Appendix

Rough Estimation of Required Reserve Margin of Generation Capacity

Some of the generators installed in power system are usually stopped with a certain probability during any period of time in a year. For the sake of simplicity, the system has “N” units of generators with its unavailable probability of “p” per unit. (here, both its periodical inspections and failures are assumed to happen at the unified probabilities during the year because of the flat load curve of Indonesia.)

The probability of operating “m” generators among “N” generators with others stopped is represented by the following formula.

$$p(m) = \binom{N}{m} (1-p)^m \, p^{N-m}$$

In this case, because of operation of “m” generators, the power output of generators is represented by “mG” where the power output of a generator is G.
Adding to the abovementioned formula, the following relation is generally fulfilled.

$$1 = p(1) + p(2) + \cdots + p(N)$$

For example, on the condition that N=100, the graph of p(m) can be depicted as follows.

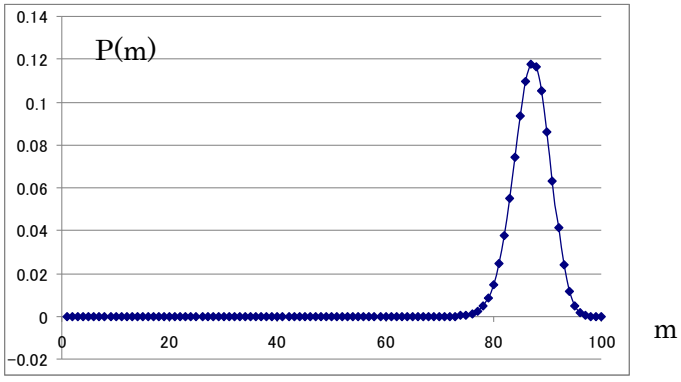


Figure. p(m)(N=10)

Here, the demand at hour “i” is assumed “Li”. The probability of the power supply interruption at hour “i”, we call it $S(i)$, can be obtained by the summation of the abovementioned formula within the range of $mG < L_i$ because its probability indicates the case that the power output in the system is less than Li.

$$S(i) = p(1) + p(2) + \cdots + p(n_i)$$

where n_i is the maximum number that fullfils $n_i G < L_i$

Expected hours of power supply interruption in a year can be obtained by the summation of the abovementioned equation for each hour on the condition that Li is constant during an hour at time "i" and the duration of power supply interruption is $S(i)$ (for example, the duration of power supply interruption is an half hour if the abovementioned probability is 0.5)

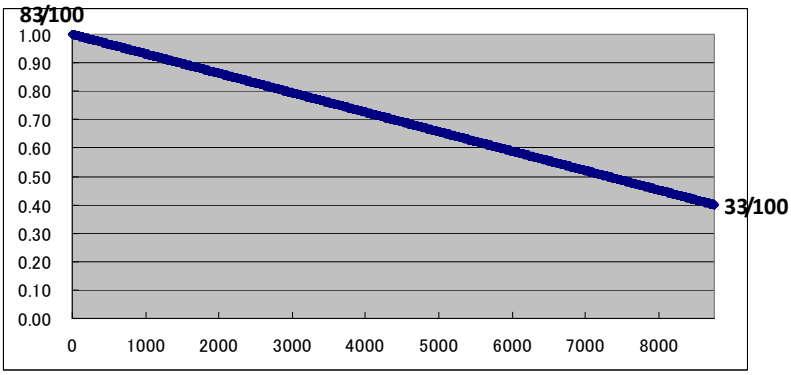
Here, we assume reserve margin α and the ratio of the load at hour "i" to the peak load is β_i. L_i become $\frac{\beta_i}{1+\alpha} NG$. The condition $n_i G < L_i$ become equivalent to $n_i < \frac{\beta_i}{1+\alpha} N$ and the expected duration of power supply interruption is obtained by the flowing.

Expected duration of power supply interruption in a year

$$= \sum_{i=1}^{8760} S(i) = \sum_{i=1}^{8760} (p(1) + p(2) + \cdots + p(n_i))$$

where n_i is the maximum number that fullfills the relation $n_i < \frac{\beta_i}{1+\alpha} N$

The load duration curve with its load factor of 70% is assumed. Where N=100 and the reserve margin $\alpha = 0.22$, the 83 units of generators would be required during the peak demand period of time and the 33 units of generators would be required during the off peak time. Thus, $n_1 = 82$ and $n_{8760} = 33$ if the time zones are arranged in the order from peak to off-peak.



On the assumption of the abovementioned load curve, the number of generators in the system is 100, duration of the periodical inspection is 10% of a year, failure probability is 3% and the reserve margin of power outputs is 22%, the expected power supply interruption would be calculated as around one day per year.

Java-Bali 500kV System Year 2015

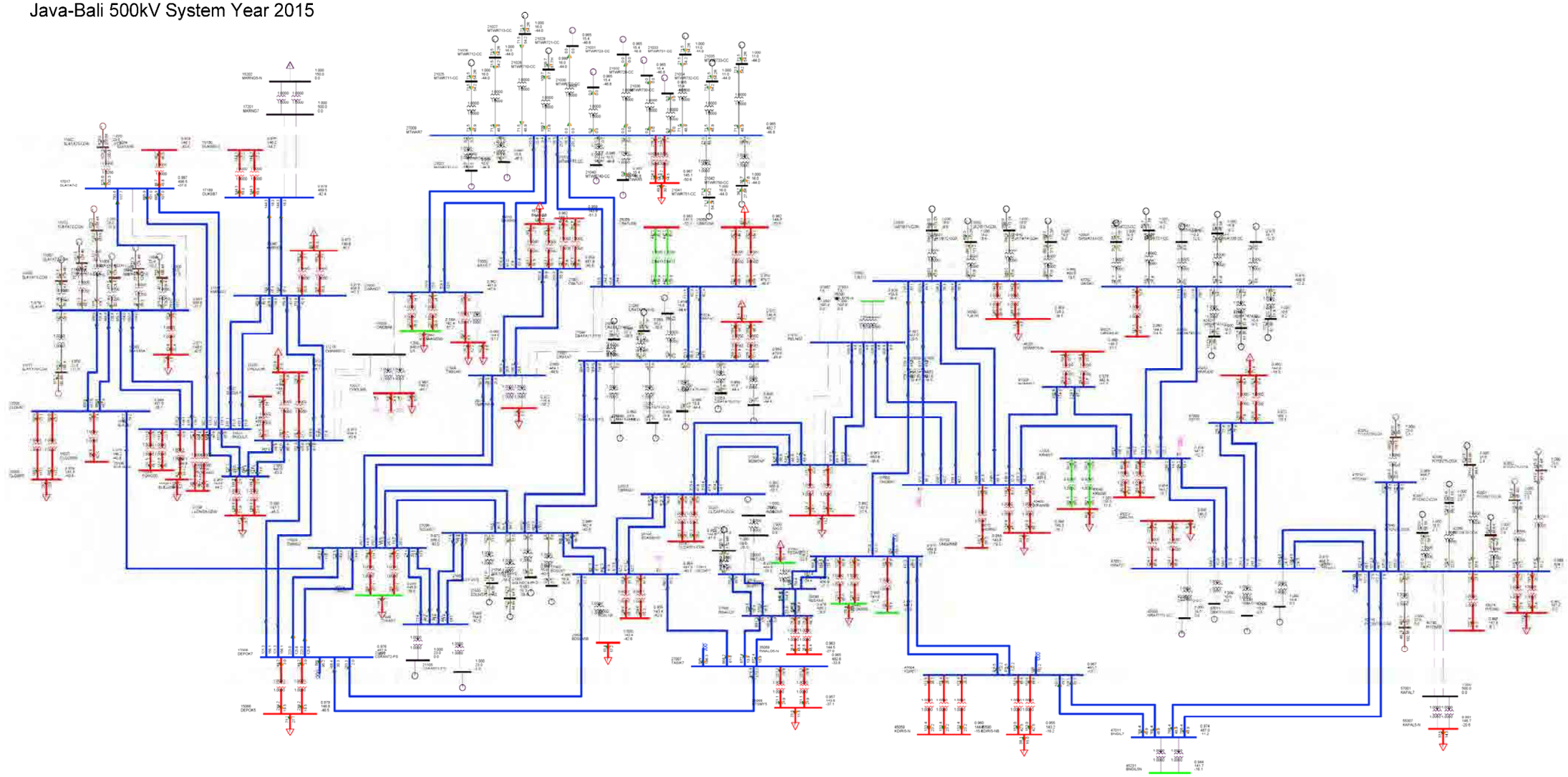


Figure.1 Power Flow Diagram of Java-Bali 500kV System under Jakarta Peak Demand in 2015

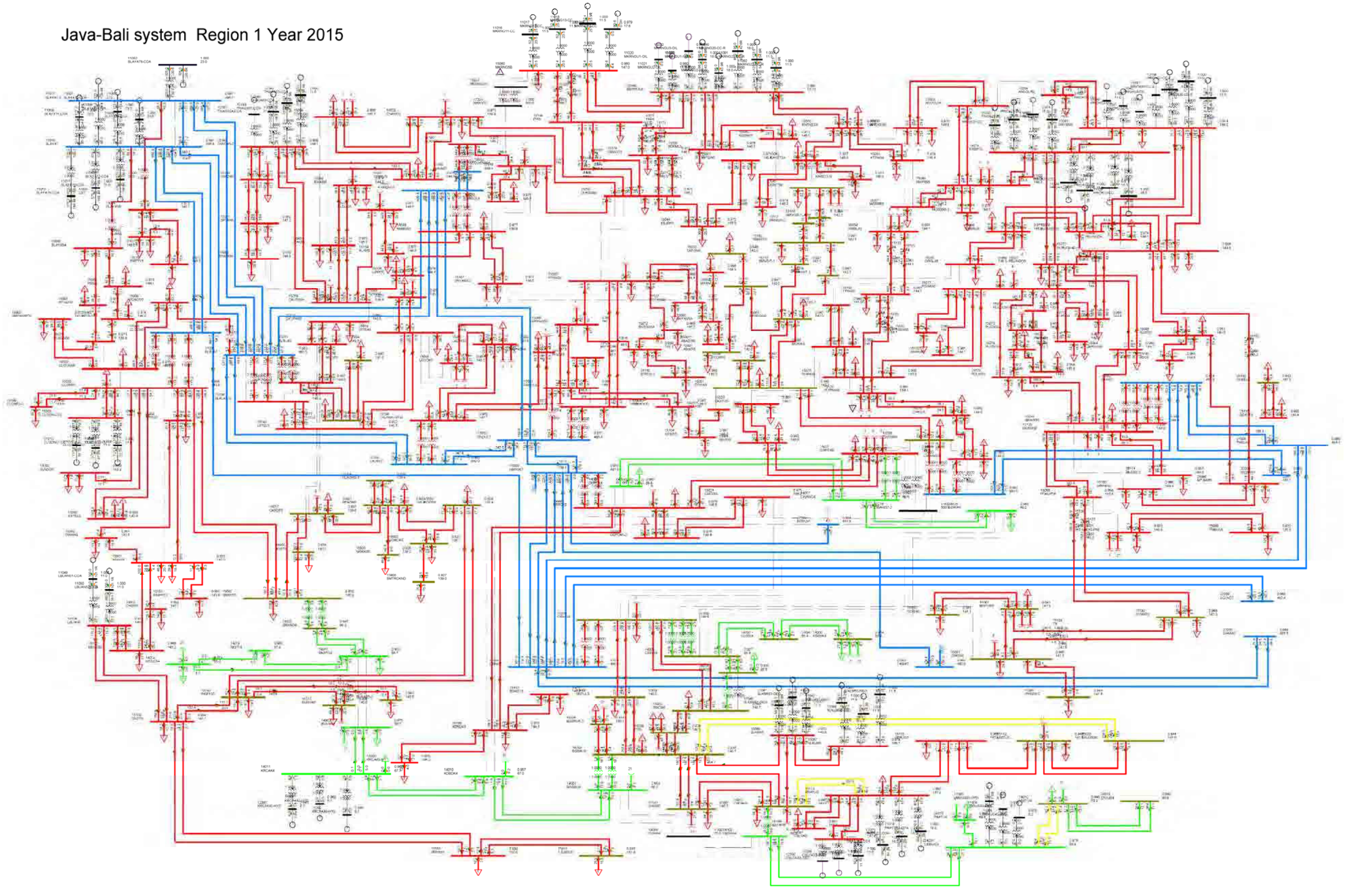


Figure.2 Power Flow Diagram of Java-Bali 500/150/70kV System under Jakarta Peak Demand in 2015 (Region 1)

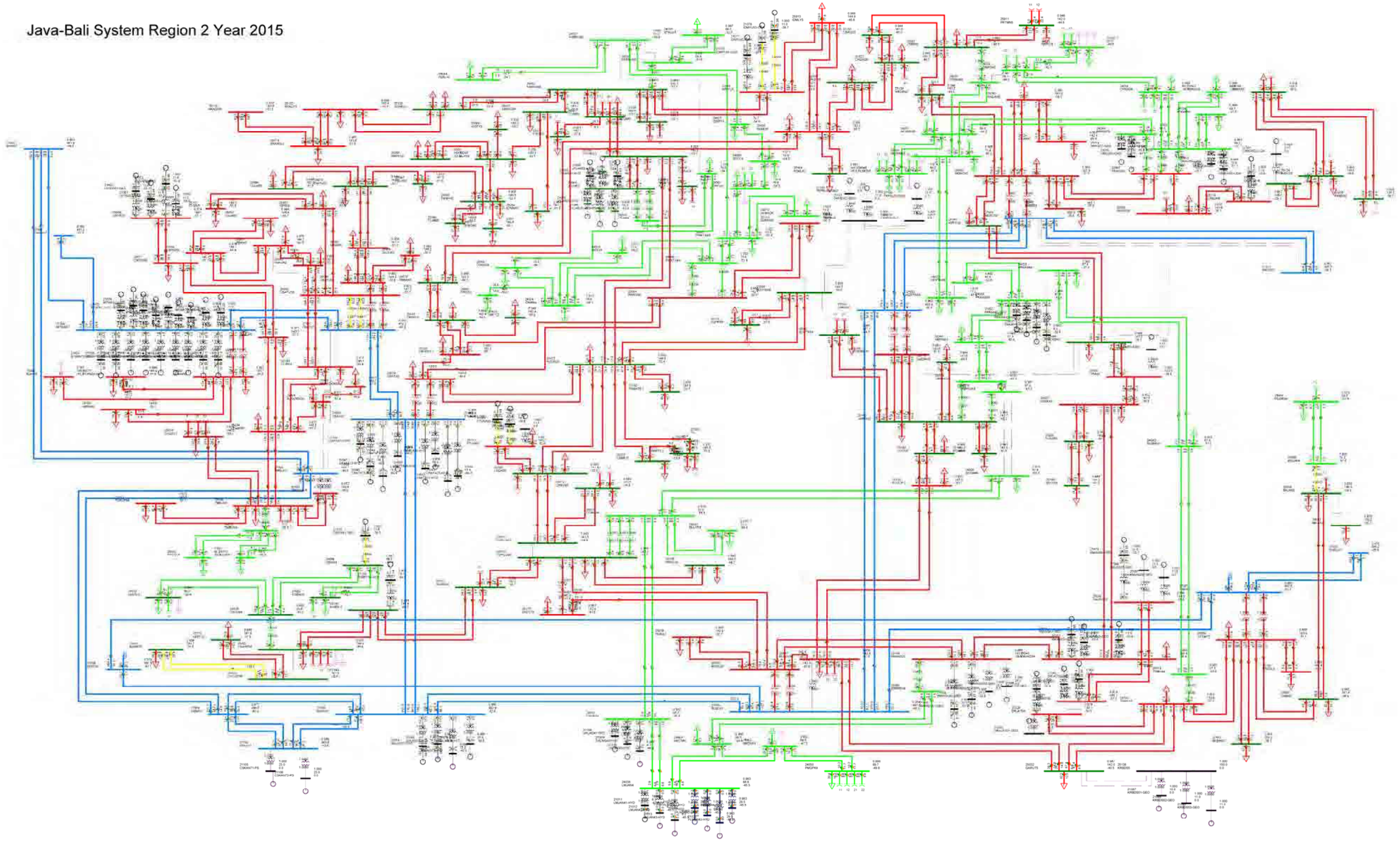


Figure.3 Power Flow Diagram of Java-Bali 500/150/70kV System under Jakarta Peak Demand in 2015 (Region 2)

Java-Bali 500kV System Year 2015

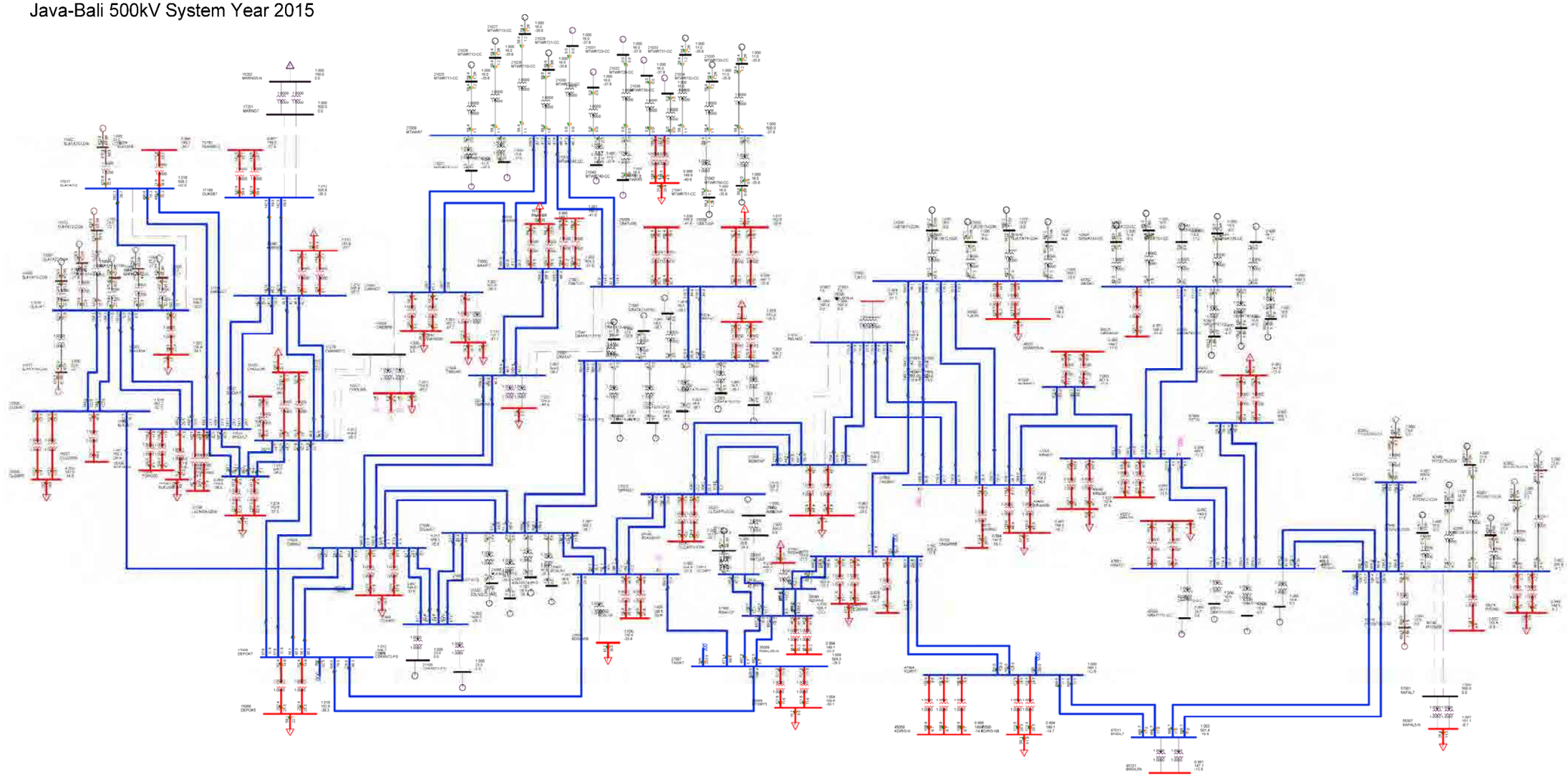


Figure.4 Power Flow Diagram of Java-Bali 500kV System under Off-peak Demand in 2015

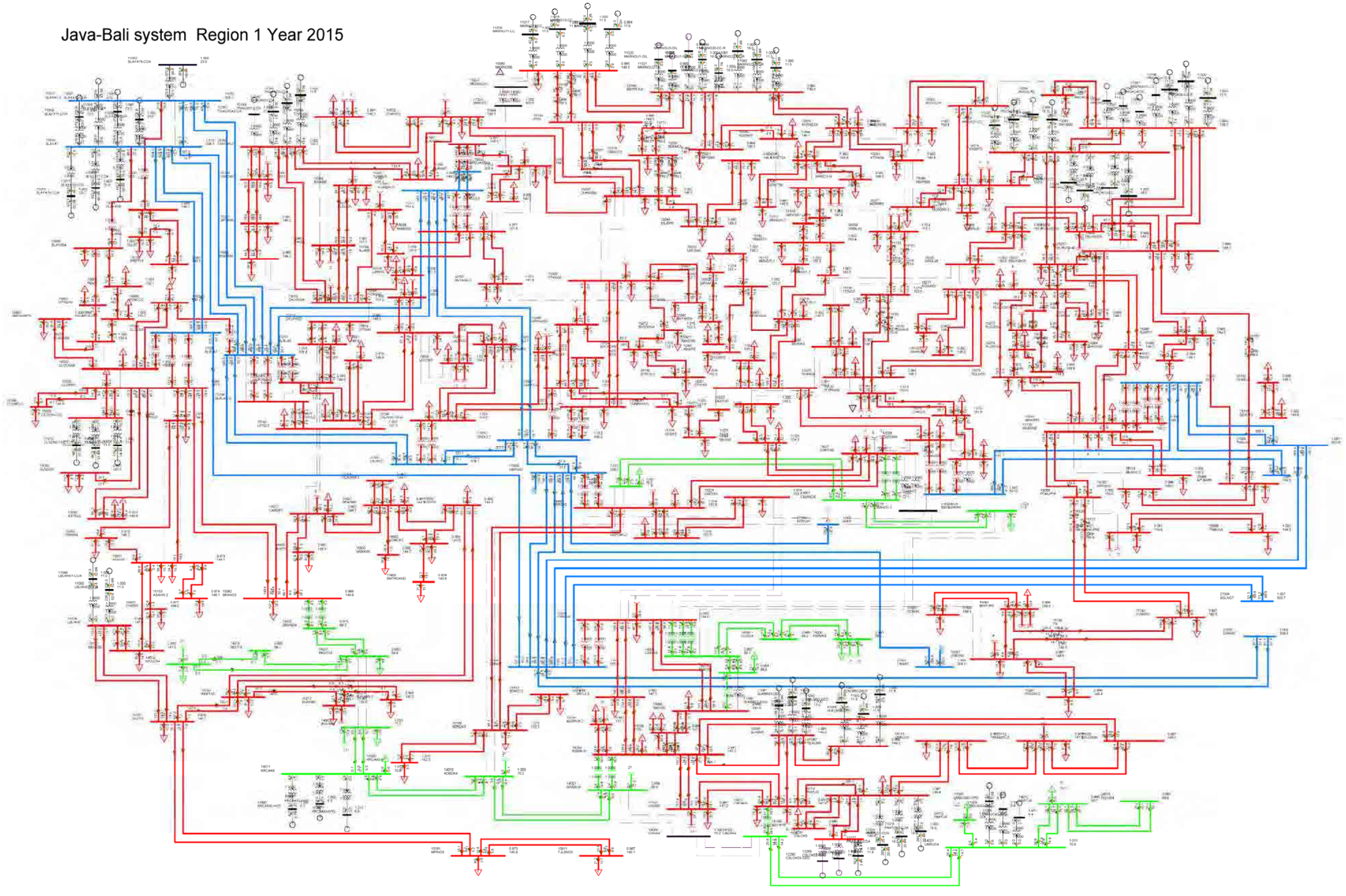


Figure.5 Power Flow Diagram of Java-Bali 500/150/70kV System under Off-peak Demand in 2015 (Region 1)

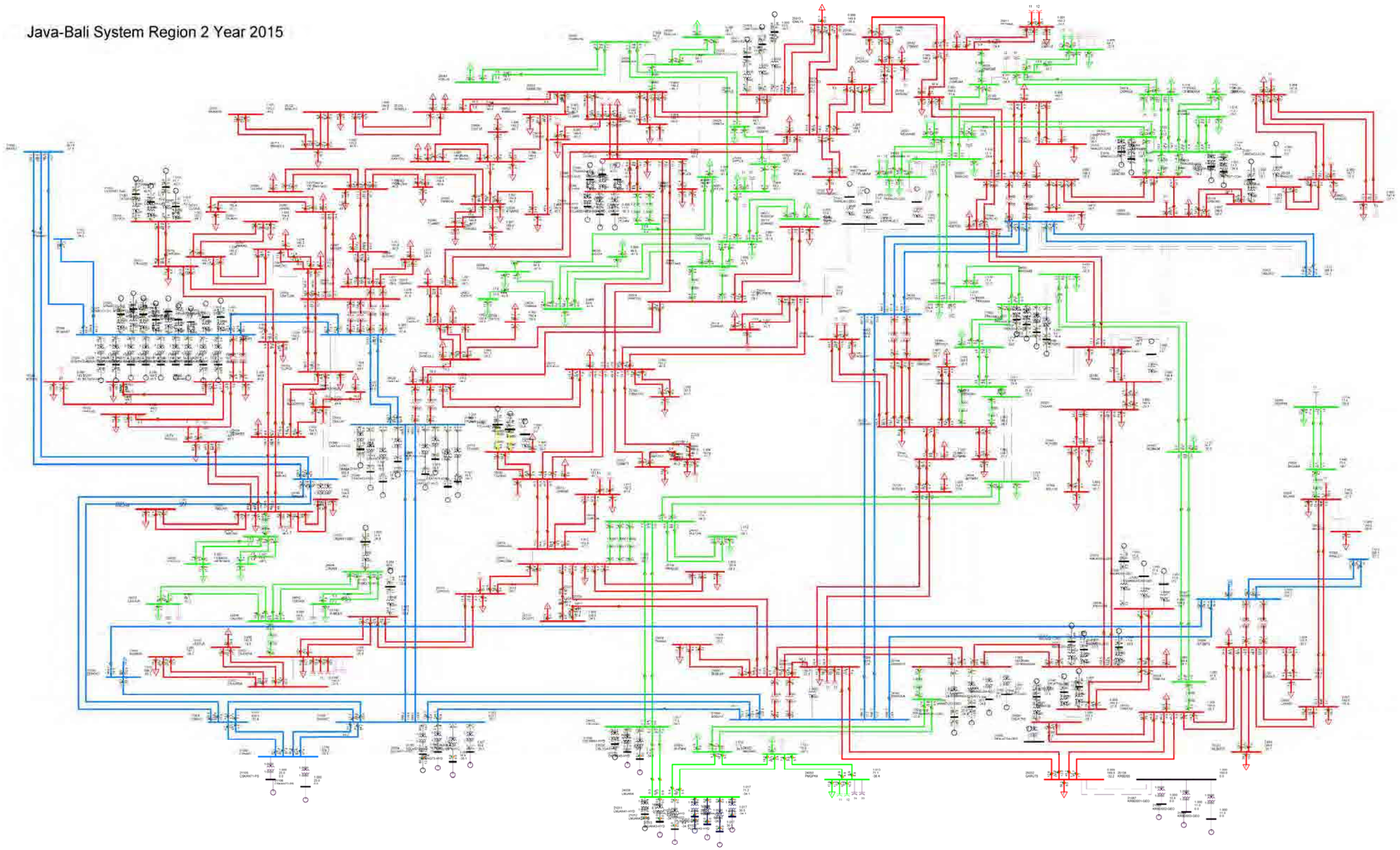


Figure.6 Power Flow Diagram of Java-Bali 500/150/70kV System under Off-peak Demand in 2015 (Region 2)

Java-Bali 500kV System Year 2021

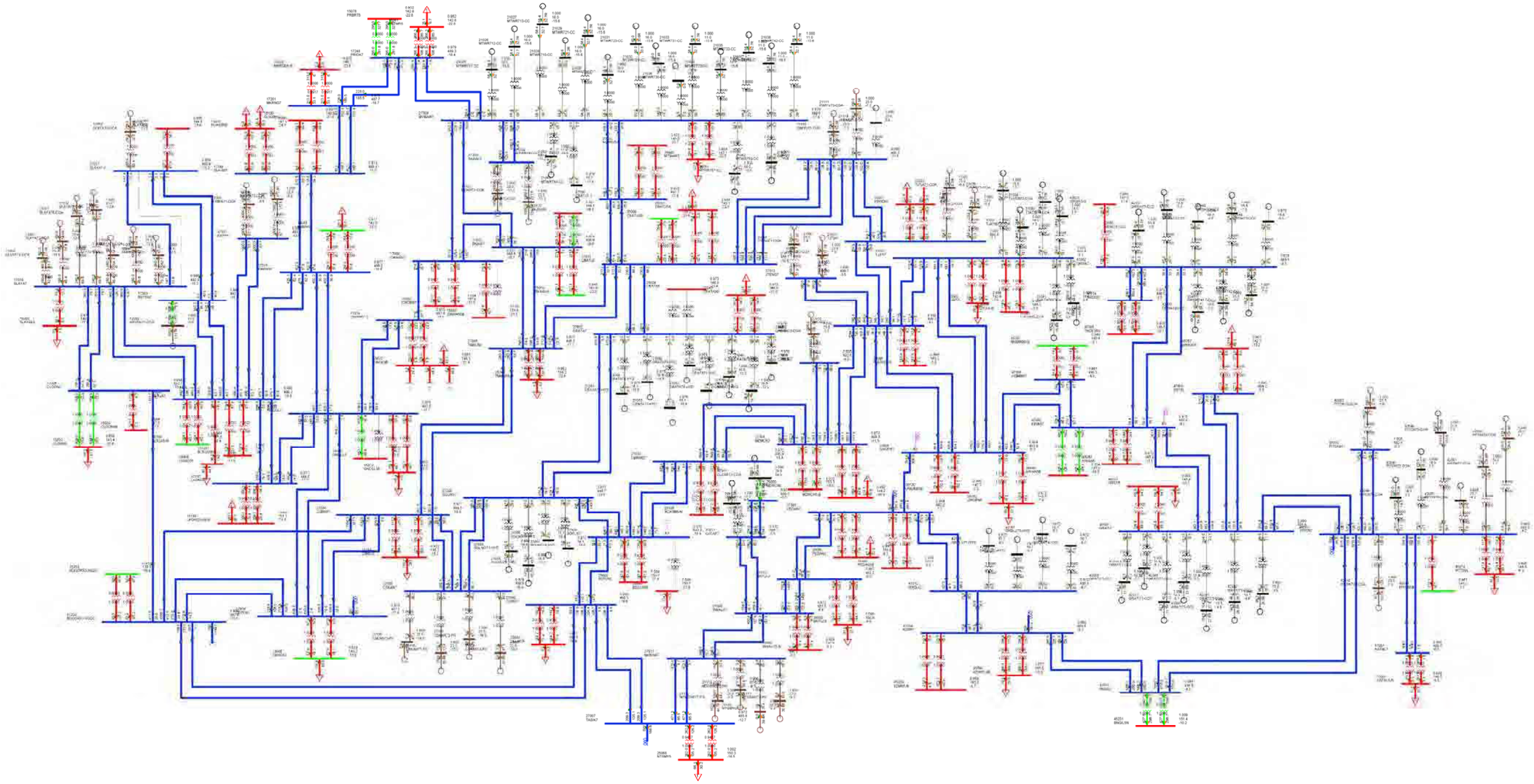


Figure.7 Power Flow Diagram of Java-Bali 500kV System under Jakarta Peak Demand in 2021

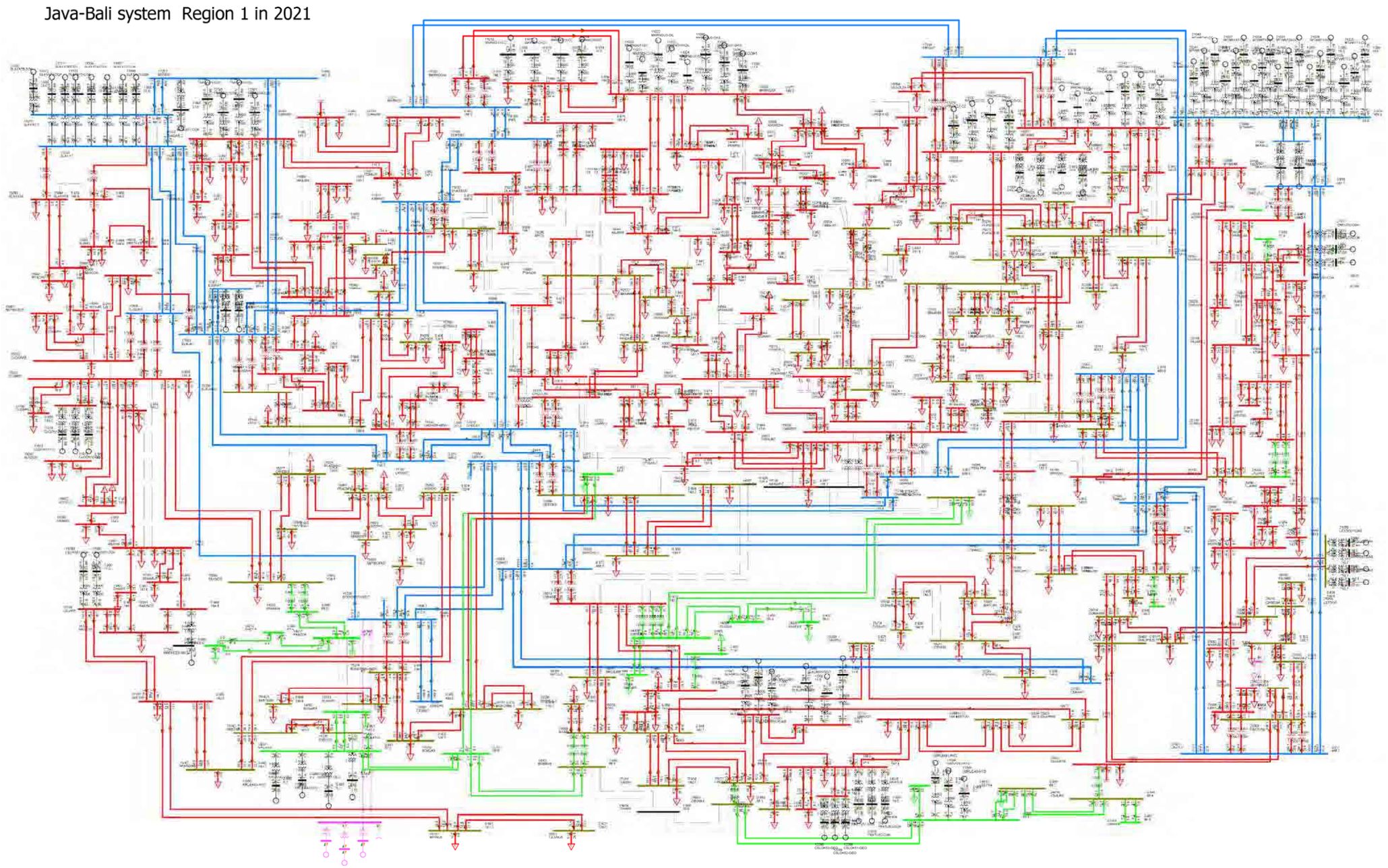


Figure.8 Power Flow Diagram of Java-Bali 500/150/70kV System under Jakarta Peak Demand in 2021(Region 1)

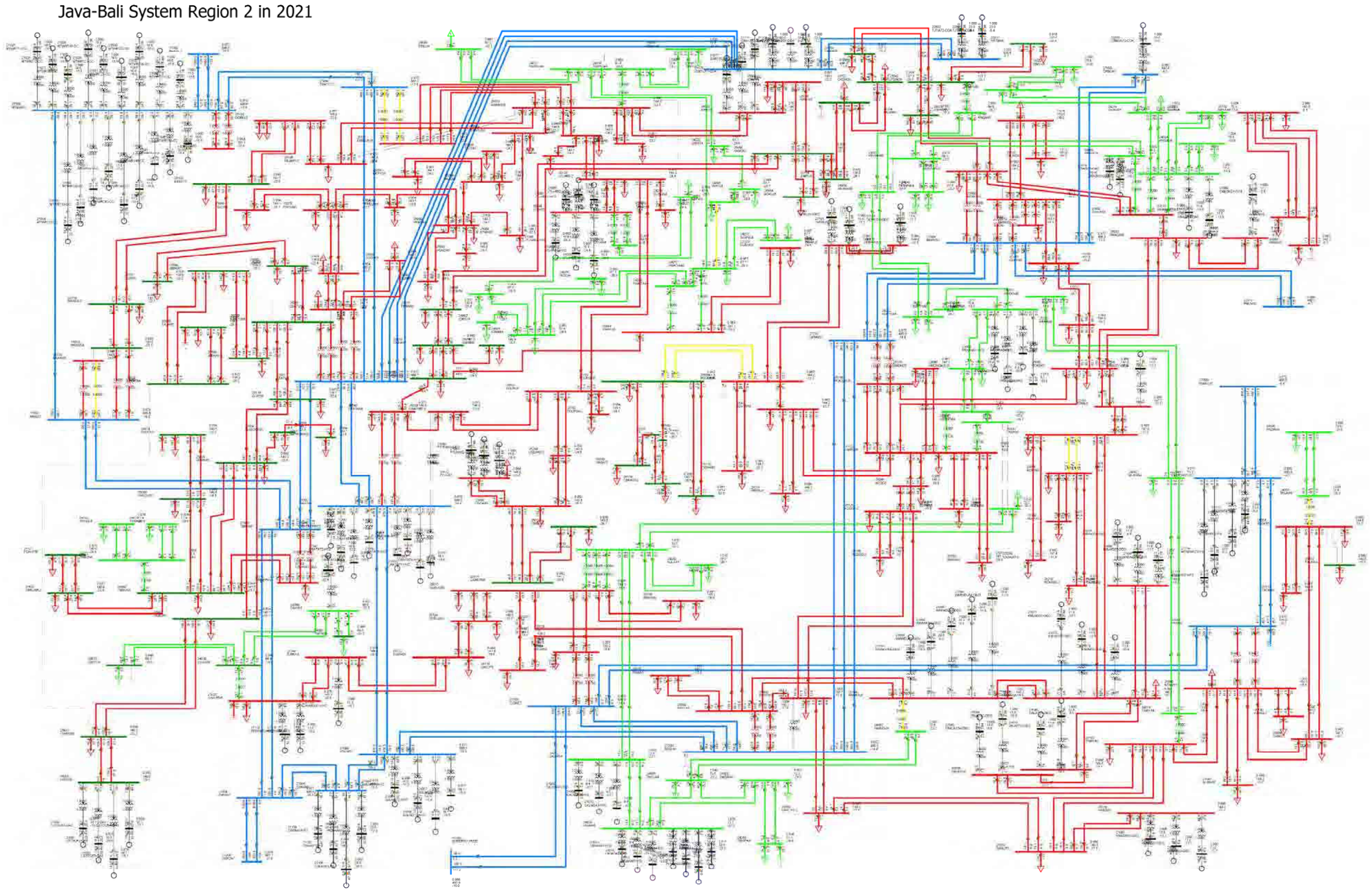


Figure.9 Power Flow Diagram of Java-Bali 500/150/70kV System under Jakarta Peak Demand in 2021(Region 2)

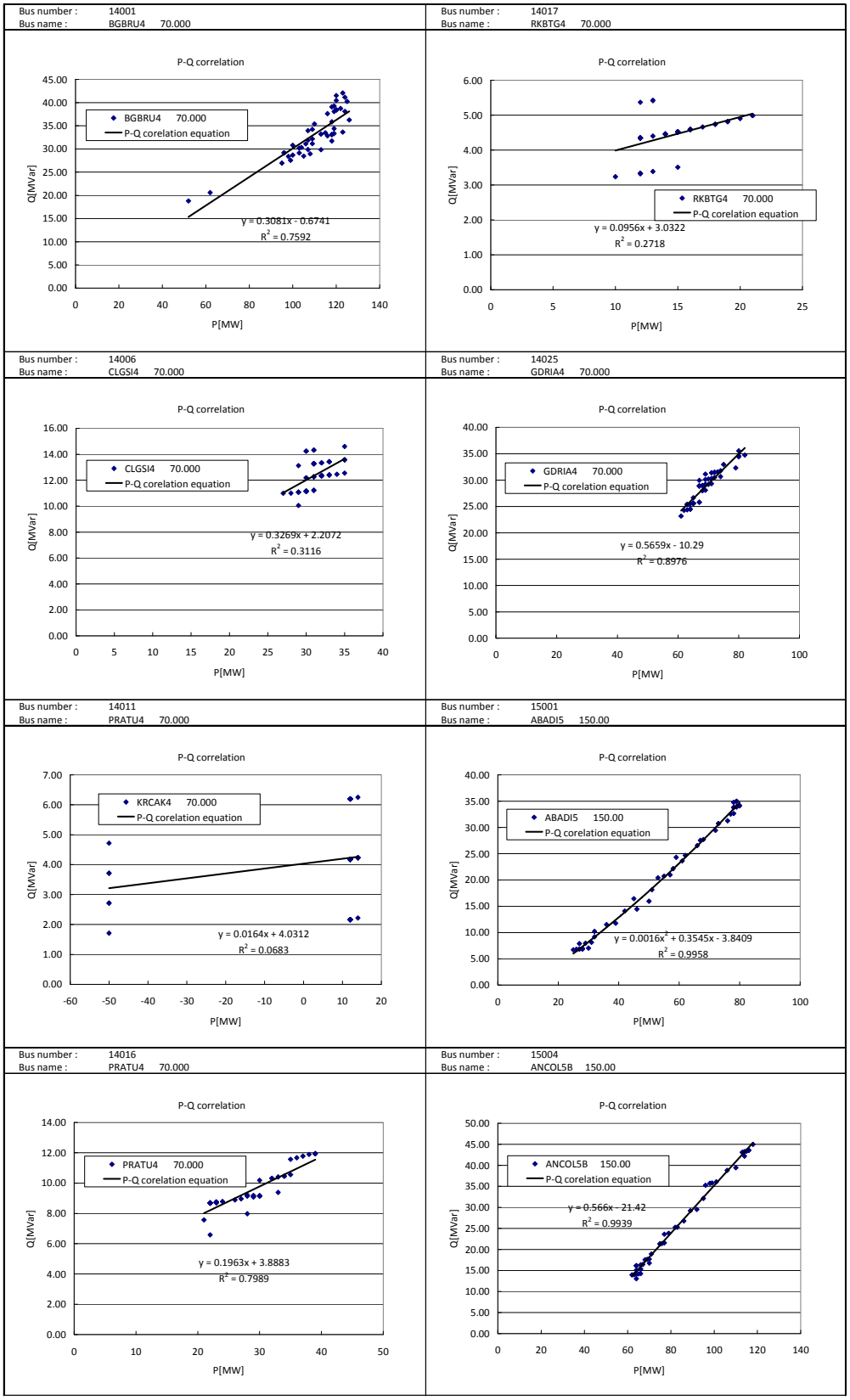


Figure.10 P-Q Correlation in Region 1 (1/9)

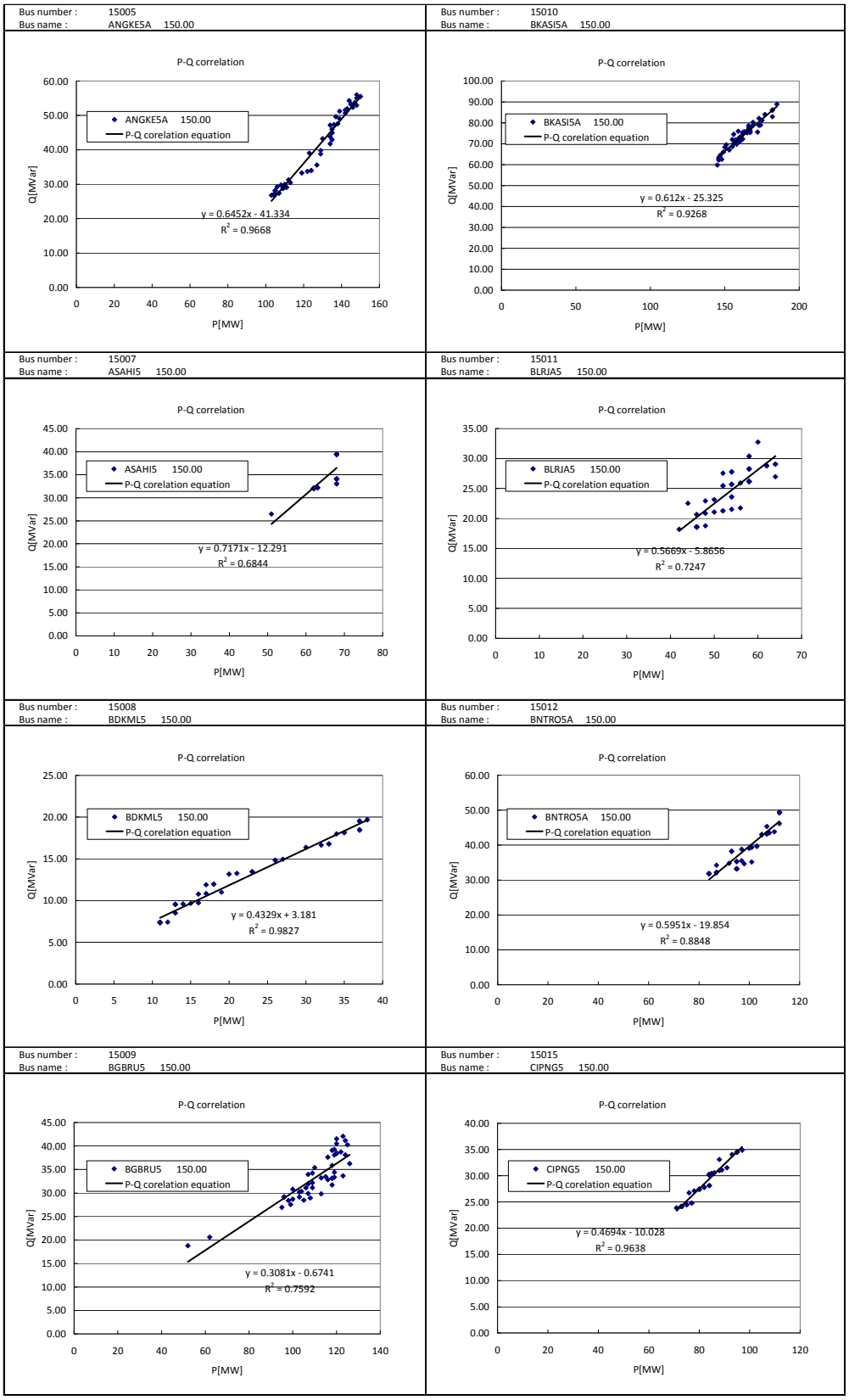


Figure.11 P-Q Correlation in Region 1 (2/9)

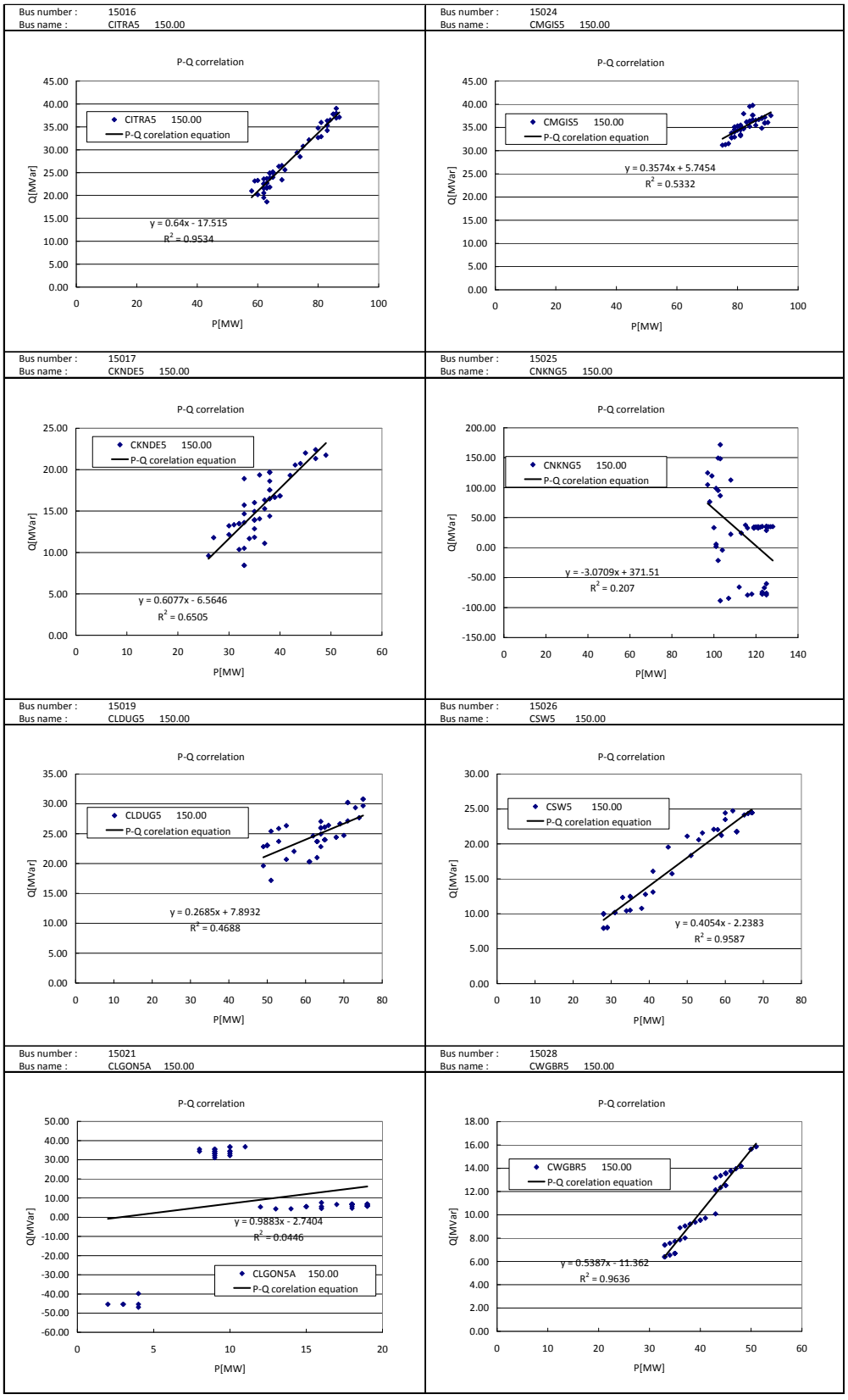


Figure.12 P-Q Correlation in Region 1 (3/9)

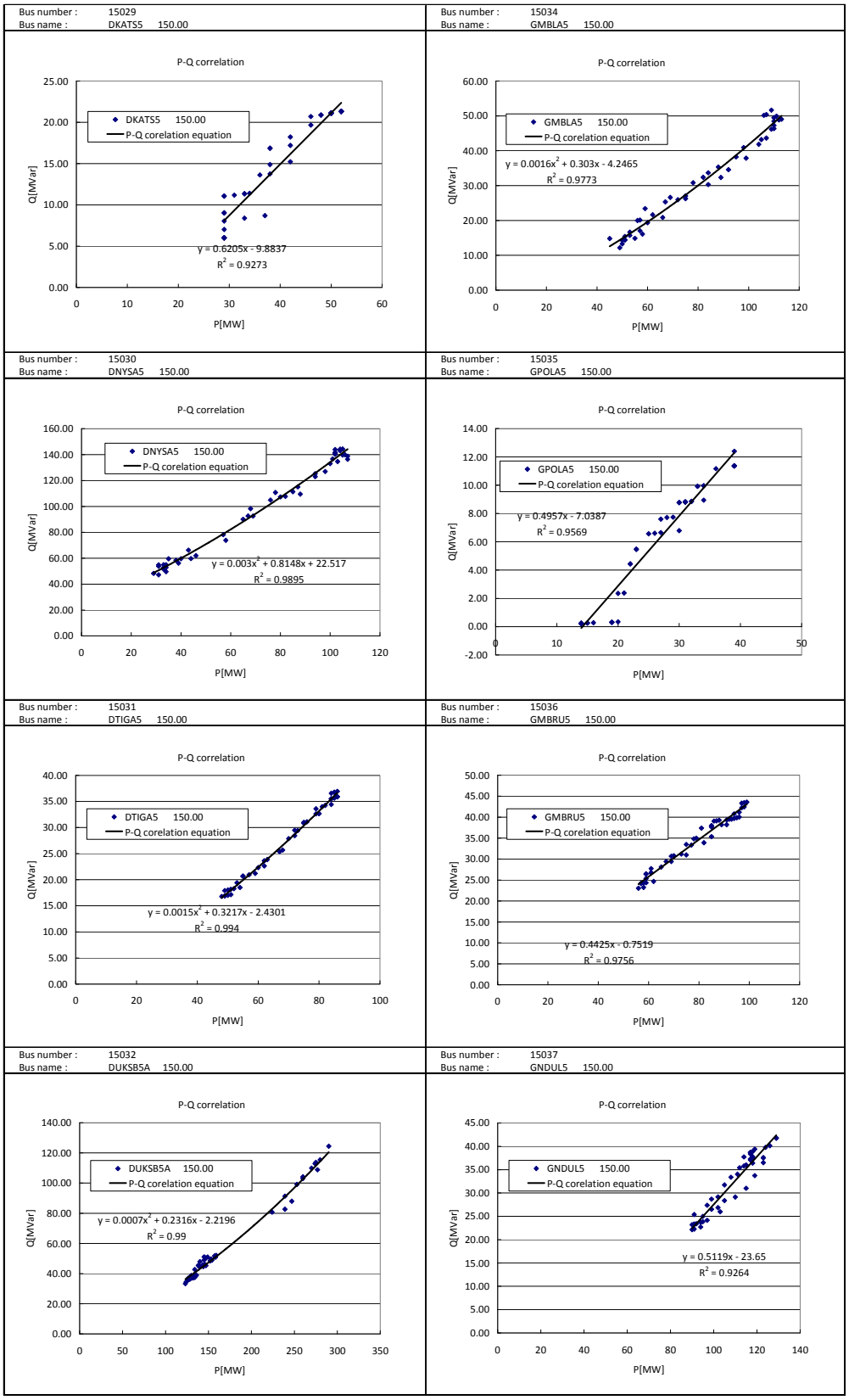


Figure.13 P-Q Correlation in Region 1 (4/9)

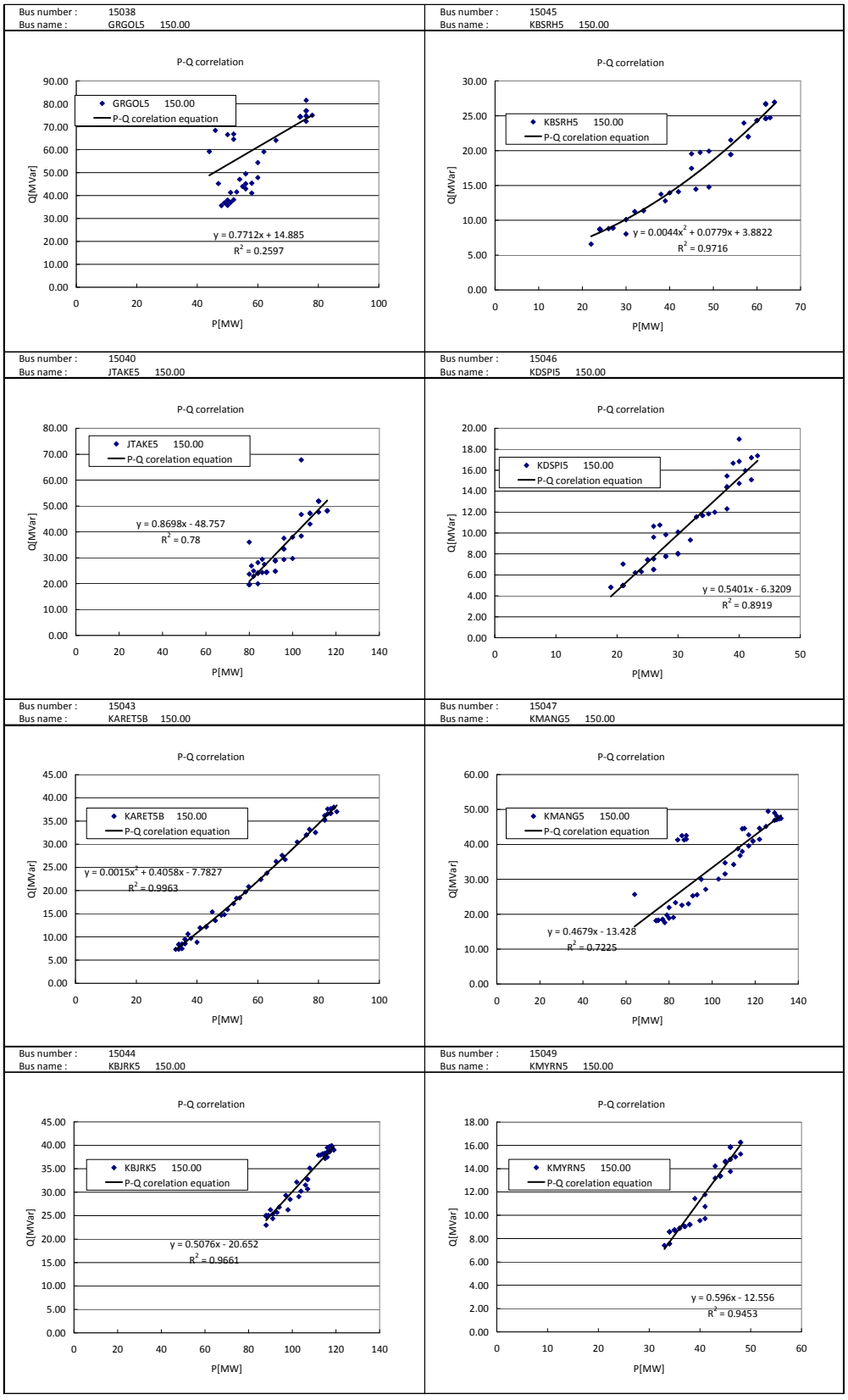


Figure.14 P-Q Correlation in Region 1 (5/9)

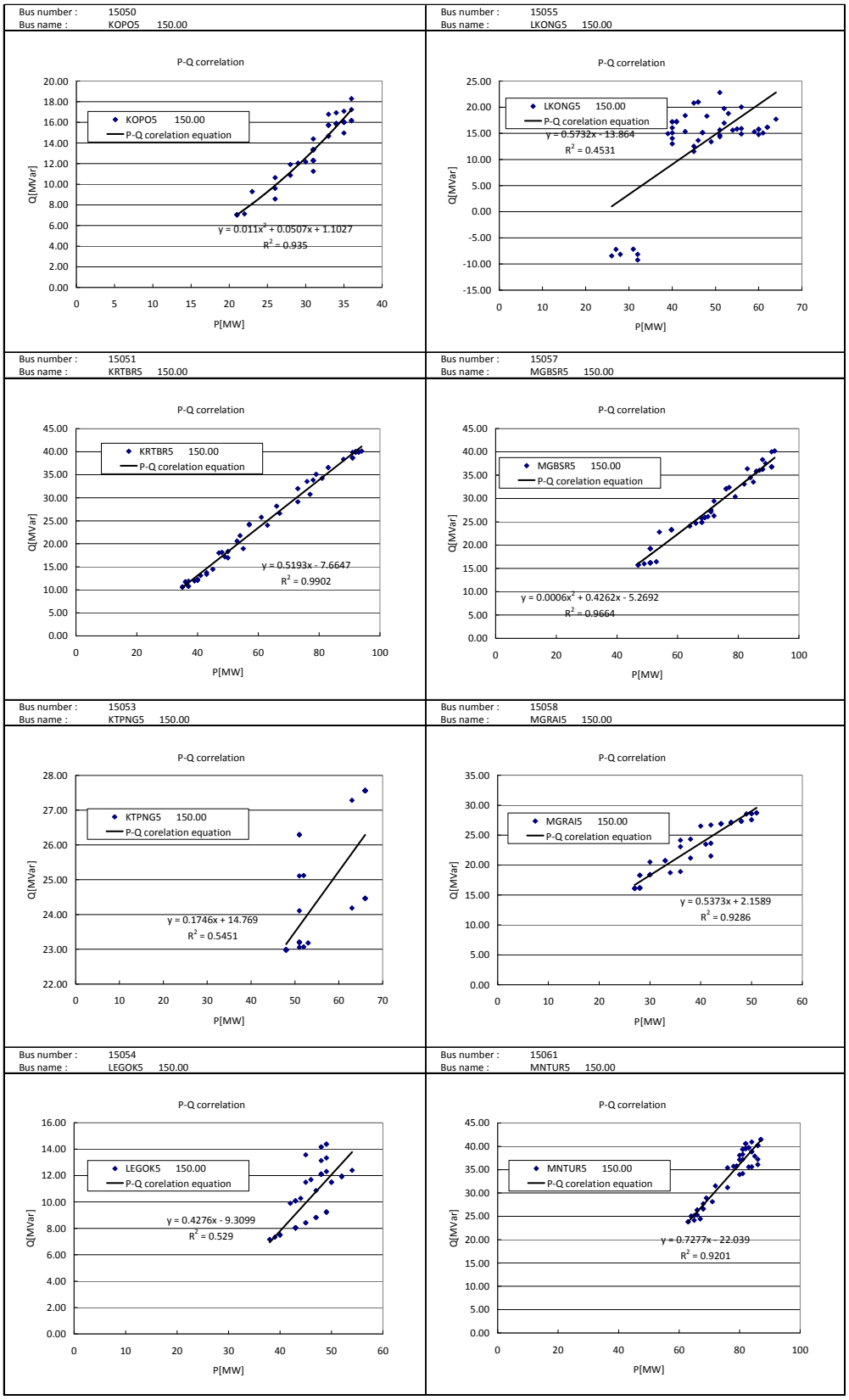


Figure.15 P-Q Correlation in Region 1 (6/9)

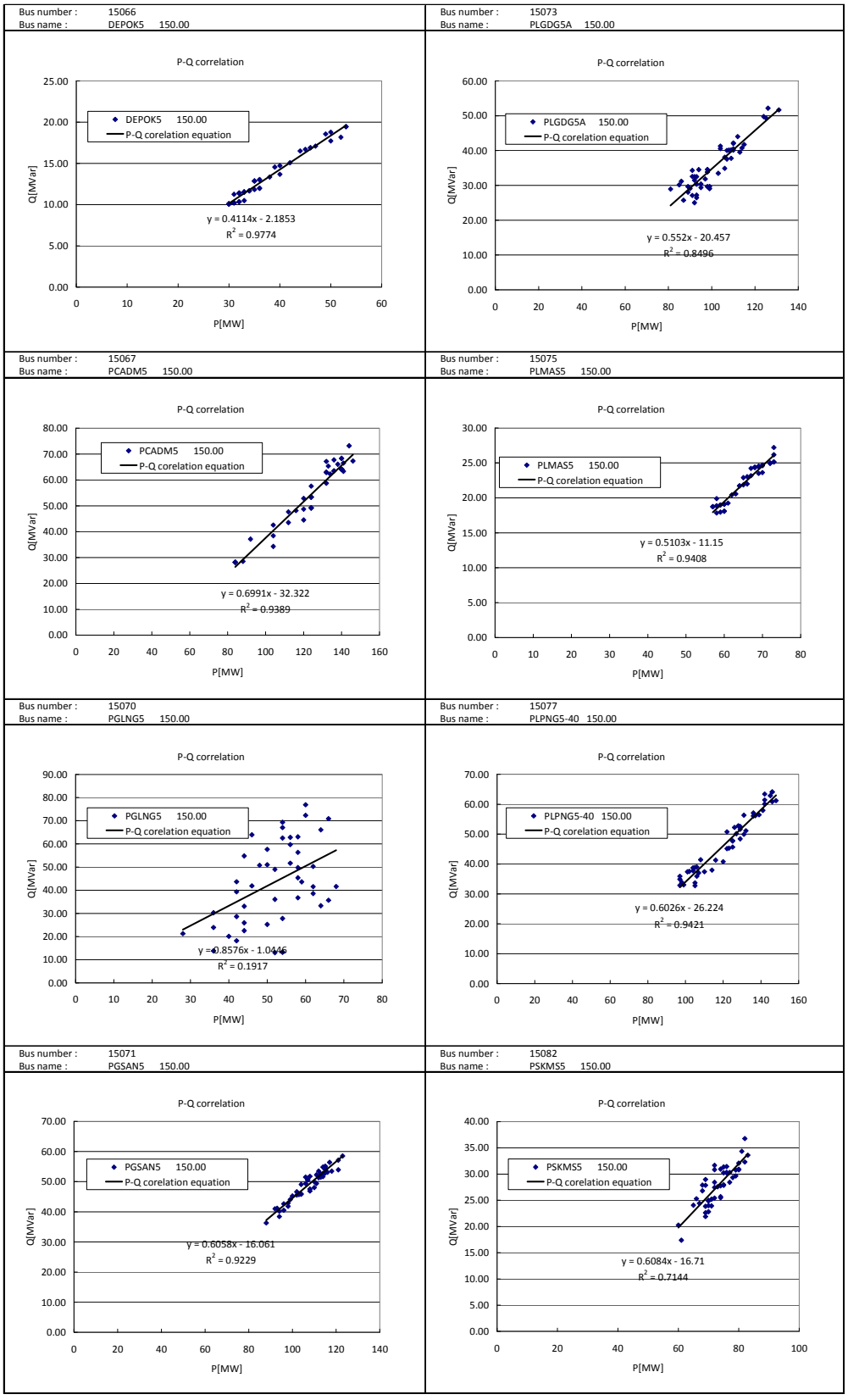


Figure.16 P-Q Correlation in Region 1 (7/9)

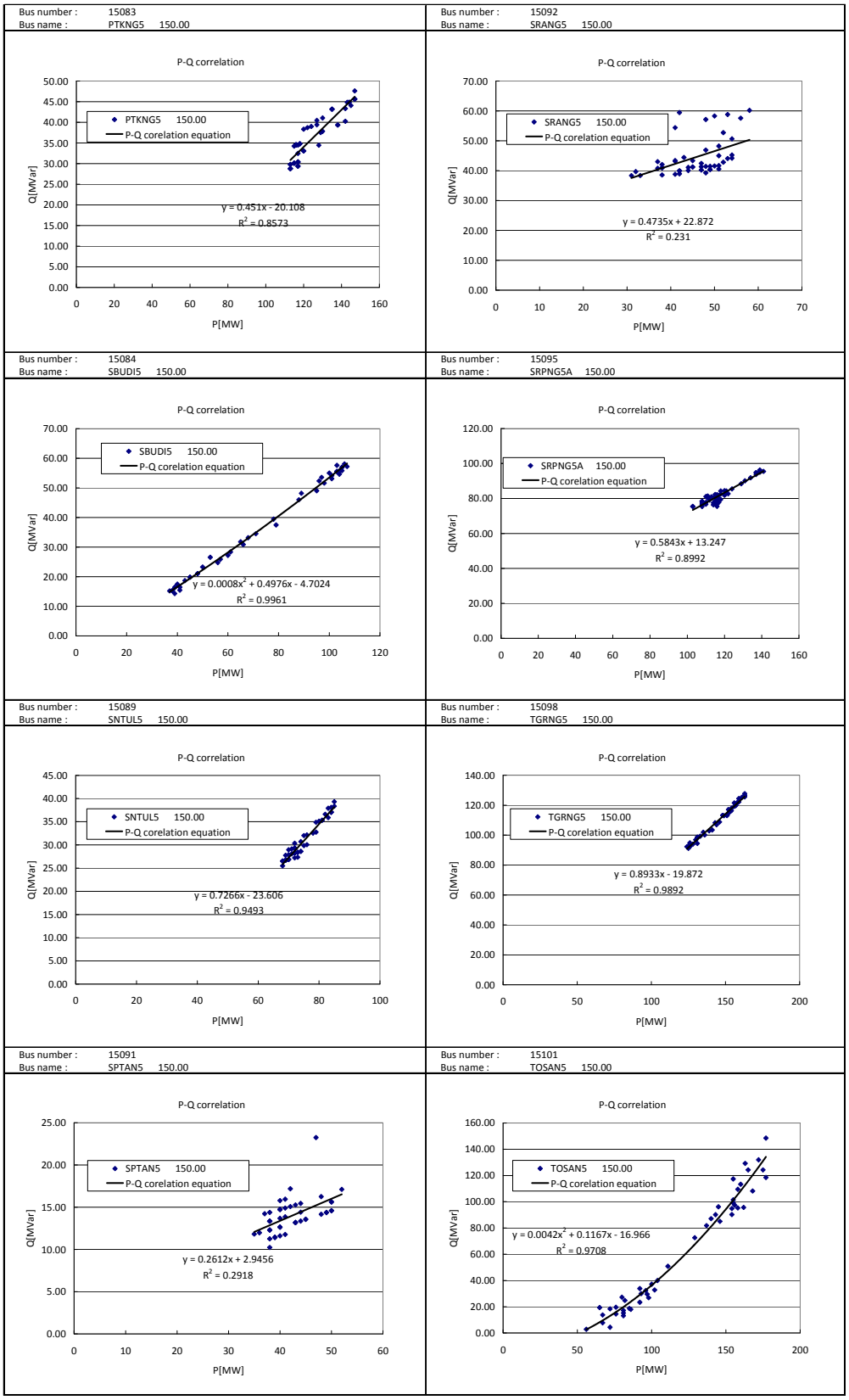


Figure.17 P-Q Correlation in Region 1 (8/9)

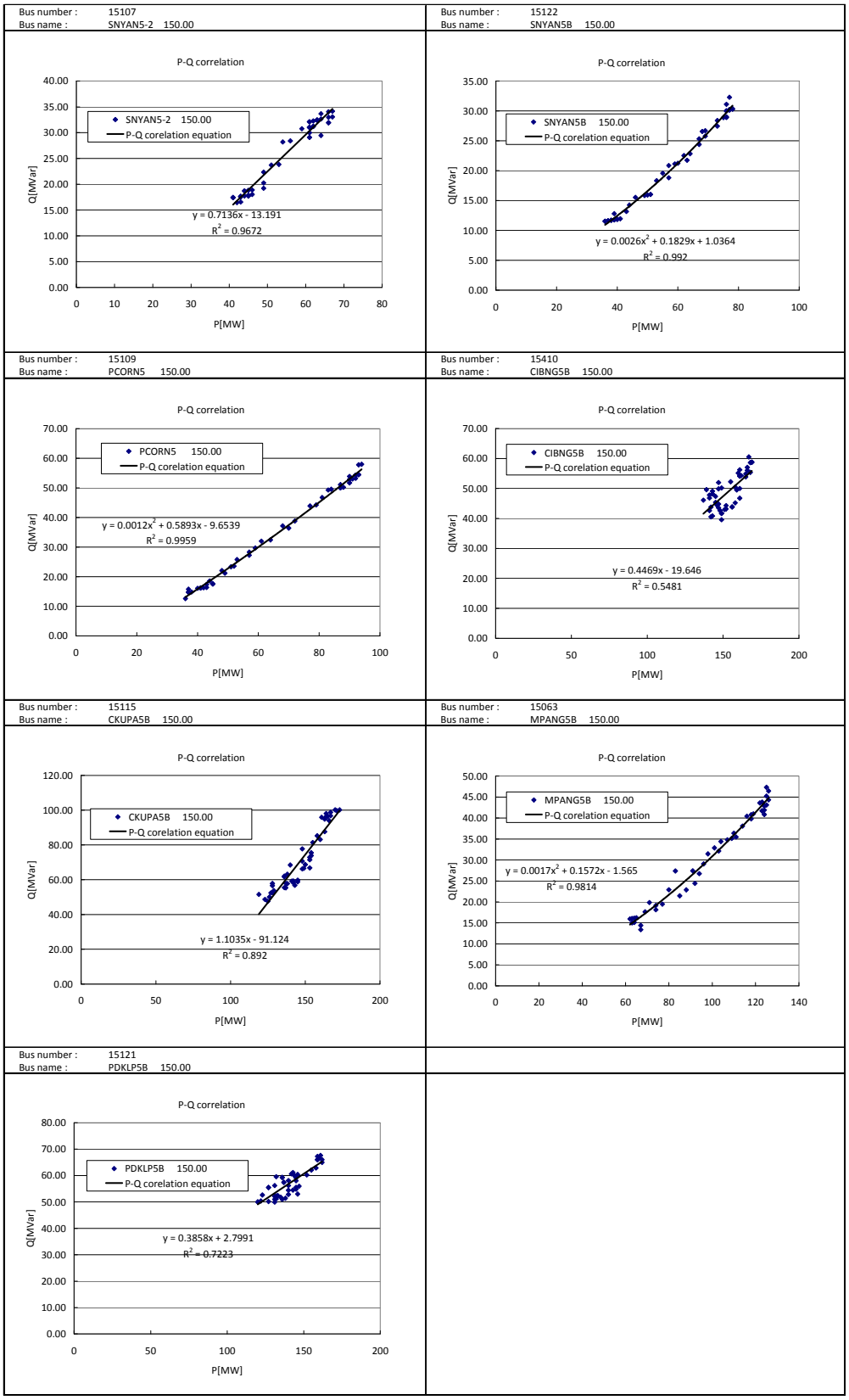


Figure.18 P-Q Correlation in Region 1 (9/9)

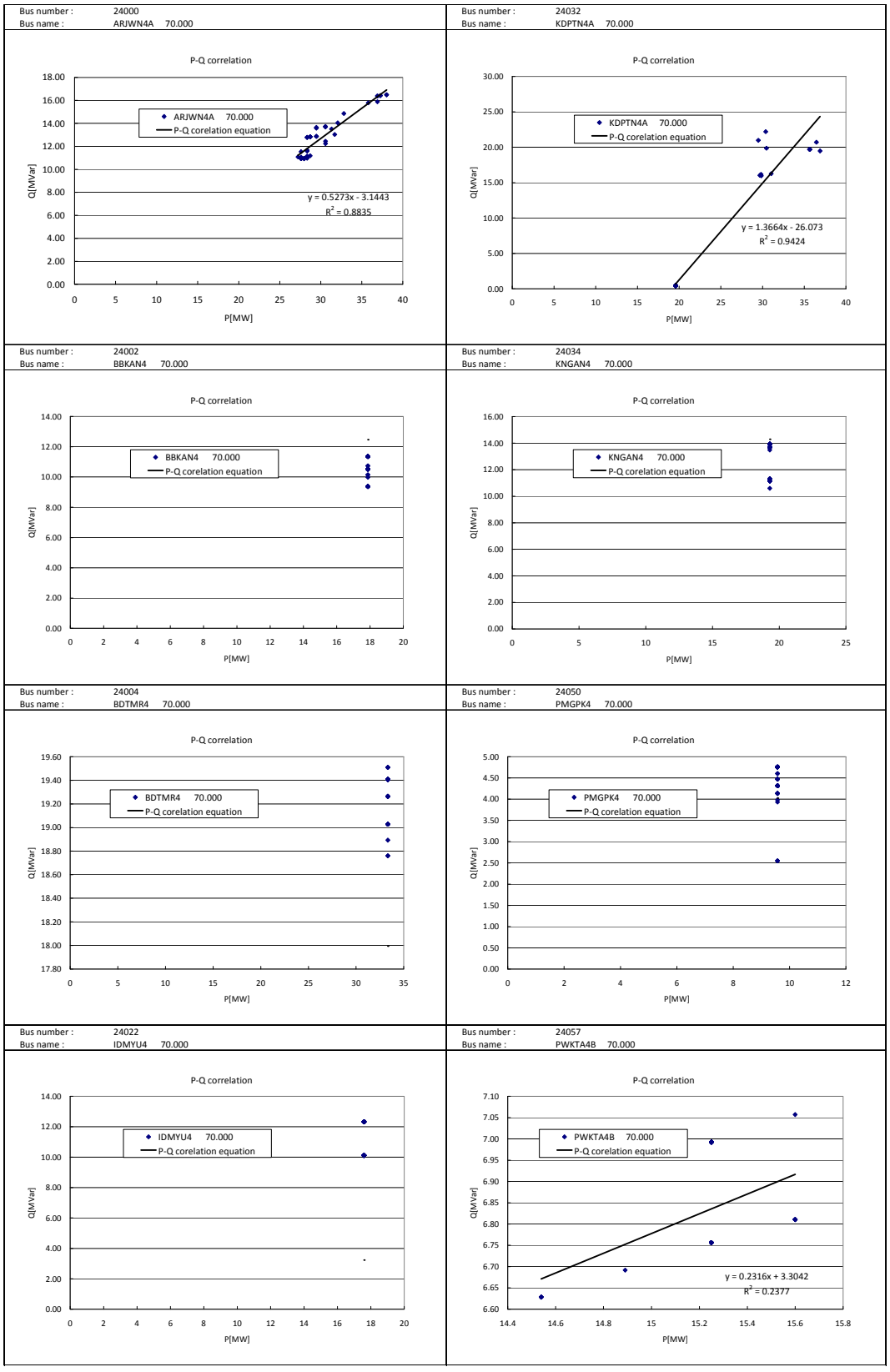


Figure.19 P-Q Correlation in Region 2 (1/6)

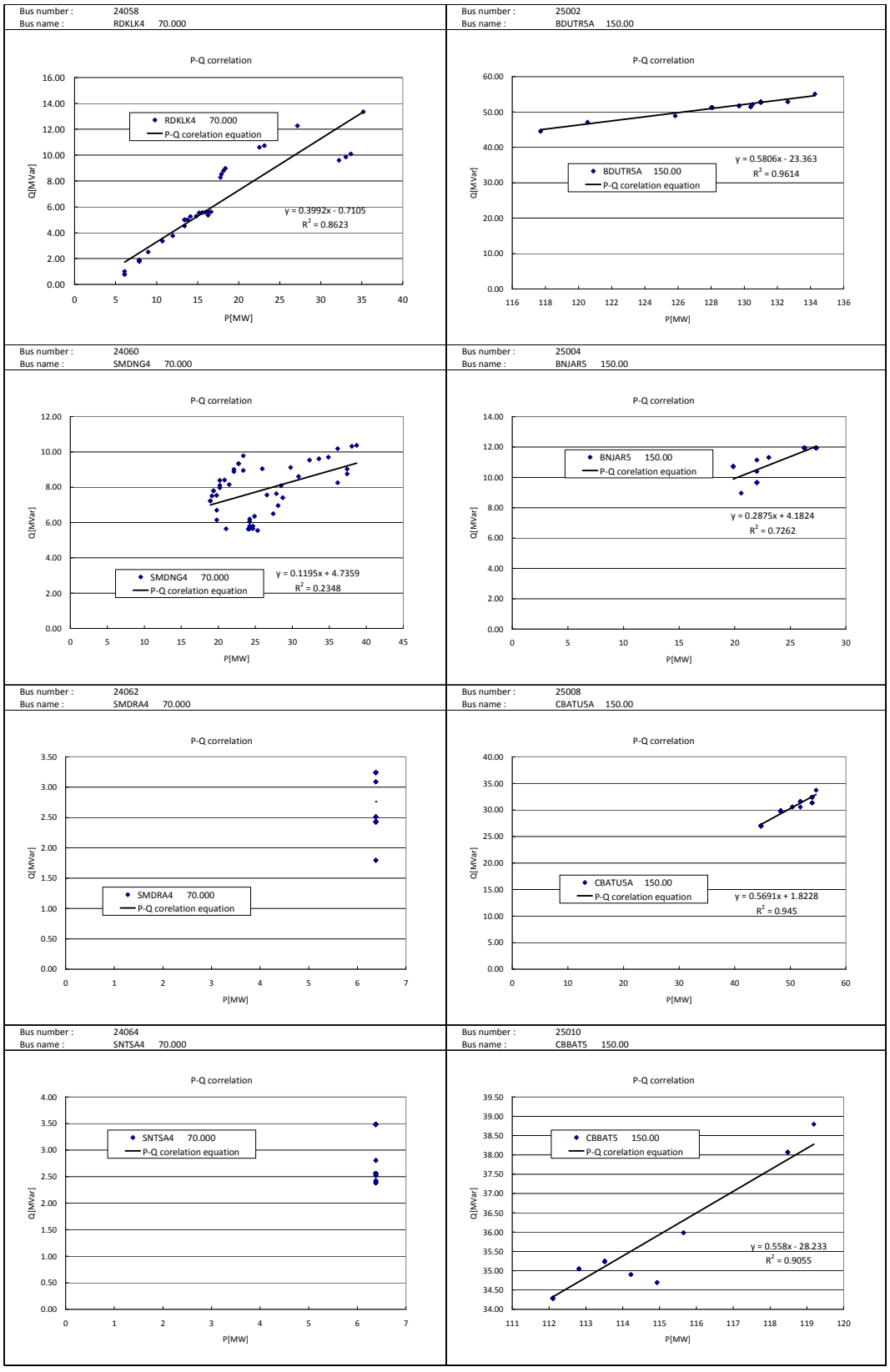


Figure.20 P-Q Correlation in Region 2 (2/6)

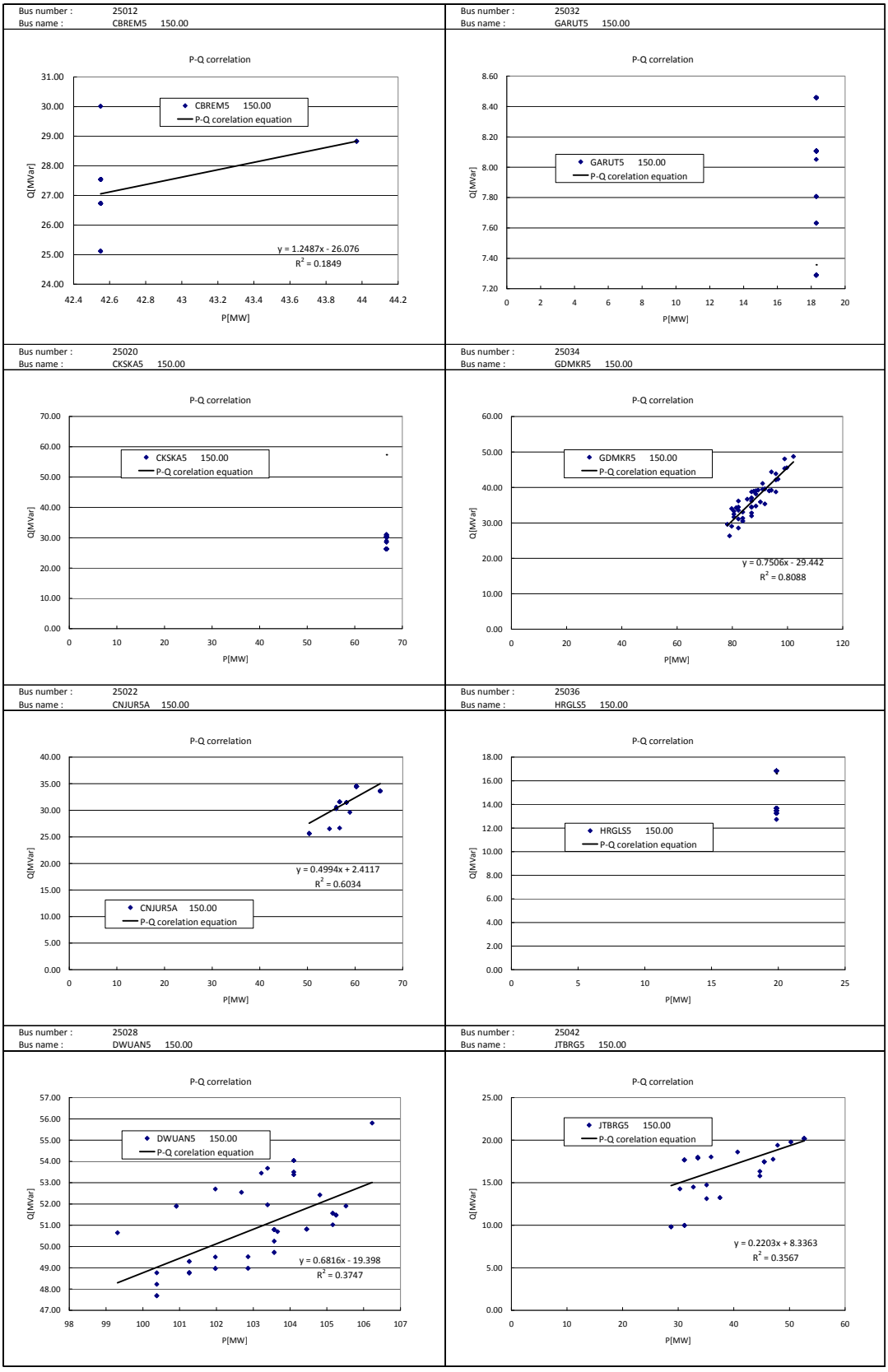


Figure.21 P-Q Correlation in Region 2 (3/6)

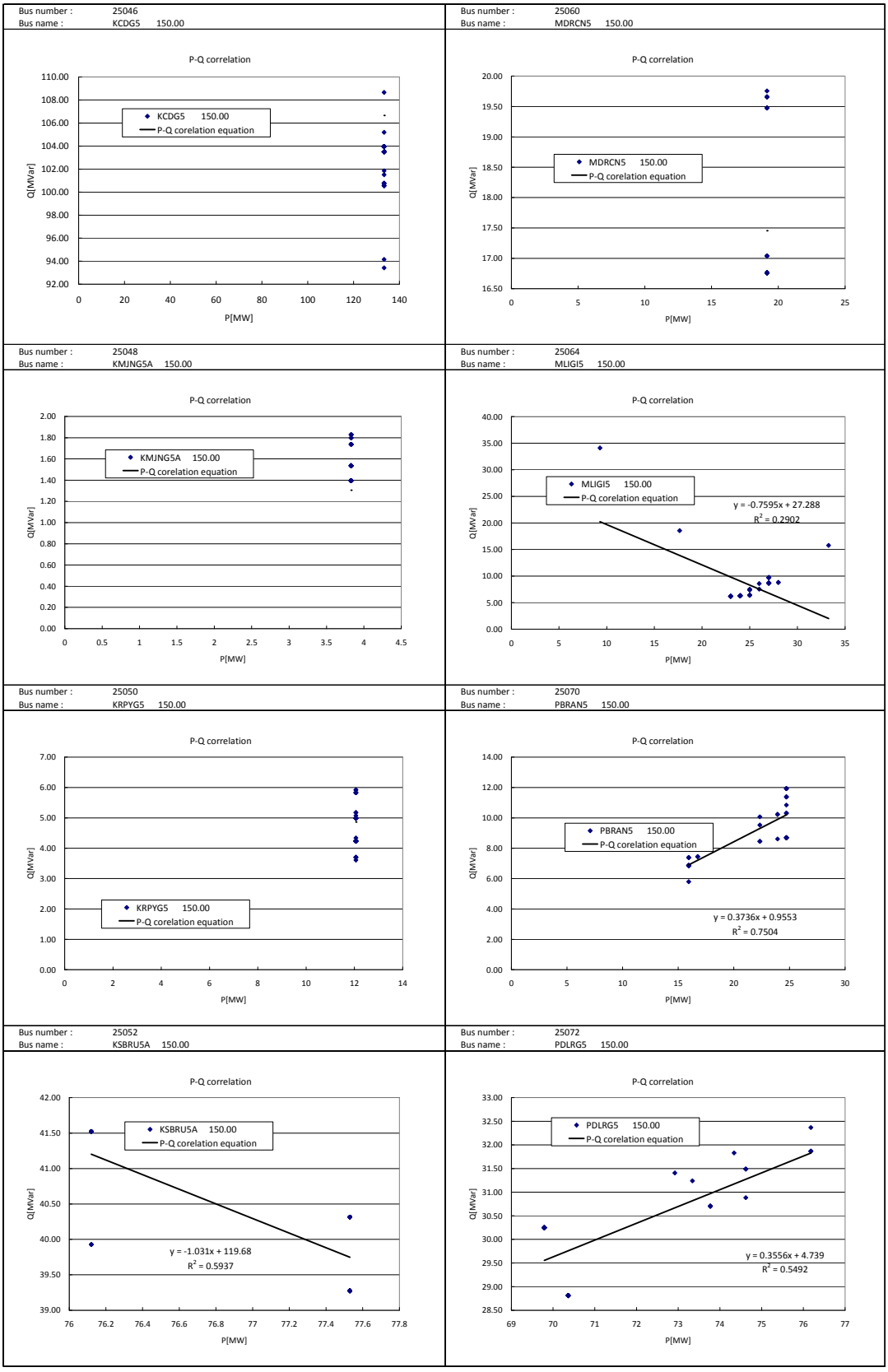


Figure.22 P-Q Correlation in Region 2 (4/6)

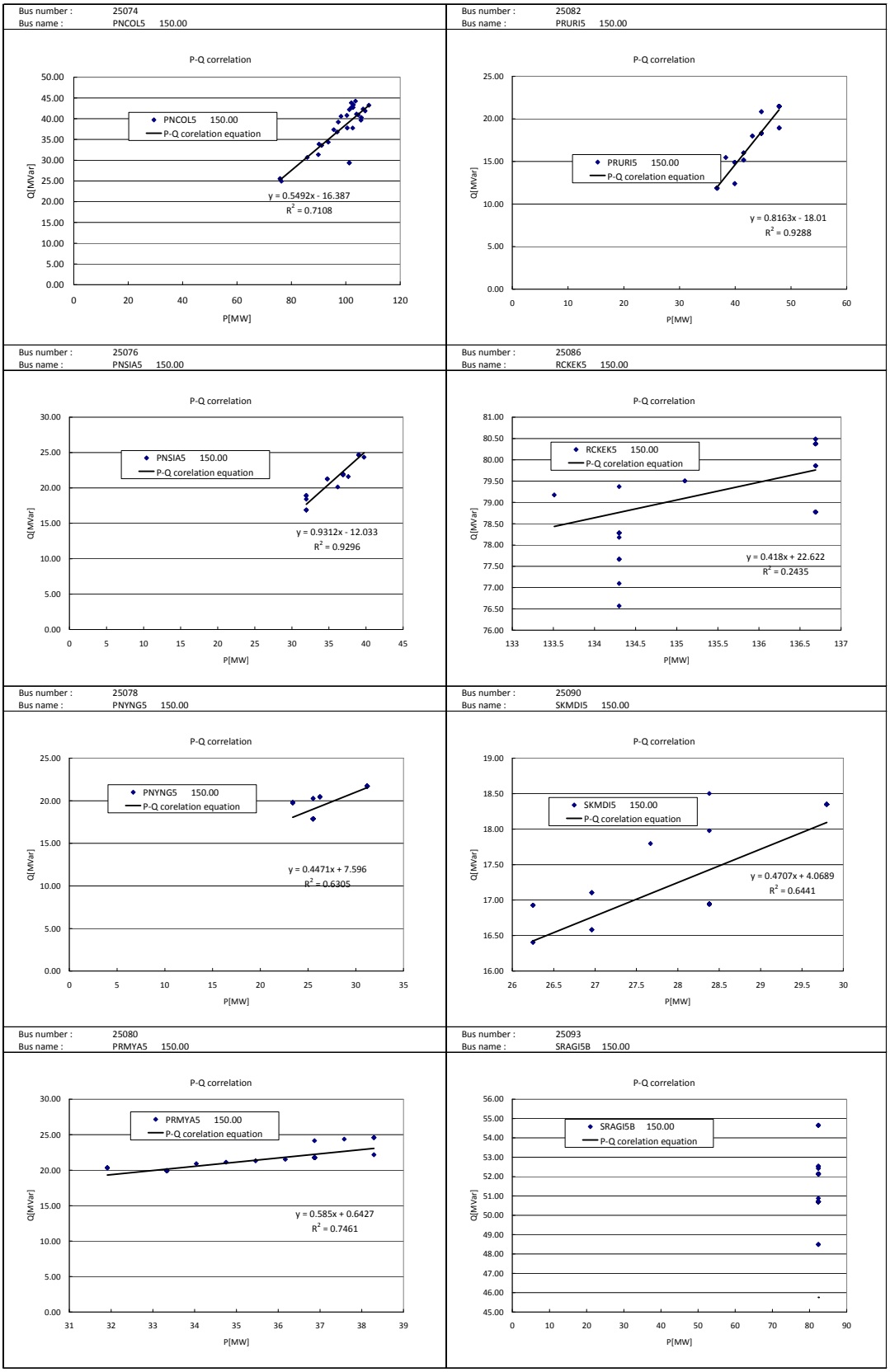


Figure.23 P-Q Correlation in Region 2 (5/6)

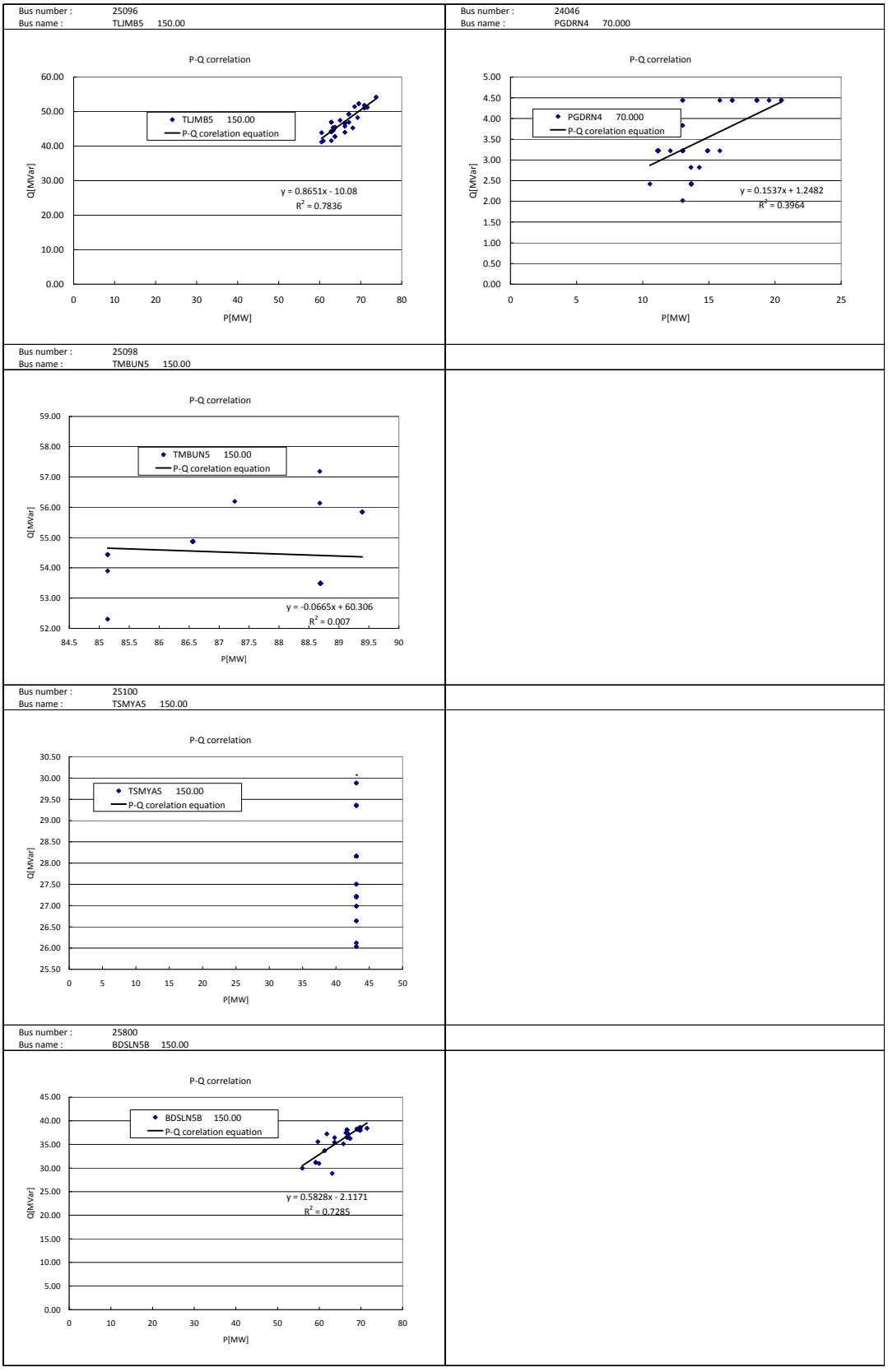


Figure.24 P-Q Correlation in Region 2 (6/6)

Table.1 Active and Reactive Power Outputs of Generators under Jakarta Peak Demand in 2015 (1/4)

Bus No.	Bus Name	Id	Code	Vschd	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
11000	KRCAK41-HYD 6.3000	1	-2	1	1	4	6.3	2.52	1.619	1.619	-0.939	7.88
11001	KRCAK42 HYD 6.3000	1	2	1	0	0	6.3	2.52	1.619	1.619	-0.939	7.88
11002	KRCAK43-HYD 6.3000	1	-2	1	0	0	6.3	2.52	1.619	1.619	-0.939	7.88
11003	UBRUG41-HYD 6.3000	1	2	1	1	3	5.9	2.36	1.4532	1.52	-3.885	7.38
11004	UBRUG42-HYD 6.3000	1	-2	1	0	0	5.9	2.36	1.52	1.52	-3.885	7.38
11005	UBRUG43 HYD 6.3000	1	2	1	0	0	5.9	2.36	1.52	1.52	-3.885	7.38
11006	SLAYA71-COA 23.000	1	2	1	1	371.5	400	160	124.4011	247.898	-30	470.59
11007	SLAYA72 COA 23.000	1	2	1	1	371.5	400	160	124.4011	247.898	30	470.59
11008	SLAYA73-COA 23.000	1	2	1	1	371.5	400	160	124.4011	247.898	-30	470.59
11009	SLAYA74 COA 23.000	1	2	1	1	371.5	400	160	124.4011	247.898	-30	470.59
11010	SLAYA75-COA 23.000	1	2	1	1	575.2	600	240	188.3858	333.333	-220.412	705.88
11011	SLAYA76 COA 23.000	1	2	1	1	575.2	600	240	188.3858	333.333	220.412	705.88
11012	SLAYA77-COA 23.000	1	2	1	1	575.2	600	240	188.3858	269.305	-220.412	705.88
11013	CLGON11 CC 11.000	1	2	1	1	117.6	240	96	67.0834	109.208	-57.882	300
11014	CLGON12-CC 11.000	1	2	1	1	117.6	240	96	67.0834	109.208	-57.882	300
11015	CLGON10-CC 11.000	1	2	1	1	127.4	260	104	72.6737	120.468	63.46	325
11016	MKRNG11-CC 11.500	1	2	1	1	52.4	107	42.8	23.4862	45	-21	133.75
11017	MKRNG12 CC 11.500	1	2	1	1	52.4	107	42.8	23.4862	45	21	133.75
11018	MKRNG13-CC 11.500	1	2	1	1	52.4	107	42.8	23.4862	45	-21	133.75
11019	MKRNG10-CC 18.000	1	2	1	1	90.6	185	74	0	0	-121.818	231.25
11020	MKRNGU1-OIL 11.500	1	-2	1	0	0	100	40	26.7014	32.5	-15	125
11021	MKRNGU2-OIL 11.500	1	2	1	0	0	100	40	26.7014	32.5	-15	125
11022	MKRNGU3-OIL 11.500	1	-2	1	0	0	100	40	26.7014	32.5	-15	125
11023	MKRNGU1 NEW 18.000	1	2	1	1	98	200	80	43.949	115.714	-47.143	250
11024	MKRNGU2-NEW 18.000	1	2	1	1	98	200	80	43.949	115.714	-47.143	250
11025	PRIOK11-CC 15.750	1	2	1	1	63.7	130	52	36.1223	114.65	-38	162.5
11026	PRIOK12-CC 15.750	1	2	1	1	63.7	130	52	36.1223	114.65	-38	162.5
11027	PRIOK13-CC 15.750	1	-2	1	0	0	130	52	33.9232	120	-38	162.5
11028	PRIOK10-CC 18.000	1	2	1	1	98	200	80	55.5727	115.714	-47.143	250
11029	PRIOK21-CC 15.750	1	2	1	1	63.7	130	52	36.1223	113.631	-37.619	162.5
11030	PRIOK22-CC 15.750	1	2	1	1	63.7	130	52	36.1223	113.631	-37.619	162.5
11031	PRIOK23-CC 15.750	1	-2	1	0	0	130	52	33.9232	43	-15	162.5
11032	PRIOK20-CC 18.000	1	2	1	1	98	200	80	55.5727	112.353	-44.902	250
11033	PRIOKG1-OIL 11.000	1	4	1	0	0	300	120	148.739	97.5	-110.206	352.94
11040	PRIOKG2-OIL 11.000	1	4	1	0	0	300	120	148.739	97.5	-110.206	352.94
11041	PRIOKU3-OIL 11.000	1	4	1	0	0	50	20	37.5	16.3	-7.5	62.5
11042	PRIOKU4-OIL 11.000	1	4	1	0	0	50	20	37.5	16.3	-7.5	62.5
11043	SLKLM51-GEO 11.800	1	2	1	1	60	60	24	19.2049	23	-5	75
11044	SLKLM52-GEO 11.800	1	2	1	1	60	60	24	19.2049	20	-5	75
11045	SLKLM53-GEO 11.800	1	2	1	1	60	60	24	19.2049	23	-5	75
11046	SLKBR51-GEO 11.000	1	2	1	1	56.5	60	24	19.5615	23	-5	75
11047	SLKBR52 GEO 11.000	1	2	1	1	56.5	60	24	19.5615	23	-5	75
11048	SLKBR53-GEO 11.000	1	2	1	1	57	60	24	19.6084	23	-5	75
11049	LBUAN51 COA 11.000	1	2	1	1	300	300	120	101.1441	195.45	110.206	352.94
11050	LBUAN52-COA 11.000	1	2	1	1	300	300	120	101.1441	195.45	-110.206	352.94
11052	SLAYA78 COA 23.000	1	2	1	1	625	625	250	200.5701	384.117	203.766	735.29
11075	PRATU51-COA 18.000	1	2	1	1	350	350	140	81.2208	216.911	-40.814	411.76
11076	PRATU52 COA 18.000	1	2	1	1	350	350	140	81.2208	216.911	40.814	411.76
11077	PRATU53-COA 18.000	1	2	1	1	350	350	140	81.2208	216.911	-58.3	411.76
11090	MKRNG20-CC-R18.000	1	2	1	1	95	194	77.6	42.6277	72.1	127.745	242.5
11091	MKRNG21-CC-R11.500	1	2	1	1	122.5	250	100	54.9363	93	-37.2	312.5
11092	MKRNG22-CC-R11.500	1	2	1	1	122.5	250	100	54.9363	93	37.2	312.5
12144	TNAGA51-COA 11.000	1	2	1	1	315	315	126	56.2743	236	-52.5	394
12145	TNAGA52 COA 11.000	1	2	1	1	315	315	126	56.2743	236	52.5	394
12146	TNAGA53-COA 11.000	1	2	1	1	315	315	126	56.2743	236	-52.5	394
12147	PRIOK31 CC E11.000	1	2	1	1	118.8	243	97	67.6814	90.4	36.1	304
12148	PRIOK32-CC-E11.000	1	2	1	1	122.5	250	100	69.5921	93	-37.2	312.5
12149	PRIOK30 CC E11.000	1	2	1	1	122.5	250	100	69.5921	93	37.2	312.5
12288	CSLOK51-GEO 11.800	1	2	1	1	50	50	24	11.0859	19.2	-4.2	75
12289	CSLOK52-GEO 11.800	1	4	1	0	0	50	24	13.154	19.2	-4.2	75
12290	CSLOK53-GEO 11.800	1	4	1	0	0	50	24	13.154	19.2	-4.2	75
12301	TNAGA54-COA 11.000	1	4	1	0	0	315	126	156	195	116	371
21000	PRKAN41-HYD 6.0000	1	-2	1	1	1.25	2.49	0.996	0.652	0.652	-0.357	3.11
21001	PRKAN42 HYD 6.0000	1	2	1	1	1.25	2.49	0.996	0.652	0.652	-0.357	3.11
21002	PRKAN43-HYD 6.0000	1	-2	1	1	1.25	2.49	0.996	0.652	0.652	-0.357	3.11
21003	PRKAN44 HYD 6.0000	1	2	1	1	1.25	2.49	0.996	0.652	0.652	-0.357	3.11
21008	CKLNG41-HYD 6.3000	1	-2	1	0	0	6.4	2.56	1.662	1.662	-0.932	8
21009	CKLNG42-HYD 6.3000	1	-2	1	0	0	6.4	2.56	1.662	1.662	-0.932	8
21010	CKLNG43-HYD 6.3000	1	-2	1	0	0	6.4	2.56	1.662	1.662	-0.932	8
21011	LMJAN41 HYD 6.3000	1	2	1	1	3	6.5	2.6	1.2428	1.665	0.939	8.13
21012	LMJAN42-HYD 6.3000	1	-2	1	0	0	6.5	2.6	1.665	1.665	-0.939	8.13
21013	LMJAN43 HYD 6.3000	1	-2	1	0	0	6.5	2.6	1.665	1.665	0.939	8.13
21014	SRAGI51-GAS 11.000	1	-2	1	0	0	20	8	15	15	-13.17	25
21015	SRAGI52 GAS 11.000	1	2	1	0	0	20	8	14.9811	15	13.17	25
21016	SRAGI53-GAS 11.000	1	-2	1	0	0	20	8	15	15	-13.17	25

Table.2 Active and Reactive Power Outputs of Generators under Jakarta Peak Demand in 2015 (2/4)

Bus No.	Bus Name	Id	Code	Vsched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
21017	SRAGI54-GAS 11.000	1	-2	1	0	0	20	8	14.9811	15	-13.17	25
21021	PLNGN41-HYD 30.000	1	-2	1	1	1.3	4	1.6	0.7434	1.008	-0.57	5
21022	PLNGN42-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	0.57	5
21023	PLNGN43-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
21024	PLNGN44-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
21025	MTWR711-CC 16.000	1	2	1	1	71.5	146	58.4	54.2171	74.362	-17.66	182.5
21026	MTWR712-CC 16.000	1	2	1	1	71.5	146	58.4	54.2171	74.362	-17.66	182.5
21027	MTWR713-CC 16.000	1	2	1	1	71.5	146	58.4	54.2171	65	-20	182.5
21028	MTWR710-CC 16.000	1	-2	1	1	109.7	224	89.6	81.667	81.667	-15	280
21029	MTWR721-CC 16.000	1	2	1	0	0	146	58.4	48.9074	65	-20	182.5
21030	MTWR722-CC 16.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21031	MTWR723-CC 16.000	1	-2	1	0	0	150	60	50.3473	65	-20	187.5
21032	MTWR720-CC 16.000	1	-2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21033	MTWR731-CC 11.000	1	2	1	1	71.5	146	58.4	54.2171	65	-20	182.5
21034	MTWR732-CC 11.000	1	2	1	1	71.5	146	58.4	54.2171	65	-20	182.5
21035	MTWR733-CC 11.000	1	2	1	1	71.5	146	58.4	54.2171	65	-20	182.5
21036	MTWR730-CC 16.000	1	-2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21037	MTWR741-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21038	MTWR742-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21039	MTWR743-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21040	MTWR740-CC 16.000	1	-2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21041	MTWR751-CC 16.000	1	2	1	1	71.5	146	58.4	54.2171	72.04	-18.4	182.5
21042	MTWR750-CC 16.000	1	2	1	1	36.7	75	30	27.8498	31.857	-17.029	93.75
21043	DRJAT51-GEO 13.800	1	2	1	1	52	60	30	17.5945	23	-5	70
21044	DRJAT52-GEO 13.800	1	2	1	1	90.24	110	55	33.5711	42.2	-9.2	137.5
21045	DRJAT53-GEO 13.800	1	2	1	1	105.8	110	55	34.9028	42.2	-9.2	137.5
21046	CRATA71-HYD 16.500	1	-2	1	1	98	126	50.4	42.733	42.733	-40	157.5
21047	CRATA72-HYD 16.500	1	-2	1	1	98	126	50.4	42.733	42.733	-40	157.5
21048	CRATA73-HYD 16.500	1	-2	1	0	0	126	50.4	42.733	42.733	-40	157.5
21049	CRATA74-HYD 16.500	1	-2	1	0	0	126	50.4	42.733	42.733	-40	157.5
21050	CRATA75-HYD 16.500	1	-2	1	0	0	126	50.4	40	40	-40	157.5
21051	CRATA76-HYD 16.500	1	-2	1	0	0	126	50.4	40	40	-40	157.5
21052	CRATA77-HYD 16.500	1	-2	1	0	0	126	50.4	40	40	-40	157.5
21053	CRATA78-HYD 16.500	1	2	1	0	0	126	50.4	40	40	-40	157.5
21054	SGLNG71-HYD 16.500	1	-2	1	1	147	175	70	44.841	44.841	-115.234	218.75
21055	SGLNG72-HYD 16.500	1	2	1	1	147	175	70	44.841	44.841	-115.234	218.75
21056	SGLNG73-HYD 16.500	1	-2	1	0	0	175	70	44.841	44.841	-115.234	218.75
21057	SGLNG74-HYD 16.500	1	-2	1	0	0	175	70	49	49	-115.234	218.75
21058	WWNDU51-GEO 20.000	1	2	1	1	109.21	110	44	41.2105	42.2	-9.2	137.5
21059	WWNDU52-GEO 20.000	1	2	1	1	110	110	44	41.2889	42.2	-9.2	137.5
21060	LSTDO51-GAS 11.000	1	2	1	1	34	49	19.6	14.2783	19.987	5.708	61.25
21061	LSTDO52-GAS 11.000	1	2	1	1	34	49	19.6	14.2783	19.987	-5.708	61.25
21062	LSTDO53-GAS 11.000	1	2	1	1	41	49	19.6	14.8077	19.987	5.708	61.25
21063	LSTDO54-GAS 11.000	1	2	1	1	41	150	60	40.6992	61.292	-17.425	187.5
21065	JTLHR51-HYD 11.000	1	-2	1	1	15	25	10	6.402	6.402	-3.62	31.25
21066	JTLHR52-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21067	JTLHR53-HYD 11.000	1	-2	1	1	15	25	10	6.402	6.402	-3.62	31.25
21068	JTLHR54-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21069	JTLHR55-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21070	JTLHR56-HYD 11.000	1	2	1	0	0	25	10	6.402	6.402	3.62	31.25
21071	KMJNG51-GEO 11.800	1	2	1	1	27.4	30	12	11.8566	15	-5	37.5
21072	KMJNG52-GEO 11.800	1	2	1	1	52.3	60	24	23.4905	25	-8	75
21073	KMJNG53-GEO 11.800	1	2	1	1	52.3	60	24	23.4905	25	-8	75
21074	KMJNG54-GEO 11.800	1	2	1	1	60	60	24	24.0928	25	-8	75
21076	IDMYU51-COA 11.000	1	2	1	1	330	330	200	115.0202	120	-81.724	412
21077	IDMYU52-COA 11.000	1	2	1	1	330	330	200	103.2766	120	-81.724	351
21078	IDMYU53-COA 11.000	1	2	1	1	330	330	200	103.2766	120	-81.724	351
21080	CRBON21-COA 11.000	1	2	1	1	660	660	400	122.1247	365	-47	825
21082	PTUHA51-GEO 11.000	1	-2	1	1	60	60	45	23	23	-5	65
21083	PTUHA52-GEO 11.000	1	-2	1	1	60	60	45	23	23	-5	65
21084	PTUHA53-GEO 11.000	1	4	1	0	0	60	45	23	23	-5	65
21085	DRAJAT54-GEO13.800	1	4	1	0	0	55	45	13.06	23	2	60
21087	KRBDS51-GEO 13.800	1	4	1	0	0	30	5	11.298	15	-15	34
21088	KRBDS52-GEO 11.000	1	4	1	0	0	55	45	20.062	21.1	-4.6	60
21089	KRBDS53-GEO 11.000	1	4	1	0	0	55	45	20.062	21.1	-4.6	60
21094	WWNDU54-GEO20.000	1	4	1	0	0	120	44	30.156	46	-10	137.5
21095	WWNDU55-GEO20.000	1	4	1	0	0	120	44	30.156	46	-10	137.5
21096	KMJNG55-GEO 11.800	1	4	1	0	0	60	24	21.628	23	-5	75
21097	KMJNG56-GEO 11.800	1	4	1	0	0	40	12	15.3	15.3	-15	56
21100	TKPRU51-GEO 11.000	1	4	1	0	0	55	45	21.1	21.1	-4.6	60
21101	TKPRU52-GEO 11.000	1	4	1	0	0	55	45	21.1	21.1	-4.6	60
21102	CBUNI41-GEO 11.500	1	-2	1	1	10	10	5	3.8	3.8	-0.8	12
21103	RJMDL51-HYD 11.000	1	-2	1	1	10	47	10	12.05	12.05	-15	48
21104	TPMAS51-GEO 11.000	1	4	1	0	0	45	15	17.3	17.3	-3.8	48
21105	CSKAN71-PS 23.000	1	4	1	0	0	260	150	101.438	101.438	-33.184	269

Table.3 Active and Reactive Power Outputs of Generators under Jakarta Peak Demand in 2015 (3/4)

Bus No.	Bus Name	Id	Code	Voched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
21106	CSKAN72-PS 23.000	1	4	1	0	0	260	150	101.438	101.438	-23.184	269
21109	TKPRI53-GEO 11.000	1	4	1	0	0	55	45	21.1	21.1	-4.6	60
21301	CRBON22-COA 11.000	1	4	1	0	0	660	400	100.118	330	-150	825
22800	CRBON72-COA 23.000	1	4	1	0	0	1000	400	364.37	620	-367	1176
31000	GARNG51-HYD 6.3000	1	-2	1	0	0	13.2	5.28	3.378	3.378	-1.91	16.5
31001	GARNG52-HYD 6.3000	1	4	1	0	0	13.2	5.28	2.735	3.378	-1.91	16.5
31002	KDMBO51-HYD 6.3000	1	-2	1	1	21	22.5	9	5.751	5.751	3.265	28.13
31003	WLTNG51-HYD 6.3000	1	-2	1	1	7.5	9	3.6	4.999	6.75	-1.294	11.25
31004	WLTNG52-HYD 6.3000	1	-2	1	1	7.5	9	3.6	4.999	6.75	-1.8	11.25
31005	WNGRI51-HYD 6.3000	1	-2	1	0	0	6	2.4	1.562	1.562	-0.978	7.5
31006	WNGRI52-HYD 6.3000	1	-2	1	0	0	6	2.4	1.562	1.562	-0.878	7.5
31007	CLCAP51-OIL 11.000	1	-2	1	0	0	29	11.6	9.4	9.4	4.4	36.25
31008	CLCAP52-OIL 11.000	1	-2	1	0	0	26	10.4	8.5	8.5	-3.9	32.5
31009	DIENG51-GEO 11.000	1	2	1	1	45	60	24	19.6791	23	-5	75
31010	TBROK1-OIL 11.500	1	-2	1	0	0	50	20	13.8085	16.3	-7.5	62.5
31011	TBROK510-CC 11.500	1	2	1	1	92.1	188	75.2	76.2328	141	-123.794	235
31012	TBROK511-CC 11.500	1	-2	1	1	53.9	110	44	37.575	37.575	-20	137.5
31013	TBROK512-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31014	TBROK513-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31015	TBROK2-OIL 11.500	1	-2	1	0	0	50	20	13.8085	16.3	-7.5	62.5
31016	TBROK520-CC 11.500	1	2	1	1	92.1	188	75.2	76.2328	141	-123.794	235
31017	TBROK521-CC 11.500	1	-2	1	1	53.9	110	44	38.433	38.433	-20	137.5
31018	TBROK522-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31019	TBROK523-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31020	TBROK3-OIL 11.500	1	-2	1	0	0	200	80	55.2341	65	-30	250
31021	MRICA51-HYD 13.800	1	-2	1	0	0	60.3	24.12	24	24	-23	75.38
31022	MRICA52-HYD 13.800	1	4	1	0	0	60.3	24.12	15.864	24	-23	75.38
31023	MRICA53-HYD 13.800	1	4	1	0	0	60.3	24.12	15.864	24	-23	75.38
31024	CLCAP51-COA 18.000	1	2	1	1	281	300	120	77.4521	125	-110.206	352.94
31025	CLCAP52-COA 18.000	1	2	1	1	281	300	120	77.4521	125	-110.206	352.94
31026	TJATIB71-COA18.000	1	2	1	1	660	660	264	113.2063	328.571	-200	776.47
31027	TJATIB72-COA18.000	1	2	1	1	660	660	264	113.2063	328.571	-200	776.47
31028	JELOK41-HYD 30.000	1	-2	1	1	3.5	5.12	2.048	1.309	1.309	-3.371	6.4
31029	JELOK42-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	-3.371	6.4
31030	JELOK43-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	-3.371	6.4
31031	JELOK44-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	3.371	6.4
31032	KTNGR41-HYD 30.000	1	-2	1	0	0	3.52	1.408	0.909	0.909	-0.519	4.4
31033	KTNGR42-HYD 30.000	1	-2	1	0	0	3.52	1.408	0.909	0.909	0.519	4.4
31034	TIMO41-HYD 30.000	1	-2	1	1	2.5	4	1.6	1.008	1.008	-0.57	5
31035	TIMO42-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
31036	TIMO43-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
31037	RMBNG51-COA 11.000	1	2	1	1	315	315	126	50.243	194.173	-122.948	393.75
31038	RMBNG52-COA 11.000	1	2	1	1	315	315	126	50.243	194.173	122.948	393.75
31039	TJATIB73-COA18.000	1	2	1	1	660	660	264	113.2063	365	-47	776.47
31040	TJATIB74-COA18.000	1	2	1	1	660	660	264	113.2063	365	-47	776.47
31041	DIENG52-GEO 11.000	1	2	1	1	60	60	24	20.9814	23	-5	75
31042	CLCAP71-COA 18.000	1	2	1	1	660	660	132	170.5557	365	-47	787
31043	DIENG53-GEO 11.000	1	2	1	1	60	60	24	20.9814	23	-5	75
31044	UNGRN51-GEO 11.000	1	2	1	1	55	55	24	17.3517	21.1	-4.6	75
31045	UNGRN52-GEO 11.000	1	2	1	1	29	29	11.6	8.6154	11.1	-2.4	36.25
32301	CLCAP72-COA 18.000	1	4	1	0	0	660	132	174.17	429	-165	787
41000	TLGNG51-HYD 6.0000	1	4	1	0	0	18	7.2	1.139	13.5	-2.588	22.5
41001	TLGNG52-HYD 6.0000	1	4	1	0	0	18	7.2	1.02	13.5	-2.588	22.5
42000	GRSIK511-CC 10.500	1	4	1	0	0	112.45	44.98	25.378	50.805	-27.179	140.56
42001	GRSIK512-CC 10.500	1	4	1	0	0	112.45	44.98	25.378	50.805	-27.179	140.56
42002	GRSIK513-CC 10.500	1	4	1	0	0	112.45	44.98	25.378	47.518	-25.47	140.56
42003	GRSIK721-CC 10.500	1	2	1	1	55.1	112.45	44.98	44.1451	47.518	25.47	140.56
42004	GRSIK722-CC 10.500	1	2	1	1	55.1	112.45	44.98	44.1451	47.518	-25.47	140.56
42005	GRSIK723-CC 10.500	1	2	1	1	55.1	112.45	44.98	44.1451	47.518	-25.47	140.56
42006	GRSIK731-CC 10.500	1	-2	1	0	0	112.45	44.98	30.8353	37	-20	140.56
42007	GRSIK732-CC 10.500	1	2	1	1	55.1	112.45	44.98	27.6506	47.518	-25.47	140.56
42008	GRSIK733-CC 10.500	1	2	1	1	55.1	112.45	44.98	27.6506	47.518	25.47	140.56
42009	GRATI711-CC 10.500	1	4	1	0	0	100.75	40.3	39.868	58.829	-28.452	125.94
42010	GRATI712-CC 10.500	1	4	1	0	0	100.75	40.3	39.868	58.829	28.452	125.94
42011	GRATI713-CC 10.500	1	4	1	0	0	100.75	40.3	39.868	58.829	-28.452	125.94
42012	GRATI721-CC 10.500	1	2	1	1	49.4	100.75	40.3	36.5366	64.603	-28.453	125.94
42013	GRATI722-CC 10.500	1	2	1	1	49.4	100.75	40.3	36.5366	64.603	-28.452	125.94
42014	GRATI723-CC 10.500	1	2	1	1	49.4	100.75	40.3	36.5366	64.603	-28.452	125.94
42015	GRSIKU51-OIL11.000	1	4	1	0	0	100	40	23.2	32.5	-15	125
42016	GRSIKU52-OIL11.000	1	4	1	0	0	100	40	23.2	32.5	-15	125
42019	MNDLN51-HYD 11.000	1	2	1	1	2.73	5.8	2.32	1.462	1.462	0.878	7.25
42020	MNDLN52-HYD 11.000	1	-2	1	1	2.72	5.8	2.32	1.462	1.462	-0.878	7.25
42021	MNDLN53-HYD 11.000	1	-2	1	1	2.72	5.8	2.32	1.462	1.462	-0.878	7.25
42022	MNDLN54-HYD 11.000	1	-2	1	0	0	5.8	2.32	1.462	1.462	-0.878	7.25
42025	PERAK53-OIL 11.000	1	-2	1	0	0	50	20	16.3	16.3	-7.5	62.5

Table.4 Active and Reactive Power Outputs of Generators under Jakarta Peak Demand in 2015 (4/4)

Bus No.	Bus Name	Id	Code	Voltage	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
42026	PERAK54-OIL 11.000	1	-2	1	0	0	50	20	16.3	16.3	-7.5	62.5
42029	WLNGI41-HYD 11.000	1	-2	1	0	0	27	10.8	11.246	11.246	-1.484	33.75
42030	WLNGI42-HYD 11.000	1	2	1	0	0	27	10.8	11.246	11.246	1.484	33.75
42031	SGRUH42-HYD 11.000	1	-2	1	0	0	14.5	5.8	3.735	3.735	-2.124	18.13
42032	SGRUH41-HYD 11.000	1	-2	1	0	0	14.5	5.8	3.735	3.735	-2.124	18.13
42033	SIMAN41-HYD 11.000	1	2	1	1	2.02	3.6	1.44	0.908	0.908	-0.516	4.5
42034	SIMAN42-HYD 11.000	1	-2	1	1	2.02	3.6	1.44	0.908	0.908	-0.516	4.5
42035	SIMAN43-HYD 11.000	1	-2	1	1	2.02	3.6	1.44	0.908	0.908	-0.516	4.5
42036	STAMI51-HYD 11.000	1	2	1	1	20.48	35	14	23.6391	26.25	-2.897	43.75
42037	STAMI52-HYD 11.000	1	-2	1	0	0	35	14	20.5682	26.25	-2.897	43.75
42038	STAMI53-HYD 11.000	1	-2	1	0	0	35	14	20.5682	26.25	-2.897	43.75
42039	SLRJO51-HYD 11.500	1	2	1	1	2.04	4.48	1.792	1.16	1.16	0.667	5.6
42040	GRSIKU53-OIL15.000	1	4	1	0	0	200	80	83.606	103.316	-48.274	250
42041	GRSIKG54-OIL15.000	1	4	1	0	0	200	80	83.606	103.316	-48.274	250
42042	GRSIK510-CC 15.750	1	4	1	0	0	189	75.6	50.043	85.812	-42.391	236.25
42043	GRSIK720-CC 15.750	1	2	1	1	92.6	189	75.6	46.474	79.88	-42.819	236.25
42044	GRSIK730-CC 15.750	1	-2	1	0	0	189	75.6	51.8272	62.2	-33.6	236.25
42045	GRATI710-CC 15.750	1	4	1	0	0	160	64	63.312	120	-36.276	200
42046	PITON71-COA 18.000	1	2	1	1	370	400	160	59.0624	247.898	-19.379	470.59
42047	PITON72-COA 18.000	1	2	1	1	370	400	160	59.0624	247.898	-19.379	470.59
42049	PITON75-COA 21.000	1	2	1	1	610	610	244	94.632	332.482	-224.085	717.65
42050	PITON76-COA 21.000	1	2	1	1	610	610	244	94.632	332.482	-224.085	717.65
42051	PITON77-COA 23.000	1	2	1	1	615	615	246	95.4076	332.125	-225.922	723.53
42052	PITON78-COA 23.000	1	2	1	1	615	615	246	95.4076	332.125	-225.922	723.53
42053	PITON79-COA 23.000	1	2	1	1	650	650	260	100.5339	402.834	-338.779	764.71
42070	GRSIKG51-OIL11.000	1	4	1	0	0	20	8	15	15	-13.17	25
42071	GRSIKG52-OIL11.000	1	4	1	0	0	20	8	15	15	-13.17	25
42072	GRSIKG53-OIL11.000	1	4	1	0	0	20	8	15	15	-13.17	25
42073	PCTAN51-COA 18.000	1	2	1	1	315	315	126	67.8368	194.173	-122.948	393.75
42074	PCTAN52-COA 18.000	1	2	1	1	315	315	126	67.8368	194.173	-122.948	393.75
42079	GLTMR51-OIL 6.0000	1	-2	1	0	0	28	10	9.1	9.1	-4.2	100
42081	GLTMR52-OIL 6.0000	1	-2	1	0	0	28	10	9.1	9.1	-4.2	100
42116	PITON734-COA23.000	1	3	1	1	461.6	814.0	326	102.2782	465.471	-47.236	1018.8
42118	WILIS51-GEO 11.000	1	4	1	0	0	55	22	7.305	21.1	-4.6	68
42120	TJWAR51-COA 18.000	1	2	1	1	350	350	140	66.4467	170.829	-40.814	437.5
42121	WILIS52-GEO 11.000	1	4	1	0	0	55	22	7.305	21.1	-4.6	68
42123	WILIS53-GEO 11.000	1	4	1	0	0	55	22	7.305	21.1	-4.6	68
42124	UJEN51-GEO 11.000	1	2	1	1	55	55	22	6.2921	21.1	-4.6	68
42125	UJEN52-GEO 11.000	1	2	1	1	55	55	22	6.2921	21.1	-4.6	68
42126	TJWAR52-COA 18.000	1	2	1	1	350	350	140	66.4467	170.829	-40.814	437.5
42127	JYANG51-GEO 11.000	1	4	1	0	0	55	22	21.1	21.1	-4.6	68
42128	MDURA51-COA 11.000	1	2	1	1	200	200	80	36.7125	123.9	-33.3	235.3
42129	MDURA52-COA 11.000	1	2	1	1	200	200	80	36.7125	123.9	-33.3	235.3
42400	GRSIK740-CC 10.500	1	2	1	1	122.5	250	100	61.9189	93	-37.2	312.5
42401	GRSIK741-CC 10.500	1	2	1	1	122.5	250	100	61.9189	93	-37.2	312.5
42402	GRSIK742-CC 10.500	1	2	1	1	122.5	250	100	61.9189	93	-37.2	312.5
51000	PSGRN51-DIE 6.3000	1	-2	1	0	0	12	4.8	0.594	5.126	-1.132	15
51001	PSGRN52-DIE 6.3000	1	-2	1	0	0	12	4.8	0.594	5.126	-1.132	15
51011	PSGRN53-DIE 20.000	1	-2	1	0	0	5	2	0.2475	3.75	-3.292	6.25
52002	CLKBW11 11.000	1	2	1	1	130	130	52	6.5465	55.664	-12.098	162.5
52003	CLKBW12 11.000	1	2	1	1	125	125	50	6.304	53.466	-11.636	156
52004	CLKBW13 11.000	1	2	1	1	125	125	50	6.304	53.466	-11.636	156
52006	PMRON51-GAS 11.000	1	-2	1	0	0	49	19.6	-0.2077	16.436	-8.59	61.25
52008	PMRON52-GAS 11.000	1	-2	1	0	0	49	19.6	-0.2077	16.436	-8.59	61.25
52009	PSGRN51-GAS 11.500	1	2	1	1	10.3	21	8.4	1.5887	8.58	-2.418	26.25
52010	PSGRN52-GAS 11.500	1	2	1	1	9.8	20	8	1.5126	15	-13.17	25
52011	PSGRN53-GAS 11.500	1	2	1	1	20.6	42	16.8	3.1774	17.16	-4.835	52.5
52012	PSGRN54-GAS 11.500	1	2	1	1	20.6	42	16.8	3.1774	17.16	-4.835	52.5
52014	GLMNK51-GAS 16.000	1	-2	1	0	0	146	58.4	16.7102	60.548	-33.856	182.5
52020	BALIT51 11.000	1	-2	1	0	0	100	40	-2.7757	41.604	-9.234	125
52021	BALIT52 11.000	1	2	1	0	0	100	40	7.871	41.604	9.234	125
52900	PMRON-BOO1 11.000	1	2	1	1	22	45	18	0.8944	27.889	-16.531	52.94
52901	PMRON-BOO2 11.000	1	2	1	1	22	45	18	0.8944	27.889	-16.531	52.94
52902	PMRON-BOO3 11.000	1	4	1	1	0	45	18	14.046	27.889	16.531	52.94
52904	PSRAN-BOT 20.000	1	2	1	1	24.5	50	20	3.7293	30.987	-18.368	58.82
52905	PSRAN-BOO1 11.000	1	2	1	1	4.9	10	4	0.865	6.197	-3.674	11.76
52906	PSRAN-BOO2 11.000	1	2	1	1	4.9	10	4	0.865	6.197	3.674	11.76
52907	PSRAN-BOO3 11.000	1	2	1	1	4.9	10	4	0.865	6.197	-3.674	11.76
52910	PSRAN-PEAKR120.000	1	2	1	1	24.5	50	20	3.7293	30.987	-18.368	58.82
52911	PSRAN-PEAKR220.000	1	2	1	1	24.5	50	20	3.7293	30.987	18.368	58.82

Table.5 Active and Reactive Power Outputs of Generators under Jakarta Off-Peak Demand in 2015 (1/4)

Bus No.	Bus Name	Id	Code	Vsched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
11000	KRCAK41-HYD 6.3000	1	2	1	1	4	6.3	2.52	-0.7374	1.619	-0.939	7.88
11001	KRCAK42-HYD 6.3000	1	2	1	1	4	6.3	2.52	-0.7374	1.619	-0.939	7.88
11002	KRCAK43-HYD 6.3000	1	2	1	0	0	6.3	2.52	1.619	1.619	-0.939	7.88
11003	UBRUG41-HYD 6.3000	1	2	1	1	3	5.9	2.36	-0.6226	1.52	-3.885	7.38
11004	UBRUG42-HYD 6.3000	1	2	1	0	0	5.9	2.36	1.52	1.52	-3.885	7.38
11005	UBRUG43-HYD 6.3000	1	-2	1	0	0	5.9	2.36	1.52	1.52	-3.885	7.38
11006	SLAYA71-COA 23.000	1	2	1	1	279.9	400	160	43.0238	247.898	-30	470.59
11007	SLAYA72-COA 23.000	1	2	1	1	279.9	400	160	43.0238	247.898	-30	470.59
11008	SLAYA73-COA 23.000	1	2	1	1	279.9	400	160	43.0238	247.898	30	470.59
11009	SLAYA74-COA 23.000	1	2	1	1	279.9	400	160	43.0238	247.898	-30	470.59
11010	SLAYA75-COA 23.000	1	2	1	1	433.3	600	240	65.522	333.333	-220.412	705.88
11011	SLAYA76-COA 23.000	1	2	1	1	433.3	600	240	65.522	333.333	-220.412	705.88
11012	SLAYA77-COA 23.000	1	2	1	1	433.3	600	240	65.522	269.305	-220.412	705.88
11013	CLGON11-CC 11.000	1	2	1	1	96	240	96	31.7951	109.208	-57.882	300
11014	CLGON12-CC 11.000	1	2	1	1	96	240	96	31.7951	109.208	57.882	300
11015	CLGON10-CC 11.000	1	2	1	1	104	260	104	34.4447	120.468	-63.46	325
11016	MKRNG11-CC 11.500	1	2	1	1	42.8	107	42.8	6.182	45	21	133.75
11017	MKRNG12-CC 11.500	1	2	1	1	42.8	107	42.8	6.182	45	-21	133.75
11018	MKRNG13-CC 11.500	1	2	1	1	42.8	107	42.8	6.182	45	21	133.75
11019	MKRNG10-CC 18.000	1	-2	1	1	74	185	74	0	0	-121.818	231.25
11020	MKRNGU1-OIL 11.500	1	2	1	0	0	100	40	26.7014	32.5	15	125
11021	MKRNGU2-OIL 11.500	1	-2	1	0	0	100	40	26.7014	32.5	-15	125
11022	MKRNGU3-OIL 11.500	1	2	1	0	0	100	40	26.7014	32.5	15	125
11023	MKRNGU1-NEW 18.000	1	2	1	1	80	200	80	11.7139	115.714	-47.143	250
11024	MKRNGU2-NEW 18.000	1	2	1	1	80	200	80	11.7139	115.714	-47.143	250
11025	PRIOK11-CC 15.750	1	2	1	1	52	130	52	3.7658	114.65	-38	162.5
11026	PRIOK12-CC 15.750	1	2	1	1	52	130	52	3.7658	114.65	-38	162.5
11027	PRIOK13-CC 15.750	1	-2	1	0	0	130	52	33.9232	120	-38	162.5
11028	PRIOK10-CC 18.000	1	2	1	1	80	200	80	5.7936	115.714	-47.143	250
11029	PRIOK21-CC 15.750	1	2	1	1	52	130	52	3.7658	113.631	-37.619	162.5
11030	PRIOK22-CC 15.750	1	2	1	1	52	130	52	3.7658	113.631	-37.619	162.5
11031	PRIOK23-CC 15.750	1	-2	1	0	0	130	52	33.9232	43	-15	162.5
11032	PRIOK20-CC 18.000	1	2	1	1	80	200	80	5.7936	112.353	-44.902	250
11033	PRIOKG1-OIL 11.000	1	4	1	0	0	300	120	148.739	97.5	-110.206	352.94
11040	PRIOKG2-OIL 11.000	1	4	1	0	0	300	120	148.739	97.5	-110.206	352.94
11041	PRIOKU3-OIL 11.000	1	4	1	0	0	50	20	37.5	16.3	-7.5	62.5
11042	PRIOKU4-OIL 11.000	1	4	1	0	0	50	20	37.5	16.3	-7.5	62.5
11043	SLKLM51-GEO 11.800	1	2	1	1	60	60	24	5.9411	23	-5	75
11044	SLKLM52-GEO 11.800	1	2	1	1	60	60	24	5.9411	36	-5	75
11045	SLKLM53-GEO 11.800	1	2	1	1	60	60	24	5.9411	23	-5	75
11046	SLKBR51-GEO 11.000	1	2	1	1	56.5	60	24	5.9012	23	-5	75
11047	SLKBR52-GEO 11.000	1	2	1	1	56.5	60	24	5.9012	23	-5	75
11048	SLKBR53-GEO 11.000	1	2	1	1	57	60	24	5.9471	23	5	75
11049	LBUAN51-COA 11.000	1	2	1	1	226	300	120	52.5675	195.45	-110.206	352.94
11050	LBUAN52-COA 11.000	1	2	1	1	226	300	120	52.5675	195.45	-110.206	352.94
11052	SLAYA78-COA 23.000	1	2	1	1	470.8	625	250	69.9094	384.117	-203.766	735.29
11075	PRATU51-COA 18.000	1	2	1	1	263.7	350	140	20.3975	216.911	-40.814	411.76
11076	PRATU52-COA 18.000	1	2	1	1	263.7	350	140	20.3975	216.911	-40.814	411.76
11077	PRATU53-COA 18.000	1	2	1	1	263.7	350	140	20.3975	216.911	58.3	411.76
11090	MKRNG20-CC-R18.000	1	2	1	1	77.6	194	77.6	11.3625	72.1	-127.745	242.5
11091	MKRNG21-CC-R11.500	1	2	1	1	100	250	100	14.6424	93	37.2	312.5
11092	MKRNG22-CC-R11.500	1	2	1	1	100	250	100	14.6424	93	-37.2	312.5
12144	TNAGA51-COA 11.000	1	2	1	1	237.3	315	126	3.2637	236	52.5	394
12145	TNAGA52-COA 11.000	1	2	1	1	237.3	315	126	3.2637	236	-52.5	394
12146	TNAGA53-COA 11.000	1	2	1	1	237.3	315	126	3.2637	236	52.5	394
12147	PRIOK31-CC-E11.000	1	2	1	1	97	243	97	7.1271	90.4	-36.1	304
12148	PRIOK32-CC-E11.000	1	2	1	1	100	250	100	7.3374	93	37.2	312.5
12149	PRIOK30-CC-E11.000	1	2	1	1	100	250	100	7.3374	93	-37.2	312.5
12288	CSLOK51-GEO 11.800	1	2	1	1	50	50	24	2.4117	19.2	4.2	75
12289	CSLOK52-GEO 11.800	1	4	1	1	0	50	24	13.154	19.2	-4.2	75
12290	CSLOK53-GEO 11.800	1	4	1	1	0	50	24	13.154	19.2	4.2	75
12301	TNAGA54-COA 11.000	1	4	1	0	0	315	126	156	195	-116	371
21000	PRKAN41-HYD 6.0000	1	2	1	1	1.3	2.49	0.996	-0.357	0.652	0.357	3.11
21001	PRKAN42-HYD 6.0000	1	-2	1	1	1.3	2.49	0.996	-0.357	0.652	-0.357	3.11
21002	PRKAN43-HYD 6.0000	1	2	1	1	1.3	2.49	0.996	-0.357	0.652	0.357	3.11
21003	PRKAN44-HYD 6.0000	1	-2	1	1	1.3	2.49	0.996	-0.357	0.652	-0.357	3.11
21008	CKLNG41-HYD 6.3000	1	2	1	1	3	6.4	2.56	0.932	1.662	0.932	8
21009	CKLNG42-HYD 6.3000	1	-2	1	0	0	6.4	2.56	1.662	1.662	-0.932	8
21010	CKLNG43-HYD 6.3000	1	2	1	0	0	6.4	2.56	1.662	1.662	0.932	8
21011	LMJAN41-HYD 6.3000	1	-2	1	1	3	6.5	2.6	-0.939	1.665	-0.939	8.13
21012	LMJAN42-HYD 6.3000	1	2	1	0	0	6.5	2.6	1.665	1.665	0.939	8.13
21013	LMJAN43-HYD 6.3000	1	-2	1	0	0	6.5	2.6	1.665	1.665	-0.939	8.13
21014	SRAGI51-GAS 11.000	1	2	1	1	8	20	8	6.5735	15	13.17	25
21015	SRAGI52-GAS 11.000	1	2	1	1	8	20	8	-2.8366	15	-13.17	25
21016	SRAGI53-GAS 11.000	1	2	1	1	8	20	8	6.5735	15	13.17	25

Table.6 Active and Reactive Power Outputs of Generators under Jakarta Off-Peak Demand in 2015 (2/4)

Bus No	Bus Name	Id	Code	Vsched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
21017	SRAGI54 GAS 11.000	1	2	1	1	8	20	8	2.8366	15	13.17	25
21021	PLNGN41-HYD 30.000	1	-2	1	1	1.3	4	1.6	-0.57	1.008	-0.57	5
21022	PLNGN42-HYD 30.000	1	2	1	0	0	4	1.6	1.008	1.008	0.57	5
21023	PLNGN43-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
21024	PLNGN44-HYD 30.000	1	2	1	0	0	4	1.6	1.008	1.008	0.57	5
21025	MTWR711-CC 16.000	1	2	1	1	58.4	146	58.4	1.192	74.362	-17.66	182.5
21026	MTWR712-CC 16.000	1	2	1	1	58.4	146	58.4	1.192	74.362	17.66	182.5
21027	MTWR713-CC 16.000	1	2	1	1	58.4	146	58.4	1.192	65	-20	182.5
21028	MTWR710-CC 16.000	1	2	1	1	89.6	224	89.6	1.8288	81.667	15	280
21029	MTWR721-CC 16.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21030	MTWR722-CC 16.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21031	MTWR723-CC 16.000	1	-2	1	0	0	150	60	50.2473	65	-20	187.5
21032	MTWR720-CC 16.000	1	-2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21033	MTWR731-CC 11.000	1	2	1	1	58.4	146	58.4	1.192	65	-20	182.5
21034	MTWR732-CC 11.000	1	2	1	1	58.4	146	58.4	1.192	65	-20	182.5
21035	MTWR733-CC 11.000	1	2	1	1	58.4	146	58.4	1.192	65	-20	182.5
21036	MTWR730-CC 16.000	1	2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21037	MTWR741-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21038	MTWR742-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21039	MTWR743-CC 11.000	1	-2	1	0	0	146	58.4	48.9074	65	-20	182.5
21040	MTWR740-CC 16.000	1	-2	1	0	0	350	140	115.2	115.2	-62.2	437.5
21041	MTWR751-CC 16.000	1	2	1	1	58.4	146	58.4	1.192	72.04	-18.4	182.5
21042	MTWR750-CC 16.000	1	2	1	1	30	75	30	0.6123	31.857	-17.029	93.75
21043	DRJAT51-GEO 13.800	1	2	1	1	52	60	30	3.1508	23	-5	70
21044	DRJAT52-GEO 13.800	1	2	1	1	90.24	110	55	-3.7966	42.2	-9.2	137.5
21045	DRJAT53-GEO 13.800	1	2	1	1	105.8	110	55	6.5728	42.2	-9.2	137.5
21046	CRATA71-HYD 16.500	1	2	1	1	50	126	50.4	-0.9505	42.733	-40	157.5
21047	CRATA72-HYD 16.500	1	-2	1	0	0	126	50.4	42.733	42.733	-40	157.5
21048	CRATA73-HYD 16.500	1	2	1	0	0	126	50.4	42.733	42.733	-40	157.5
21049	CRATA74-HYD 16.500	1	-2	1	0	0	126	50.4	42.733	42.733	-40	157.5
21050	CRATA75-HYD 16.500	1	2	1	0	0	126	50.4	40	40	-40	157.5
21051	CRATA76-HYD 16.500	1	-2	1	0	0	126	50.4	40	40	-40	157.5
21052	CRATA77-HYD 16.500	1	2	1	0	0	126	50.4	40	40	-40	157.5
21053	CRATA78-HYD 16.500	1	-2	1	0	0	126	50.4	40	40	-40	157.5
21054	SGLNG71-HYD 16.500	1	2	1	1	60	175	70	12.3559	44.841	-115.234	218.75
21055	SGLNG72-HYD 16.500	1	-2	1	0	0	175	70	44.841	44.841	-115.234	218.75
21056	SGLNG73-HYD 16.500	1	2	1	0	0	175	70	44.841	44.841	-115.234	218.75
21057	SGLNG74-HYD 16.500	1	-2	1	0	0	175	70	49	49	-115.234	218.75
21058	WWNDU51-GEO 20.000	1	2	1	1	109.21	110	44	3.4437	42.2	9.2	137.5
21059	WWNDU52-GEO 20.000	1	2	1	1	110	110	44	3.5195	42.2	-9.2	137.5
21060	LSTDO51-GAS 11.000	1	2	1	1	19.6	49	19.6	-5.708	19.987	-5.708	61.25
21061	LSTDO52-GAS 11.000	1	-2	1	1	19.6	49	19.6	-5.708	19.987	-5.708	61.25
21062	LSTDO53-GAS 11.000	1	2	1	1	19.6	49	19.6	-5.708	19.987	-5.708	61.25
21063	LSTDO54-GAS 11.000	1	-2	1	1	41	150	60	-17.425	61.292	-17.425	187.5
21065	JTLHR51-HYD 11.000	1	2	1	1	19	25	10	1.0479	6.402	-3.62	31.25
21066	JTLHR52-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21067	JTLHR53-HYD 11.000	1	2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21068	JTLHR54-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21069	JTLHR55-HYD 11.000	1	2	1	0	0	25	10	6.402	6.402	3.62	31.25
21070	JTLHR56-HYD 11.000	1	-2	1	0	0	25	10	6.402	6.402	-3.62	31.25
21071	KMJNG51-GEO 11.800	1	2	1	1	27.4	30	12	2.4441	15	5	37.5
21072	KMJNG52-GEO 11.800	1	2	1	1	52.3	60	24	4.6723	25	-8	75
21073	KMJNG53-GEO 11.800	1	2	1	1	52.3	60	24	4.6723	25	-8	75
21074	KMJNG54-GEO 11.800	1	2	1	1	60	60	24	5.3144	25	-9	75
21076	IDMYU51-COA 11.000	1	2	1	1	248.6	330	200	5.7122	120	-81.724	412
21077	IDMYU52-COA 11.000	1	2	1	1	248.6	330	200	7.7695	120	-81.724	351
21078	IDMYU53-COA 11.000	1	2	1	1	248.6	330	200	7.7695	120	81.724	351
21080	CRBON21-COA 11.000	1	2	1	1	497.2	660	400	-15.1653	365	-47	825
21082	PTUHA51-GEO 11.000	1	2	1	1	60	60	45	-1.7078	23	-5	65
21083	PTUHA52-GEO 11.000	1	2	1	1	60	60	45	-1.7078	23	-5	65
21084	PTUHA53-GEO 11.000	1	4	1	1	0	60	45	23	23	-5	65
21085	DRAJAT54-GEO13.800	1	4	1	1	0	55	45	13.06	23	-2	60
21087	KRBDS51-GEO 13.800	1	4	1	1	0	30	5	11.298	15	-15	34
21088	KRBDS52-GEO 11.000	1	4	1	1	0	55	45	20.062	21.1	-4.6	60
21089	KRBDS53-GEO 11.000	1	4	1	1	0	55	45	20.062	21.1	-4.6	60
21094	WWNDU54-GEO20.000	1	4	1	1	0	120	44	30.156	46	-10	137.5
21095	WWNDU53-GEO20.000	1	4	1	1	0	120	44	30.156	46	-10	137.5
21096	KMJNG55-GEO 11.800	1	4	1	1	0	60	24	21.628	23	-5	75
21097	KMJNG56-GEO 11.800	1	4	1	1	0	40	12	15.3	15.3	-15	56
21100	TKPRU51-GEO 11.000	1	4	1	1	0	55	45	21.1	21.1	-4.6	60
21101	TKPRU52-GEO 11.000	1	4	1	1	0	55	45	21.1	21.1	-4.6	60
21102	CBUNI41-GEO 11.800	1	2	1	1	10	10	5	1.1105	5.8	-0.8	12
21103	RJMDL51-HYD 11.000	1	2	1	1	10	47	10	-1.0887	12.05	-15	48
21104	TPMAS51-GEO 11.000	1	4	1	1	0	45	15	17.3	17.3	-3.8	48
21105	CSKAN71-PS 23.000	1	4	1	1	0	260	150	101.438	101.438	-23.184	269

Table.7 Active and Reactive Power Outputs of Generators under Jakarta Off-Peak Demand in 2015 (3/4)

Bus No	Bus Name	Id	Code	Vsched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
21106	CSKAN72 PS 23.000	1	4	1	1	0	260	150	101.438	101.438	-23.184	269
21109	TKPRU53-GEO 11.000	1	4	1	1	0	55	45	21.1	21.1	-4.6	60
21301	CRBON22-COA 11.000	1	4	1	0	0	660	400	100.118	330	150	825
22800	CRBON72-COA 23.000	1	4	1	0	0	1000	400	364.37	620	-367	1176
31000	GARNG51-HYD 6.3000	1	2	1	0	0	13.2	5.28	3.378	3.378	1.91	16.5
31001	GARNG52-HYD 6.3000	1	4	1	1	0	13.2	5.28	2.735	3.378	-1.91	16.5
31002	KDMBO51-HYD 6.3000	1	2	1	1	21	22.5	9	5.6062	5.751	3.265	28.13
31003	WLTNG51-HYD 6.3000	1	2	1	1	7.5	9	3.6	2.5323	6.75	-1.294	11.25
31004	WLTNG52-HYD 6.3000	1	2	1	0	7.5	9	3.6	1.999	6.75	-1.8	11.25
31005	WNGRI51-HYD 6.3000	1	-2	1	0	0	6	2.4	1.562	1.562	-0.878	7.5
31006	WNGRI52-HYD 6.3000	1	-2	1	0	0	6	2.4	1.562	1.562	-0.878	7.5
31007	CLCAP51-OIL 11.000	1	-2	1	0	0	29	11.6	9.4	9.4	-4.4	36.25
31008	CLCAP52-OIL 11.000	1	2	1	0	0	26	10.4	8.5	8.5	3.9	32.5
31009	DIENG51-GEO 11.000	1	2	1	1	45	60	24	8.1006	23	-5	75
31010	TBROK1-OIL 11.500	1	2	1	0	0	50	20	13.8085	16.3	-7.5	62.5
31011	TBROK510-CC 11.500	1	2	1	1	75.2	188	75.2	33.6531	141	-123.794	235
31012	TBROK511-CC 11.500	1	2	1	1	44	110	44	19.6906	37.575	-20	137.5
31013	TBROK512-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31014	TBROK513-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31015	TBROK2-OIL 11.500	1	-2	1	0	0	50	20	13.8085	16.3	-7.5	62.5
31016	TBROK520-CC 11.500	1	2	1	1	75.2	188	75.2	33.6531	141	-123.794	235
31017	TBROK521-CC 11.500	1	2	1	1	44	110	44	19.6906	38.433	-20	137.5
31018	TBROK522-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31019	TBROK523-CC 11.500	1	-2	1	0	0	110	44	30.3788	35	-20	137.5
31020	TBROK3-OIL 11.500	1	2	1	0	0	200	80	55.2341	65	30	250
31021	MRICA51-HYD 13.800	1	-2	1	0	0	60.3	24.12	24	24	-23	75.38
31022	MRICA52-HYD 13.800	1	4	1	1	0	60.3	24.12	15.864	24	-23	75.38
31023	MRICA53-HYD 13.800	1	4	1	1	0	60.3	24.12	15.864	24	-23	75.38
31024	CLCAP51-COA 18.000	1	2	1	1	211.7	300	120	14.4214	125	-110.206	352.94
31025	CLCAP52-COA 18.000	1	2	1	1	211.7	300	120	14.4214	125	-110.206	352.94
31026	TJATIB71-COA18.000	1	2	1	1	497.2	660	264	-22.9647	328.571	-200	776.47
31027	TJATIB72-COA18.000	1	2	1	1	497.2	660	264	-22.9647	328.571	-200	776.47
31028	JELOK41-HYD 30.000	1	2	1	1	3.5	5.12	2.048	0.926	1.309	-3.371	6.4
31029	JELOK42-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	-3.371	6.4
31030	JELOK43-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	-3.371	6.4
31031	JELOK44-HYD 30.000	1	-2	1	0	0	5.12	2.048	1.309	1.309	-3.371	6.4
31032	KTNGR41-HYD 30.000	1	2	1	1	1.7	3.52	1.408	0.6008	0.909	-0.519	4.4
31033	KTNGR42-HYD 30.000	1	2	1	1	1.7	3.52	1.408	0.6008	0.909	-0.519	4.4
31034	TIMO41-HYD 30.000	1	2	1	1	2.5	4	1.6	0.7084	1.008	-0.57	5
31035	TIMO42-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
31036	TIMO43-HYD 30.000	1	-2	1	0	0	4	1.6	1.008	1.008	-0.57	5
31037	RMBNG51-COA 11.000	1	2	1	1	237.3	315	126	16.6721	194.173	-122.948	393.75
31038	RMBNG52-COA 11.000	1	2	1	1	237.3	315	126	16.6721	194.173	122.948	393.75
31039	TJATIB73-COA18.000	1	2	1	1	497.2	660	264	-22.9647	365	-47	776.47
31040	TJATIB74-COA18.000	1	2	1	1	497.2	660	264	22.9647	365	-47	776.47
31041	DIENG52-GEO 11.000	1	2	1	1	45.2	60	24	8.1152	23	-5	75
31042	CLCAP71-COA 18.000	1	2	1	1	497.2	660	132	46.3222	365	47	787
31043	DIENG53-GEO 11.000	1	2	1	1	60	60	24	9.3785	23	-5	75
31044	UNGRN51-GEO 11.000	1	2	1	1	55	55	24	2.7153	21.1	-4.6	75
31045	UNGRN52-GEO 11.000	1	2	1	1	29	29	11.6	1.5358	11.1	-2.4	36.25
32301	CLCAP72-COA 18.000	1	4	1	1	0	660	132	174.17	429	165	787
41000	TLGNG51-HYD 6.0000	1	4	1	1	0	18	7.2	1.139	13.5	-2.588	22.5
41001	TLGNG52-HYD 6.0000	1	4	1	1	0	18	7.2	1.02	13.5	2.588	22.5
42000	GRSIK511-CC 10.500	1	4	1	1	0	112.45	44.98	25.378	50.805	-27.179	140.56
42001	GRSIK512-CC 10.500	1	4	1	1	0	112.45	44.98	25.378	50.805	-27.179	140.56
42002	GRSIK513-CC 10.500	1	4	1	1	0	112.45	44.98	25.378	47.518	-25.47	140.56
42003	GRSIK721-CC 10.500	1	2	1	1	45	112.45	44.98	16.3996	47.518	-25.47	140.56
42004	GRSIK722-CC 10.500	1	2	1	1	45	112.45	44.98	16.3996	47.518	-25.47	140.56
42005	GRSIK723-CC 10.500	1	2	1	1	45	112.45	44.98	16.3996	47.518	-25.47	140.56
42006	GRSIK731-CC 10.500	1	-2	1	0	0	112.45	44.98	30.8353	37	-20	140.56
42007	GRSIK732-CC 10.500	1	2	1	1	45	112.45	44.98	2.6012	47.518	-25.47	140.56
42008	GRSIK733-CC 10.500	1	2	1	1	45	112.45	44.98	2.6012	47.518	-25.47	140.56
42009	GRATI711-CC 10.500	1	4	1	1	0	100.75	40.3	39.868	58.829	-28.452	125.94
42010	GRATI712-CC 10.500	1	4	1	1	0	100.75	40.3	39.868	58.829	-28.452	125.94
42011	GRATI713-CC 10.500	1	4	1	1	0	100.75	40.3	39.868	58.829	-28.452	125.94
42012	GRATI721-CC 10.500	1	2	1	1	40.3	100.75	40.3	8.6776	64.603	-28.452	125.94
42013	GRATI722-CC 10.500	1	2	1	1	40.3	100.75	40.3	8.6776	64.603	-28.452	125.94
42014	GRATI723-CC 10.500	1	2	1	1	40.3	100.75	40.3	8.6776	64.603	-28.452	125.94
42015	GRSIKU51-OIL11.000	1	4	1	0	0	100	40	23.2	32.5	-15	125
42016	GRSIKU52-OIL11.000	1	4	1	0	0	100	40	23.2	32.5	-15	125
42019	MNDLN51-HYD 11.000	1	2	1	1	3	5.8	2.32	0.142	1.462	0.878	7.25
42020	MNDLN52-HYD 11.000	1	2	1	1	3	5.8	2.32	0.142	1.462	-0.878	7.25
42021	MNDLN53-HYD 11.000	1	2	1	1	3	5.8	2.32	0.142	1.462	0.878	7.25
42022	MNDLN54-HYD 11.000	1	-2	1	0	0	5.8	2.32	1.462	1.462	-0.878	7.25
42025	PERAK53-OIL 11.000	1	-2	1	0	0	50	20	16.3	16.3	7.5	62.5

Table.8 Active and Reactive Power Outputs of Generators under Jakarta Off-Peak Demand in 2015 (4/4)

Bus No	Bus Name	Id	Code	Vsched	Inservice	Pgen	Pmax	Pmin	Qgen	Qmax	Qmin	Mbase
42026	PERAK54-OIL 11.000	1	2	1	0	0	50	20	16.3	16.3	-7.5	62.5
42029	WLNGI41-HYD 11.000	1	2	1	1	10.9	27	10.8	4.4237	11.246	-1.484	33.75
42030	WLNGI42-HYD 11.000	1	2	1	0	0	27	10.8	11.246	11.246	-1.484	33.75
42031	SGRUH42-HYD 11.000	1	-2	1	0	0	14.5	5.8	3.735	3.735	-2.124	18.13
42032	SGRUH41-HYD 11.000	1	2	1	0	0	14.5	5.8	3.735	3.735	-2.124	18.13
42033	SIMAN41-HYD 11.000	1	2	1	1	2	3.6	1.44	0.1452	0.908	-0.516	4.5
42034	SIMAN42-HYD 11.000	1	2	1	1	2	3.6	1.44	0.1452	0.908	-0.516	4.5
42035	SIMAN43-HYD 11.000	1	2	1	1	2	3.6	1.44	0.1452	0.908	-0.516	4.5
42036	STAMI51-HYD 11.000	1	2	1	1	20.5	35	14	5.6031	26.25	-2.897	43.75
42037	STAMI52-HYD 11.000	1	-2	1	0	0	35	14	20.5682	26.25	-2.897	43.75
42038	STAMI53-HYD 11.000	1	2	1	0	0	35	14	20.5682	26.25	-2.897	43.75
42039	SLRJO51-HYD 11.500	1	-2	1	1	2	4.48	1.792	1.16	1.16	-0.667	5.6
42040	GRSIKU53-OIL15.000	1	4	1	1	0	200	80	83.606	103.316	-48.274	250
42041	GRSIKG54-OIL15.000	1	4	1	1	0	200	80	83.606	103.316	-48.274	250
42042	GRSIK510-CC 15.750	1	4	1	1	0	189	75.6	50.043	85.812	-42.391	236.25
42043	GRSIK720-CC 15.750	1	2	1	1	75.6	189	75.6	4.3707	79.88	-42.819	236.25
42044	GRSIK730-CC 15.750	1	2	1	0	0	189	75.6	51.8272	62.2	-33.6	236.25
42045	GRATI710-CC 15.750	1	4	1	1	0	160	64	63.312	120	-36.276	200
42046	PITON71-COA 18.000	1	2	1	1	278.7	400	160	3.5886	247.898	-19.379	470.59
42047	PITON72-COA 18.000	1	2	1	1	278.7	400	160	3.5886	247.898	-19.379	470.59
42049	PITON75-COA 21.000	1	2	1	1	459.5	610	244	8.0255	332.482	-224.085	717.65
42050	PITON76-COA 21.000	1	2	1	1	459.5	610	244	8.0255	332.482	-224.085	717.65
42051	PITON77-COA 23.000	1	2	1	1	463.3	615	246	8.0939	332.125	-225.922	723.53
42052	PITON78-COA 23.000	1	2	1	1	463.3	615	246	8.0939	332.125	-225.922	723.53
42053	PITON79-COA 23.000	1	2	1	1	489.7	650	260	8.5174	402.834	-238.779	764.71
42070	GRSIKG51-OIL11.000	1	4	1	1	0	20	8	15	15	-13.17	25
42071	GRSIKG52-OIL11.000	1	4	1	1	0	20	8	15	15	-13.17	25
42072	GRSIKG53-OIL11.000	1	4	1	1	0	20	8	15	15	-13.17	25
42073	PCTAN51-COA 18.000	1	2	1	1	237.3	315	126	10.0417	194.173	-122.948	393.75
42074	PCTAN52-COA 18.000	1	2	1	1	237.3	315	126	10.0417	194.173	-122.948	393.75
42079	GLTMR51-OIL 6.0000	1	2	1	0	0	28	10	9.1	9.1	-4.2	100
42081	GLTMR52-OIL 6.0000	1	-2	1	0	0	28	10	9.1	9.1	-4.2	100
42116	PITON734-COA23.000	1	3	1	1	604.6	814.0	326	7.8582	465.471	-47.236	1018.8
42118	WILIS51-GEO 11.000	1	4	1	1	0	55	22	7.305	21.1	-4.6	68
42120	TJWAR51-COA 18.000	1	2	1	1	263.7	350	140	5.8794	170.829	-40.814	437.5
42121	WILIS52-GEO 11.000	1	4	1	1	0	55	22	7.305	21.1	-4.6	68
42123	WILIS53-GEO 11.000	1	4	1	1	0	55	22	7.305	21.1	-4.6	68
42124	IJEN51-GEO 11.000	1	2	1	1	55	55	22	-0.079	21.1	-4.6	68
42125	IJEN52-GEO 11.000	1	2	1	1	55	55	22	0.079	21.1	-4.6	68
42126	TJWAR52-COA 18.000	1	2	1	1	263.7	350	140	5.8794	170.829	-40.814	437.5
42127	IYANG51-GEO 11.000	1	4	1	1	0	55	22	21.1	21.1	-4.6	68
42128	MDURA51-COA 11.000	1	2	1	1	150.7	200	80	8.2104	123.9	-33.3	235.3
42129	MDURA52-COA 11.000	1	2	1	1	150.7	200	80	8.2104	123.9	-33.3	235.3
42400	GRSIK740-CC 10.500	1	2	1	1	100	250	100	5.7969	93	-37.2	312.5
42401	GRSIK741-CC 10.500	1	2	1	1	100	250	100	5.7969	93	-37.2	312.5
42402	GRSIK742-CC 10.500	1	2	1	1	100	250	100	5.7969	93	-37.2	312.5
51000	PSGRN51-DIE 6.3000	1	2	1	0	0	12	4.8	0.594	5.126	-1.132	15
51001	PSGRN52-DIE 6.3000	1	-2	1	0	0	12	4.8	0.594	5.126	-1.132	15
51011	PSGRN53-DIE 20.000	1	2	1	0	0	5	2	0.2475	3.75	-3.292	6.25
52002	CLKBW11 11.000	1	2	1	1	97.9	130	52	-9.1851	55.664	-12.098	162.5
52003	CLKBW12 11.000	1	2	1	1	94.2	125	50	8.8021	53.466	-11.636	156
52004	CLKBW13 11.000	1	2	1	1	94.2	125	50	-8.8021	53.466	-11.636	156
52006	PMRON51-GAS 11.000	1	2	1	1	19.6	49	19.6	-4.4329	16.436	-8.59	61.25
52008	PMRON52-GAS 11.000	1	2	1	1	19.6	49	19.6	-4.4329	16.436	-8.59	61.25
52009	PSGRN51-GAS 11.500	1	2	1	1	8.4	21	8.4	-1.8956	8.58	-2.418	26.25
52010	PSGRN52-GAS 11.500	1	2	1	1	8	20	8	-1.8053	15	-13.17	25
52011	PSGRN53-GAS 11.500	1	2	1	1	16.8	42	16.8	-3.7912	17.16	-4.835	52.5
52012	PSGRN54-GAS 11.500	1	2	1	1	16.8	42	16.8	-3.7912	17.16	-4.835	52.5
52014	GLMNK51-GAS 16.000	1	2	1	1	58.4	146	58.4	-5.4614	60.548	-33.856	182.5
52020	BALIT51 11.000	1	-2	1	0	0	100	40	-2.7757	41.604	-9.234	125
52021	BALIT52 11.000	1	-2	1	0	0	100	40	-7.871	41.604	-9.234	125
52900	PMRON-BOO1 11.000	1	2	1	1	18	45	18	-4.4914	27.889	-16.531	52.94
52901	PMRON-BOO2 11.000	1	2	1	1	18	45	18	-4.4914	27.889	-16.531	52.94
52902	PMRON-BOO3 11.000	1	4	1	1	0	45	18	14.046	27.889	-16.531	52.94
52904	PSRAN-BOT 20.000	1	2	1	1	20	50	20	-4.4076	30.987	-18.368	58.82
52905	PSRAN-BOO1 11.000	1	2	1	1	4	10	4	-1.1111	6.197	-3.674	11.76
52906	PSRAN-BOO2 11.000	1	2	1	1	4	10	4	-1.1111	6.197	-3.674	11.76
52907	PSRAN-BOO3 11.000	1	2	1	1	4	10	4	-1.1111	6.197	-3.674	11.76
52910	PSRAN-PEAKR120.000	1	2	1	1	20	50	20	-4.4076	30.987	-18.368	58.82
52911	PSRAN-PEAKR220.000	1	2	1	1	20	50	20	-4.4076	30.987	-18.368	58.82

Table.9 Comparison of Load Flow and SIL Value of Transmission Lines under Jakarta Peak Demand in 2015 (1/4)

Transmission Line					Line R (pu)	Line X (pu)	Charging (pu)	Length	kV	SIL(MW)	Load (MW)	Rate of Load/SIL (%)
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Id								
14000	ASPEK4 70.000	14006	CLGSI4 70.000	1	0.002224	0.00382	0.00007	0.5	70	13.54	13.9	102.7
14000	ASPEK4 70.000	14006	CLGSI4 70.000	2	0.002224	0.00382	0.00007	0.5	70	13.54	13.9	102.7
14003	CBDAK4 70.000	14021	UBRUG4 70.000	1	0.043944	0.075864	0.00148	9.9	70	13.97	39.1	279.9
14003	CBDAK4 70.000	14021	UBRUG4 70.000	2	0.043944	0.075864	0.00148	9.9	70	13.97	39.1	279.9
14005	CIBNG4 70.000	14006	CLGSI4 70.000	1	0.024763	0.045795	0.00078	5.67	70	13.05	13.9	106.5
14005	CIBNG4 70.000	14006	CLGSI4 70.000	2	0.024763	0.045795	0.00078	5.67	70	13.05	13.9	106.5
14012	LBSTU4 70.000	14021	UBRUG4 70.000	1	0.127972	0.115079	0.00262	16.22	70	15.09	37.2	246.5
14012	LBSTU4 70.000	14021	UBRUG4 70.000	2	0.127972	0.115079	0.00262	16.22	70	15.09	37.2	246.5
15009	BGBRU5 150.00	15013	CBDAK5 150.00	1	0.005099	0.032752	0.0282	28.9	150	92.79	184.8	199.2
15009	BGBRU5 150.00	15039	ITP5 150.00	1	0.00618	0.03967	0.03415	35	150	92.78	186.3	200.8
15009	BGBRU5 150.00	15039	ITP5 150.00	2	0.00618	0.03967	0.03415	35	150	92.78	186.3	200.8
15009	BGBRU5 150.00	15086	SLKBR5 150.00	1	0.0102	0.065515	0.05641	57.81	150	92.79	204.7	220.6
15009	BGBRU5 150.00	15089	SNTUL5 150.00	1	0.00229	0.01966	0.00942	10.2	150	69.22	253.4	366.1
15009	BGBRU5 150.00	15089	SNTUL5 150.00	2	0.00229	0.01966	0.00942	10.2	150	69.22	253.4	366.1
15009	BGBRU5 150.00	15141	CIAWI5 150.00	1	0.00072	0.00687	0.01118	8.4	150	127.57	187.5	147
15009	BGBRU5 150.00	15141	CIAWI5 150.00	2	0.00072	0.00687	0.01118	8.4	150	127.57	187.5	147
15009	BGBRU5 150.00	25023	CNJUR5B 150.00	1	0.022507	0.078472	0.03029	45.54	150	62.13	125	201.2
15009	BGBRU5 150.00	25023	CNJUR5B 150.00	2	0.022507	0.078472	0.03029	45.54	150	62.13	125	201.2
15010	BKASI5A 150.00	15070	PGLNG5 150.00	1	0.000746	0.004871	0.0042	4.3	150	92.86	166.7	179.5
15010	BKASI5A 150.00	15070	PGLNG5 150.00	2	0.000746	0.004871	0.0042	4.3	150	92.86	166.7	179.5
15013	CBDAK5 150.00	15086	SLKBR5 150.00	1	0.008205	0.052698	0.04537	46.5	150	92.79	138.4	149.2
15013	CBDAK5 150.00	15114	PRATU5 150.00	1	0.01235	0.07933	0.0683	70	150	92.79	339	365.3
15013	CBDAK5 150.00	15114	PRATU5 150.00	2	0.01235	0.07933	0.0683	70	150	92.79	339	365.3
15013	CBDAK5 150.00	15141	CIAWI5 150.00	1	0.00221	0.02102	0.0342	25.7	150	127.55	231.5	181.5
15013	CBDAK5 150.00	15141	CIAWI5 150.00	2	0.00221	0.02102	0.0342	25.7	150	127.55	231.5	181.5
15014	CIBNG5 150.00	15088	SMCIB5 150.00	1	0.000725	0.004658	0.00401	4.11	150	92.78	123.7	133.3
15014	CIBNG5 150.00	15088	SMCIB5 150.00	2	0.000725	0.004658	0.00401	4.11	150	92.78	123.7	133.3
15014	CIBNG5 150.00	15089	SNTUL5 150.00	1	0.00272	0.02332	0.01117	12.1	150	69.21	219.4	317
15014	CIBNG5 150.00	15089	SNTUL5 150.00	2	0.00272	0.02332	0.01117	12.1	150	69.21	219.4	317
15015	CIPNG5 150.00	15880	CWANG5B 150.00	1	0.00061	0.003921	0.00338	3.46	150	92.85	95.3	102.6
15015	CIPNG5 150.00	15880	CWANG5B 150.00	2	0.00061	0.003921	0.00338	3.46	150	92.85	95.3	102.6
15018	CKUPA5A 150.00	15040	JTAKE5 150.00	1	0.00127	0.00816	0.00703	7.2	150	92.82	120.5	129.8
15018	CKUPA5A 150.00	15040	JTAKE5 150.00	2	0.00127	0.00816	0.00703	7.2	150	92.82	120.5	129.8
15018	CKUPA5A 150.00	15143	TNAGA5-2 150.00	1	0.00942	0.04093	0.05653	50	150	117.52	144.9	123.3
15018	CKUPA5A 150.00	15143	TNAGA5-2 150.00	2	0.00942	0.04093	0.05653	50	150	117.52	144.9	123.3
15020	CLGBR5 150.00	15023	CLGON-CC5 150.00	1	0.001491	0.012937	0.01817	16.9	150	118.51	180.6	152.4
15020	CLGBR5 150.00	15023	CLGON-CC5 150.00	2	0.001491	0.012937	0.01817	16.9	150	118.51	180.6	152.4
15020	CLGBR5 150.00	15052	KSTEL5 150.00	1	0.000723	0.004646	0.004	4.1	150	92.79	102.9	110.9
15020	CLGBR5 150.00	15052	KSTEL5 150.00	2	0.000723	0.004646	0.004	4.1	150	92.79	102.9	110.9
15020	CLGBR5 150.00	15092	SRANG5 150.00	1	0.0039	0.02547	0.02199	22.5	150	92.92	162.5	174.9
15020	CLGBR5 150.00	15092	SRANG5 150.00	2	0.0039	0.02547	0.02199	22.5	150	92.92	162.5	174.9
15025	CNKNG5 150.00	15097	TGBRU5 150.00	1	0.00098	0.01214	0.006	6.5	150	70.30	123.6	175.8
15025	CNKNG5 150.00	15097	TGBRU5 150.00	2	0.00098	0.01214	0.006	6.5	150	70.30	123.6	175.8
15027	CWGLM5 150.00	15066	DEPOK5 150.00	1	0.006123	0.04812	0.02559	28.7	150	72.92	85.7	117.5
15027	CWGLM5 150.00	15066	DEPOK5 150.00	2	0.006123	0.04812	0.02559	28.7	150	72.92	85.7	117.5
15028	CWGBR5 150.00	15031	DTIGA5 150.00	1	0.000301	0.002862	0.00466	3.5	150	127.60	211.5	165.7
15028	CWGBR5 150.00	15031	DTIGA5 150.00	2	0.000301	0.002862	0.00466	3.5	150	127.60	211.5	165.7
15031	DTIGA5 150.00	15063	MPANG5B 150.00	1	0.00048	0.00458	0.00745	5.6	150	127.54	131.6	103.2
15031	DTIGA5 150.00	15063	MPANG5B 150.00	2	0.00048	0.00458	0.00745	5.6	150	127.54	131.6	103.2
15039	ITP5 150.00	15088	SMCIB5 150.00	1	0.00173	0.01481	0.00711	7.7	150	69.29	141	203.5
15039	ITP5 150.00	15088	SMCIB5 150.00	2	0.00173	0.01481	0.00711	7.7	150	69.29	141	203.5
15041	JTRGN5 150.00	15126	TX 150.00	1	0.001041	0.006796	0.00587	6	150	92.94	120.3	129.4
15046	KDSPI5 150.00	25066	MTWAR5 150.00	1	0.00188	0.00962	0.01077	10	150	111.78	176.8	158.2
15049	KMYRN5 150.00	15078	PRBRT5 150.00	1	0.000794	0.0051	0.00439	4.5	150	92.78	92.9	100.1
15049	KMYRN5 150.00	15078	PRBRT5 150.00	2	0.000794	0.0051	0.00439	4.5	150	92.78	92.9	100.1
15055	LKONG5 150.00	15198	LKONG5-NEW 150.00	1	0.00051	0.003285	0.00283	2.9	150	92.82	120.8	130.1
15055	LKONG5 150.00	15198	LKONG5-NEW 150.00	2	0.00051	0.003285	0.00283	2.9	150	92.82	120.8	130.1
15061	MNTUR5 150.00	15128	TX 150.00	1	0.000908	0.005924	0.00511	5.23	150	92.88	130.4	140.4
15068	PDKLP5A 150.00	15120	BKASI5B 150.00	1	0.001145	0.007476	0.00645	6.6	150	92.88	162.6	175.1
15068	PDKLP5A 150.00	15120	BKASI5B 150.00	2	0.001145	0.007476	0.00645	6.6	150	92.88	162.6	175.1
15068	PDKLP5A 150.00	15127	TX 150.00	1	0.001041	0.006796	0.00587	6	150	92.94	159	171.1
15068	PDKLP5A 150.00	15129	TX 150.00	1	0.000908	0.005924	0.00511	5.23	150	92.88	166.1	178.8
15070	PGLNG5 150.00	15071	PGSAN5 150.00	1	0.000885	0.005777	0.00499	5.1	150	92.94	101.7	109.4
15070	PGLNG5 150.00	15074	PLGDG5B 150.00	1	0.000746	0.004871	0.0042	4.3	150	92.86	160.1	172.4
15083	PTKNG5 150.00	15370	GNDUL5B 150.00	1	0.003263	0.021295	0.01838	18.8	150	92.90	157.1	169.1
15083	PTKNG5 150.00	15370	GNDUL5B 150.00	2	0.003263	0.021295	0.01838	18.8	150	92.90	157.1	169.1
15092	SRANG5 150.00	15905	IKIAT5 150.00	1	0.001067	0.006855	0.0059	6.05	150	92.77	110.1	118.7
15096	SRPNG5B 150.00	15124	BNTRO5B 150.00	1	0.00269	0.01952	0.01417	15.7	150	85.20	101	118.5
15097	TGBRU5 150.00	15143	TNAGA5-2 150.00	1	0.00422	0.01834	0.02533	22.4	150	117.52	183.5	156.1
15097	TGBRU5 150.00	15143	TNAGA5-2 150.00	2	0.00422	0.01834	0.02533	22.4	150	117.52	183.5	156.1
15100	TNAGA5 150.00	15143	TNAGA5-2 150.00	1	0.00094	0.00409	0.00565	5	150	117.53	140.3	119.4
15100	TNAGA5 150.00	15143	TNAGA5-2 150.00	2	0.00094	0.00409	0.00565	5	150	117.53	140.3	119.4
15103	MENES5 150.00	15104	LBUAN5 150.00	1	0.001168	0.005076	0.00701	6.2	150	117.52	129.5	110.2
15103	MENES5 150.00	15104	LBUAN5 150.00	2	0.001168	0.005076	0.00701	6.2	150	117.52	129.5	110.2
15103	MENES5 150.00	15902	CHSRI5 150.00	1	0.00424	0.01842	0.02544	22.5	150	117.52	120	102.1
15104	LBUAN5 150.00	15105	SKETI5 150.00	1	0.00406	0.02607	0.02244	23	150	92.78	170.2	183.5
15104	LBUAN5 150.00	15105	SKETI5 150.00	2	0.00406	0.02607	0.02244	23	150	92.78	170.2	183.5
15105	SKETI5 150.00	15142	RKBTG5 150.00	1	0.00641	0.02783	0.03844	34	150	117.53	132.4	112.7
15105	SKETI5 150.00	15142	RKBTG5 150.00	2	0.00641	0.02783	0.03844	34	150	117.53	132.4	112.7

Table.10 Comparison of Load Flow and SIL Value of Transmission Lines under Jakarta Peak Demand in 2015 (2/4)

Transmission Line					Line R (pu)	Line X (pu)	Charging (pu)	Length	kV	SIL(MW)	Load (MW)	Rate of Load/SIL (%)
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Id								
15106	BLRJA5-N 150.00	15140	LSTEL5 150.00	1	0.00245	0.01064	0.0147	13	150	117.54	131.5	111.9
15106	BLRJA5-N 150.00	15140	LSTEL5 150.00	2	0.00245	0.01064	0.0147	13	150	117.54	131.5	111.9
15112	LBSTU5 150.00	15113	UBRUG5 150.00	1	0.01235	0.07933	0.0683	70	150	92.79	167.2	180.2
15112	LBSTU5 150.00	15113	UBRUG5 150.00	2	0.01235	0.07933	0.0683	70	150	92.79	167.2	180.2
15112	LBSTU5 150.00	25023	CNJUR5B 150.00	1	0.00565	0.03627	0.03122	32	150	92.78	130.4	140.6
15112	LBSTU5 150.00	25023	CNJUR5B 150.00	2	0.00565	0.03627	0.03122	32	150	92.78	130.4	140.6
15113	UBRUG5 150.00	15114	PRATU5 150.00	1	0.0043	0.03025	0.02331	25	150	87.78	171.1	194.9
15113	UBRUG5 150.00	15114	PRATU5 150.00	2	0.0043	0.03025	0.02331	25	150	87.78	171.1	194.9
15126	TX 150.00	15130	JTWRG5 150.00	1	0.00212	0.0136	0.01171	12	150	92.79	120.5	129.9
15127	TX 150.00	15130	JTWRG5 150.00	1	0.00212	0.0136	0.01171	12	150	92.79	158.8	171.1
15128	TX 150.00	15130	JTWRG5 150.00	1	0.00212	0.0136	0.01171	12	150	92.79	130.6	140.7
15129	TX 150.00	15130	JTWRG5 150.00	1	0.00212	0.0136	0.01171	12	150	92.79	165.9	178.8
15162	TX 150.00	25066	MTWAR5 150.00	1	0.00188	0.00862	0.01077	10	150	111.78	174.1	155.8
15177	PSTEL5 150.00	151061	BLRJA5B-N 150.00	1	0.00377	0.01637	0.02261	20	150	117.52	135	114.9
15177	PSTEL5 150.00	151061	BLRJA5B N 150.00	2	0.00377	0.01637	0.02261	20	150	117.52	135	114.9
22227	TX 150.00	25015	CGRLG5B 150.00	2	0.00186	0.00745	0.00644	6.6	150	92.97	107.3	115.4
22227	TX 150.00	25118	DKLOT5 150.00	1	0.00026	0.0017	0.00146	1.5	150	92.67	107.3	115.8
22228	TX 150.00	25000	BDSLN5 150.00	2	0.00186	0.00745	0.00644	6.6	150	92.97	157	168.9
22228	TX 150.00	25118	DKLOT5 150.00	1	0.00026	0.0017	0.00146	1.5	150	92.67	157	169.4
24001	ARJWN4B 70.000	24048	PLMNN4 70.000	1	0.01316	0.04008	0.00071	5	70	13.31	34.7	260.7
24001	ARJWN4B 70.000	24048	PLMNN4 70.000	2	0.01185	0.03607	0.00064	4.5	70	13.32	38.6	289.8
24001	ARJWN4B 70.000	24069	SRAGI7B 70.000	1	0.053087	0.157335	0.00305	20.5	70	13.92	36.7	263.6
24001	ARJWN4B 70.000	24069	SRAGI7B 70.000	2	0.053087	0.157335	0.00305	20.5	70	13.92	36.7	263.6
24006	BNJAR4 70.000	24046	PGDRN4 70.000	1	0.196194	0.338705	0.00659	44.2	70	13.95	17.3	124
24006	BNJAR4 70.000	24046	PGDRN4 70.000	2	0.196194	0.338705	0.00659	44.2	70	13.95	17.3	124
24014	CKRNG4 70.000	24029	JTBRG4B 70.000	1	0.173112	0.298857	0.00582	39	70	13.95	22.8	163.4
24014	CKRNG4 70.000	24029	JTBRG4B 70.000	2	0.173112	0.298857	0.00582	39	70	13.95	22.8	163.4
24014	CKRNG4 70.000	24068	SRAGI7A 70.000	1	0.007769	0.023025	0.00045	3	70	13.98	22.8	163.1
24014	CKRNG4 70.000	24068	SRAGI7A 70.000	2	0.007769	0.023025	0.00045	3	70	13.98	22.8	163.1
24022	IDMYU4 70.000	24029	JTBRG4B 70.000	1	0.066582	0.114945	0.00224	15	70	13.96	21.5	154
24022	IDMYU4 70.000	24029	JTBRG4B 70.000	2	0.066582	0.114945	0.00224	15	70	13.96	21.5	154
24024	IDRMA4 70.000	24056	PWKTA4A 70.000	1	0.017112	0.0521	0.00093	6.5	70	13.36	24.4	182.6
24024	IDRMA4 70.000	24056	PWKTA4A 70.000	2	0.017112	0.0521	0.00093	6.5	70	13.36	24.4	182.6
24038	LMJAN4 70.000	24062	SMDRA4 70.000	1	0.079898	0.137934	0.00269	18	70	13.96	16	114.6
24057	PWKTA4B 70.000	24901	SPFVI4 70.000	1	0.028874	0.049579	0.00097	6.49	70	13.99	38.9	278.1
24062	SMDRA4 70.000	24064	SNTSA4 70.000	1	0.054908	0.094791	0.00185	12.37	70	13.97	26.2	187.5
25000	BDSLN5 150.00	25015	CGRLG5B 150.00	1	0.00372	0.01491	0.01288	13.2	150	92.94	162.4	174.7
25000	BDSLN5 150.00	25104	WWNDU5 150.00	1	0.00589	0.03781	0.03255	33.36	150	92.78	132.8	143.1
25000	BDSLN5 150.00	25104	WWNDU5 150.00	2	0.00589	0.03781	0.03255	33.36	150	92.78	132.8	143.1
25008	CBATU5A 150.00	25062	MKSRI5 150.00	1	0.000865	0.005553	0.00478	4.9	150	92.78	196.3	211.6
25008	CBATU5A 150.00	25062	MKSRI5 150.00	2	0.000865	0.005553	0.00478	4.9	150	92.78	196.3	211.6
25009	CBATU5B 150.00	25134	CLIPO5 150.00	1	0.00203	0.01303	0.01122	11.5	150	92.79	264.2	284.7
25009	CBATU5B 150.00	25134	CLIPO5 150.00	2	0.00203	0.01303	0.01122	11.5	150	92.79	264.2	284.7
25009	CBATU5B 150.00	25900	HNKOK5 150.00	2	0.00031	0.00199	0.00171	1.76	150	92.70	130.6	140.9
25009	CBATU5B 150.00	25900	HNKOK5 150.00	3	0.00031	0.00199	0.00171	1.76	150	92.70	130.6	140.9
25020	CKSKA5 150.00	25048	KMJNG5A 150.00	1	0.002685	0.017249	0.01485	15.22	150	92.79	111.3	120
25020	CKSKA5 150.00	25048	KMJNG5A 150.00	2	0.002685	0.017249	0.01485	15.22	150	92.79	111.3	120
25020	CKSKA5 150.00	25088	RCKSB5 150.00	1	0.003158	0.011011	0.00425	6.39	150	62.13	79.6	128.1
25020	CKSKA5 150.00	25088	RCKSB5 150.00	2	0.003158	0.011011	0.00425	6.39	150	62.13	79.6	128.1
25024	CRATA5 150.00	25072	PDLRG5 150.00	1	0.012434	0.039977	0.02614	33	150	80.86	189.2	234
25024	CRATA5 150.00	25072	PDLRG5 150.00	2	0.012434	0.039977	0.02614	33	150	80.86	189.2	234
25024	CRATA5 150.00	25084	PWKTA5 150.00	1	0.003105	0.019946	0.01717	17.6	150	92.78	105	113.2
25032	GARUT5 150.00	25100	TSMYA5 150.00	1	0.022933	0.069823	0.02626	40	150	61.33	67.4	109.9
25032	GARUT5 150.00	25100	TSMYA5 150.00	2	0.022933	0.069823	0.02626	40	150	61.33	67.4	109.9
25034	GDMKR5 150.00	25098	TMBUN5 150.00	1	0.001274	0.008182	0.00704	7.22	150	92.76	179.2	193.2
25034	GDMKR5 150.00	25098	TMBUN5 150.00	2	0.001274	0.008182	0.00704	7.22	150	92.76	179.2	193.2
25034	GDMKR5 150.00	25134	CLIPO5 150.00	1	0.00203	0.01303	0.01122	11.5	150	92.79	247.8	267
25034	GDMKR5 150.00	25134	CLIPO5 150.00	2	0.00203	0.01303	0.01122	11.5	150	92.79	247.8	267
25038	IDMYU5 150.00	25053	KSBRU5B 150.00	1	0.00754	0.03275	0.04522	40	150	117.51	313.9	267.1
25038	IDMYU5 150.00	25053	KSBRU5B 150.00	2	0.00754	0.03275	0.04522	40	150	117.51	313.9	267.1
25038	IDMYU5 150.00	25913	IDMLY5 150.00	1	0.00113	0.00491	0.00678	3	150	117.51	181.1	154.1
25038	IDMYU5 150.00	25913	IDMLY5 150.00	2	0.00113	0.00491	0.00678	3	150	117.51	181.1	154.1
25040	JBBKA5 150.00	25900	HNKOK5 150.00	2	0.002272	0.01459	0.01256	12.87	150	92.78	104.8	113
25040	JBBKA5 150.00	25900	HNKOK5 150.00	3	0.002272	0.01459	0.01256	12.87	150	92.78	104.8	113
25042	JTBRG5 150.00	25154	ARJWN5 150.00	1	0.00737	0.04731	0.04074	41.75	150	92.80	125.8	135.6
25042	JTBRG5 150.00	25154	ARJWN5 150.00	2	0.00737	0.04731	0.04074	41.75	150	92.80	125.8	135.6
25052	KSBRU5A 150.00	25064	MLIGI5 150.00	1	0.001182	0.007593	0.00654	6.7	150	92.81	108.3	116.7
25053	KSBRU5B 150.00	25901	TTJBR5 150.00	1	0.00229	0.01473	0.01268	13	150	92.78	112.6	121.4
25053	KSBRU5B 150.00	25901	TTJBR5 150.00	2	0.00229	0.01473	0.01268	13	150	92.78	112.6	121.4
25060	MDRCN5 150.00	25092	SRAGI5A 150.00	1	0.00214	0.013747	0.01184	12.13	150	92.81	218.1	235
25060	MDRCN5 150.00	25092	SRAGI5A 150.00	2	0.00214	0.013747	0.01184	12.13	150	92.81	218.1	235
25060	MDRCN5 150.00	25140	KDPTN5 150.00	1	0.00159	0.01022	0.0088	9.02	150	92.79	93.2	100.4
25060	MDRCN5 150.00	25140	KDPTN5 150.00	2	0.00159	0.01022	0.0088	9.02	150	92.79	93.2	100.4
25060	MDRCN5 150.00	25154	ARJWN5 150.00	1	0.00472	0.030315	0.0261	26.75	150	92.79	158.5	170.8
25060	MDRCN5 150.00	25154	ARJWN5 150.00	2	0.00472	0.030315	0.0261	26.75	150	92.79	158.5	170.8
25062	MKSRI5 150.00	25078	PNYNG5 150.00	1	0.000759	0.004873	0.0042	4.3	150	92.84	178.1	191.8
25062	MKSRI5 150.00	25078	PNYNG5 150.00	2	0.000759	0.004873	0.0042	4.3	150	92.84	178.1	191.8
25078	PNYNG5 150.00	25080	PRMYA5 150.00	1	0.001357	0.008715	0.0075	7.69	150	92.77	93.3	100.6
25090	SKMDI5 150.00	25913	IDMLY5 150.00	1	0.00716	0.03275	0.04092	38	150	111.78	120	107.4
25090	SKMDI5 150.00	25913	IDMLY5 150.00	2	0.00716	0.03275	0.04092	38	150	111.78	120	107.4

Table.11 Comparison of Load Flow and SIL Value of Transmission Lines under Jakarta Peak Demand in 2015 (3/4)

Transmission Line					Line R (pu)	Line X (pu)	Charging (pu)	Length	kV	SIL(MW)	Load (MW)	Rate of Load/SIL (%)
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Id								
25093	SRAGI5B 150.00	25114	CRBON5 150.00	1	0.00756	0.03285	0.04537	40.1	150	117.52	321.5	273.6
25093	SRAGI5B 150.00	25114	CRBON5 150.00	2	0.00756	0.03285	0.04537	40.1	150	117.52	321.5	273.6
25102	UBRNG5 150.00	25106	RCKSB5-N 150.00	1	0.00397	0.0255	0.02195	22.5	150	92.78	111.2	119.9
25102	UBRNG5 150.00	25106	RCKSB5-N 150.00	2	0.00397	0.0255	0.02195	22.5	150	92.78	111.2	119.9
25102	UBRNG5 150.00	25106	RCKSB5-N 150.00	3	0.0032	0.02054	0.01768	18.1	150	92.78	138.1	148.9
27004	MDRCN7 500.00	37010	PMLNG7 500.00	1	0.00125	0.01595	1.024742	120	500	801.54	915.1	114.2
27004	MDRCN7 500.00	37010	PMLNG7 500.00	2	0.00125	0.01595	1.024742	120	500	801.54	915.1	114.2
35000	BAWEN5 150.00	35058	SCANG5 150.00	1	0.00548	0.03708	0.02888	31.1	150	88.25	103	116.7
35000	BAWEN5 150.00	35720	UNGRN5B 150.00	1	0.001461	0.009384	0.00808	8.28	150	92.79	109	117.5
35000	BAWEN5 150.00	35720	UNGRN5B 150.00	2	0.001461	0.009384	0.00808	8.28	150	92.79	109	117.5
35002	BMAYU5 150.00	35025	KLBKL5 150.00	1	0.01005	0.04136	0.03285	35.1	150	89.12	140.8	158
35002	BMAYU5 150.00	35025	KLBKL5 150.00	2	0.01005	0.04136	0.03285	35.1	150	89.12	140.8	158
35002	BMAYU5 150.00	35087	BLPLG5 150.00	1	0.00406	0.01669	0.01326	14.2	150	89.13	130.2	146.1
35002	BMAYU5 150.00	35087	BLPLG5 150.00	2	0.00406	0.01669	0.01326	14.2	150	89.13	130.2	146.1
35006	BRGIN5 150.00	35017	JELOK5 150.00	1	0.004128	0.012568	0.00473	7.2	150	61.35	70.6	115.1
35006	BRGIN5 150.00	35017	JELOK5 150.00	2	0.004128	0.012568	0.00473	7.2	150	61.35	70.6	115.1
35010	CLCAP5 150.00	35057	RWALO5 150.00	1	0.006307	0.025951	0.02061	22	150	89.12	168.4	189
35010	CLCAP5 150.00	35057	RWALO5 150.00	2	0.006307	0.025951	0.02061	22	150	89.12	168.4	189
35010	CLCAP5 150.00	35062	SNTRA5 150.00	1	0.003813	0.015689	0.01246	13.3	150	89.12	112.6	126.4
35010	CLCAP5 150.00	35062	SNTRA5 150.00	2	0.003813	0.015689	0.01246	13.3	150	89.12	112.6	126.4
35011	DIENG5 150.00	35012	GARNG5 150.00	1	0.00463	0.014533	0.00515	8.08	150	59.53	77.5	130.2
35011	DIENG5 150.00	35079	WSOBO5 150.00	1	0.01068	0.03352	0.01187	18.63	150	59.51	77.5	130.2
35012	GARNG5 150.00	35079	WSOBO5 150.00	2	0.006049	0.018987	0.00673	10.55	150	59.54	77.2	129.7
35017	JELOK5 150.00	35072	UNGRN5 150.00	1	0.007182	0.021208	0.0122	16.57	150	75.85	100	131.8
35017	JELOK5 150.00	35072	UNGRN5 150.00	2	0.007182	0.021208	0.0122	16.57	150	75.85	100	131.8
35018	JKULO5 150.00	35030	KUDUS5 150.00	1	0.002174	0.009447	0.01305	11.54	150	117.53	210.1	178.8
35018	JKULO5 150.00	35030	KUDUS5 150.00	2	0.002174	0.009447	0.01305	11.54	150	117.53	210.1	178.8
35018	JKULO5 150.00	35044	PATI5 150.00	1	0.00407	0.01768	0.02442	21.6	150	117.53	225.9	192.2
35018	JKULO5 150.00	35044	PATI5 150.00	2	0.00407	0.01768	0.02442	21.6	150	117.53	225.9	192.2
35021	KBSEN5 150.00	35087	BLPLG5 150.00	1	0.00406	0.01669	0.01326	14.2	150	89.13	118.1	132.5
35021	KBSEN5 150.00	35087	BLPLG5 150.00	2	0.00406	0.01669	0.01326	14.2	150	89.13	118.1	132.5
35025	KLBKL5 150.00	35057	RWALO5 150.00	1	0.004659	0.019173	0.01523	16.25	150	89.13	182	204.2
35025	KLBKL5 150.00	35057	RWALO5 150.00	2	0.004659	0.019173	0.01523	16.25	150	89.13	182	204.2
35026	KLSARI5 150.00	35068	TBROK5B 150.00	1	0.002423	0.010494	0.00754	8.45	150	84.76	104.9	123.8
35029	KPYAK5 150.00	35068	TBROK5B 150.00	1	0.00446	0.018353	0.01458	15.56	150	89.13	95.5	107.1
35032	LMNIS5 150.00	35062	SNTRA5 150.00	1	0.002638	0.00828	0.00293	4.6	150	59.49	73.9	124.2
35039	MSRAN5 150.00	35043	PALUR5 150.00	1	0.007109	0.022315	0.0079	12.4	150	59.50	88.8	149.2
35043	PALUR5 150.00	35063	SLORU5 150.00	1	0.002185	0.009496	0.01311	11.6	150	117.50	140.7	119.7
35043	PALUR5 150.00	35063	SLORU5 150.00	2	0.002185	0.009496	0.01311	11.6	150	117.50	140.7	119.7
35043	PALUR5 150.00	35064	SRGEN5 150.00	1	0.013301	0.04175	0.01479	23.2	150	59.52	67.6	113.6
35044	PATI5 150.00	35082	RMBNG5-2 150.00	1	0.01004	0.04363	0.06026	53.3	150	117.52	261.9	222.9
35044	PATI5 150.00	35082	RMBNG5-2 150.00	2	0.01004	0.04363	0.06026	53.3	150	117.52	261.9	222.9
35046	PDLAM5 150.00	35068	TBROK5B 150.00	1	0.001805	0.007429	0.0059	6.3	150	89.12	112.3	126
35046	PDLAM5 150.00	35068	TBROK5B 150.00	2	0.001805	0.007429	0.0059	6.3	150	89.12	112.3	126
35057	RWALO5 150.00	35062	SNTRA5 150.00	1	0.013214	0.040232	0.01513	23.05	150	61.32	63.2	103.1
35057	RWALO5 150.00	35062	SNTRA5 150.00	2	0.013214	0.040232	0.01513	23.05	150	61.32	63.2	103.1
35057	RWALO5 150.00	35902	START5 150.00	1	0.0085	0.0539	0.01223	18.9	150	47.63	58.2	122.2
35057	RWALO5 150.00	35902	START5 150.00	2	0.0085	0.0539	0.01223	18.9	150	47.63	58.2	122.2
35063	SLORU5 150.00	35077	WNSRI5 150.00	1	0.000829	0.003792	0.00474	4.4	150	111.80	171.3	153.2
35063	SLORU5 150.00	35077	WNSRI5 150.00	2	0.000829	0.003792	0.00474	4.4	150	111.80	171.3	153.2
35066	SYUNG5 150.00	35067	TBROK5A 150.00	1	0.003443	0.01417	0.01126	12.01	150	89.14	108.9	122.2
35066	SYUNG5 150.00	35067	TBROK5A 150.00	2	0.003443	0.01417	0.01126	12.01	150	89.14	108.9	122.2
35066	SYUNG5 150.00	35080	TJATI5 150.00	1	0.00121	0.01149	0.0187	14.1	150	127.57	130	101.9
35066	SYUNG5 150.00	35080	TJATI5 150.00	2	0.00121	0.01149	0.0187	14.1	150	127.57	130	101.9
35076	WNGRI5 150.00	35077	WNSRI5 150.00	1	0.005935	0.025787	0.03561	31.5	150	117.51	207.6	176.7
35076	WNGRI5 150.00	35077	WNSRI5 150.00	2	0.005935	0.025787	0.03561	31.5	150	117.51	207.6	176.7
35076	WNGRI5 150.00	35088	NTDRI5 150.00	1	0.002367	0.007066	0.01436	15.55	150	142.56	222.6	156.1
35076	WNGRI5 150.00	35088	NTDRI5 150.00	2	0.002367	0.007066	0.01436	15.55	150	142.56	222.6	156.1
35088	NTDRI5 150.00	45217	PCTAN5-2 150.00	1	0.007101	0.0212	0.04307	46.65	150	142.53	231.3	162.3
35088	NTDRI5 150.00	45217	PCTAN5-2 150.00	2	0.007101	0.0212	0.04307	46.65	150	142.53	231.3	162.3
37008	UNGRN7 500.00	37010	PMLNG7 500.00	1	0.00125	0.01595	1.024742	120	500	801.54	938.1	117
37008	UNGRN7 500.00	37010	PMLNG7 500.00	2	0.00125	0.01595	1.024742	120	500	801.54	938.1	117
42080	TX 150.00	45101	UJUNG5 150.00	2	0.00191	0.00774	0.00287	4.4	150	60.89	116.4	191.2
42083	TX 150.00	44207	GLTMR5B 150.00	1	0.00648	0.02033	0.0072	11.3	150	59.51	99.8	167.7
42084	TX 150.00	45007	BGKLN5 150.00	1	0.009345	0.028453	0.0107	16.3	150	61.32	116.7	190.3
42086	TX 150.00	45036	KJRAN5 150.00	2	0.00164	0.00667	0.00247	3.8	150	60.85	99.6	163.7
42099	TARIK4B 70.000	44045	SKTIH4 70.000	1	0.017755	0.030652	0.0006	4	70	13.99	14.4	102.9
42099	TARIK4B 70.000	44045	SKTIH4 70.000	2	0.017755	0.030652	0.0006	4	70	13.99	14.4	102.9
44004	BLBNG4-A 70.000	44056	TX 70.000	2	0.106512	0.136265	0.00593	27	70	20.86	29.4	140.9
44007	BNGIL4 70.000	44056	TX 70.000	1	0.051284	0.065609	0.00286	13	70	20.88	31.2	149.4
44007	BNGIL4 70.000	44057	TX 70.000	1	0.988183	1.04468	0.00066	21.1	70	2.51	5.3	210.9
44011	CRBAN4 70.000	44202	MNRJO4-B 70.000	1	0.037286	0.091577	0.00341	16.8	70	19.30	20.6	106.8
44017	KBAGN4 70.000	44033	PLHAN4 70.000	1	0.024413	0.056963	0.00234	11	70	20.27	27.7	136.7
44017	KBAGN4 70.000	44033	PLHAN4 70.000	2	0.024413	0.056963	0.00234	11	70	20.27	27.7	136.7
44017	KBAGN4 70.000	44041	SGRUH4 70.000	1	0.05612	0.147654	0.00483	25.7	70	18.09	41.3	228.3
44017	KBAGN4 70.000	44053	TUREN4 70.000	1	0.046294	0.1218	0.00399	21.2	70	18.10	45.6	251.9
44018	BNRAN4 70.000	44201	TAGNG4-B 70.000	1	0.064806	0.151211	0.00622	29.2	70	20.28	26.4	130.2
44018	BNRAN4 70.000	44201	TAGNG4-B 70.000	2	0.064806	0.151211	0.00622	29.2	70	20.28	26.4	130.2
44020	KTSNO4-A 70.000	44034	PLOSO4 70.000	1	0.055041	0.128426	0.00528	24.8	70	20.28	22.8	112.4
44020	KTSNO4-A 70.000	44034	PLOSO4 70.000	2	0.055041	0.128426	0.00528	24.8	70	20.28	22.8	112.4

Table.12 Comparison of Load Flow and SIL Value of Transmission Lines under Jakarta Peak Demand in 2015 (4/4)

Transmission Line					Line R (pu)	Line X (pu)	Charging (pu)	Length	kV	SIL(MW)	Load (MW)	Rate of Load/SIL (%)
From Bus Number	From Bus Name	To Bus Number	To Bus Name	Id								
44029	MRGEN4 70.000	44202	MNRJO4-B 70.000	1	0.050824	0.118587	0.00488	22.9	70	20.29	20.6	101.5
44029	MRGEN4 70.000	44202	MNRJO4-B 70.000	2	0.050824	0.118587	0.00488	22.9	70	20.29	20.6	101.5
44047	TAGNG4 2A 70.000	44050	TGLEK4 70.000	1	0.132276	0.23542	0.00432	29.8	70	13.55	15	110.7
45002	BABAT5 150.00	45045	LMGAN5 150.00	1	0.011279	0.033428	0.01368	20	150	63.97	69.9	109.3
45002	BABAT5 150.00	45045	LMGAN5 150.00	2	0.011279	0.033428	0.01368	20	150	63.97	69.9	109.3
45002	BABAT5 150.00	45253	TJWAR5 150.00	1	0.00565	0.02456	0.03392	30	150	117.52	216.2	184
45002	BABAT5 150.00	45253	TJWAR5 150.00	2	0.00565	0.02456	0.03392	30	150	117.52	216.2	184
45005	BDRAN5 150.00	45102	WARU5 150.00	1	0.003813	0.015023	0.00591	8.8	150	62.72	70.3	112.1
45005	BDRAN5 150.00	45102	WARU5 150.00	2	0.003813	0.015023	0.00591	8.8	150	62.72	70.3	112.1
45006	BDWSO5 150.00	45093	STBDO5 150.00	1	0.015037	0.05924	0.02332	34.7	150	62.74	72.7	115.9
45006	BDWSO5 150.00	45093	STBDO5 150.00	2	0.015037	0.05924	0.02332	34.7	150	62.74	72.7	115.9
45007	BGKLN5 150.00	45071	GLTMR5 150.00	2	0.00404	0.0227	0.01454	16.3	150	79.48	111	139.7
45007	BGKLN5 150.00	45082	SAMPG5 150.00	1	0.01371	0.07702	0.04864	55.3	150	79.47	133.1	167.5
45007	BGKLN5 150.00	45082	SAMPG5 150.00	2	0.01371	0.07702	0.04864	55.3	150	79.47	133.1	167.5
45010	BLKDG5 150.00	45011	BNGIL5 150.00	1	0.009837	0.039952	0.01481	22.7	150	60.88	72.6	119.2
45011	BNGIL5 150.00	45019	GDWTN5-A 150.00	1	0.00728	0.028681	0.01129	16.8	150	62.74	80.9	128.9
45011	BNGIL5 150.00	45019	GDWTN5-A 150.00	2	0.00728	0.028681	0.01129	16.8	150	62.74	80.9	128.9
45011	BNGIL5 150.00	45047	LWANG5 150.00	1	0.009273	0.037664	0.01396	21.4	150	60.88	115.9	190.4
45011	BNGIL5 150.00	45073	PIER5 150.00	1	0.0009	0.00578	0.00498	5.1	150	92.82	121.7	131.1
45011	BNGIL5 150.00	45073	PIER5 150.00	2	0.0009	0.00578	0.00498	5.1	150	92.82	121.7	131.1
45014	BWNG15 150.00	45252	BEN5 150.00	1	0.01059	0.068	0.05854	60	150	92.78	108.7	117.2
45015	CERME5 150.00	45051	MNYAR5 150.00	1	0.001621	0.012743	0.00678	7.6	150	72.94	190.5	261.2
45015	CERME5 150.00	45051	MNYAR5 150.00	2	0.001621	0.012743	0.00678	7.6	150	72.94	190.5	261.2
45015	CERME5 150.00	45400	KRIAN5B 150.00	1	0.004373	0.034371	0.01828	20.5	150	72.93	260.6	357.3
45015	CERME5 150.00	45904	SSTEL5 150.00	1	0.0025	0.01962	0.01043	11.7	150	72.91	137.5	188.6
45016	DREJO5 150.00	45400	KRIAN5B 150.00	1	0.00248	0.01323	0.00923	10	150	83.53	100.4	120.2
45017	DRMGR5 150.00	45097	TNDES5 150.00	1	0.00192	0.011165	0.00281	4.5	150	50.17	52.8	105.2
45017	DRMGR5 150.00	45097	TNDES5 150.00	2	0.00192	0.011165	0.00281	4.5	150	50.17	52.8	105.2
45018	MLWNG5 150.00	45035	KEREK5 150.00	1	0.005076	0.015043	0.00616	9	150	63.99	67.3	105.2
45018	MLWNG5 150.00	45035	KEREK5 150.00	2	0.005076	0.015043	0.00616	9	150	63.99	67.3	105.2
45019	GDWTN5-A 150.00	45023	GRATI5 150.00	1	0.003264	0.020966	0.01805	18.5	150	92.79	127.2	137.1
45019	GDWTN5-A 150.00	45023	GRATI5 150.00	2	0.003264	0.020966	0.01805	18.5	150	92.79	127.2	137.1
45023	GRATI5 150.00	45073	PIER5 150.00	1	0.00603	0.0262	0.03618	32	150	117.51	166.3	141.5
45023	GRATI5 150.00	45073	PIER5 150.00	2	0.00603	0.0262	0.03618	32	150	117.51	166.3	141.5
45025	GRSIK5-B 150.00	45097	TNDES5 150.00	1	0.00197	0.01096	0.01421	13.8	150	113.87	156.4	137.4
45025	GRSIK5-B 150.00	45097	TNDES5 150.00	2	0.00197	0.01096	0.01421	13.8	150	113.87	156.4	137.4
45030	JYKTS5 150.00	45590	KDIRI5-NB 150.00	1	0.0072	0.06168	0.02955	32	150	69.22	102.5	148.1
45034	BNRAN5 150.00	45049	MJGNG5 150.00	1	0.01196	0.047119	0.01855	27.6	150	62.74	102.7	163.7
45034	BNRAN5 150.00	45049	MJGNG5 150.00	2	0.01196	0.047119	0.01855	27.6	150	62.74	102.7	163.7
45034	BNRAN5 150.00	45059	KDIRI5-N 150.00	1	0.00013	0.00271	0.00092	1	150	58.27	197.1	338.3
45034	BNRAN5 150.00	45059	KDIRI5-N 150.00	2	0.00013	0.00271	0.00092	1	150	58.27	197.1	338.3
45035	KEREK5 150.00	45098	TUBAN5 150.00	1	0.007929	0.0235	0.00962	14.06	150	63.98	103.1	161.1
45035	KEREK5 150.00	45098	TUBAN5 150.00	2	0.007929	0.0235	0.00962	14.06	150	63.98	103.1	161.1
45037	KJTIM5 150.00	45400	KRIAN5B 150.00	1	0.001777	0.009958	0.00749	8.2	150	86.73	202	232.9
45037	KJTIM5 150.00	45904	SSTEL5 150.00	1	0.00318	0.0283	0.01265	14.9	150	69.35	165.2	238.2
45040	KRIAN5 150.00	45042	KRPLG5 150.00	1	0.001473	0.007845	0.00652	6.8	150	91.16	95.7	105
45040	KRIAN5 150.00	45042	KRPLG5 150.00	2	0.001473	0.007845	0.00652	6.8	150	91.16	95.7	105
45041	KRKSN5 150.00	45074	PITON5 150.00	1	0.00506	0.02699	0.01884	20.4	150	83.55	168.1	201.2
45041	KRKSN5 150.00	45074	PITON5 150.00	2	0.00506	0.02699	0.01884	20.4	150	83.55	168.1	201.2
45041	KRKSN5 150.00	45078	PRBGO5 150.00	1	0.00749	0.03996	0.02789	30.2	150	83.54	153.9	184.2
45041	KRKSN5 150.00	45078	PRBGO5 150.00	2	0.00749	0.03996	0.02789	30.2	150	83.54	153.9	184.2
45043	KTSNO5 150.00	45590	KDIRI5-NB 150.00	1	0.00697	0.05975	0.02863	31	150	69.22	106.5	153.9
45045	LMGAN5 150.00	45084	SGMDU5-B 150.00	1	0.015904	0.047134	0.01929	28.2	150	63.97	97.5	152.4
45045	LMGAN5 150.00	45084	SGMDU5-B 150.00	2	0.015904	0.047134	0.01929	28.2	150	63.97	97.5	152.4
45049	MJGNG5 150.00	45089	SKTIH5 150.00	1	0.009447	0.037217	0.01466	21.8	150	62.74	81.3	129.6
45049	MJGNG5 150.00	45089	SKTIH5 150.00	2	0.009447	0.037217	0.01466	21.8	150	62.74	81.3	129.6
45073	PIER5 150.00	45221	PSARI5 150.00	1	0.001057	0.00679	0.00585	5.99	150	92.82	112.5	121.2
45081	RNKUT5 150.00	45228	KLSRI5 150.00	2	0.00081	0.00521	0.00449	4.6	150	92.83	205.6	221.5
45081	RNKUT5 150.00	45228	KLSRI5 150.00	3	0.00081	0.00521	0.00449	4.6	150	92.83	205.6	221.5
45082	SAMPG5 150.00	45256	MDURA5 150.00	1	0.00132	0.01148	0.01613	15	150	118.53	199.5	168.3
45082	SAMPG5 150.00	45256	MDURA5 150.00	2	0.00132	0.01148	0.01613	15	150	118.53	199.5	168.3
45083	WNRJO5 150.00	45228	KLSRI5 150.00	2	0.00081	0.00521	0.00449	4.6	150	92.83	221.9	239
45083	WNRJO5 150.00	45228	KLSRI5 150.00	3	0.00081	0.00521	0.00449	4.6	150	92.83	221.9	239
45093	STBDO5 150.00	45740	PITON5B 150.00	1	0.01373	0.0733	0.05116	55.4	150	83.54	114.2	136.7
45093	STBDO5 150.00	45740	PITON5B 150.00	2	0.01373	0.0733	0.05116	55.4	150	83.54	114.2	136.7
45095	SWHAN5 150.00	45097	TNDES5 150.00	1	0.000693	0.003692	0.00307	3.2	150	91.19	99.4	109
45095	SWHAN5 150.00	45097	TNDES5 150.00	2	0.000693	0.003692	0.00307	3.2	150	91.19	99.4	109
45098	TUBAN5 150.00	45253	TJWAR5 150.00	1	0.00565	0.02456	0.03392	30	150	117.52	129.9	110.5
45098	TUBAN5 150.00	45253	TJWAR5 150.00	2	0.00565	0.02456	0.03392	30	150	117.52	129.9	110.5
47001	GRATI7 500.00	47007	PITON7 500.00	1	0.000772	0.009578	0.914319	87.86	500	977.04	1064.6	109
47001	GRATI7 500.00	47007	PITON7 500.00	2	0.000772	0.009578	0.914319	87.86	500	977.04	1064.6	109
55005	CLKBW5 150.00	55307	KAPAL5-N 150.00	1	0.012236	0.053152	0.0734	64.89	150	117.51	123.7	105.3
55005	CLKBW5 150.00	55307	KAPAL5-N 150.00	2	0.012236	0.053152	0.0734	64.89	150	117.51	123.7	105.3
55005	CLKBW5 150.00	55500	CLKBW-IPP 150.00	1	0.00014	0.00061	0.00085	0.8	150	118.04	189.9	160.9
55005	CLKBW5 150.00	55500	CLKBW-IPP 150.00	2	0.00014	0.00061	0.00085	0.8	150	118.04	189.9	160.9