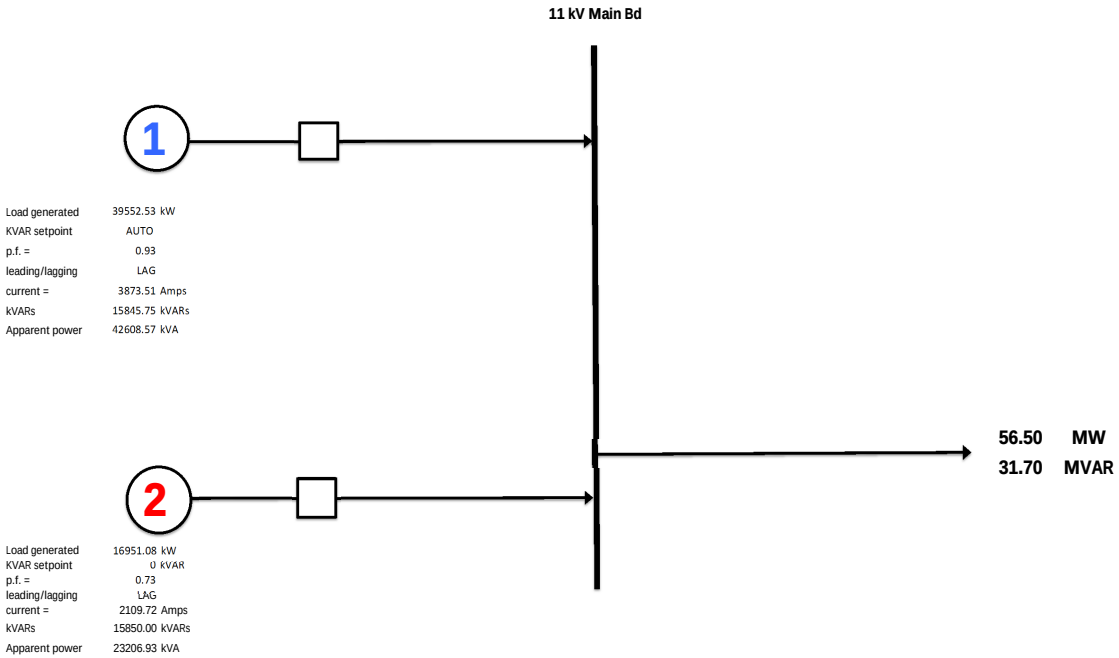


NOTE: The machines are running at there most efficient when the combined current of both machines is least.



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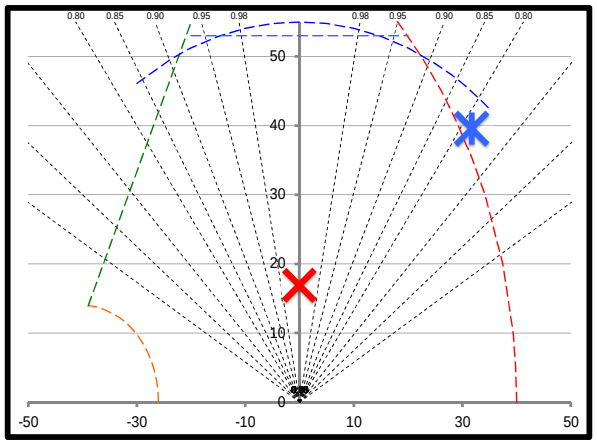
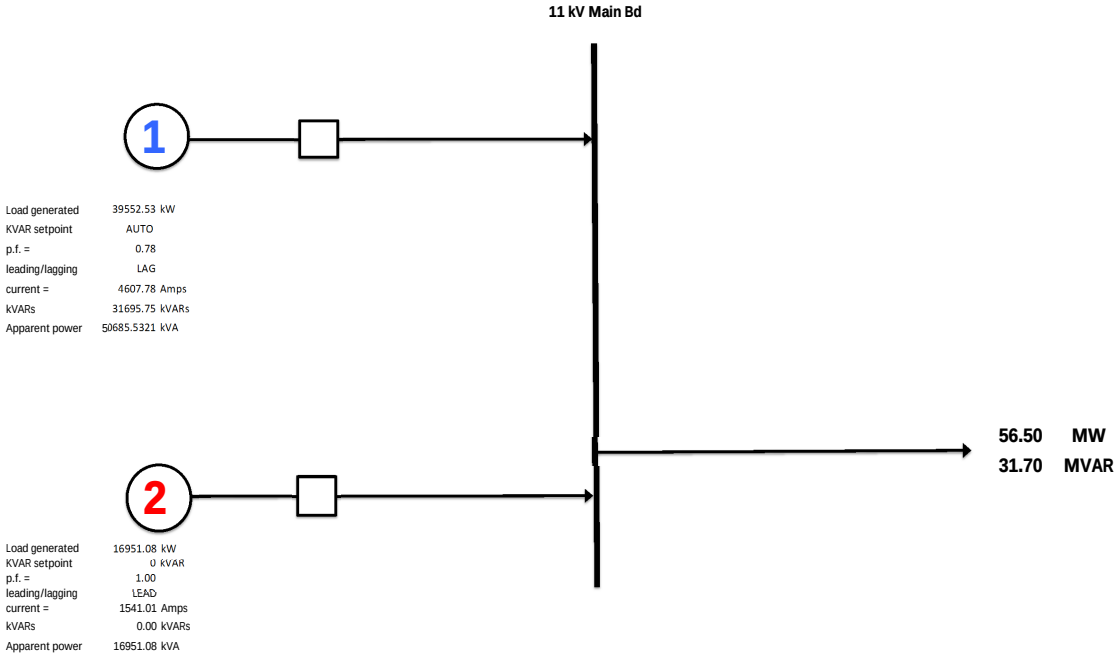


Let's start by setting Unit 2 AVR Mvar setpoint to 0 Mvar (i.e. a power factor of 1). See results in table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01



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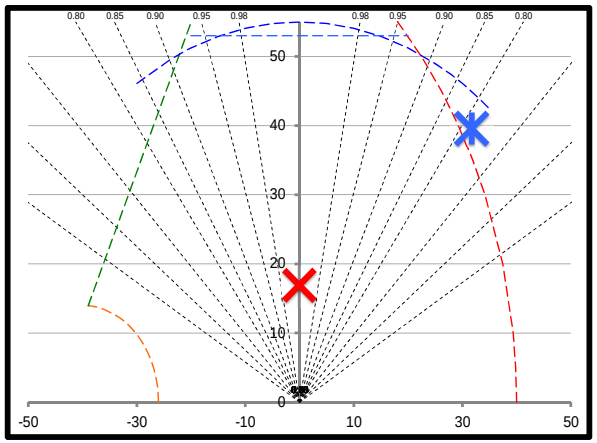
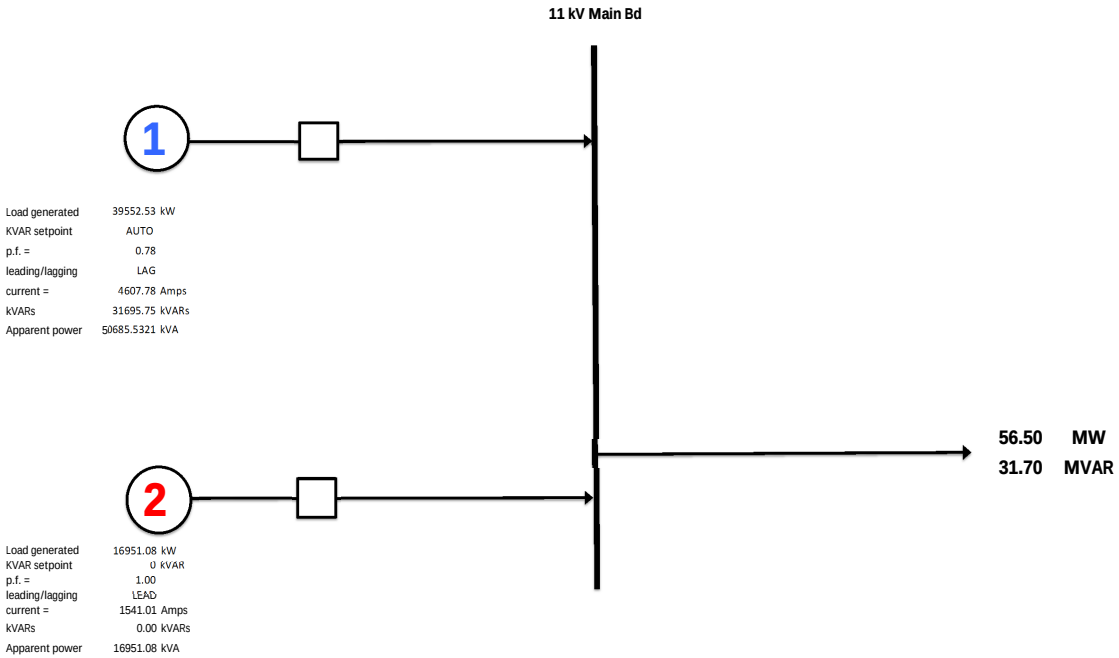


NOTE: Setting Unit 2 to 0 Mvar causes Unit 1 operating point to be outside the limits of the capability diagram.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01



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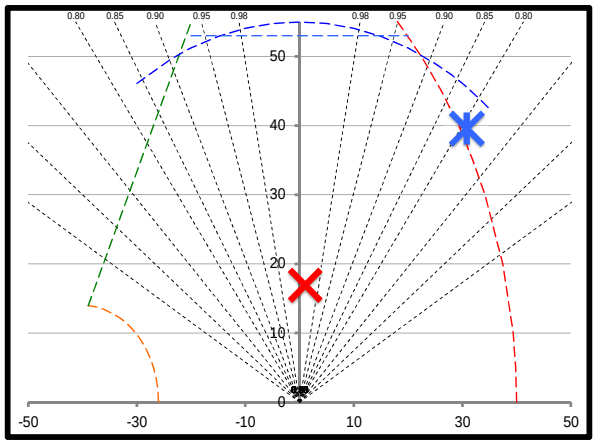
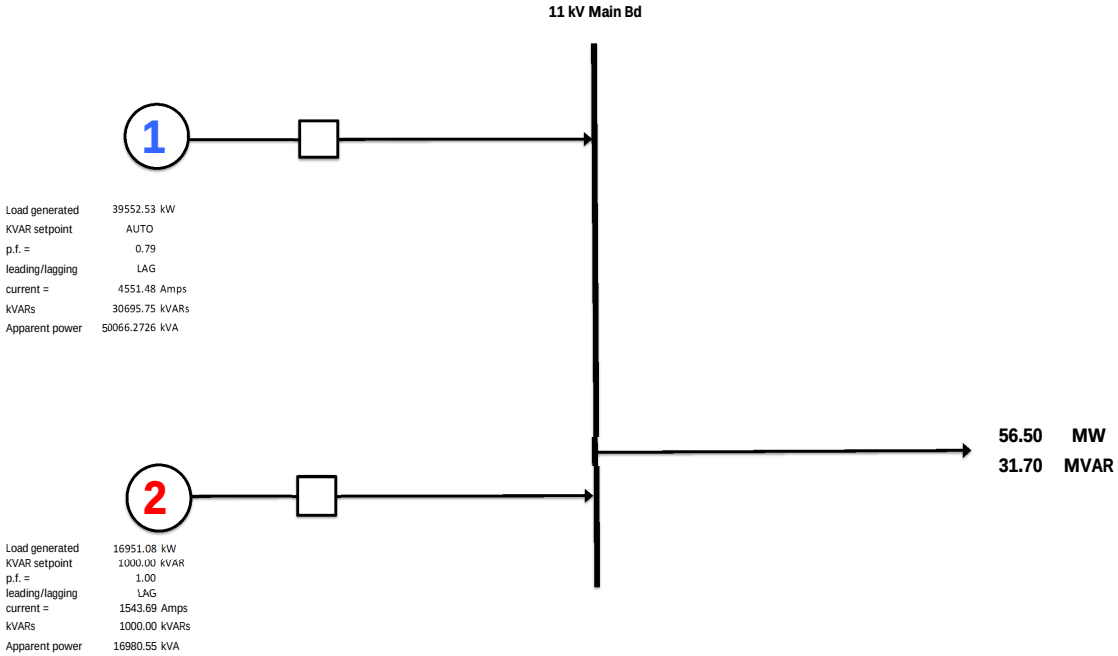


Let's increase Unit 2 AVR Mva setpoint to +1 Mvar. Unit 1 will automatically respond by reducing its Mvar setpoint to ensure the same total is exported to meet demand.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69



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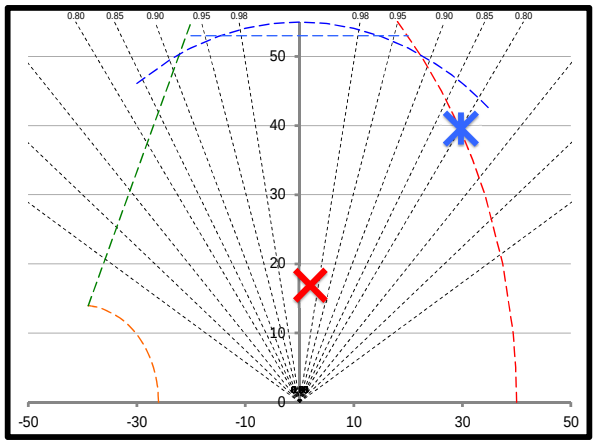
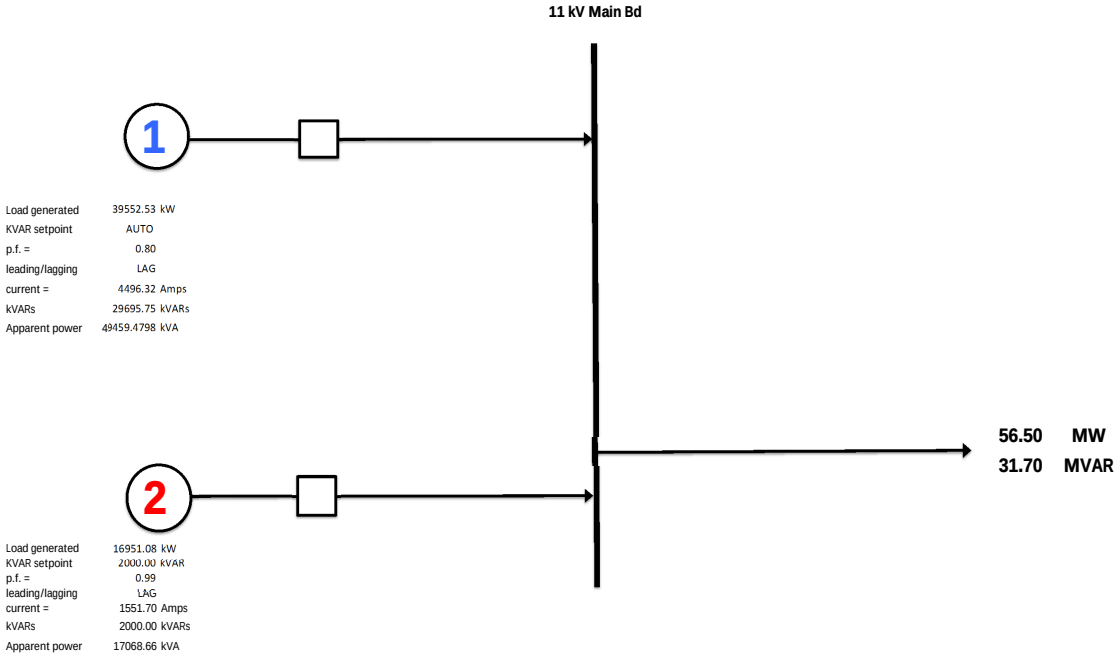


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70



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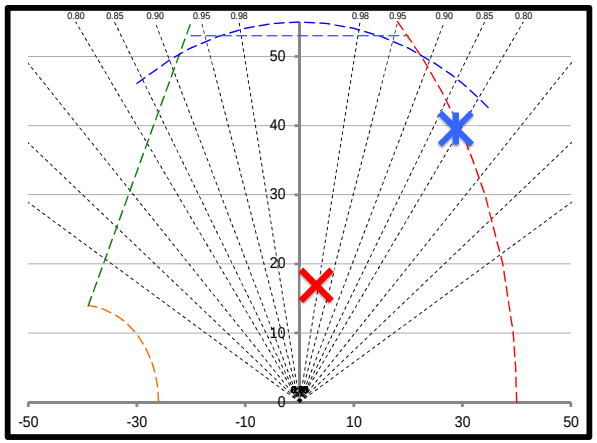
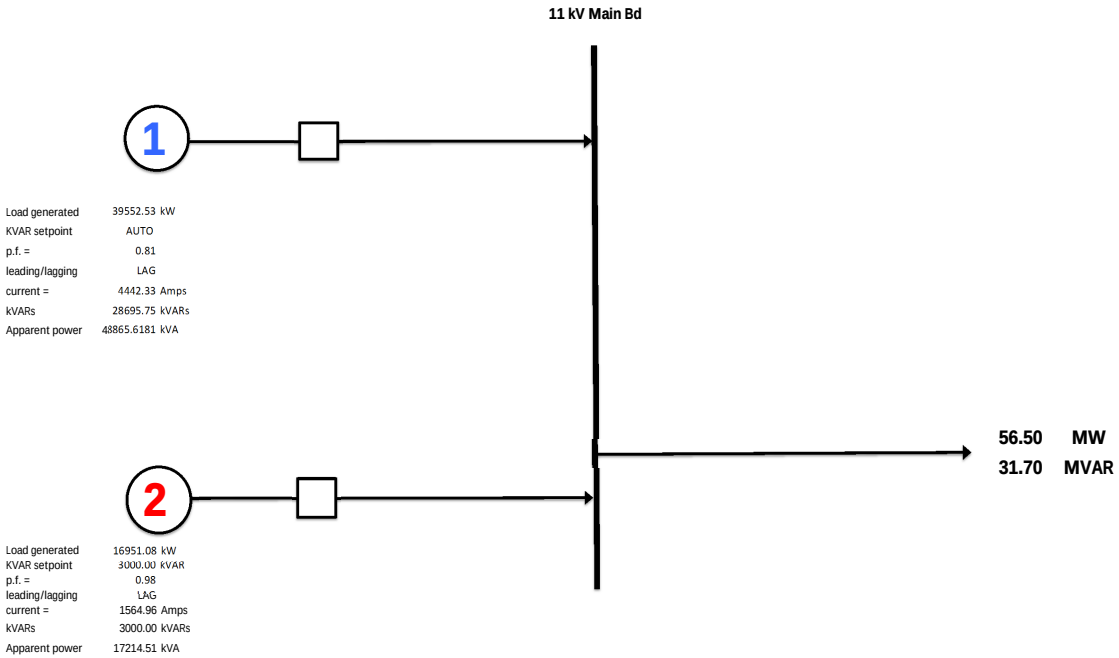


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96



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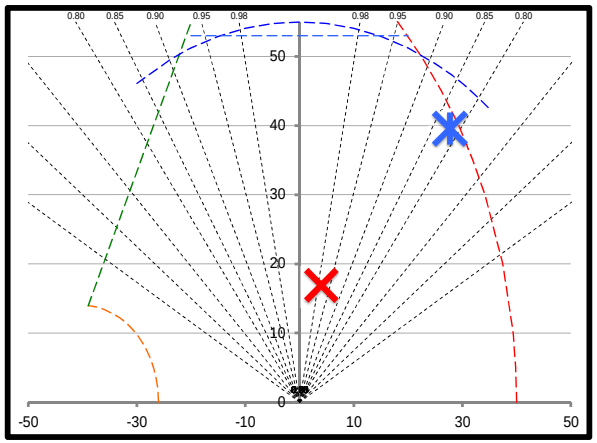
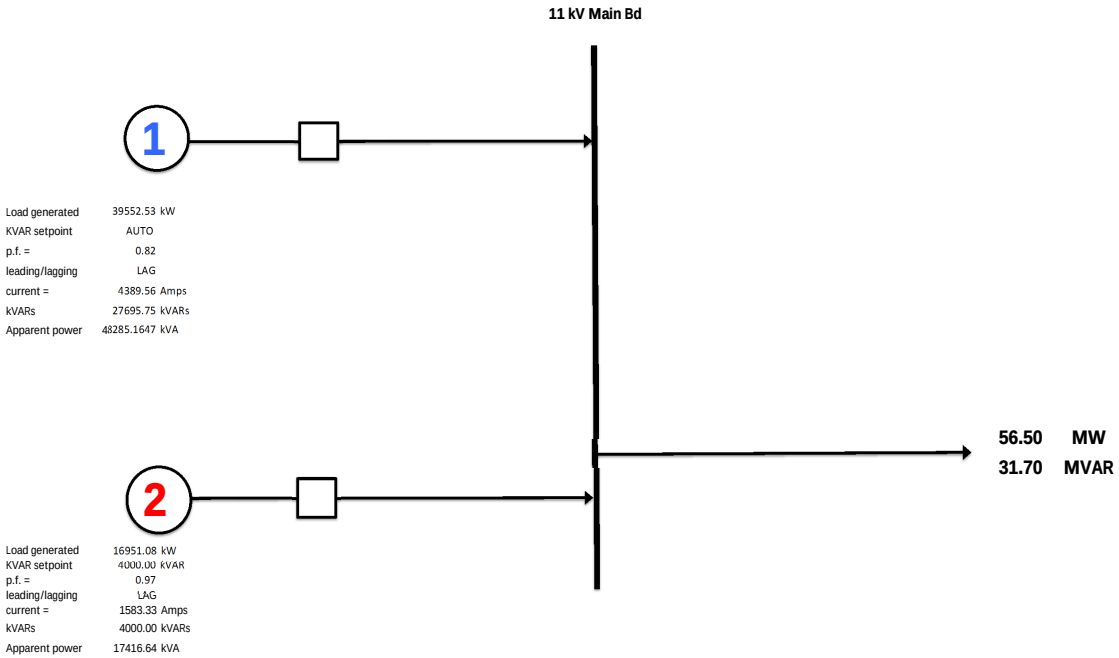


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33



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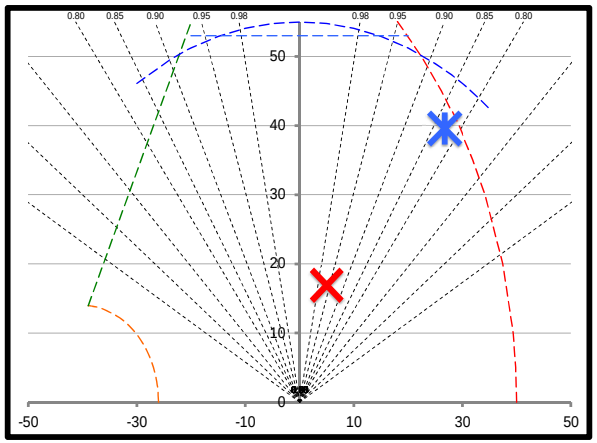

Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
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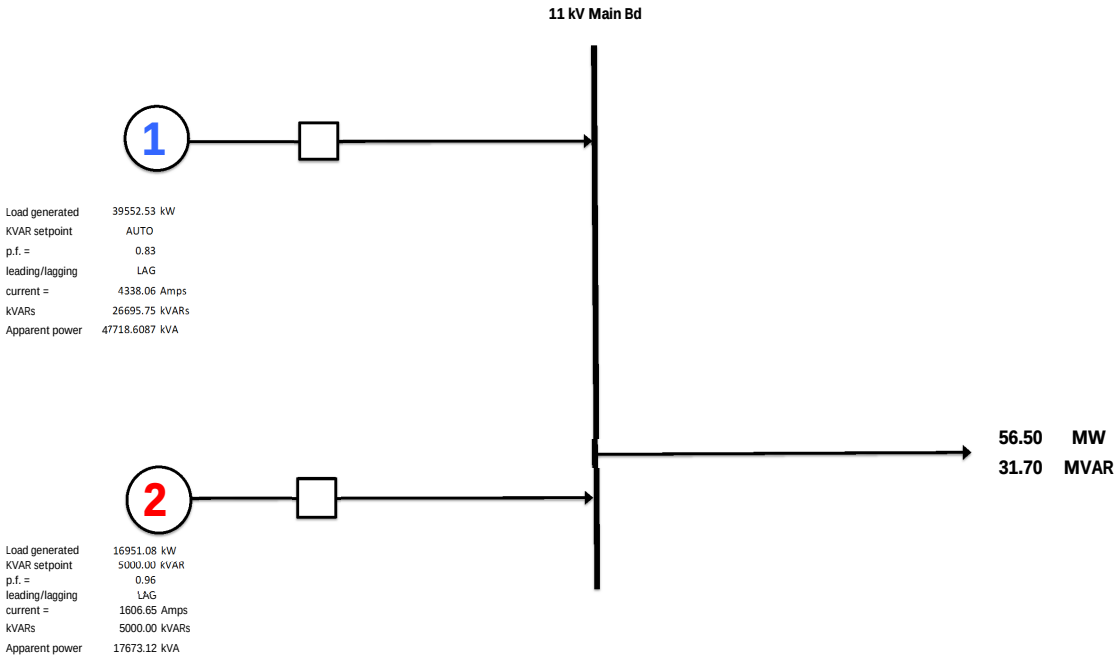
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65



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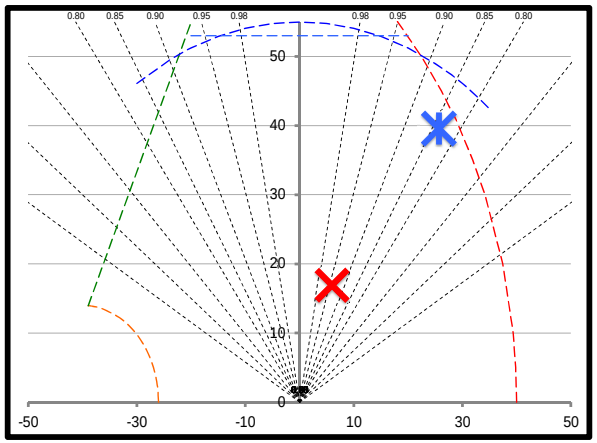

Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
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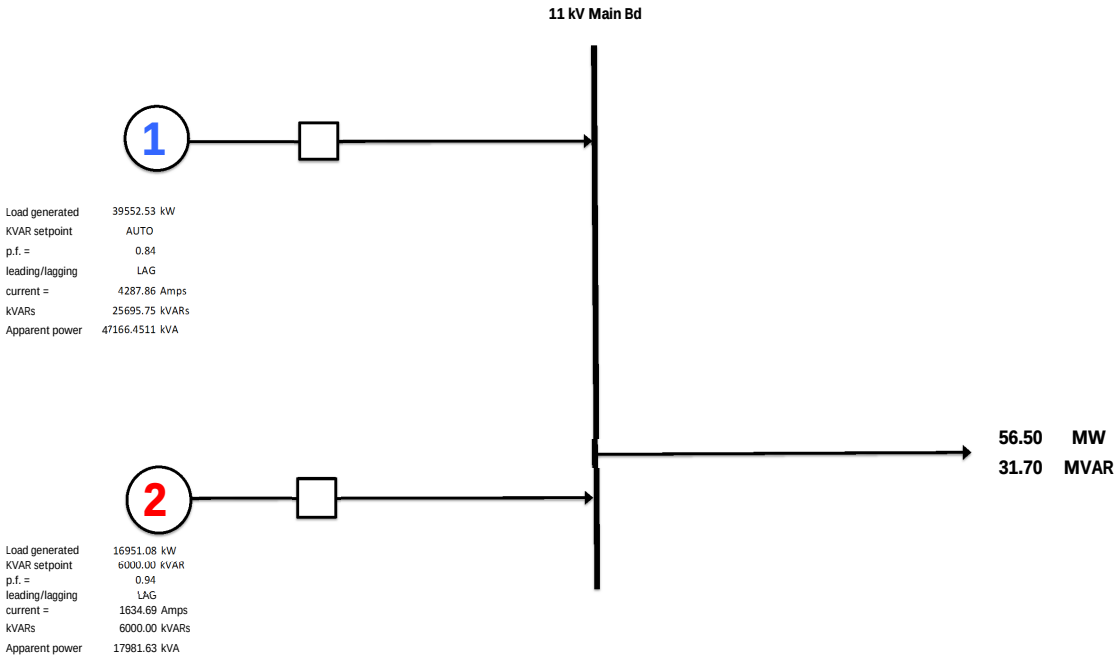
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69



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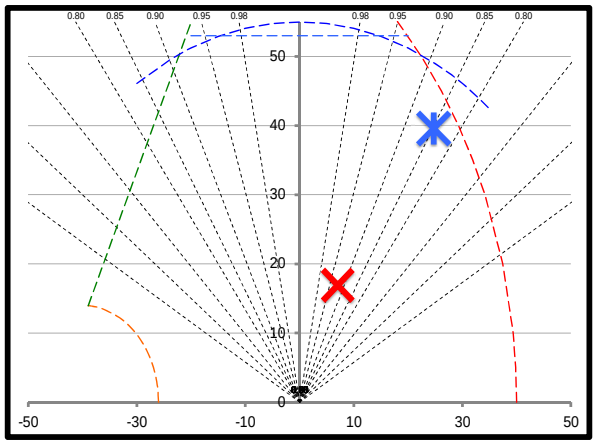

Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

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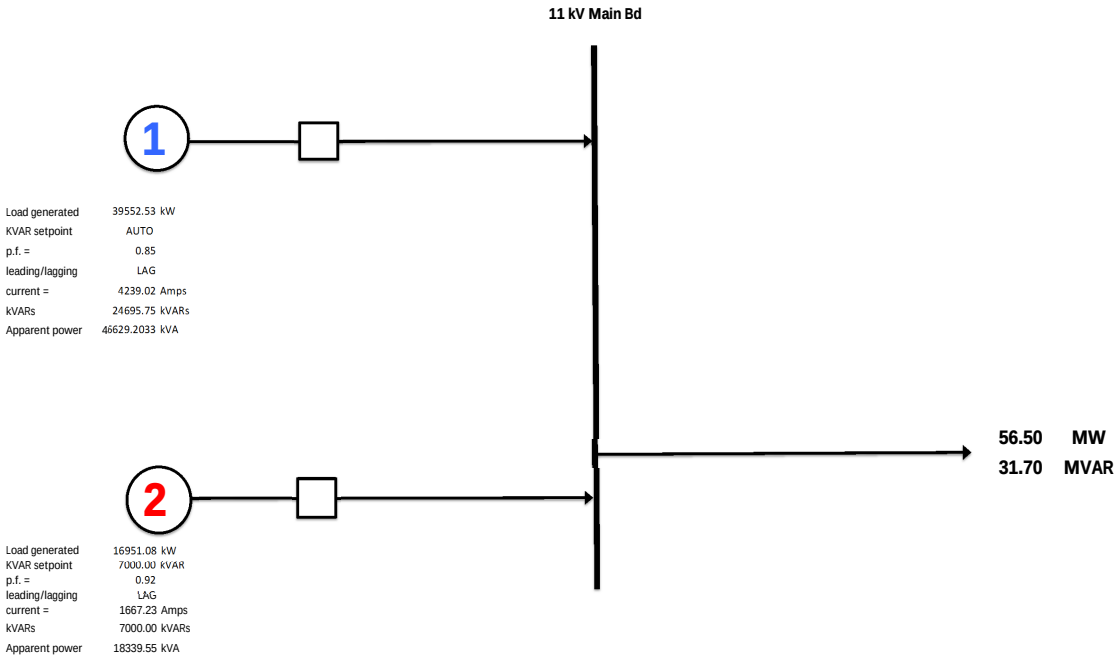
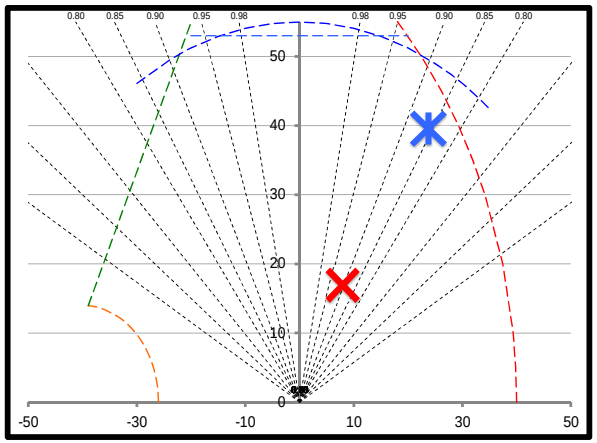
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23

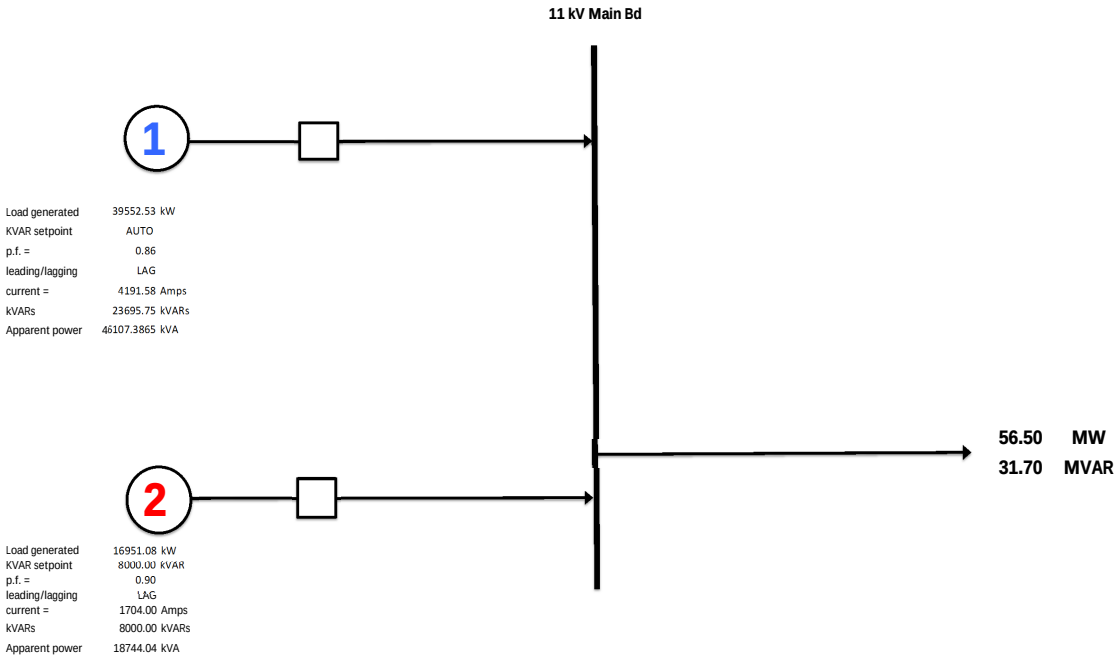


Multiple Generators supplying Reactive Power in Parallel

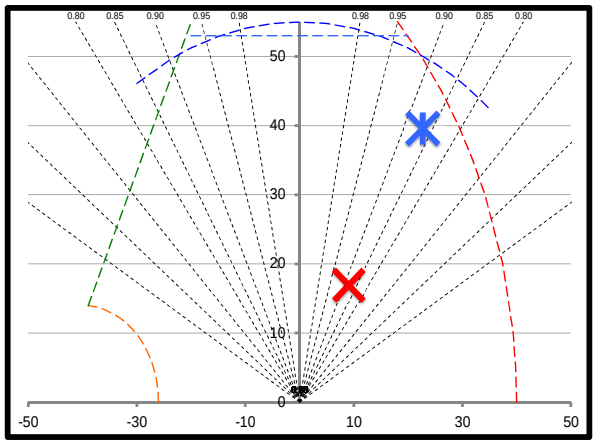


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00

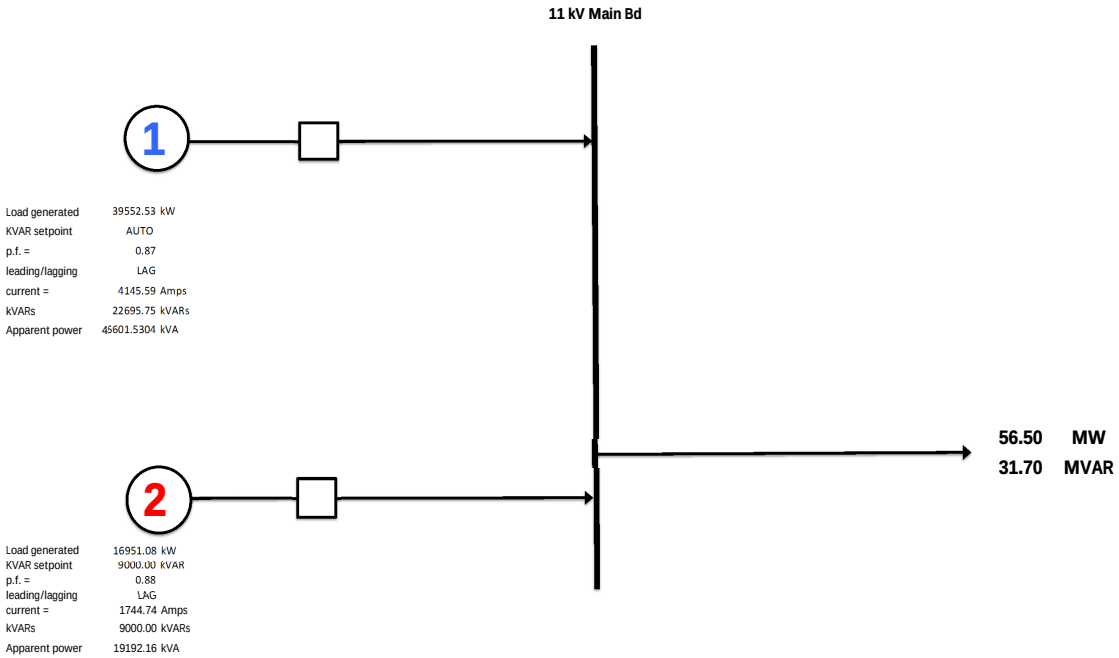


Multiple Generators supplying Reactive Power in Parallel

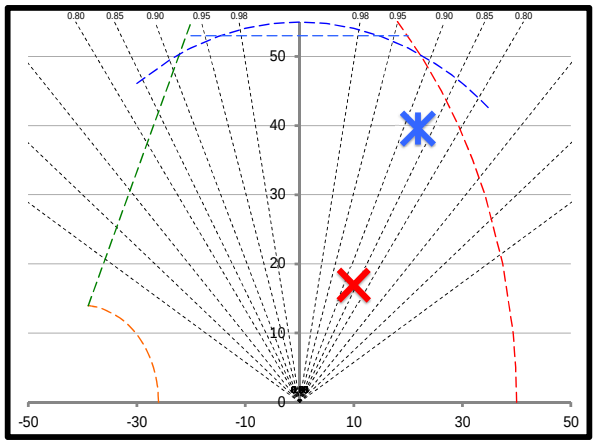


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74

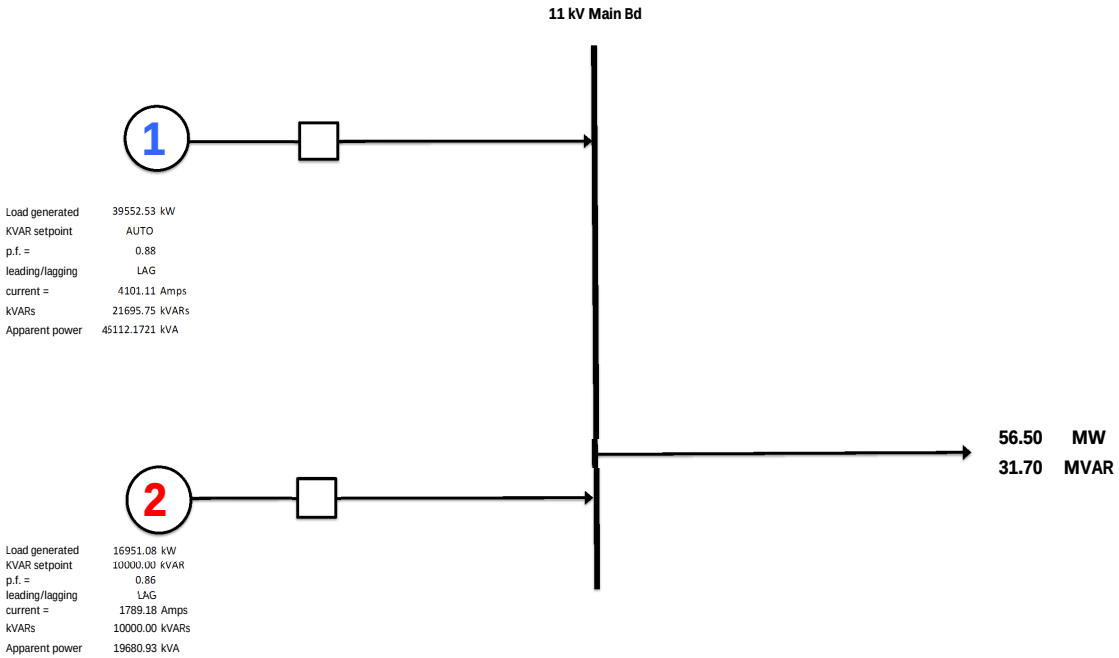


Multiple Generators supplying Reactive Power in Parallel

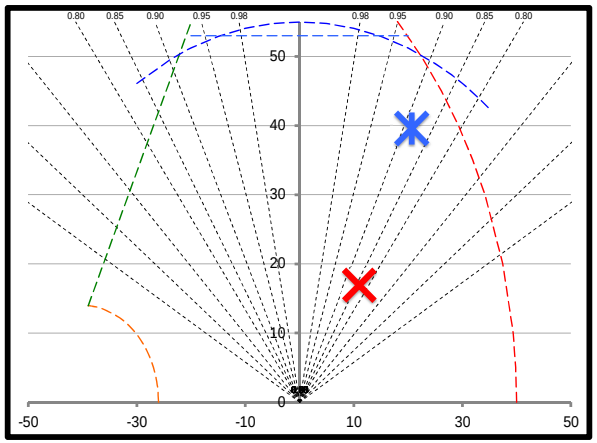


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18

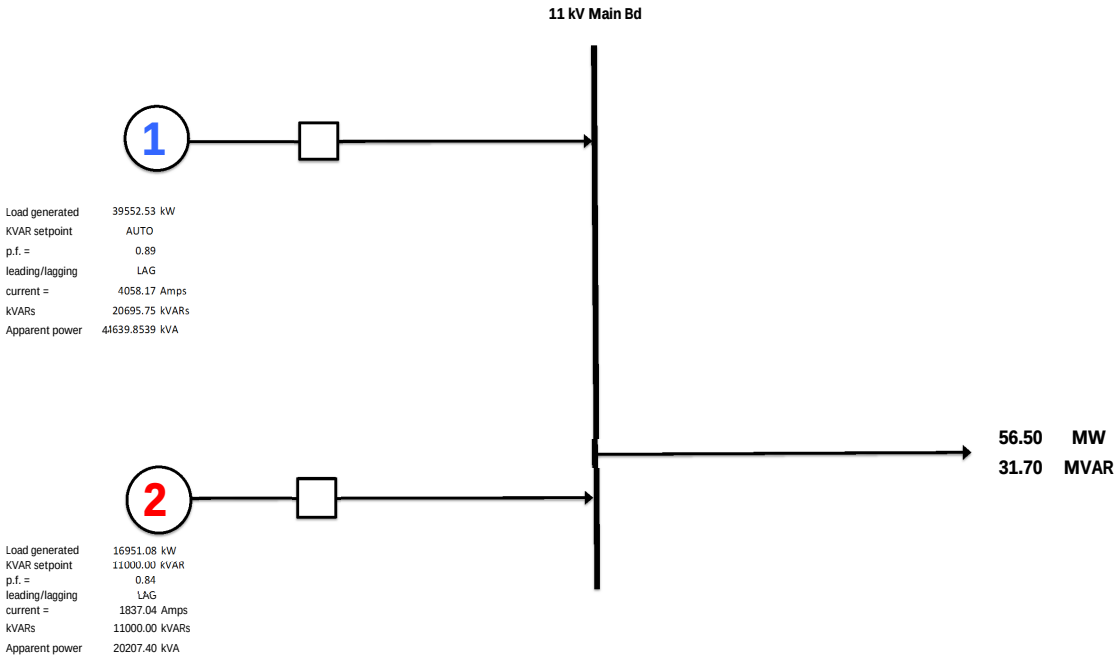


Multiple Generators supplying Reactive Power in Parallel

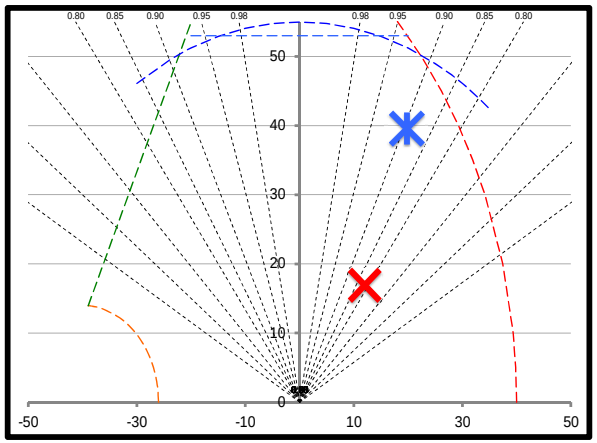


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04

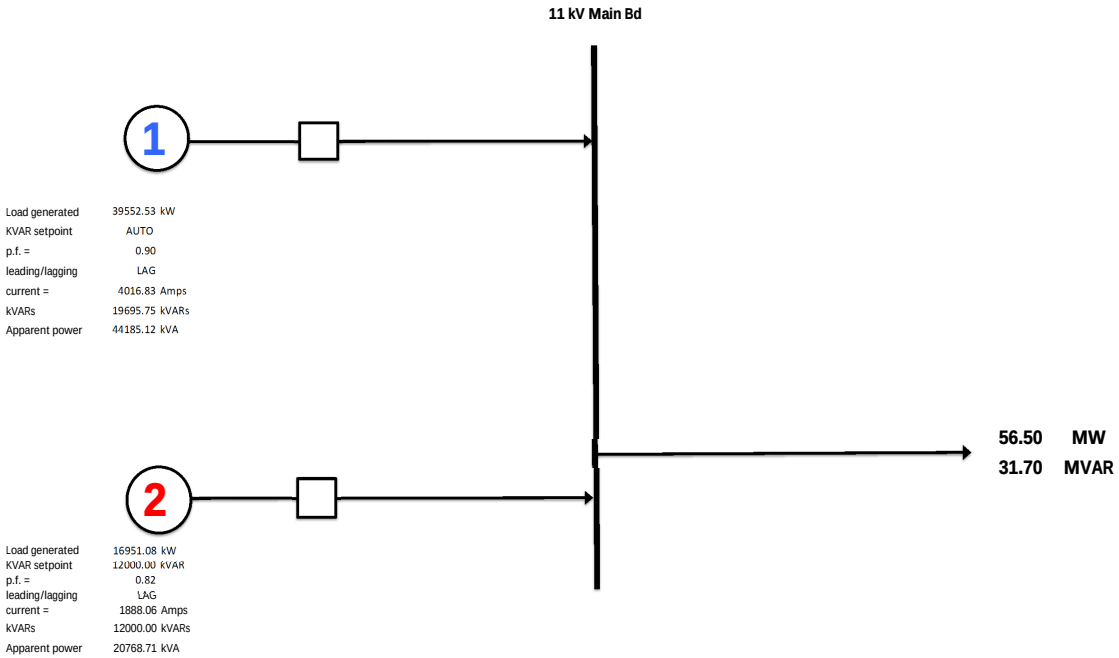


Multiple Generators supplying Reactive Power in Parallel

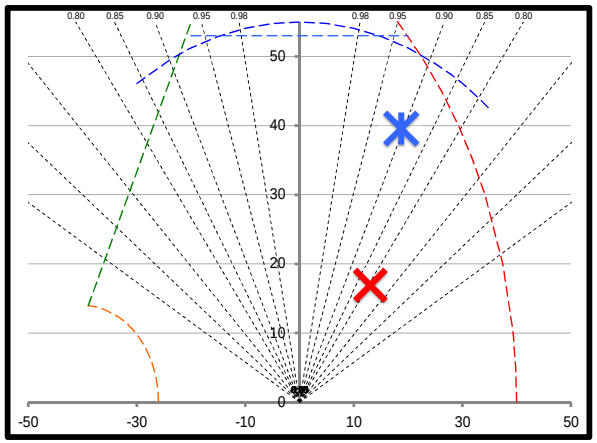


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06

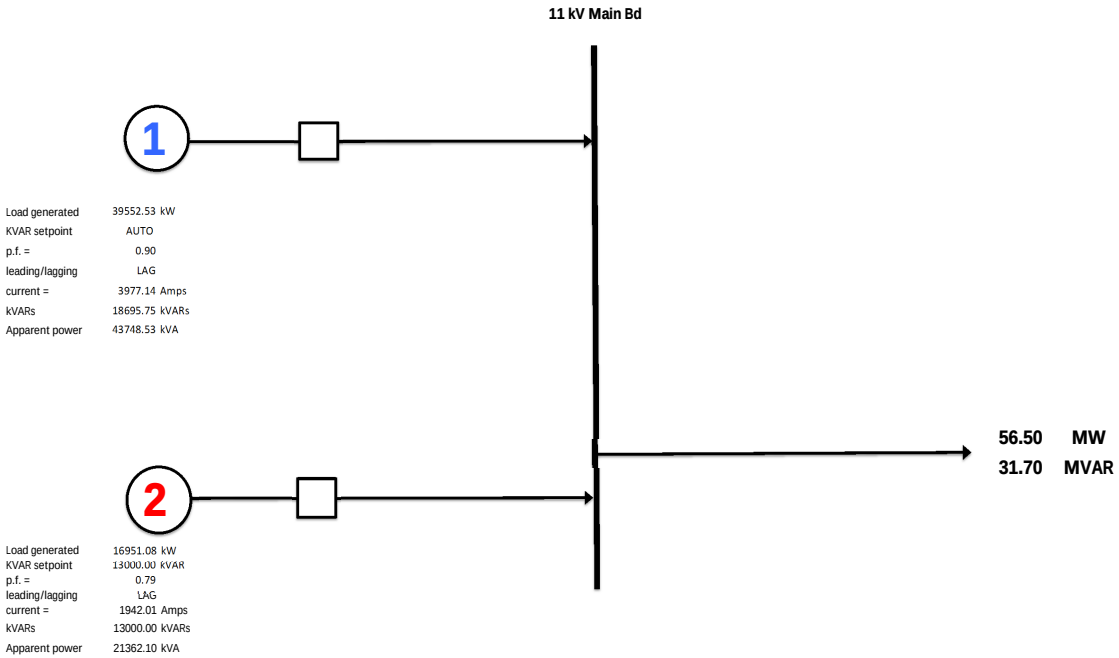


Multiple Generators supplying Reactive Power in Parallel

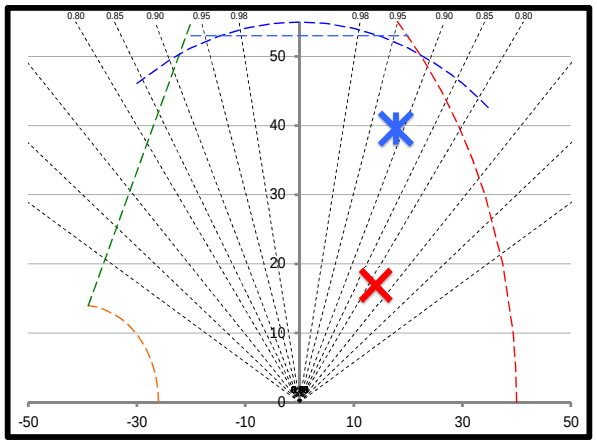


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01

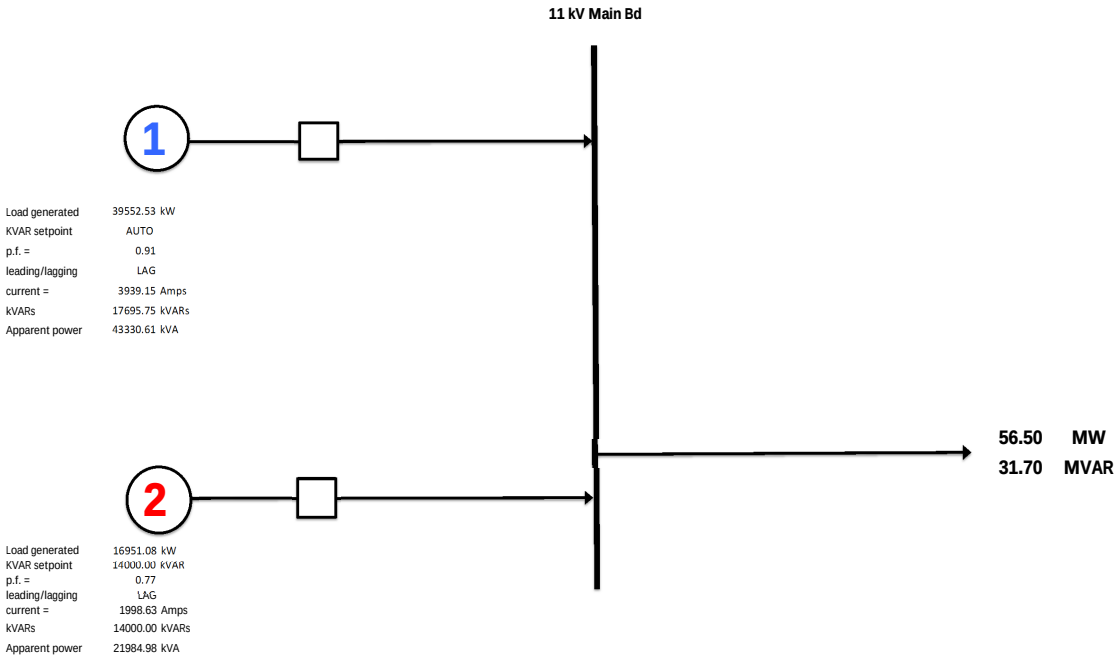


Multiple Generators supplying Reactive Power in Parallel

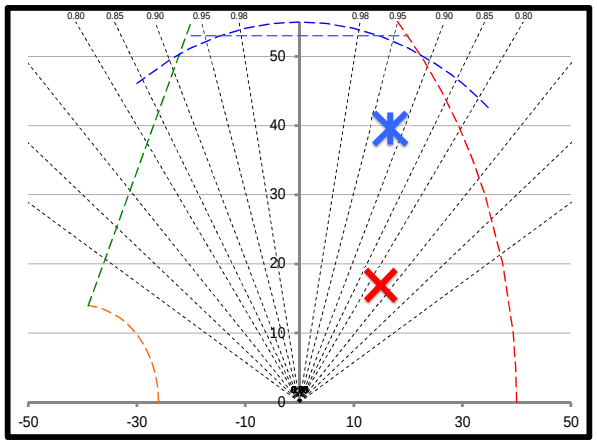


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63

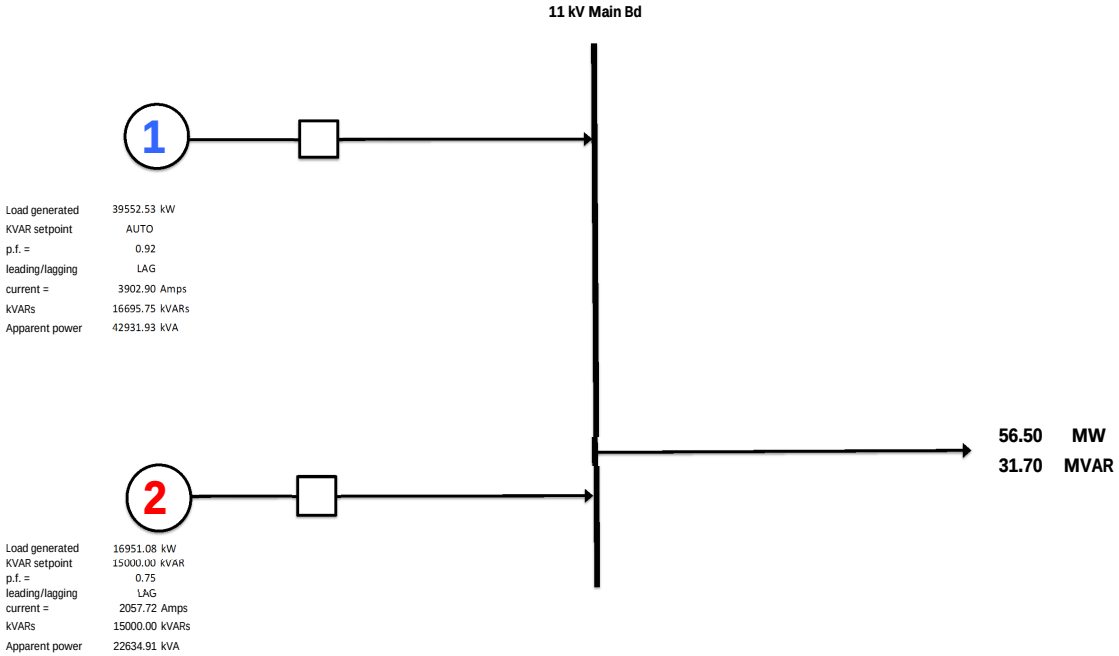


Multiple Generators supplying Reactive Power in Parallel

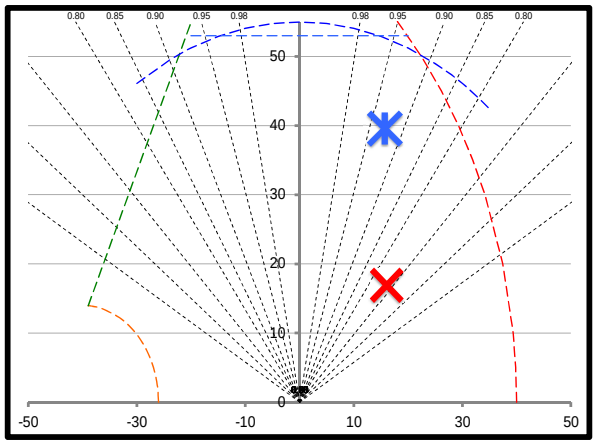


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72

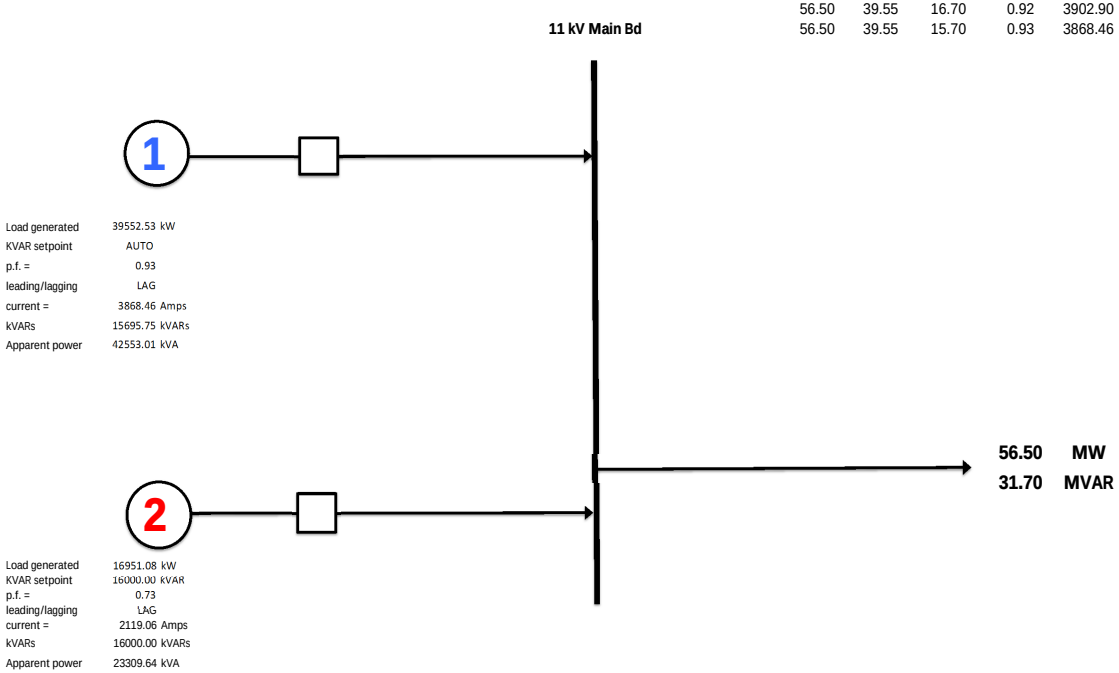


Multiple Generators supplying Reactive Power in Parallel

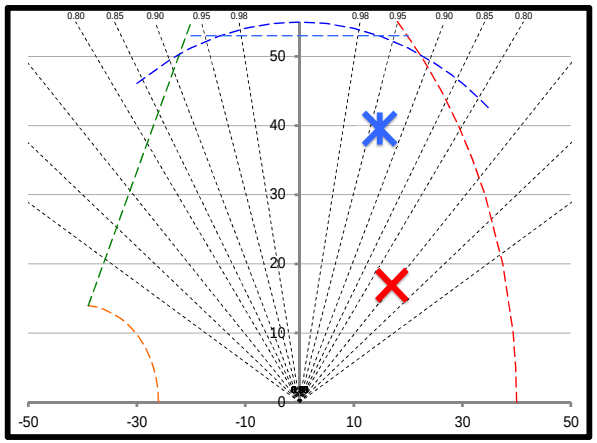


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06

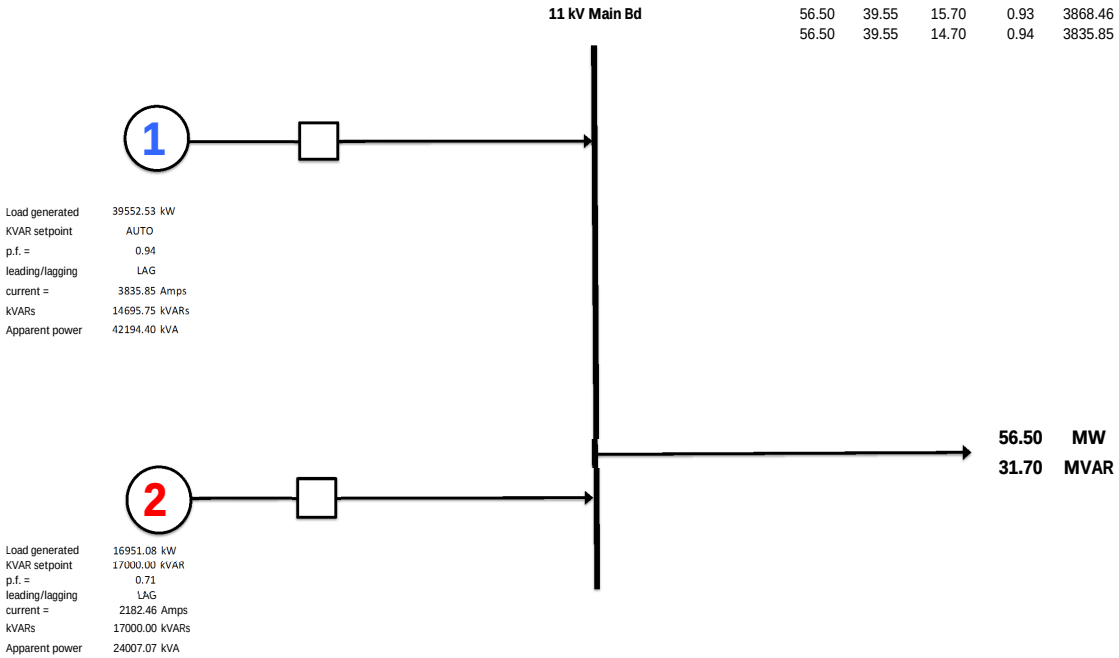


Multiple Generators supplying Reactive Power in Parallel

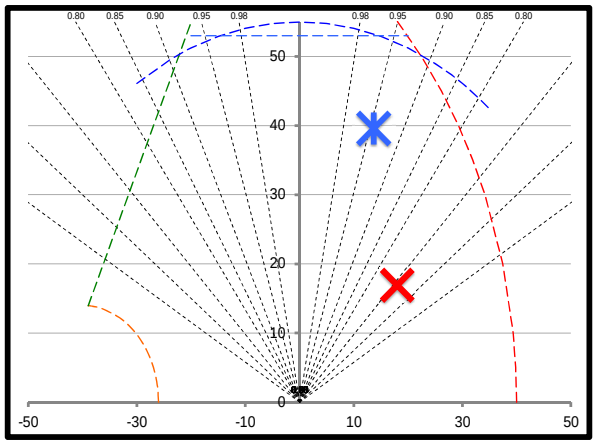


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46

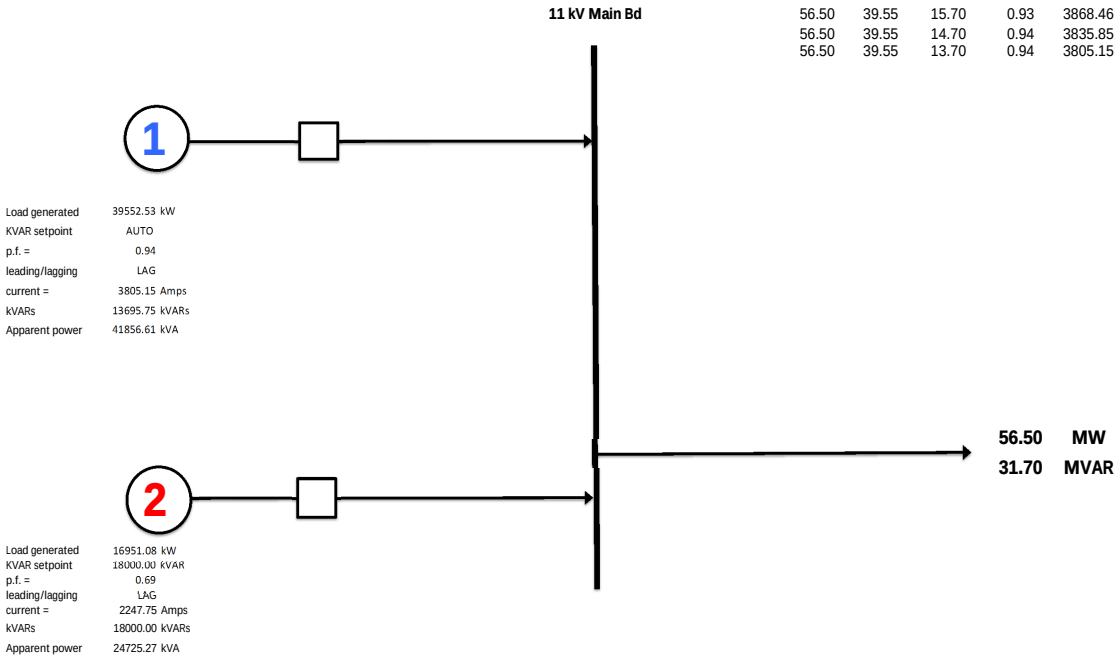


Multiple Generators supplying Reactive Power in Parallel

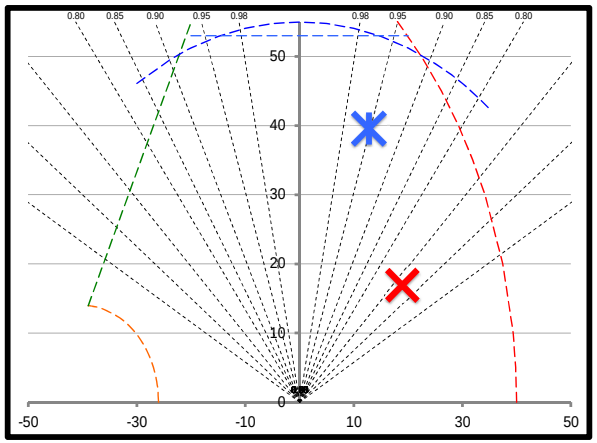


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75

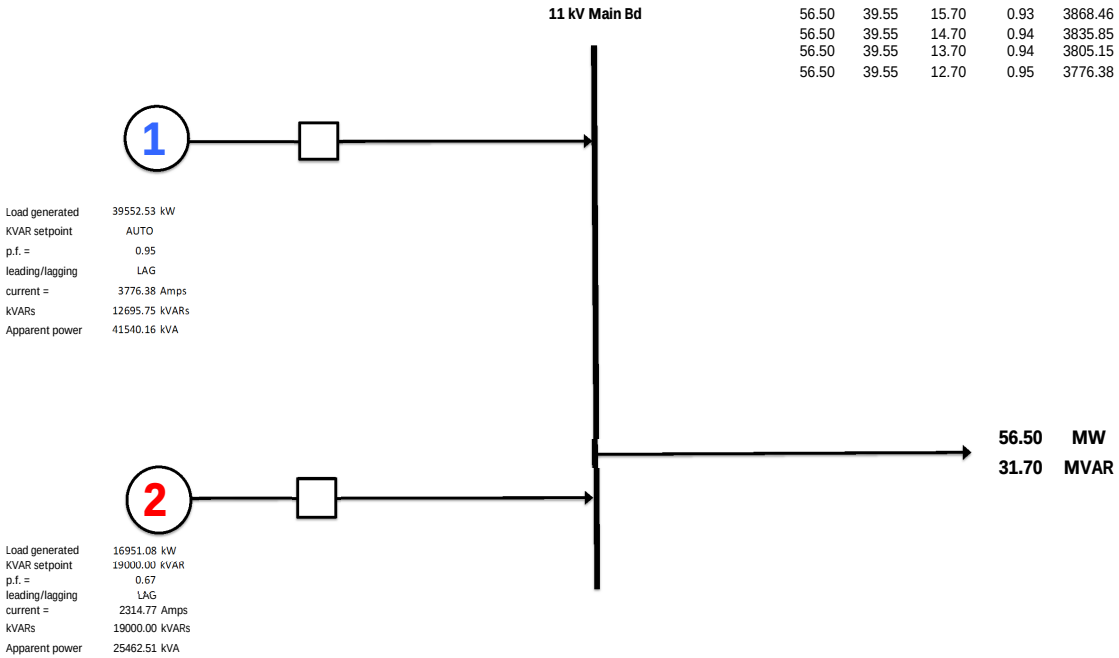


Multiple Generators supplying Reactive Power in Parallel

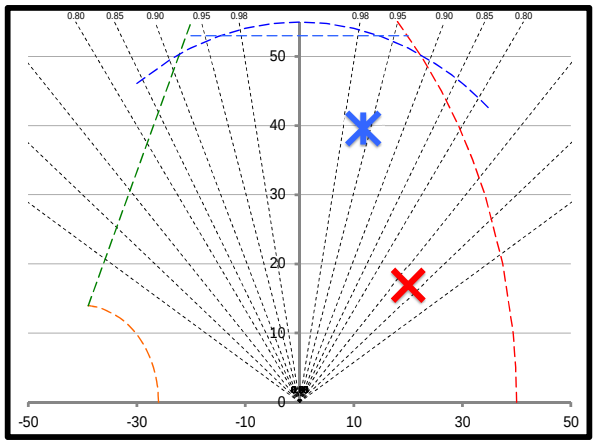


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77

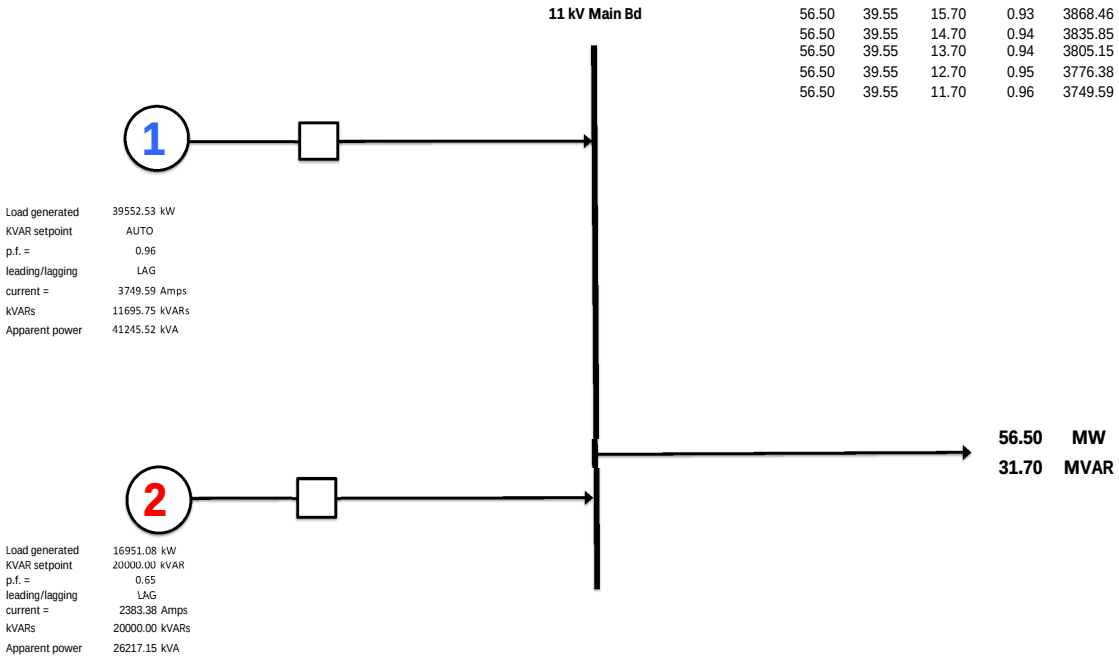


Multiple Generators supplying Reactive Power in Parallel

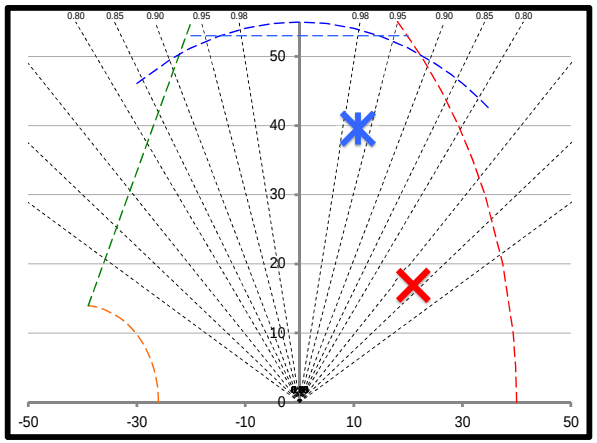


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38

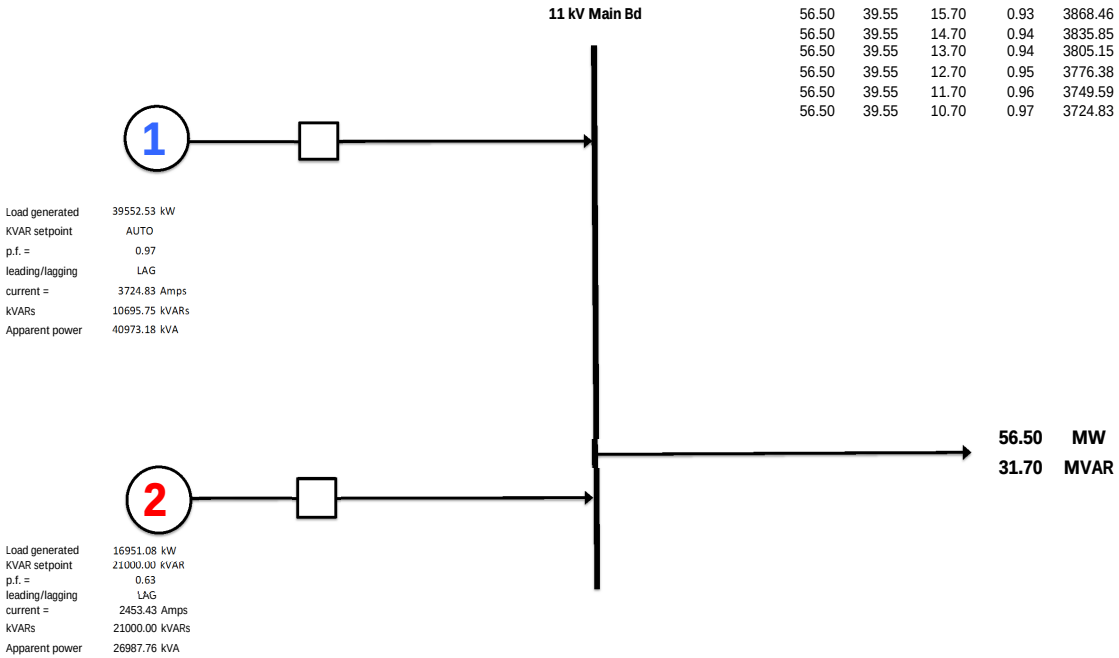


Multiple Generators supplying Reactive Power in Parallel

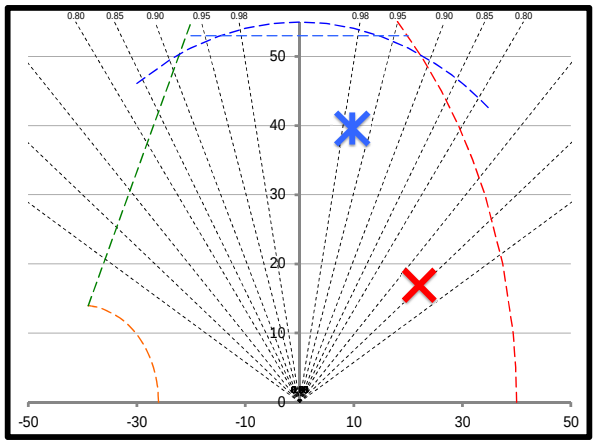


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43

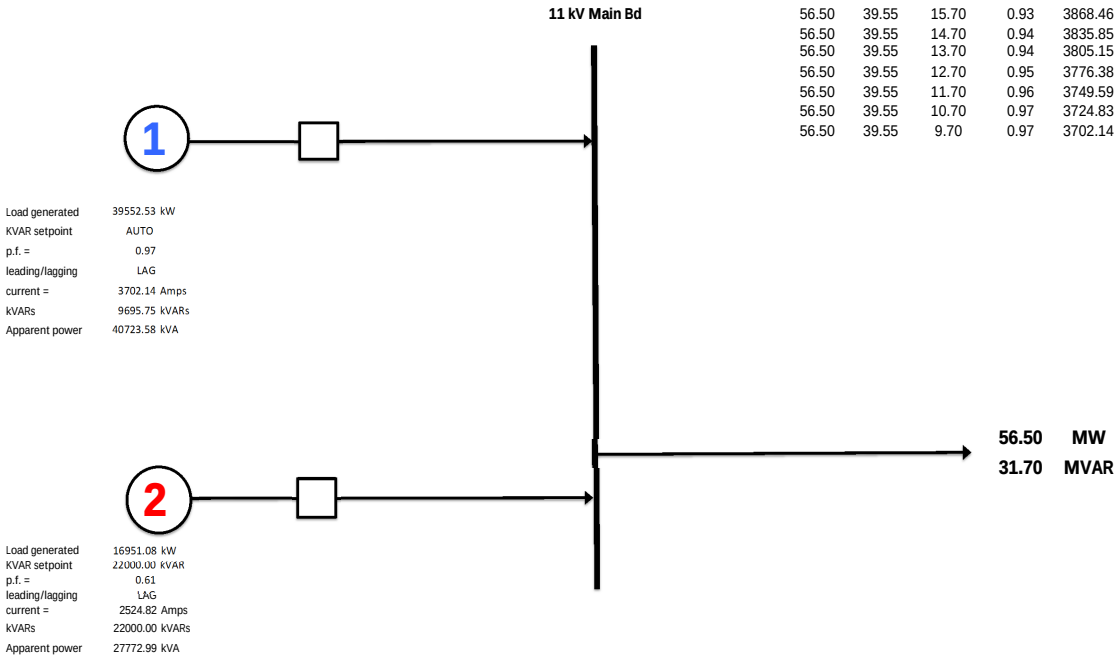


Multiple Generators supplying Reactive Power in Parallel

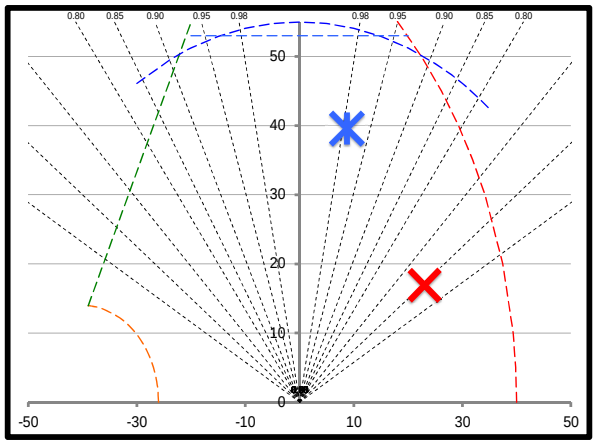


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82

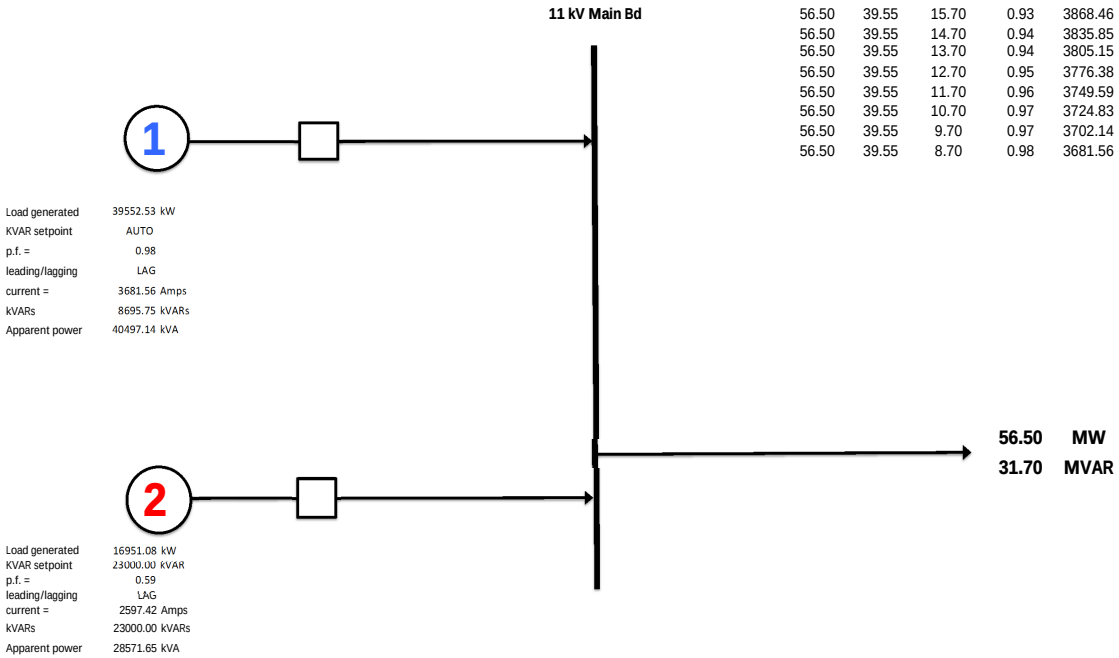


Multiple Generators supplying Reactive Power in Parallel

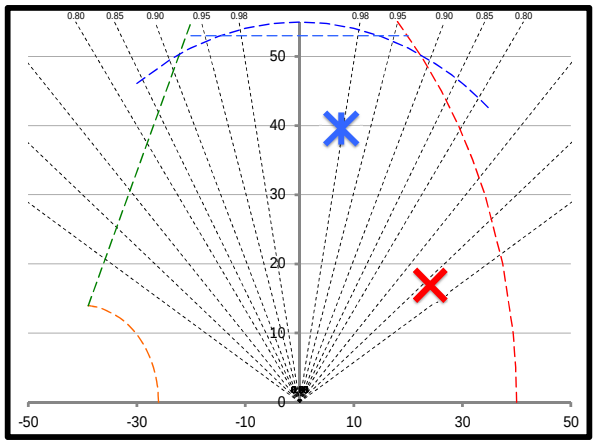


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42

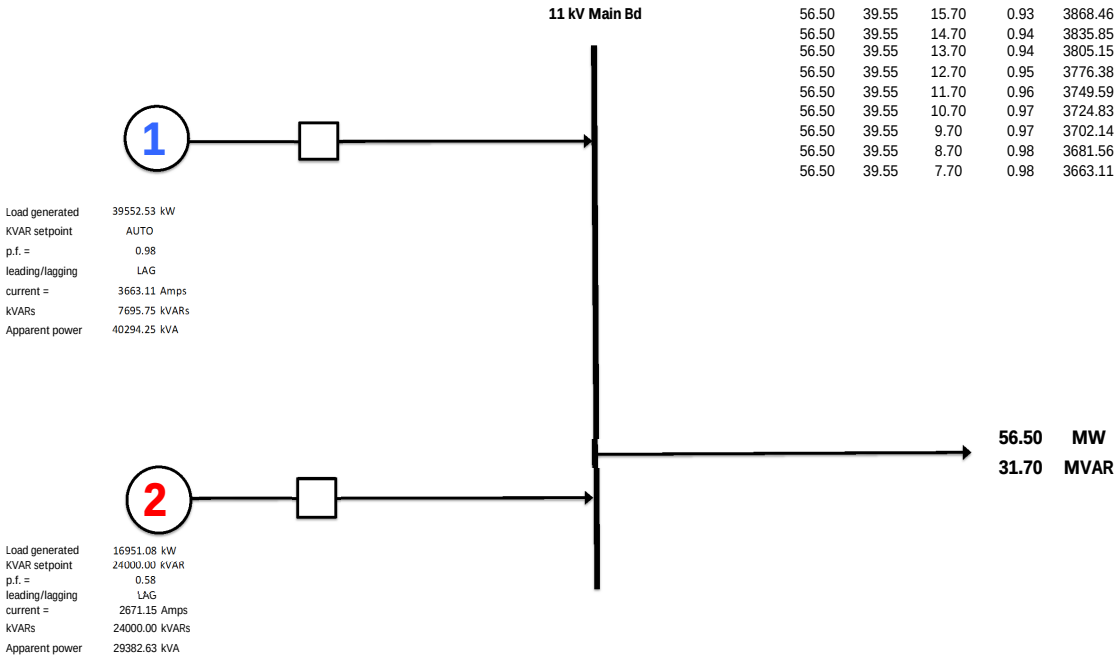


Multiple Generators supplying Reactive Power in Parallel

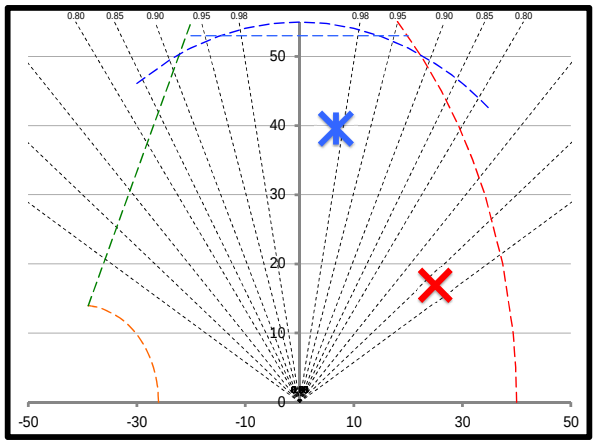


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15

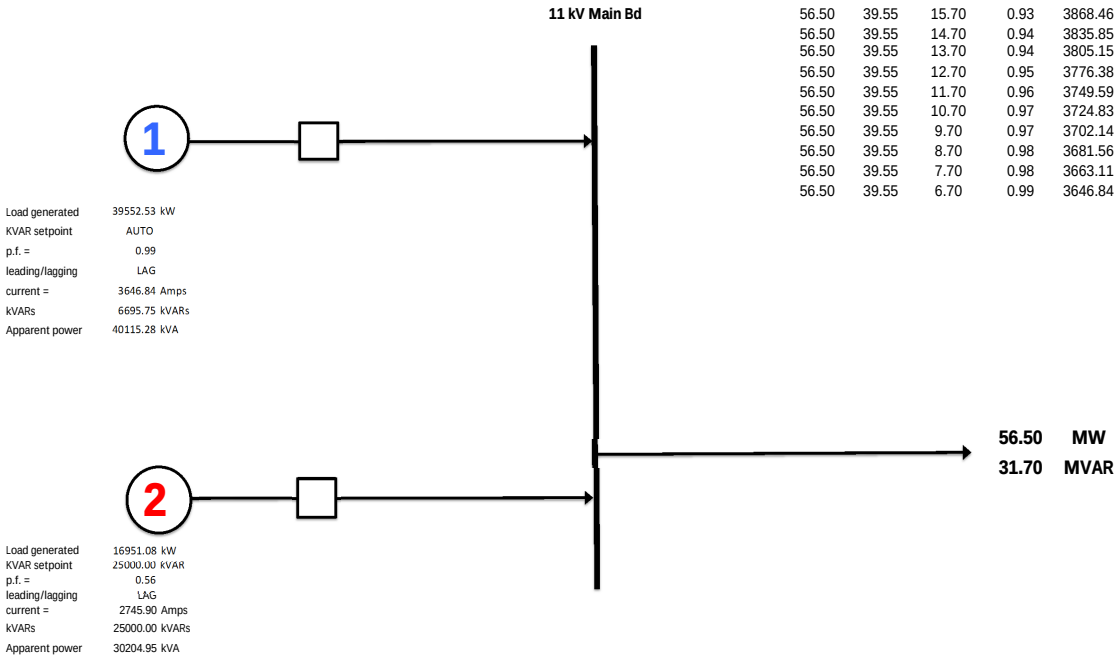


Multiple Generators supplying Reactive Power in Parallel

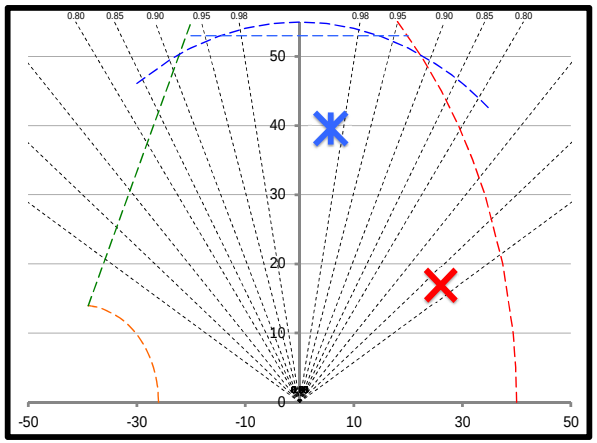


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90

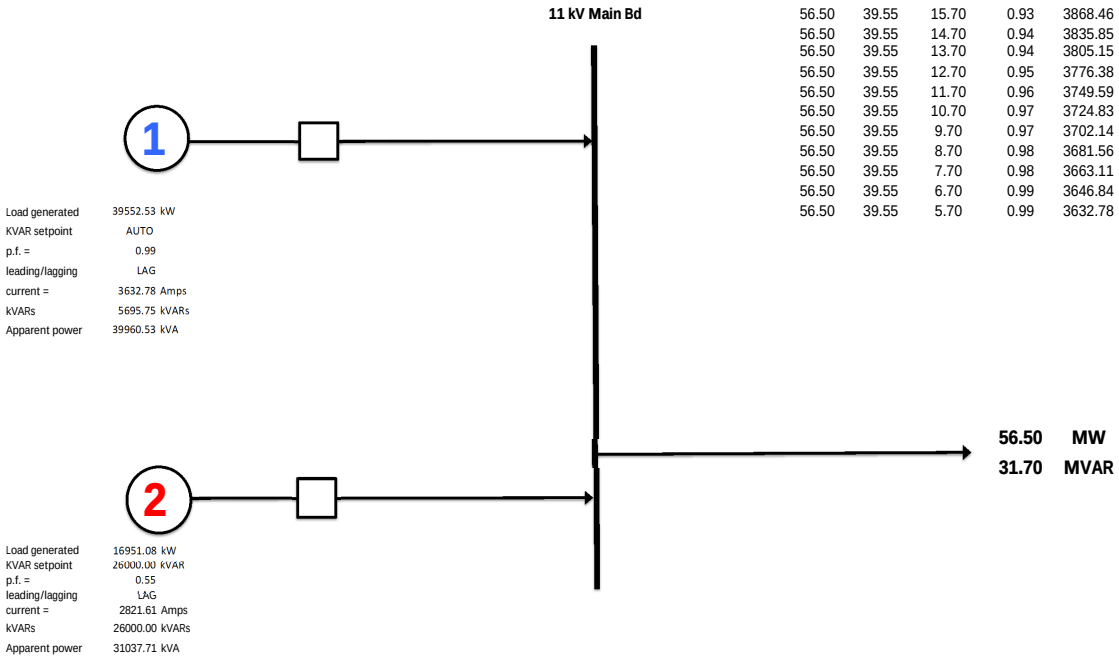


Multiple Generators supplying Reactive Power in Parallel

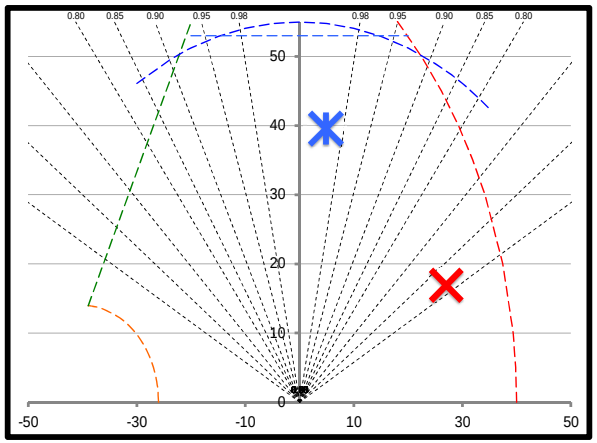


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61

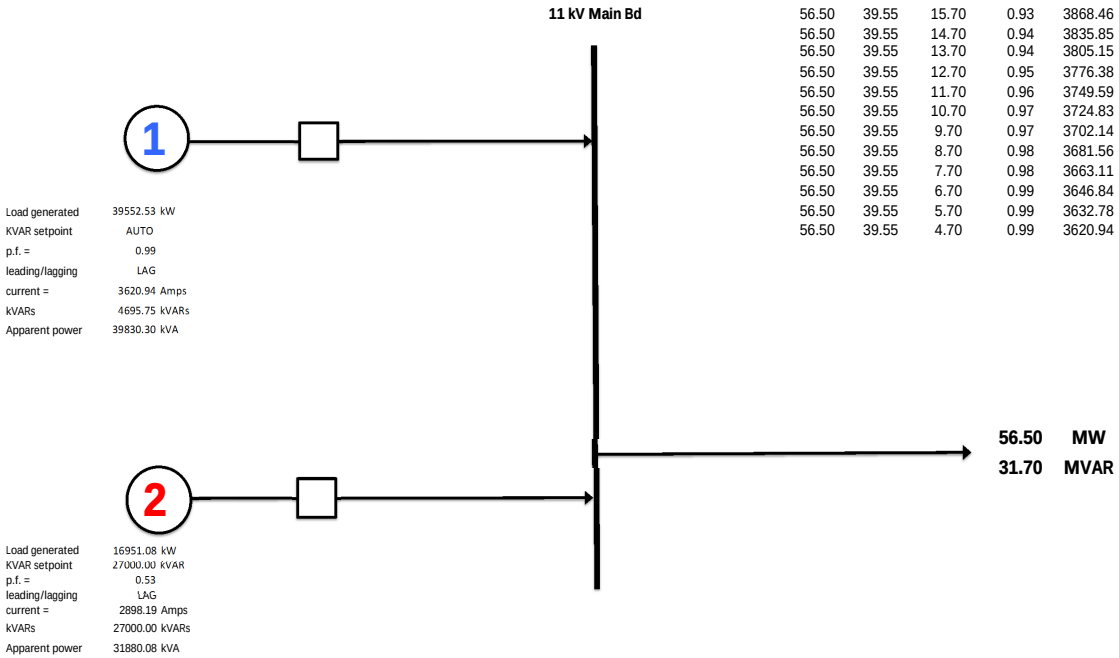


Multiple Generators supplying Reactive Power in Parallel

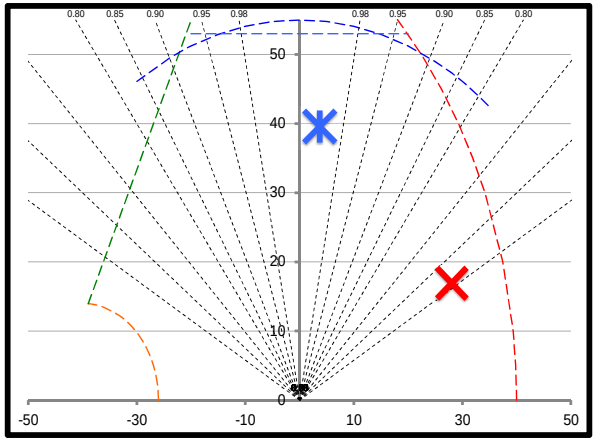


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19

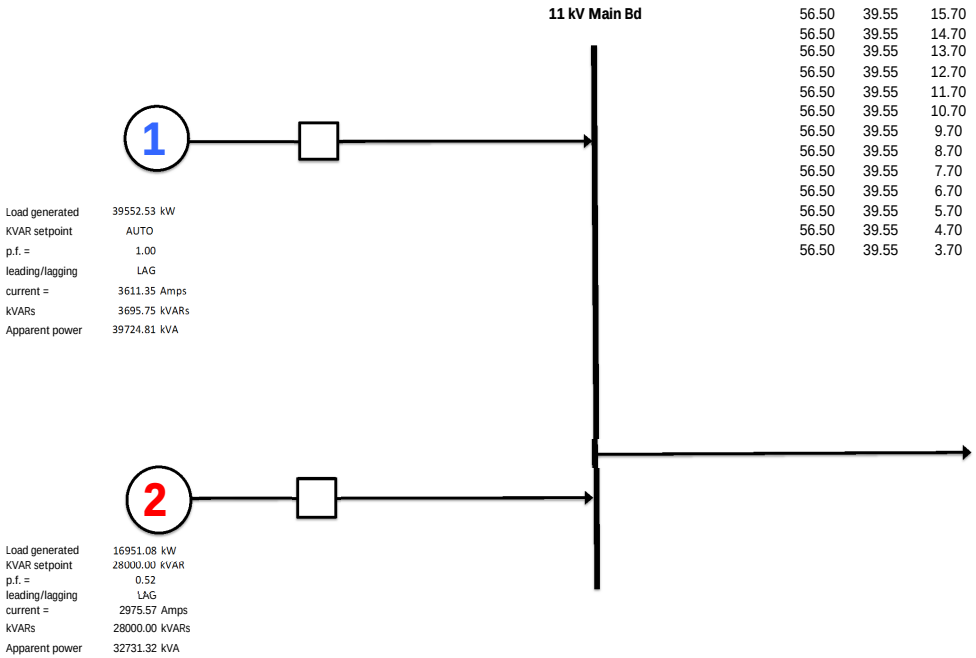


Multiple Generators supplying Reactive Power in Parallel

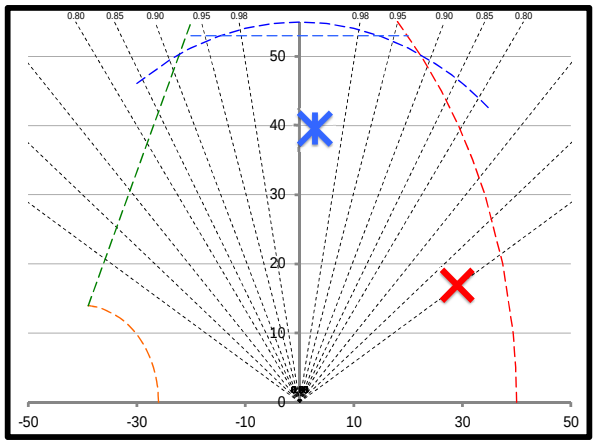


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57



Multiple Generators supplying Reactive Power in Parallel



Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
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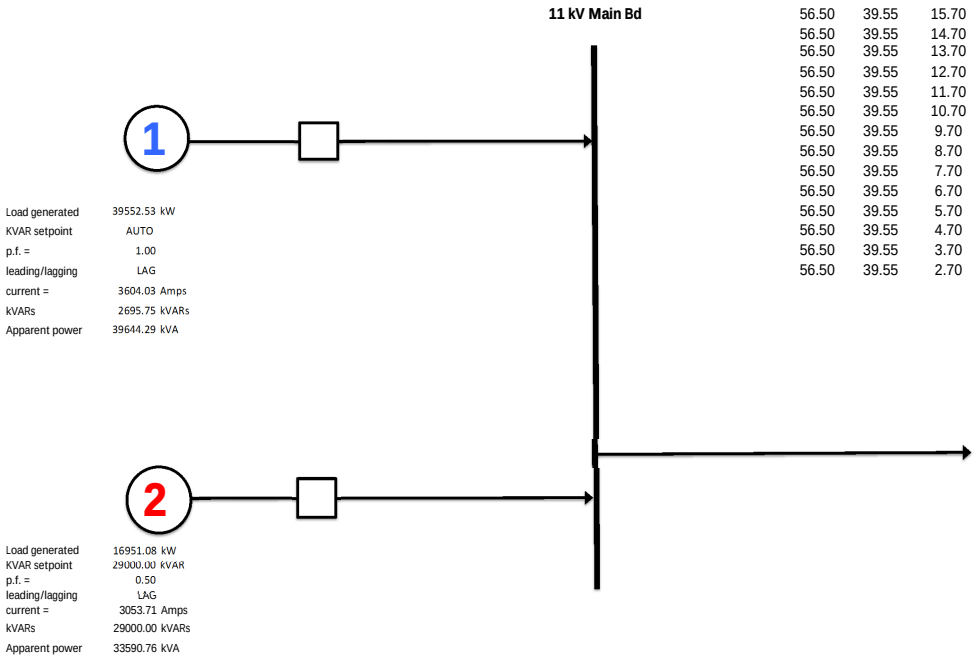
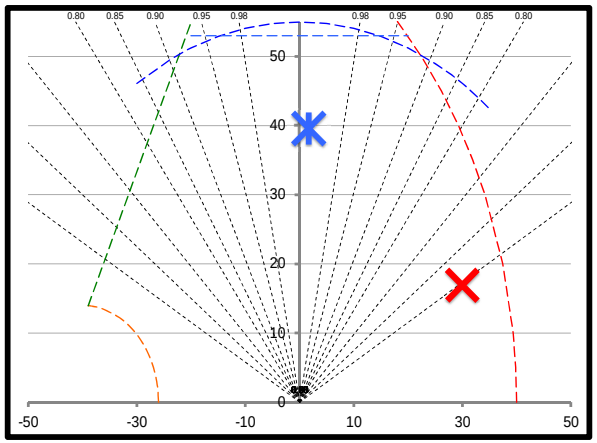
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57
56.50	39.55	2.70	1.00	3604.03	16.95	**29.00**	0.50	3053.71

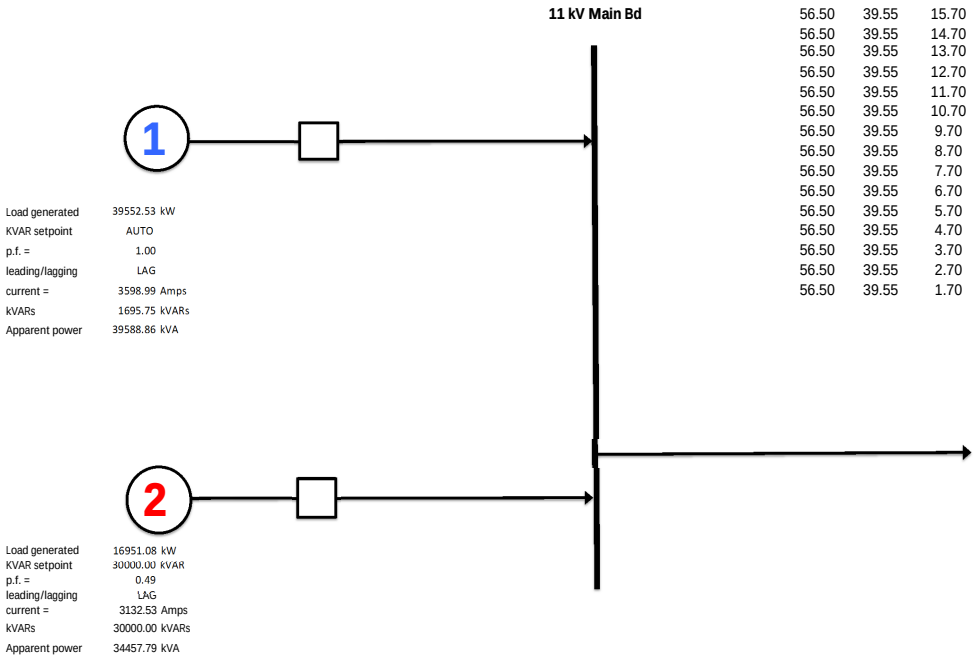


Multiple Generators supplying Reactive Power in Parallel

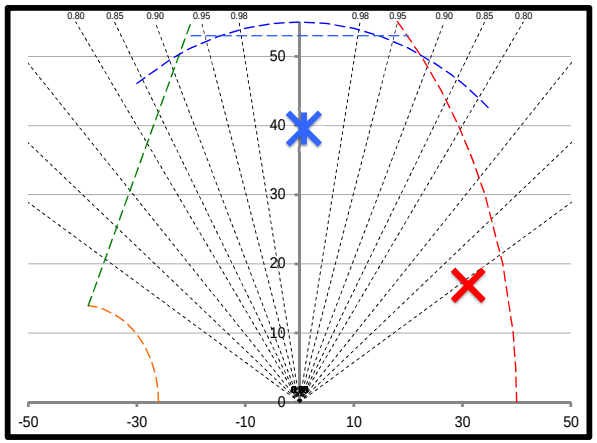


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57
56.50	39.55	2.70	1.00	3604.03	16.95	**29.00**	0.50	3053.71
56.50	39.55	1.70	1.00	3598.99	16.95	**30.00**	0.49	3132.53

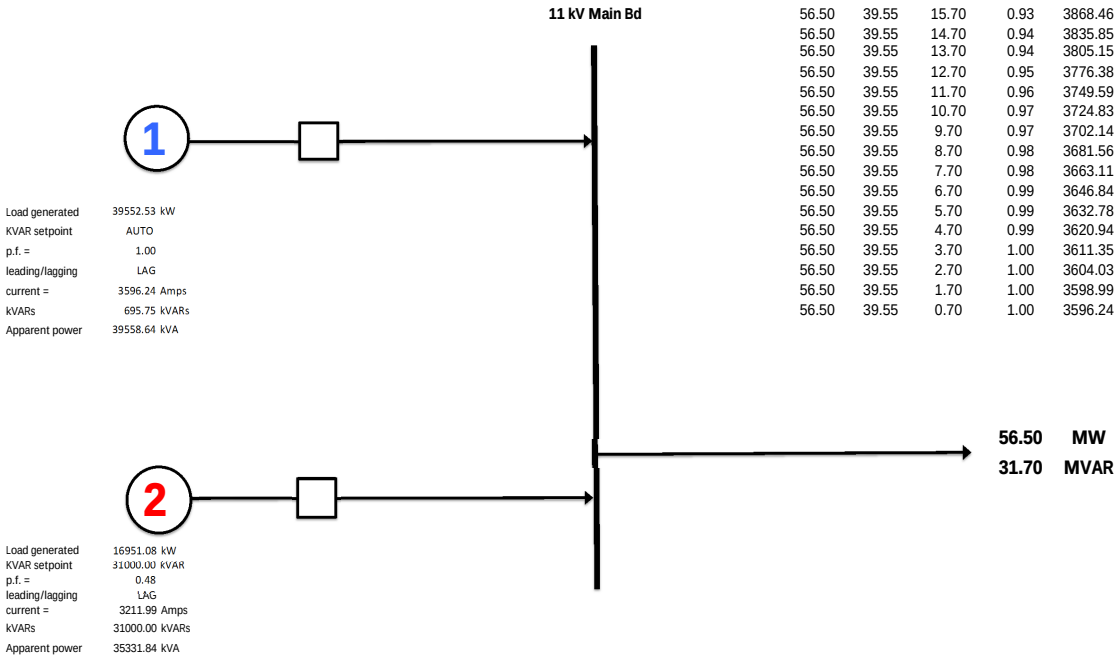


Multiple Generators supplying Reactive Power in Parallel

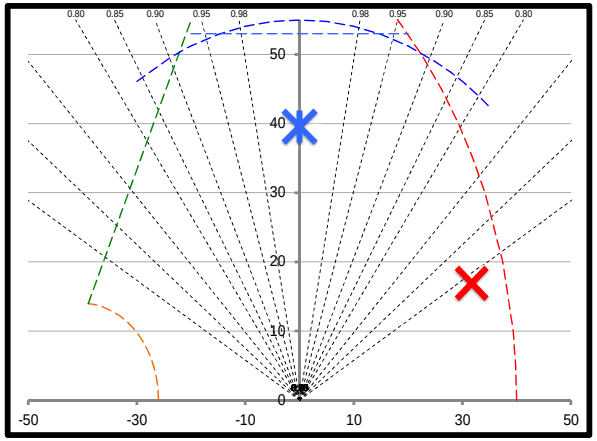


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57
56.50	39.55	2.70	1.00	3604.03	16.95	**29.00**	0.50	3053.71
56.50	39.55	1.70	1.00	3598.99	16.95	**30.00**	0.49	3132.53
56.50	39.55	0.70	1.00	3596.24	16.95	**31.00**	0.48	3211.99

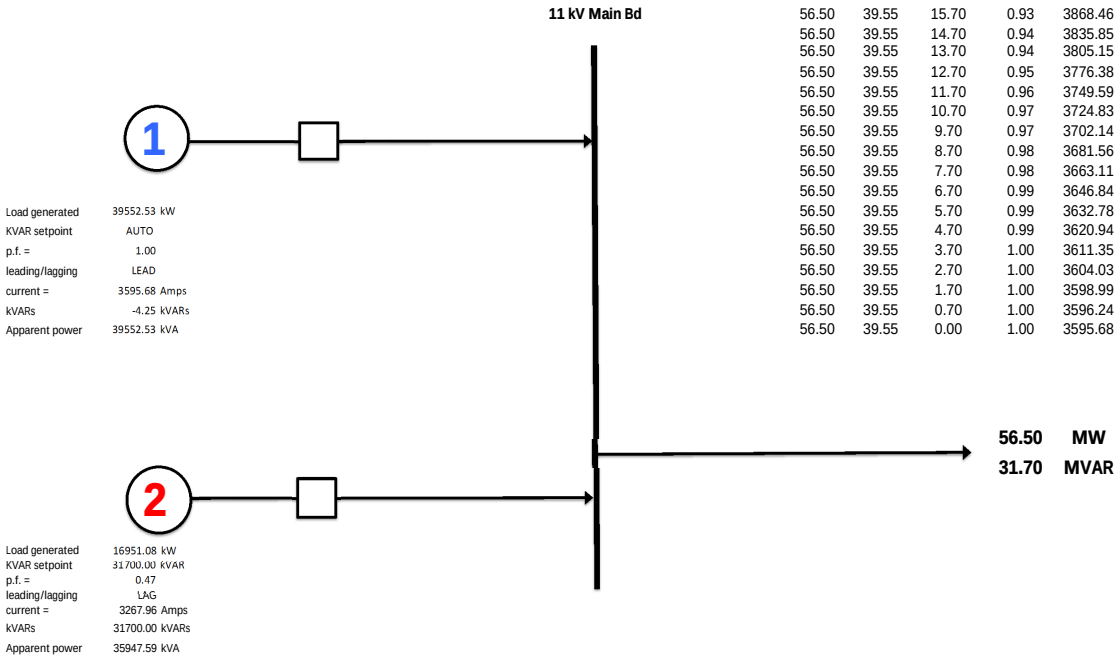


Multiple Generators supplying Reactive Power in Parallel

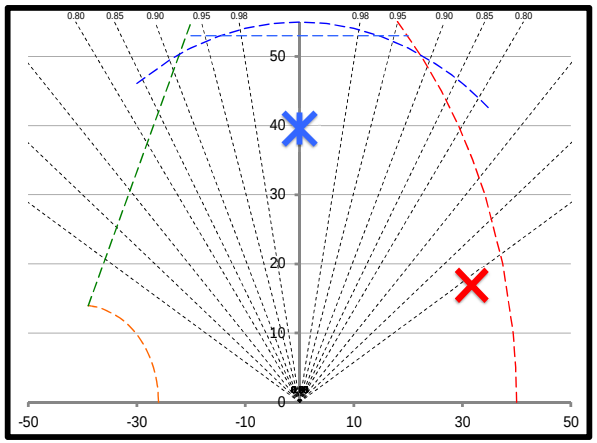


Let's continue to increase Unit 2 AVR Mvar setpoint in steps of +1 Mvar and display the results on the table below.

	U1				U2			
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57
56.50	39.55	2.70	1.00	3604.03	16.95	**29.00**	0.50	3053.71
56.50	39.55	1.70	1.00	3598.99	16.95	**30.00**	0.49	3132.53
56.50	39.55	0.70	1.00	3596.24	16.95	**31.00**	0.48	3211.99
56.50	39.55	0.00	1.00	3595.68	16.95	**31.70**	0.47	3267.96

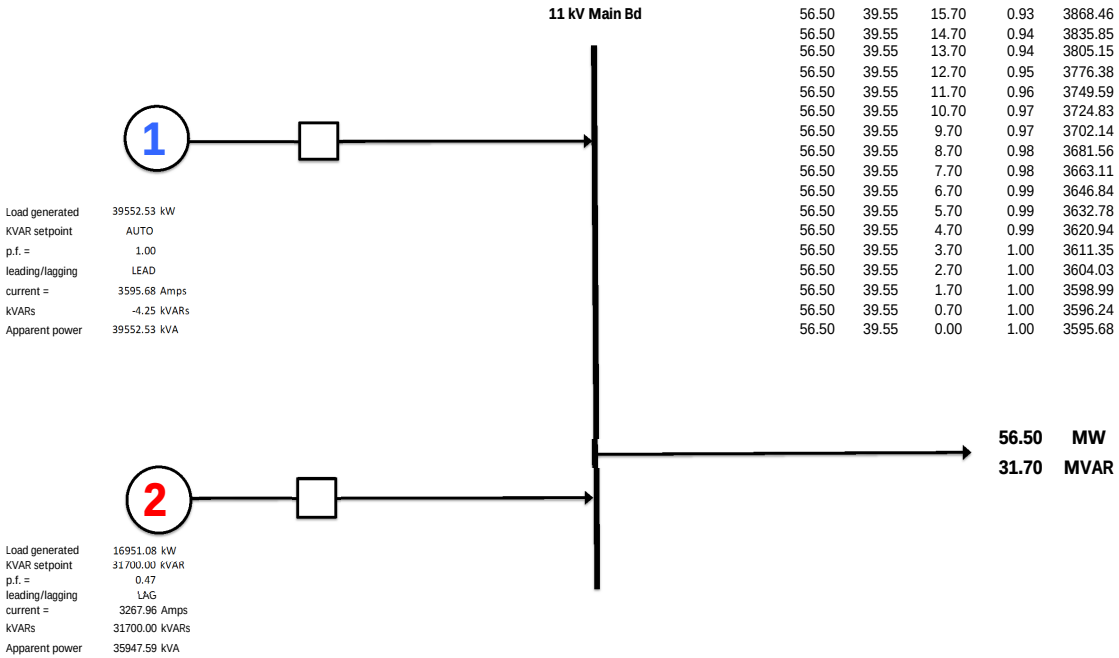


Multiple Generators supplying Reactive Power in Parallel

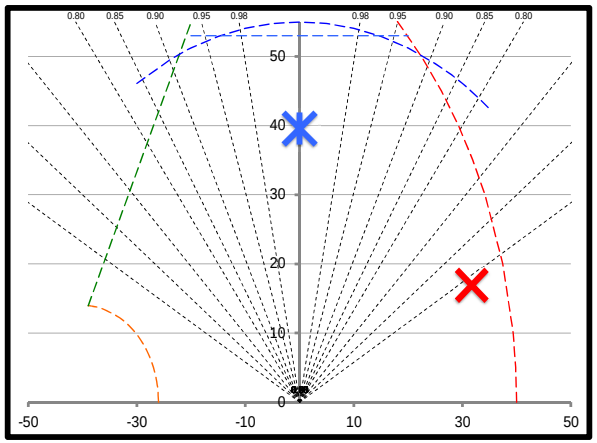


If we now add together the current flow in each generator we can see that the minimum combined current flow occurred when Unit 2 Mvar setpoint was at 9, 10 or 11 Mvar.

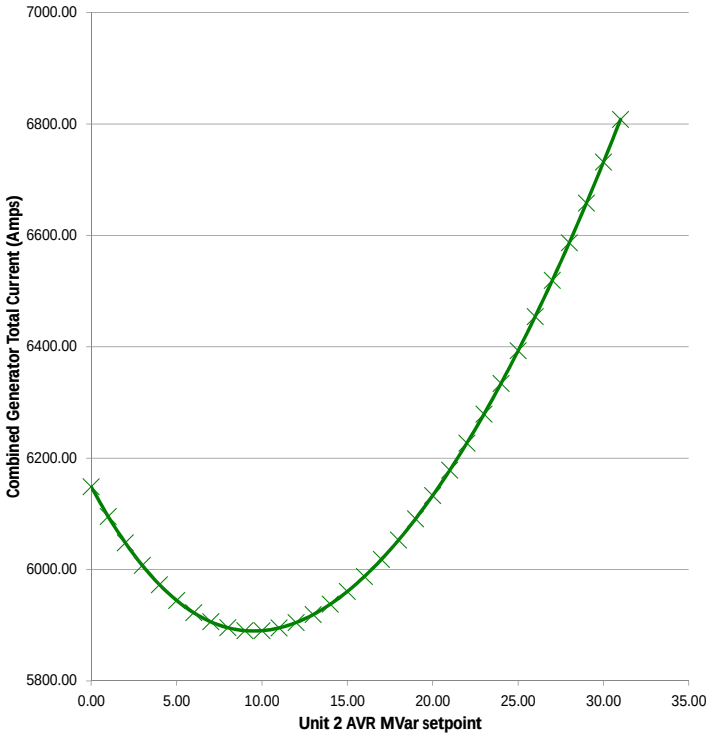
	U1				U2				
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current	Combined Current (Amps)
56.50	39.55	31.70	0.78	4607.78	16.95	**0.00**	1.00	1541.01	6148.78
56.50	39.55	30.70	0.79	4551.48	16.95	**1.00**	1.00	1543.69	6095.17
56.50	39.55	29.70	0.80	4496.32	16.95	**2.00**	0.99	1551.70	6048.01
56.50	39.55	28.70	0.81	4442.33	16.95	**3.00**	0.98	1564.96	6007.28
56.50	39.55	27.70	0.82	4389.56	16.95	**4.00**	0.97	1583.33	5972.89
56.50	39.55	26.70	0.83	4338.06	16.95	**5.00**	0.96	1606.65	5944.70
56.50	39.55	25.70	0.84	4287.86	16.95	**6.00**	0.94	1634.69	5922.55
56.50	39.55	24.70	0.85	4239.02	16.95	**7.00**	0.92	1667.23	5906.25
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00	5895.58
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74	5890.34
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18	5890.28
56.50	39.55	20.70	0.89	4058.17	16.95	**11.00**	0.84	1837.04	5895.21
56.50	39.55	19.70	0.90	4016.83	16.95	**12.00**	0.82	1888.06	5904.89
56.50	39.55	18.70	0.90	3977.14	16.95	**13.00**	0.79	1942.01	5919.15
56.50	39.55	17.70	0.91	3939.15	16.95	**14.00**	0.77	1998.63	5937.78
56.50	39.55	16.70	0.92	3902.90	16.95	**15.00**	0.75	2057.72	5960.62
56.50	39.55	15.70	0.93	3868.46	16.95	**16.00**	0.73	2119.06	5987.51
56.50	39.55	14.70	0.94	3835.85	16.95	**17.00**	0.71	2182.46	6018.32
56.50	39.55	13.70	0.94	3805.15	16.95	**18.00**	0.69	2247.75	6052.90
56.50	39.55	12.70	0.95	3776.38	16.95	**19.00**	0.67	2314.77	6091.15
56.50	39.55	11.70	0.96	3749.59	16.95	**20.00**	0.65	2383.38	6132.97
56.50	39.55	10.70	0.97	3724.83	16.95	**21.00**	0.63	2453.43	6178.27
56.50	39.55	9.70	0.97	3702.14	16.95	**22.00**	0.61	2524.82	6226.96
56.50	39.55	8.70	0.98	3681.56	16.95	**23.00**	0.59	2597.42	6278.98
56.50	39.55	7.70	0.98	3663.11	16.95	**24.00**	0.58	2671.15	6334.26
56.50	39.55	6.70	0.99	3646.84	16.95	**25.00**	0.56	2745.90	6392.75
56.50	39.55	5.70	0.99	3632.78	16.95	**26.00**	0.55	2821.61	6454.39
56.50	39.55	4.70	0.99	3620.94	16.95	**27.00**	0.53	2898.19	6519.12
56.50	39.55	3.70	1.00	3611.35	16.95	**28.00**	0.52	2975.57	6586.92
56.50	39.55	2.70	1.00	3604.03	16.95	**29.00**	0.50	3053.71	6657.73
56.50	39.55	1.70	1.00	3598.99	16.95	**30.00**	0.49	3132.53	6731.51
56.50	39.55	0.70	1.00	3596.24	16.95	**31.00**	0.48	3211.99	6808.23
56.50	39.55	0.00	1.00	3595.68	16.95	**31.70**	0.47	3267.96	6863.65

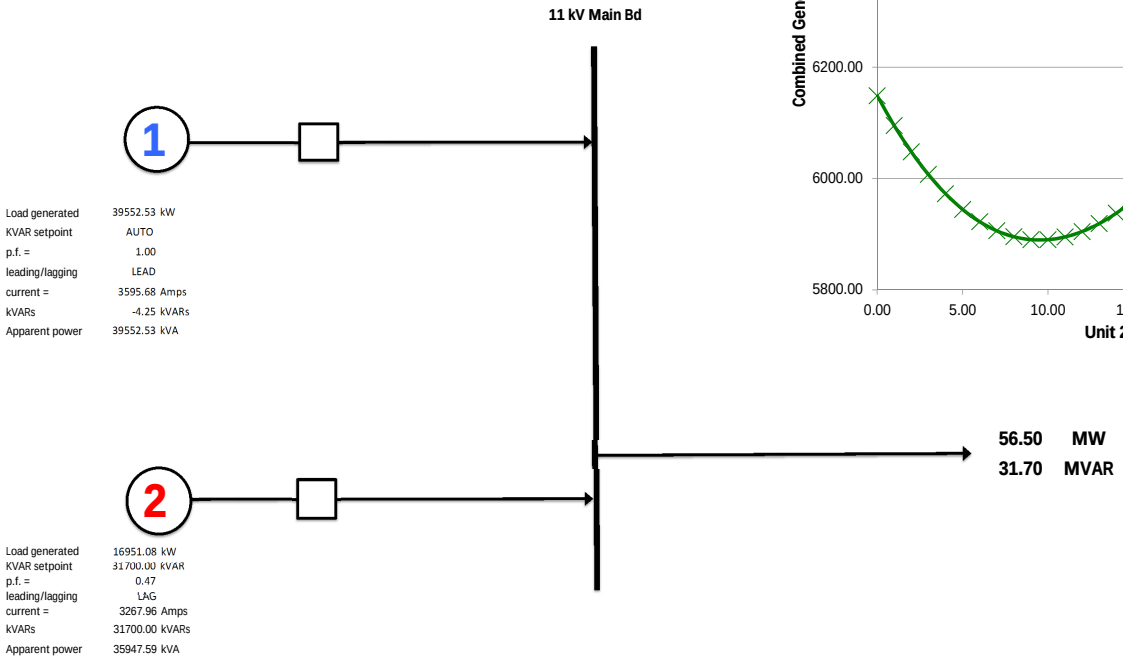


Multiple Generators supplying Reactive Power in Parallel

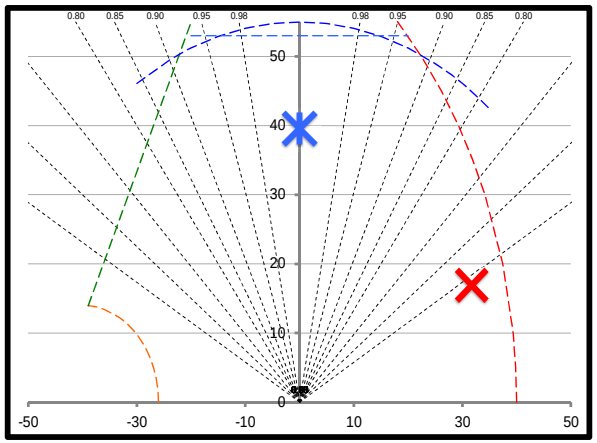


This can be shown grapically as below;



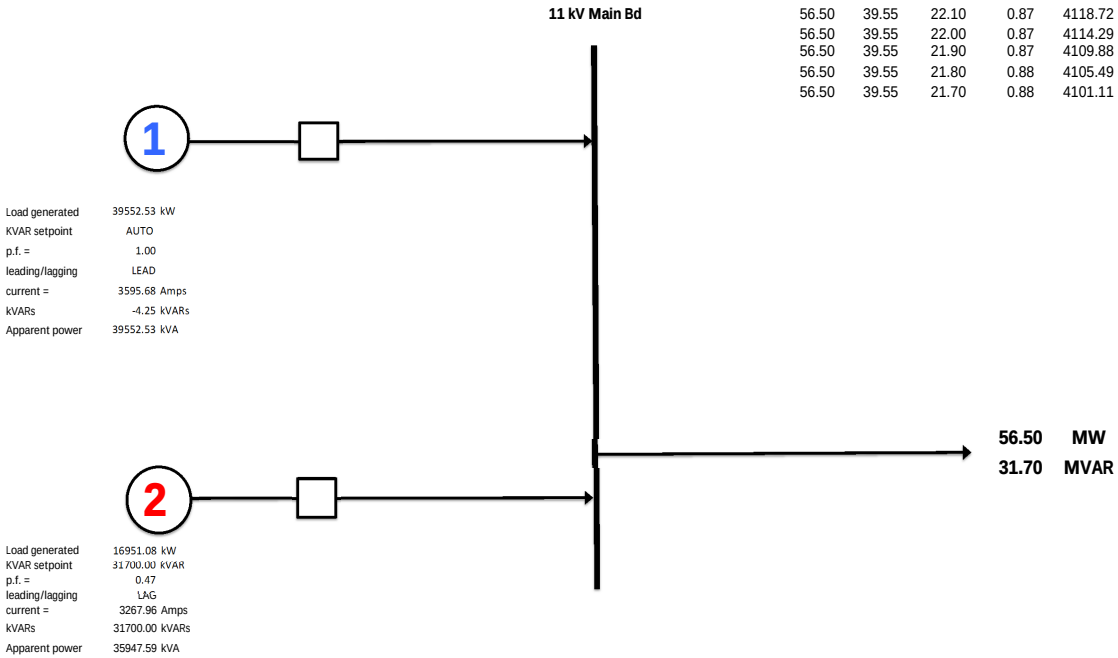


Multiple Generators supplying Reactive Power in Parallel

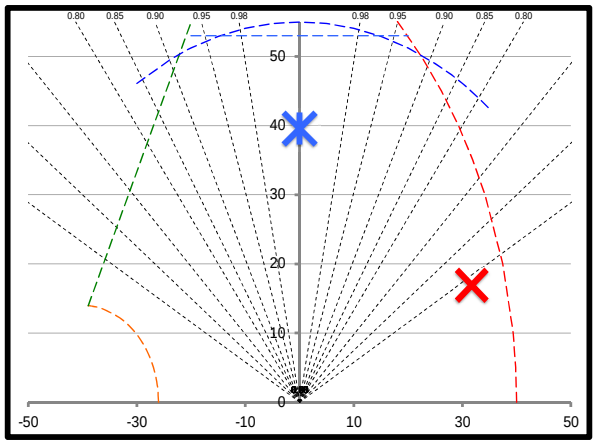


Lets concentrate on this area and redo the table just within these limits.

Total MW	U1 MW	U1 MVARs	U1 p.f.	U1 Current	U2 MW	U2 MVARs	U2 p.f.	U2 Current	Combined Current (Amps)
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00	5895.58
56.50	39.55	23.60	0.86	4186.92	16.95	**8.10**	0.90	1707.90	5894.82
56.50	39.55	23.50	0.86	4182.27	16.95	**8.20**	0.90	1711.84	5894.11
56.50	39.55	23.40	0.86	4177.63	16.95	**8.30**	0.90	1715.82	5893.45
56.50	39.55	23.30	0.86	4173.01	16.95	**8.40**	0.90	1719.84	5892.85
56.50	39.55	23.20	0.86	4168.40	16.95	**8.50**	0.89	1723.89	5892.30
56.50	39.55	23.10	0.86	4163.81	16.95	**8.60**	0.89	1727.99	5891.80
56.50	39.55	23.00	0.86	4159.23	16.95	**8.70**	0.89	1732.12	5891.35
56.50	39.55	22.90	0.87	4154.67	16.95	**8.80**	0.89	1736.29	5890.96
56.50	39.55	22.80	0.87	4150.13	16.95	**8.90**	0.89	1740.50	5890.62
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74	5890.34
56.50	39.55	22.60	0.87	4141.08	16.95	**9.10**	0.88	1749.02	5890.10
56.50	39.55	22.50	0.87	4136.57	16.95	**9.20**	0.88	1753.34	5889.92
56.50	39.55	22.40	0.87	4132.09	16.95	**9.30**	0.88	1757.70	5889.78
56.50	39.55	22.30	0.87	4127.62	16.95	**9.40**	0.87	1762.09	5889.70
56.50	39.55	22.20	0.87	4123.16	16.95	**9.50**	0.87	1766.51	5889.67
56.50	39.55	22.10	0.87	4118.72	16.95	**9.60**	0.87	1770.98	5889.69
56.50	39.55	22.00	0.87	4114.29	16.95	**9.70**	0.87	1775.47	5889.77
56.50	39.55	21.90	0.87	4109.88	16.95	**9.80**	0.87	1780.01	5889.89
56.50	39.55	21.80	0.88	4105.49	16.95	**9.90**	0.86	1784.57	5890.06
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18	5890.28

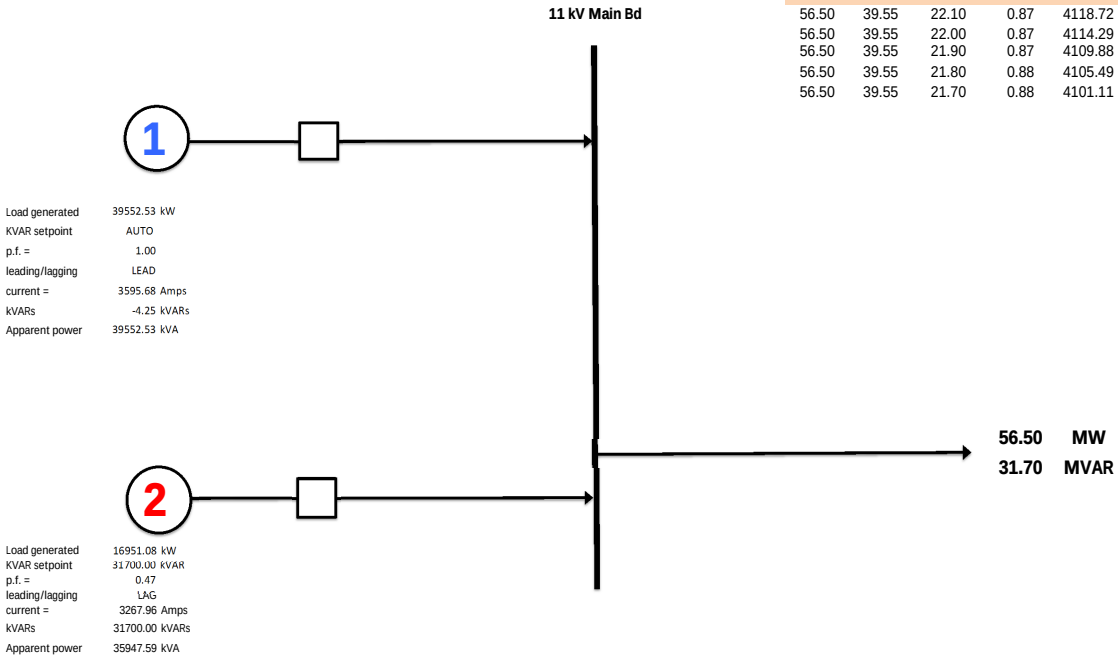


Multiple Generators supplying Reactive Power in Parallel

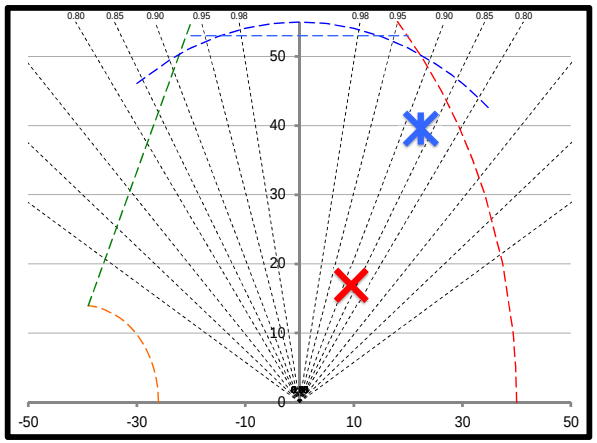


Again adding together the current flow in each generator we see that the minimum combined current flow occurs when Unit 2 AVR Mvar setpoint was +9.5 Mvar.

	U1				U2				
Total MW	MW	MVARs	p.f.	Current	MW	MVARs	p.f.	Current	Combined Current (Amps)
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00	5895.58
56.50	39.55	23.60	0.86	4186.92	16.95	**8.10**	0.90	1707.90	5894.82
56.50	39.55	23.50	0.86	4182.27	16.95	**8.20**	0.90	1711.84	5894.11
56.50	39.55	23.40	0.86	4177.63	16.95	**8.30**	0.90	1715.82	5893.45
56.50	39.55	23.30	0.86	4173.01	16.95	**8.40**	0.90	1719.84	5892.85
56.50	39.55	23.20	0.86	4168.40	16.95	**8.50**	0.89	1723.89	5892.30
56.50	39.55	23.10	0.86	4163.81	16.95	**8.60**	0.89	1727.99	5891.80
56.50	39.55	23.00	0.86	4159.23	16.95	**8.70**	0.89	1732.12	5891.35
56.50	39.55	22.90	0.87	4154.67	16.95	**8.80**	0.89	1736.29	5890.96
56.50	39.55	22.80	0.87	4150.13	16.95	**8.90**	0.89	1740.50	5890.62
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74	5890.34
56.50	39.55	22.60	0.87	4141.08	16.95	**9.10**	0.88	1749.02	5890.10
56.50	39.55	22.50	0.87	4136.57	16.95	**9.20**	0.88	1753.34	5889.92
56.50	39.55	22.40	0.87	4132.09	16.95	**9.30**	0.88	1757.70	5889.78
56.50	39.55	22.30	0.87	4127.62	16.95	**9.40**	0.87	1762.09	5889.70
56.50	39.55	22.20	**0.87**	4123.16	16.95	**9.50**	**0.87**	1766.51	5889.67
56.50	39.55	22.10	0.87	4118.72	16.95	**9.60**	0.87	1770.98	5889.69
56.50	39.55	22.00	0.87	4114.29	16.95	**9.70**	0.87	1775.47	5889.77
56.50	39.55	21.90	0.87	4109.88	16.95	**9.80**	0.87	1780.01	5889.89
56.50	39.55	21.80	0.88	4105.49	16.95	**9.90**	0.86	1784.57	5890.06
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18	5890.28

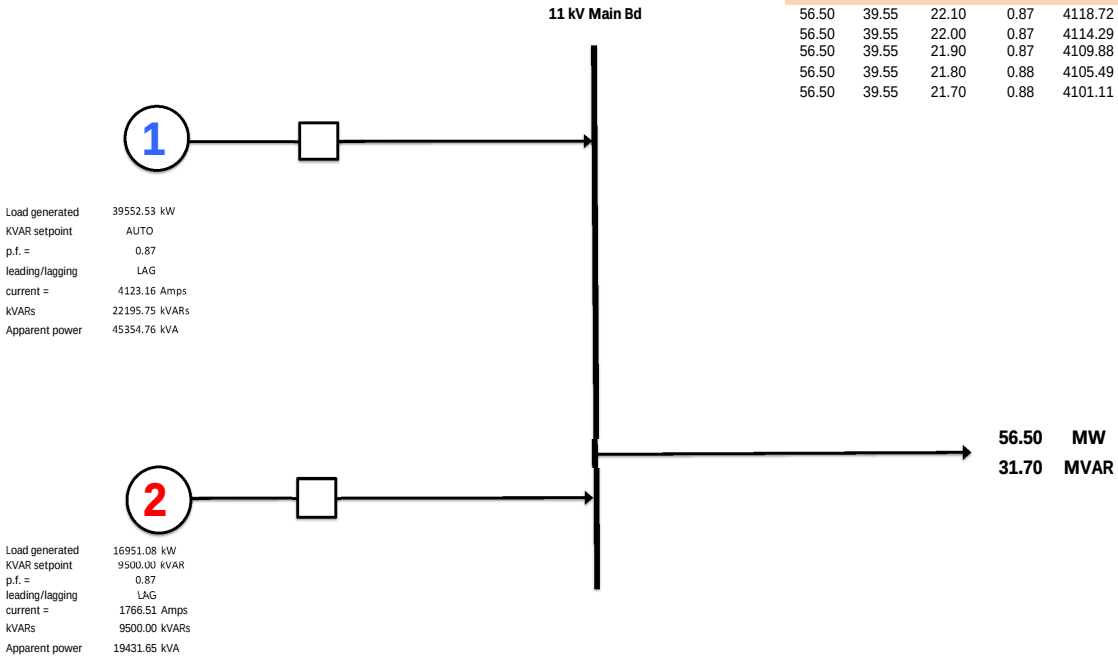


Multiple Generators supplying Reactive Power in Parallel

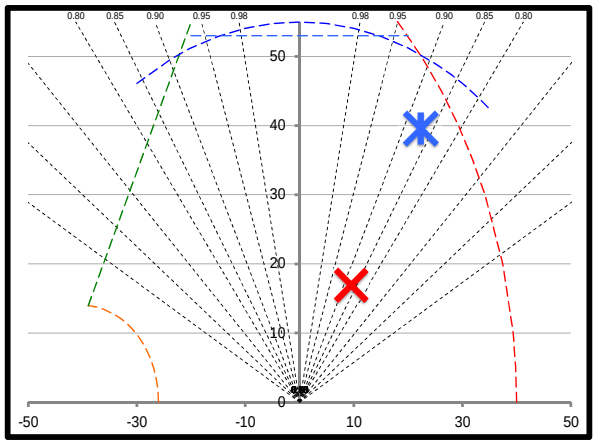


Again adding together the current flow in each generator we see that the minimum combined current flow occurs when Unit 2 AVR Mvar setpoint was +9.5 Mvar.

Total MW	U1 MW	U1 MVARs	U1 p.f.	U1 Current	U2 MW	U2 MVARs	U2 p.f.	U2 Current	Combined Current (Amps)
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00	5895.58
56.50	39.55	23.60	0.86	4186.92	16.95	**8.10**	0.90	1707.90	5894.82
56.50	39.55	23.50	0.86	4182.27	16.95	**8.20**	0.90	1711.84	5894.11
56.50	39.55	23.40	0.86	4177.63	16.95	**8.30**	0.90	1715.82	5893.45
56.50	39.55	23.30	0.86	4173.01	16.95	**8.40**	0.90	1719.84	5892.85
56.50	39.55	23.20	0.86	4168.40	16.95	**8.50**	0.89	1723.89	5892.30
56.50	39.55	23.10	0.86	4163.81	16.95	**8.60**	0.89	1727.99	5891.80
56.50	39.55	23.00	0.86	4159.23	16.95	**8.70**	0.89	1732.12	5891.35
56.50	39.55	22.90	0.87	4154.67	16.95	**8.80**	0.89	1736.29	5890.96
56.50	39.55	22.80	0.87	4150.13	16.95	**8.90**	0.89	1740.50	5890.62
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74	5890.34
56.50	39.55	22.60	0.87	4141.08	16.95	**9.10**	0.88	1749.02	5890.10
56.50	39.55	22.50	0.87	4136.57	16.95	**9.20**	0.88	1753.34	5889.92
56.50	39.55	22.40	0.87	4132.09	16.95	**9.30**	0.88	1757.70	5889.78
56.50	39.55	22.30	0.87	4127.62	16.95	**9.40**	0.87	1762.09	5889.70
56.50	39.55	22.20	**0.87**	4123.16	16.95	**9.50**	**0.87**	1766.51	5889.67
56.50	39.55	22.10	0.87	4118.72	16.95	**9.60**	0.87	1770.98	5889.69
56.50	39.55	22.00	0.87	4114.29	16.95	**9.70**	0.87	1775.47	5889.77
56.50	39.55	21.90	0.87	4109.88	16.95	**9.80**	0.87	1780.01	5889.89
56.50	39.55	21.80	0.88	4105.49	16.95	**9.90**	0.86	1784.57	5890.06
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18	5890.28



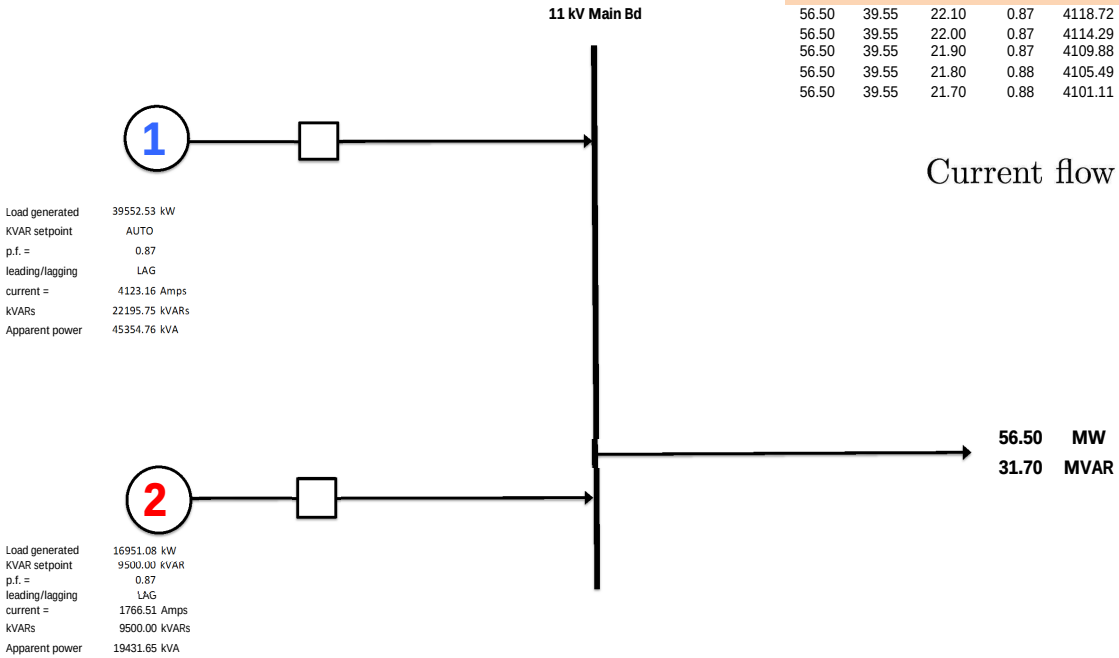
Multiple Generators supplying Reactive Power in Parallel



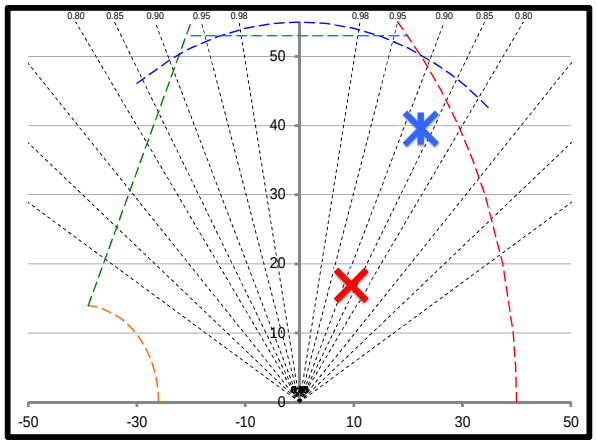
Also this combined current flow is the same value as we calculated was necessary to supply the demand if the power was generated at 11000 V.

Total MW	U1 MW	U1 MVARs	U1 p.f.	U1 Current	U2 MW	U2 MVARs	U2 p.f.	U2 Current	Combined Current (Amps)
56.50	39.55	23.70	0.86	4191.58	16.95	**8.00**	0.90	1704.00	5895.58
56.50	39.55	23.60	0.86	4186.92	16.95	**8.10**	0.90	1707.90	5894.82
56.50	39.55	23.50	0.86	4182.27	16.95	**8.20**	0.90	1711.84	5894.11
56.50	39.55	23.40	0.86	4177.63	16.95	**8.30**	0.90	1715.82	5893.45
56.50	39.55	23.30	0.86	4173.01	16.95	**8.40**	0.90	1719.84	5892.85
56.50	39.55	23.20	0.86	4168.40	16.95	**8.50**	0.89	1723.89	5892.30
56.50	39.55	23.10	0.86	4163.81	16.95	**8.60**	0.89	1727.99	5891.80
56.50	39.55	23.00	0.86	4159.23	16.95	**8.70**	0.89	1732.12	5891.35
56.50	39.55	22.90	0.87	4154.67	16.95	**8.80**	0.89	1736.29	5890.96
56.50	39.55	22.80	0.87	4150.13	16.95	**8.90**	0.89	1740.50	5890.62
56.50	39.55	22.70	0.87	4145.59	16.95	**9.00**	0.88	1744.74	5890.34
56.50	39.55	22.60	0.87	4141.08	16.95	**9.10**	0.88	1749.02	5890.10
56.50	39.55	22.50	0.87	4136.57	16.95	**9.20**	0.88	1753.34	5889.92
56.50	39.55	22.40	0.87	4132.09	16.95	**9.30**	0.88	1757.70	5889.78
56.50	39.55	22.30	0.87	4127.62	16.95	**9.40**	0.87	1762.09	5889.70
56.50	39.55	22.20	**0.87**	4123.16	16.95	**9.50**	**0.87**	1766.51	5889.67
56.50	39.55	22.10	0.87	4118.72	16.95	**9.60**	0.87	1770.98	5889.69
56.50	39.55	22.00	0.87	4114.29	16.95	**9.70**	0.87	1775.47	5889.77
56.50	39.55	21.90	0.87	4109.88	16.95	**9.80**	0.87	1780.01	5889.89
56.50	39.55	21.80	0.88	4105.49	16.95	**9.90**	0.86	1784.57	5890.06
56.50	39.55	21.70	0.88	4101.11	16.95	**10.00**	0.86	1789.18	5890.28

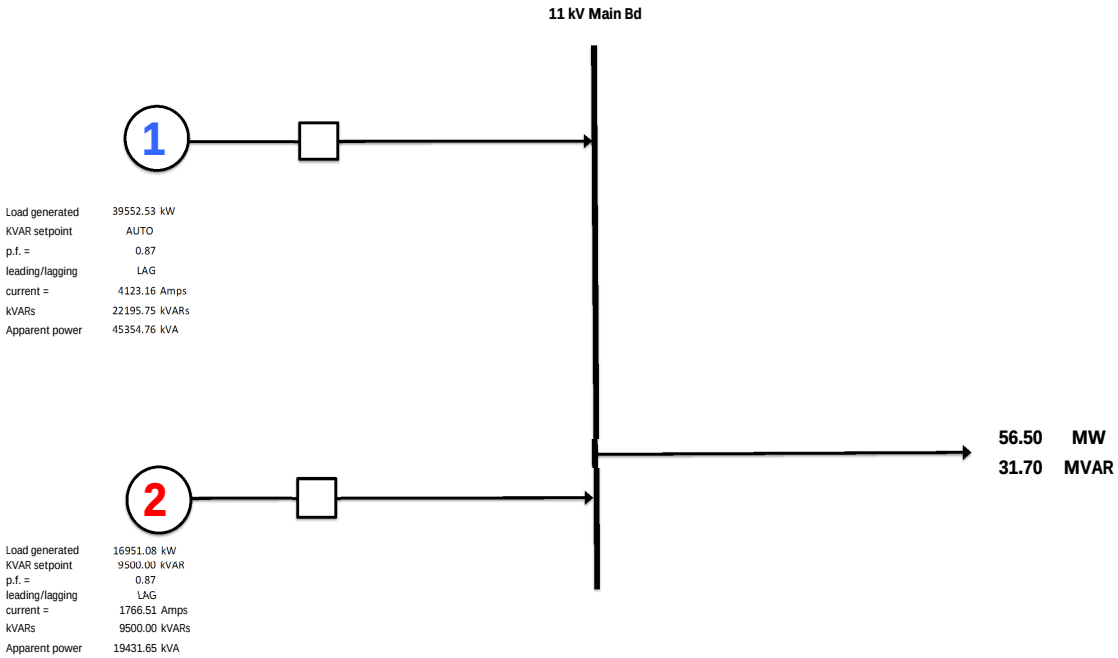
Current flow = 5889.67 Amps



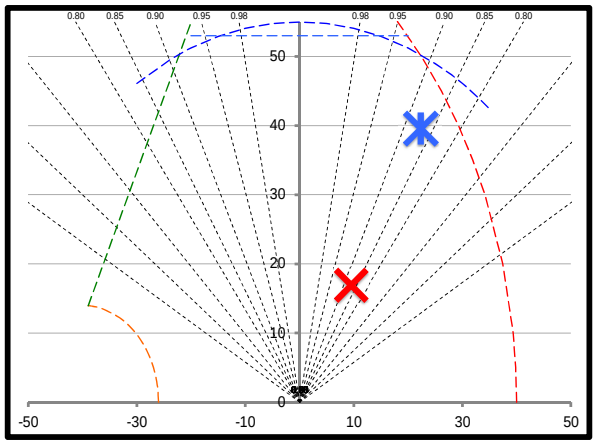
Multiple Generators supplying Reactive Power in Parallel



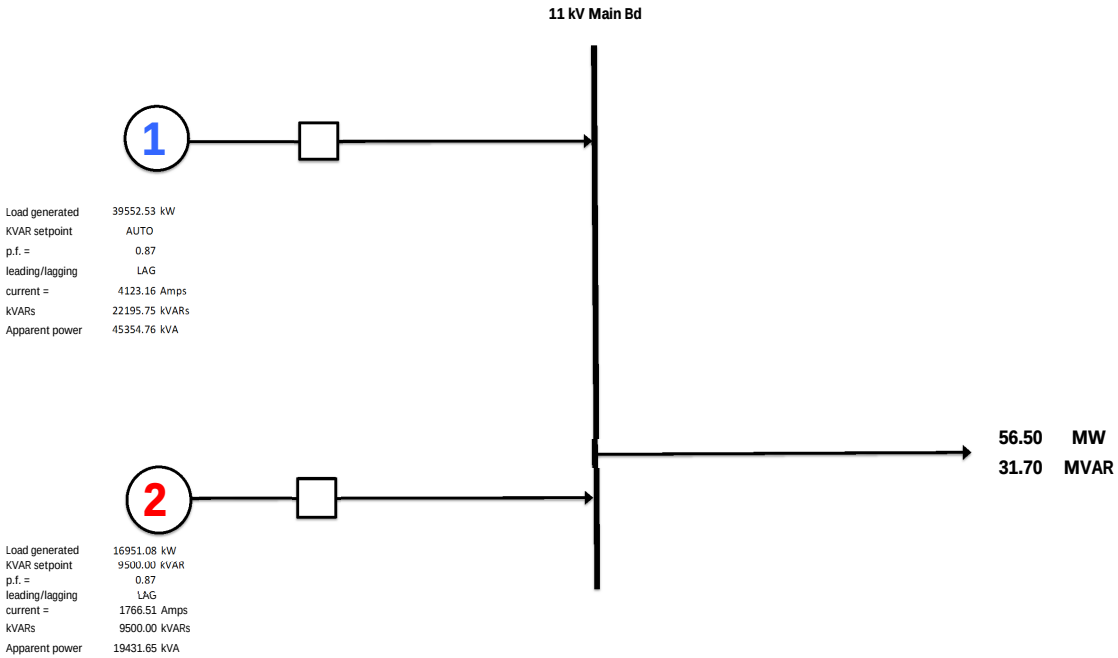
Unit 2 generating 17 MW and +9.5 Mvar. It is at a power factor of 0.87 lagging.



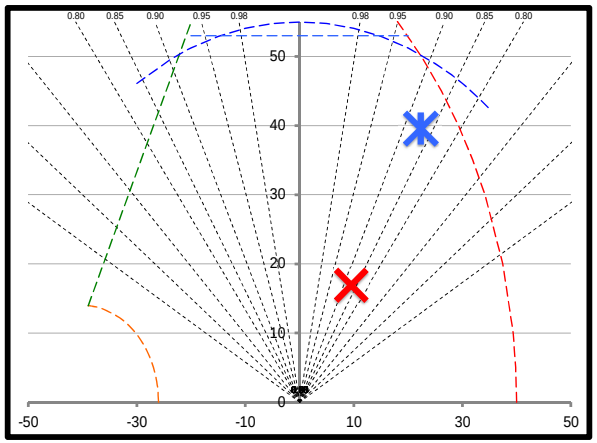
Multiple Generators supplying Reactive Power in Parallel



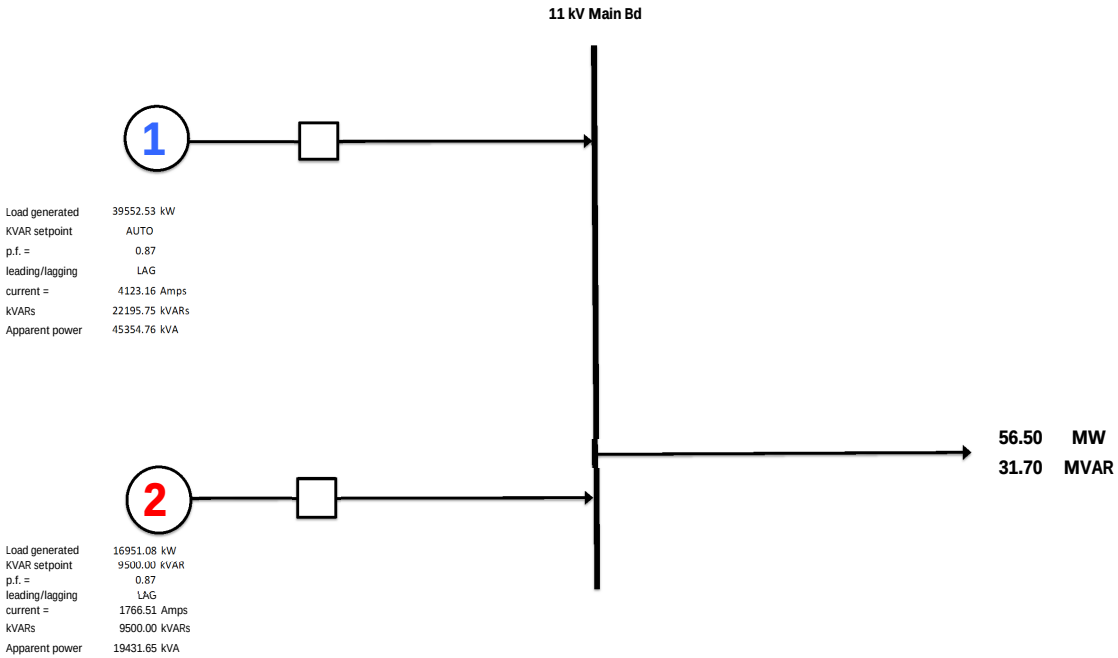
Unit 1 is generating 39.5 MW and +22.2 Mvar and is also at a power factor of 0.87 lagging.



Multiple Generators supplying Reactive Power in Parallel



So to minimise losses and operate differently sized or loaded machines feeding onto the same bus it is best to run them at the same power factor.



The End