Table I.10.3-5 Transmission Loss and Voltage Drop for 10 kV Line

(Electric Supply: 200kW, 100kVar; Power Factor:0.9)

Node No.	Distance (km)	Voltage Received (pu)	Phase Difference (degree)	Transmitted Power (pu)	Transmission Loss (pu)	Loss Ratio (%)
1	0	200kW				200kW
2	10	0.98461	-0.1	0.020289	0.000289	1.4
3	20	0.96881	-0.3	0.020595	0.000595	2.9
4	30	0.95255	-0.4	0.020918	0.000918	4.4
5	40	0.93576	-0.6	0.021263	0.001263	5.9
6	50	0.91836	-0.8	0.021633	0.001633	7.5
7	60	0.90025	-1.0	0.022031	0.002031	9.2
8	70	0.88132	-1.2	0.022464	0.002464	11.0
9	80	0.86141	-1.4	0.022939	0.002939	12.8
10	90	0.84034	-1.7	0.023466	0.003466	14.8
11	100	0.81785	-1.9	0.024057	0.004057	16.9
12	110	0.79357	-2.2	0.024732	0.004732	19.1
13	120	0.76699	-2.5	0.025520	0.005520	21.6

Table I.10.3-6 Transmission Loss and Voltage Drop for 35kV Line

(Electric Supply: 200kW, 100kVar; Power Factor:0.9)

Node No.	Distance (km)	Voltage Received (pu)	Phase Difference (degree)	Transmitted Power (pu)	Transmission Loss (pu)	Loss Ratio (%)
1	1	200kW				200kW
2	10	0.99908	0.0	0.020016	0.000016	0.1
3	20	0.99828	0.0	0.020029	0.000029	0.1
4	30	0.99759	-0.1	0.020042	0.000042	0.2
5	40	0.99701	-0.1	0.020055	0.000055	0.3
6	50	0.99654	-0.2	0.020067	0.000067	0.3
7	60	0.99619	-0.2	0.020081	0.000081	0.4
8	70	0.99594	-0.3	0.020097	0.000097	0.5
9	80	0.99581	-0.4	0.020115	0.000115	0.6
10	90	0.99578	-0.4	0.020136	0.000136	0.7
11	100	0.99587	-0.5	0.020160	0.000160	0.8
12	110	0.99606	-0.6	0.020190	0.000190	0.9
13	120	0.99637	-0.7	0.020225	0.000225	1.1
14	130	0.99678	-0.8	0.020266	0.000266	1.3
15	140	0.99730	-0.9	0.020313	0.000313	1.5
16	150	0.99793	-1.0	0.020369	0.000369	1.8
17	160	0.99866	-1.2	0.020432	0.000432	2.1
18	170	0.99950	-1.3	0.020505	0.000505	2.5
19	180	1.000451	-1.5	0.020588	0.000588	2.9
20	190	1.001504	-1.6	0.020682	0.000682	3.3
21	200	1.002661	-1.8	0.020787	0.000787	3.8

Table I.10.3-7 Final Transmission Cost by 10 kV Line

Node No.	Transmission Length		10kV Trans	Annualized Construction Cost	Transmission O/M Cost	kWh transmission Cost	total transmission cost	Transmission Loss	kWh Distribution Cost
	(km)	10kV	+Switch	$/yr	$/yr	$/kWh	$/kWh	%	$/kWh
Unit	1	5,200	15,000	1,534	300	0.01163	0.057		
2	10	52,000	67,000	6,851	1,340	0.05195	0.098	1.4	0.099
3	20	104,000	119,000	12,169	2,380	0.09227	0.138	2.9	0.142
4	30	156,000	171,000	17,486	3,420	0.13259	0.178	4.4	0.187
5	40	208,000	223,000	22,804	4,460	0.17291	0.219	5.9	0.233
6	50	260,000	275,000	28,121	5,500	0.21323	0.259	7.5	0.280
7	60	312,000	327,000	33,439	6,540	0.25354	0.299	9.2	0.330
8	70	364,000	379,000	38,756	7,580	0.29386	0.340	11.0	0.382
9	80	416,000	431,000	44,074	8,620	0.33418	0.380	12.8	0.436
10	90	468,000	483,000	49,391	9,660	0.37450	0.420	14.8	0.493
11	100	520,000	535,000	54,709	10,700	0.41482	0.461	16.9	0.554
12	110	572,000	587,000	60,026	11,740	0.45514	0.501	19.1	0.620
13	120	624,000	639,000	65,344	12,780	0.49546	0.541	21.6	0.691

Table I.10.3-8 Final Transmission Cost by 35kV Line

Node No.	Transmission Length		10kV Trans	Annualized Construction Cost	Transmission O/M Cost	kWh transmission Cost	total transmission cost	Transmission Loss	kWh Distribution Cost
	(km)	10kV	+Switch	$/yr	$/yr	$/kWh	$/kWh	%	$/kWh
Unit	1	12,000	34,000	3,477	680	0.02373	0.070		
2	10	120,000	154,000	15,748	3,080	0.10747	0.153	0.1	0.153
3	20	240,000	274,000	28,019	5,480	0.19120	0.237	0.1	0.237
4	30	360,000	394,000	40,290	7,880	0.27494	0.321	0.2	0.321
5	40	480,000	514,000	52,561	10,280	0.35868	0.405	0.3	0.406
6	50	600,000	634,000	64,832	12,680	0.44242	0.488	0.3	0.490
7	60	720,000	754,000	77,104	15,080	0.52616	0.572	0.4	0.574
8	70	840,000	874,000	89,375	17,480	0.60990	0.656	0.5	0.659
9	80	960,000	994,000	101,646	19,880	0.69364	0.739	0.6	0.744
10	90	1,080,000	1,114,000	113,917	22,280	0.77738	0.823	0.7	0.829
11	100	1,200,000	1,234,000	126,188	24,680	0.86112	0.907	0.8	0.914
12	110	1,320,000	1,354,000	138,459	27,080	0.94486	0.991	0.9	1.000
13	120	1,440,000	1,474,000	150,730	29,480	1.02860	1.074	1.1	1.087
14	130	1,560,000	1,594,000	163,002	31,880	1.11234	1.158	1.3	1.174
15	140	1,680,000	1,714,000	175,273	34,280	1.19608	1.242	1.5	1.261

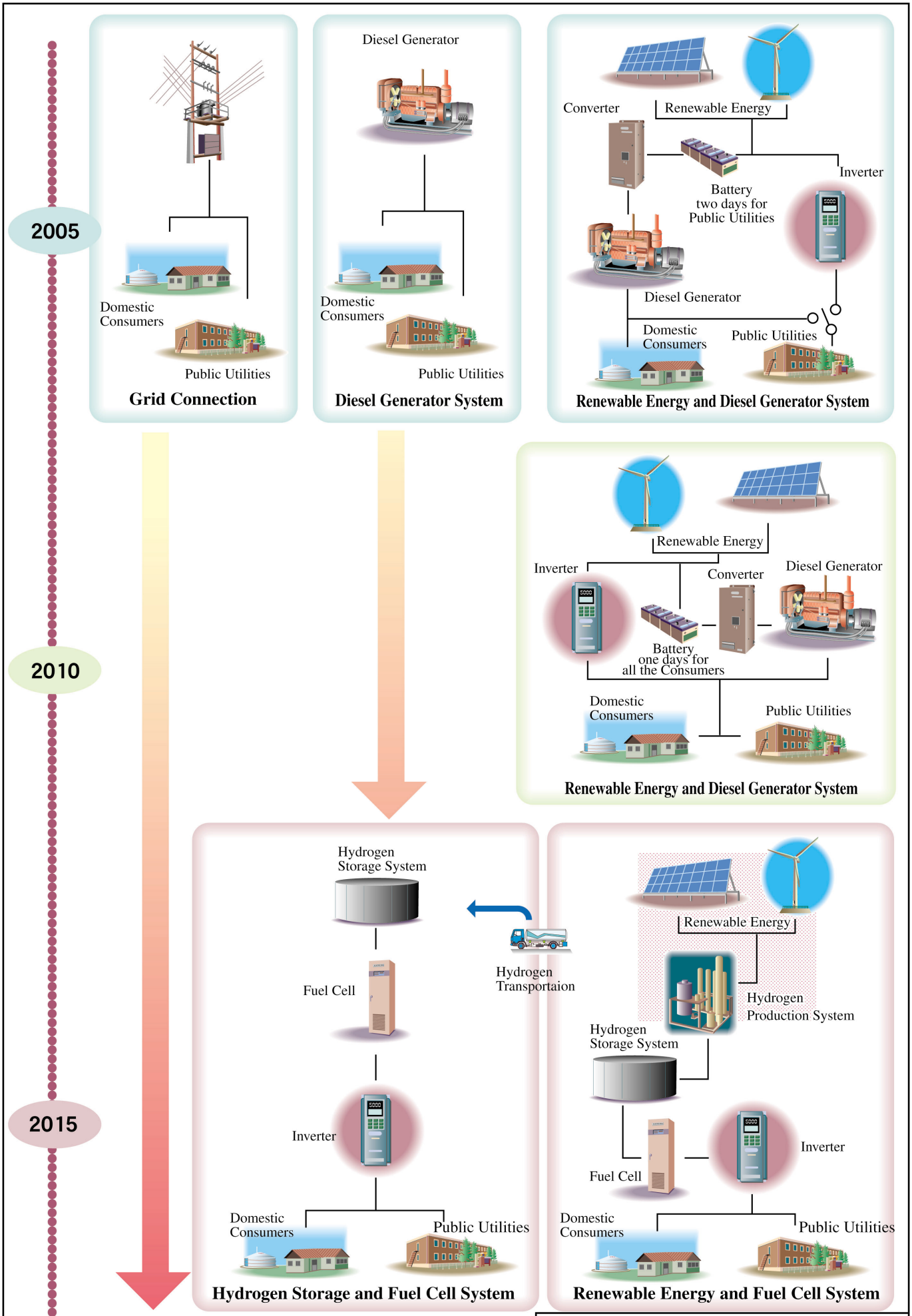

Figure I.10.5-1 Image of Power Supply to Sum Centers