

REPUBLIC OF TURKEY

GENERAL DIRECTORATE OF ELECTRIC POWER RESOURCES
SURVEY AND DEVELOPMENT ADMINISTRATION

TURKISH ELECTRICITY TRANSMISSION CO. (TEIAS)

REPUBLIC OF TURKEY

THE STUDY ON OPTIMAL POWER GENERATION FOR PEAK DEMAND IN TURKEY

(Appendix)

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PDPAT data

1. General data

(1) Operating condition

Year	PSPP operation days/week	Minimum mainte. (MW)	Stacking ratio (%)	reduction rate on holiday (%)								
2011	4	0	659	90	100	0	0	0	0	0	0	0
2012	4	0	703	90	100	0	0	0	0	0	0	0
2013	4	0	751	90	100	0	0	0	0	0	0	0
2014	4	0	801	90	100	0	0	0	0	0	0	0
2015	4	0	855	90	100	0	0	0	0	0	0	0
2016	4	0	911	90	100	0	0	0	0	0	0	0
2017	4	0	971	90	100	0	0	0	0	0	0	0
2018	4	0	1035	90	100	0	0	0	0	0	0	0
2019	4	0	1078	90	100	0	0	0	0	0	0	0
2020	4	0	1120	90	100	0	0	0	0	0	0	0
2021	4	0	1168	90	100	0	0	0	0	0	0	0
2022	4	0	1216	90	100	0	0	0	0	0	0	0
2023	4	0	1264	90	100	0	0	0	0	0	0	0
2024	4	0	1312	90	100	0	0	0	0	0	0	0
2025	4	0	1360	90	100	0	0	0	0	0	0	0
2026	4	0	1408	90	100	0	0	0	0	0	0	0
2027	4	0	1456	90	100	0	0	0	0	0	0	0
2028	4	0	1504	90	100	0	0	0	0	0	0	0
2029	4	0	1552	90	100	0	0	0	0	0	0	0
2030	4	0	1600	90	100	0	0	0	0	0	0	0

(2) Thermal group

	St	Ed	Calorific value				CO2 kg-C/Mcal
1 GAS	0	0	6	13	8350	kcal / kg	0.06400
2 Gas Turbir	0	0	14	16	8350	kcal / kg	0.06400
3 OIL	0	1	17	25	9600	kcal / kg	0.08366
4 Imp-Coal	0	0	26	30	6000	kcal / kg	0.11210
5 Dom-Coal	0	0	31	48	1500	kcal / kg	0.11545

	8350 kcal/kg	CO2 Gas	15.3 tC/TJ
	0.8 kg/m3	Oil	20 tC/TJ
Gas	10437.5 kcal/m3	Anthracite	26.8 tC/TJ
		Lignite	27.6 tC/TJ
			4.183 J/cal

(3) Characteristics (thermal and nuclear)

No.	MW								a	b	c	fuel	min				FOR	SO
2	1200	0	10	1	10	1	10	0.2062	2116	309794	1	100	100	0	5	80		
7	700	0	10	0	10	1	10	0.1126	1202	197754	2	80	85	30	4	40		
8	700	0	10	0	10	1	10	0.1126	1202	197754	2	60	65	30	6	60		
9	450	0	10	0	10	0	10	0.1252	1580	53351	2	60	65	20	6	60		
10	100	0	10	0	10	0	10	0.6659	1270	54956	2	60	70	5	6	60		
11	250	0	10	0	10	1	10	0.1163	1300	65873	2	80	85	10	4	50		
14	150	0	10	0	10	0	10	3.5347	1552	132437	2	20	30	5	6	30		
13	50	1	10	1	10	1	10	1.8681	2298	10742	2	80	80	0	6	30		
18	250	0	10	0	10	1	10	0.1866	2054	40599	3	80	85	10	4	50		
19	150	0	10	0	10	0	10	3.5347	1552	132437	3	20	30	5	4	30		
20	150	0	10	0	10	1	10	0.4325	2104	21472	3	60	65	5	10	60		
21	18	0	10	0	10	0	10	3.1239	2157	1774	3	60	70	1	10	30		
24	90	0	10	0	10	0	10	0.4298	1963	18279	4	60	65	4	10	40		
25	30	0	10	0	10	0	10	2.3351	2467	3042	4	40	50	2	8	30		
27	600	0	10	1	10	1	10	0.1624	1786	128596	5	90	95	25	4	50		
28	600	1	10	1	10	1	10	0.1644	2005	151610	5	90	95	25	4	50		
29	300	0	10	1	10	1	10	0.1612	1958	51386	5	90	95	10	4	50		
32	350	0	10	0	10	1	10	0.1716	2040	46627	6	90	95	15	4	45		
33	350	0	10	0	10	1	10	0.0455	2306	9581	6	70	75	15	15	60		
34	350	0	10	0	10	1	10	0.2321	2526	49244	6	70	75	15	15	60		
36	210	0	10	0	10	1	10	0.4254	1951	81790	6	70	75	10	12	60		
37	210	0	10	0	10	1	10	0.3709	2048	40351	6	70	75	10	6	60		
38	210	0	10	0	10	1	10	0.5634	2044	98291	6	70	75	10	12	60		
39	170	0	10	0	10	1	10	0.4952	2446	28193	6	70	75	5	15	60		
40	150	0	10	0	10	1	10	0.4123	2418	29922	6	70	75	5	10	60		
41	150	0	10	0	10	1	10	0.5105	2354	22745	6	70	75	5	5	60		
42	150	0	10	0	10	1	10	1.0371	1829	107953	6	70	75	5	10	60		
43	160	0	10	0	10	1	10	0.4202	2037	25496	6	80	85	5	10	60		
44	50	1	10	1	10	1	10	3.8710	2187	19700	6	90	90	0	5	30		
46	600	0	10	0	10	1	10	0.0833	1979	105615	7	90	95	25	4	50		
47	150	0	10	0	10	1	10	0.5846	2246	30435	7	70	75	5	5	60		

(4) Fuel price

	Nuclear	Gas	Oil	Diesel oil	Import coal	Lignite	Bituminous					
2010		3.500	5.339		1.299							
2011	0.381	3.630	5.533	5.533	1.343	1.343	1.343	0	0	0	0	0
2012	0.381	3.760	5.727	5.727	1.386	1.386	1.386	0	0	0	0	0
2013	0.381	3.890	5.921	5.921	1.430	1.430	1.430	0	0	0	0	0
2014	0.381	4.020	6.115	6.115	1.474	1.474	1.474	0	0	0	0	0
2015	0.381	4.151	6.309	6.309	1.518	1.518	1.518	0	0	0	0	0
2016	0.381	4.281	6.503	6.503	1.561	1.561	1.561	0	0	0	0	0
2017	0.381	4.411	6.697	6.697	1.605	1.605	1.605	0	0	0	0	0
2018	0.381	4.541	6.891	6.891	1.649	1.649	1.649	0	0	0	0	0
2019	0.381	4.671	7.085	7.085	1.692	1.692	1.692	0	0	0	0	0
2020	0.381	4.801	7.279	7.279	1.736	1.736	1.736	0	0	0	0	0
2021	0.381	4.880	7.388	7.388	1.746	1.746	1.746	0	0	0	0	0
2022	0.381	4.958	7.498	7.498	1.756	1.756	1.756	0	0	0	0	0
2023	0.381	5.037	7.607	7.607	1.766	1.766	1.766	0	0	0	0	0
2024	0.381	5.116	7.716	7.716	1.775	1.775	1.775	0	0	0	0	0
2025	0.381	5.194	7.825	7.825	1.785	1.785	1.785	0	0	0	0	0
2026	0.381	5.268	7.934	7.934	1.793	1.793	1.793	0	0	0	0	0
2027	0.381	5.342	8.044	8.044	1.801	1.801	1.801	0	0	0	0	0
2028	0.381	5.416	8.153	8.153	1.808	1.808	1.808	0	0	0	0	0
2029	0.381	5.489	8.262	8.262	1.816	1.816	1.816	0	0	0	0	0
2030	0.381	5.563	8.371	8.371	1.823	1.823	1.823	0	0	0	0	0
Oil	USD/bbl		2008	2010	2015	2020	2025	2030	0.9 kg/l			
Gas	USD/Mbtu		97.19	73.34	86.67	100.00	107.50	115.00	159 l/bbl	9600 kcal/kg		
Coal	USD/tonne		10.32	8.82	10.46	12.10	13.09	14.02	3.968 Btu/kcal			
Nuclear	Cent/kWh		120.59	77.94	91.05	104.16	107.12	109.40	6000 kcal/kg			
			1.00	1.00	1.00	1.00	1.00	1.00	32.80%	860 kcal/kWh		
Oil	cent/kcal		2008	2010	2015	2020	2025	2030				
Gas	cent/kcal		7.075	5.339	6.309	7.279	7.825	8.371				
Coal	cent/kcal		4.095	3.500	4.151	4.801	5.194	5.563				
Nuclear	cent/kcal		2.010	1.299	1.518	1.736	1.785	1.823				
			0.381	0.381	0.381	0.381	0.381	0.381				

(5) Fixed cost

	Const. cost (Cent/kW)	method	annual rate (%)	Interest (%)	life (year)	salvag e rate (%)	others (%)	Reference	Class
1	120000	1	11.23	10	40	10	1.00	Conventional hydro - 1	
2	140000	1	11.23	10	40	10	1.00	Conventional hydro - 2	
3	160000	1	11.23	10	40	10	1.00	Conventional hydro - 3	
4	180000	1	11.23	10	40	10	1.00	Conventional hydro - 4	
5	200000	1	11.23	10	40	10	1.00	Conventional hydro - 5	
6	60000	1	11.23	10	40	10	1.00	PSPP - 1	
7	70000	1	11.23	10	40	10	1.00	PSPP - 2	
8	80000	1	11.23	10	40	10	1.00	PSPP - 3	
9	90000	1	11.23	10	40	10	1.00	PSPP - 4	
10	100000	1	11.23	10	40	10	1.00	PSPP - 5	
11	80000	1	14.25	10	20	10	2.50	Gas - 1	
12	90000	1	14.25	10	20	10	2.50	Gas - 2	
13	100000	1	14.25	10	20	10	2.50	Gas - 3	13
14	110000	1	14.25	10	20	10	2.50	Gas - 4	7, 8, 9
15	120000	1	14.25	10	20	10	2.50	Gas - 5	10, 11
16	50000	1	15.75	10	20	10	4.00	GT - 1	
17	60000	1	15.75	10	20	10	4.00	GT - 2	
18	70000	1	15.75	10	20	10	4.00	GT - 3	12, 19
19	80000	1	15.75	10	20	10	4.00	GT - 4	
20	90000	1	15.75	10	20	10	4.00	GT - 5	
21	70000	1	13.75	10	20	10	2.00	Oil - 1	
22	80000	1	13.75	10	20	10	2.00	Oil - 2	18
23	90000	1	13.75	10	20	10	2.00	Oil - 3	20, 24
24	100000	1	13.75	10	20	10	2.00	Oil - 4	21, 25
25	110000	1	13.75	10	20	10	2.00	Oil - 5	
26	100000	1	14.75	10	20	10	3.00	Coal - 1	
27	110000	1	14.75	10	20	10	3.00	Coal - 2	
28	120000	1	14.75	10	20	10	3.00	Coal - 3	27, 28, 46
29	130000	1	14.75	10	20	10	3.00	Coal - 4	29
30	140000	1	14.75	10	20	10	3.00	Coal - 5	
31	100000	1	14.75	10	20	10	3.00	Lignite - 1	32, 33, 34
32	110000	1	14.75	10	20	10	3.00	Lignite - 2	36, 37, 38
33	120000	1	14.75	10	20	10	3.00	Lignite - 3	39, 40, 41, 42, 47
34	130000	1	14.75	10	20	10	3.00	Lignite - 4	44
35	140000	1	14.75	10	20	10	3.00	Lignite - 5	43
36	200000	1	14.75	10	20	10	3.00	Nuclear - 1	2
37	250000	1	14.75	10	20	10	3.00	Nuclear - 2	
38	100000	1	11.23	10	40	10	1.00	Wind - 1	
39	120000	1	11.23	10	40	10	1.00	Wind - 2	
40	80000	1	13.75	10	20	10	2.00	Geothermal - 1	
41	100000	1	13.75	10	20	10	2.00	Geothermal - 2	

(6) Development plan (Hydro)

3	1	1993	11	2031	1	2 Ataturk (2400MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	2	1989	2	2031	1	2 Karakaya (1800MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	3	1982	8	2031	1	2 Keban (1330MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	4	1988	7	2031	1	2 Altinkaya (703MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	5	2001	10	2031	1	2 Biurecik (672MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	6	1984	7	2031	1	2 Oymapinar (540MW)	2	2	2007	1	2031	1	2 small hydro (200MW)
3	7	2002	4	2031	1	2 Berke (510MW)	2	2	2008	1	2031	1	2 small hydro (200MW)
3	8	1983	6	2031	1	2 H. Ugurlu (500MW)	2	1	2009	1	2031	1	2 small hydro (100MW)
3	9	2006	1	2031	1	2 Borcka (300MW)	2	1	2009	1	2031	1	2 small hydro (100MW)
3	10	1991	1	2031	1	2 Sir (283.5MW)	2	2	2010	1	2031	1	2 small hydro (200MW)
3	11	1976	3	2031	1	2 Gokcekaya (278.4MW)	2	1	2010	1	2031	1	2 small hydro (100MW)
3	12	1998	1	2031	1	2 Batman (198MW)	2	2	2011	1	2031	1	2 small hydro (200MW)
3	13	2000	4	2031	1	2 Karkams (189MW)	2	2	2012	1	2031	1	2 small hydro (200MW)
3	14	1999	12	2031	1	2 Ozluce (170MW)	2	2	2012	1	2031	1	2 small hydro (200MW)
3	15	1997	8	2031	1	2 Catalan (168.9MW)	2	2	2012	1	2031	1	2 small hydro (200MW)
3	16	1966	8	2031	1	2 Sanyar (160MW)	2	2	2012	1	2031	1	2 small hydro (200MW)
3	17	1994	12	2031	1	2 Gezende (159.4MW)	2	2	2013	1	2031	1	2 small hydro (200MW)
3	18	1984	8	2031	1	2 Aslantas (138MW)	2	2	2014	1	2031	1	2 small hydro (200MW)
3	19	1983	8	2031	1	2 Hirfanli (128MW)	2	2	2015	1	2031	1	2 small hydro (200MW)
3	20	1990	7	2031	1	2 Kilickaya (120MW)	2	2	2016	1	2031	1	2 small hydro (200MW)
3	21	1993	3	2031	1	2 Menzelet (124MW)	2	2	2017	1	2031	1	2 small hydro (200MW)
3	22	2005	6	2031	1	2 Muratli (115MW)	2	2	2018	1	2031	1	2 small hydro (200MW)
3	23	2001	5	2031	1	2 Dicel (110MW)	2	2	2019	1	2031	1	2 small hydro (200MW)
3	24	2008	1	2031	1	2 Torul (105.6MW)	2	2	2020	1	2031	1	2 small hydro (200MW)
3	25	2005	7	2031	1	2 Yamula (100MW)	2	2	2021	1	2031	1	2 small hydro (200MW)
3	26	1998	10	2031	1	2 Kralkizi (94MW)	2	2	2022	1	2031	1	2 small hydro (200MW)
3	27	1998	11	2031	1	2 Kokluce (90MW)	2	2	2023	1	2031	1	2 small hydro (200MW)
3	28	2003	12	2031	1	2 Kurtun (85MW)	2	2	2024	1	2031	1	2 small hydro (200MW)
3	29	1967	2	2031	1	2 Kesikkopru (76MW)	2	2	2025	1	2031	1	2 small hydro (200MW)
3	30	1981	5	2031	1	2 Dogankent (74.5MW)	2	2	2026	1	2031	1	2 small hydro (200MW)
3	31	1971	1	2031	1	2 Kadinak (70MW)	2	2	2027	1	2031	1	2 small hydro (200MW)
3	32	1960	5	2031	1	2 Demirkopru (69MW)	2	2	2028	1	2031	1	2 small hydro (200MW)
3	33	2000	12	2031	1	2 S Ugurlu (69MW)	2	2	2029	1	2031	1	2 small hydro (200MW)
3	34	1996	6	2031	1	2 Adiguzel (62MW)	2	2	2030	1	2031	1	2 small hydro (200MW)
3	35	1956	1	2031	1	2 Seyhan1 (60MW)	1	1	2008	1	2031	1	38 Wind (100MW)
3	36	1991	11	2031	1	2 Derbent (56.4MW)	1	1	2008	1	2031	1	38 Wind (100MW)
3	37	2008	1	2031	1	2 Kadinak2 (56MW)	1	1	2008	1	2031	1	38 Wind (100MW)
3	38	1989	11	2031	1	2 Kapulukaya (54MW)	1	1	2008	1	2031	1	38 Wind (100MW)
3	39	2007	1	2031	1	2 Camlica (84MW)	1	1	2009	1	2031	1	38 Wind (100MW)
3	40	2011	1	2031	1	2 DERINER (670MW)	1	1	2009	1	2031	1	38 Wind (100MW)
3	41	2010	1	2031	1	2 ERMENEK (309MW)	1	1	2010	1	2031	1	38 Wind (100MW)
3	42	2009	1	2031	1	2 ALPASLAN-I (160MW)	1	1	2010	1	2031	1	38 Wind (100MW)
3	43	2009	1	2031	1	2 AKKOPRU (115MW)	1	1	2011	1	2031	1	38 Wind (100MW)
3	44	2009	1	2031	1	2 OBRUK (200MW)	1	1	2011	1	2031	1	38 Wind (100MW)
3	45	2010	1	2031	1	2 TOPCAM (60MW)	1	1	2011	1	2031	1	38 Wind (100MW)
3	46	2010	1	2031	1	2 Kigi (140MW)	1	1	2012	1	2031	1	38 Wind (100MW)
3	47	2016	1	2031	1	2 ILISU (1200MW)	1	3	2013	1	2031	1	38 Wind (800MW)
3	48	2009	1	2031	1	2 Uluabat Kuvvet Tuneli (110.3MW)	1	3	2014	1	2031	1	38 Wind (800MW)
3	49	2009	1	2031	1	2 Darica I (99MW)	1	3	2015	1	2031	1	38 Wind (800MW)
3	50	2009	1	2031	1	2 Uzuncayir (84MW)	1	3	2016	1	2031	1	38 Wind (800MW)
3	51	2009	1	2031	1	2 Akocak (90.1MW)	1	3	2017	1	2031	1	38 Wind (800MW)
3	52	2009	1	2031	1	2 Cirakdami (58.7MW)	1	3	2018	1	2031	1	38 Wind (800MW)
3	53	2010	1	2031	1	2 Cevizlik (102.4MW)	1	3	2019	1	2031	1	38 Wind (800MW)
3	54	2010	1	2031	1	2 Dereli (58.8MW)	1	3	2020	1	2031	1	38 Wind (800MW)
3	55	2010	1	2031	1	2 Ceyhan (63.5MW)	1	3	2021	1	2031	1	38 Wind (800MW)
3	56	2010	1	2031	1	2 Erenler (51.1MW)	1	3	2022	1	2031	1	38 Wind (800MW)
3	57	2010	1	2031	1	2 Alkumru Baraji ve (247.4MW)	1	3	2023	1	2031	1	38 Wind (800MW)
3	58	2010	1	2031	1	2 Hacinoglu (144.4MW)	1	3	2024	1	2031	1	38 Wind (800MW)
3	59	2011	1	2031	1	2 Yedigoze (317MW)	1	3	2025	1	2031	1	38 Wind (800MW)
3	60	2011	1	2031	1	2 Sariguzel (105.1MW)	1	3	2026	1	2031	1	38 Wind (800MW)
3	61	2011	1	2031	1	2 Kandil Enerji Projesi (217.6MW)	1	3	2027	1	2031	1	38 Wind (800MW)
3	62	2012	1	2031	1	2 Akkoy 2 (233.6MW)	1	3	2028	1	2031	1	38 Wind (800MW)
3	63	2011	1	2031	1	2 Tatar (115.8MW)	1	3	2029	1	2031	1	38 Wind (800MW)
3	64	2012	1	2031	1	2 Goktas (292.5MW)	1	3	2030	1	2031	1	38 Wind (800MW)
3	65	2011	1	2031	1	2 Feke II (71MW)	1	2	2009	1	2031	1	40 Geothermal (100MW)
3	66	2012	1	2031	1	2 Gullubag (99MW)	1	2	2013	1	2031	1	40 Geothermal (100MW)
3	67	2012	1	2031	1	2 Menge Baraji ve (86.8MW)	1	2	2015	1	2031	1	40 Geothermal (100MW)
3	68	2012	1	2031	1	2 Akinci (102.3MW)	1	2	2020	1	2031	1	40 Geothermal (100MW)
3	69	2012	1	2031	1	2 Pembelik (122.4MW)	1	2	2025	1	2031	1	40 Geothermal (100MW)
3	70	2012	1	2031	1	2 Daran (54.6MW)	1	2	2030	1	2031	1	40 Geothermal (100MW)
3	71	2012	1	2031	1	2 Toros (51.2MW)	4	1	2021	1	2031	1	7 PSPP (300MW) -1
3	72	2008	1	2031	1	2 Akkoy I (101.9MW)	4	1	2022	1	2031	1	7 PSPP (300MW) -2
							4	1	2024	1	2031	1	7 PSPP (300MW) -3
							4	1	2025	1	2031	1	7 PSPP (300MW) -4
							4	1	2027	1	2031	1	7 PSPP (300MW) -5
							4	1	2029	1	2031	1	7 PSPP (300MW) -6

(7) Development plan (thermal & nuclear)

8	1432.0	1999	1	2031	1	12 Bursa Dogalgaz	13	67.0	2011	1	2031	1	15 AS Enerji Elektrik Uretim
9	1350.0	1989	1	2031	1	12 Ambarli Dogalgaz	7	886.9	2012	1	2031	1	12 Borasco Elektrik Uretim S
24	180.0	1984	1	2024	1	23 Aliaga+ Cevrim	11	130.0	2011	1	2031	1	13 Camis Elektrik Uretim A.Ş
33	1440.0	2006	1	2031	1	31 Afsin Elbistan B	13	64.2	2010	1	2031	1	15 Delta Enerji Uretim ve Tic
34	1355.0	1987	1	2027	1	31 Afsin Elbistan A	7	1025.0	2012	1	2031	1	12 Enerjisa Enerji Uretim A.Ş
32	1670.0	2027	1	2031	1	31 New Afsin Elbistan A	13	48.1	2010	1	2031	1	15 Nuh Cimento Sanayi A.S.
40	600.0	1978	1	2018	1	33 Seyitomer	21	43.0	2009	1	2031	1	24 Ken Kipas Elektrik Uretim
32	720.0	2018	1	2031	1	31 New Seyitomer	7	840.0	2013	1	2031	1	12 Ambarli B Dogalgaz
40	457.0	2000	1	2031	1	33 Kangal TS	13	650	2007	1	2031	1	15 Autoproducer others (Gas
42	365.0	1978	1	2018	1	33 Tuncbilek B	13	740	2007	1	2031	1	15 Private others (Gas)
42	440.0	2018	1	2031	1	33 New Tuncbilek B	21	600	2007	1	2031	1	13 Autoproducer others (Oil)
43	320.0	2005	1	2031	1	35 18 Mart Can	21	200	2007	1	2031	1	13 Private others (Oil)
37	210.0	1992	1	2031	1	32 Orhaneli	44	210	2007	1	2031	1	13 Autoproducer others (Ligr
20	380.0	1971	1	2021	1	23 Ambarli Fuel-Oil	13	30	2010	1	2031	1	15 Autoproducer (Gas)
20	300.0	1971	1	2010	1	23 Ambarli Fuel-Oil	13	140	2011	1	2031	1	15 Autoproducer (Gas)
47	300.0	1986	1	2026	1	33 Catalagzi TS	13	100	2013	1	2031	1	15 Autoproducer (Gas)
46	350.0	2026	1	2031	1	31 New Catalagzi TS	13	100	2014	1	2031	1	15 Autoproducer (Gas)
39	1038.0	1985	1	2025	1	33 Soma A-B	13	100	2015	1	2031	1	15 Autoproducer (Gas)
32	1250.0	2025	1	2031	1	31 New Soma A-B	13	100	2016	1	2031	1	15 Autoproducer (Gas)
38	630.0	1985	1	2025	1	32 Yatagan	13	100	2017	1	2031	1	15 Autoproducer (Gas)
32	740.0	2025	1	2031	1	31 New Yatagan	13	100	2018	1	2031	1	15 Autoproducer (Gas)
36	630.0	2007	1	2031	1	32 Kemerkoç TS	13	100	2019	1	2031	1	15 Autoproducer (Gas)
36	420.0	1987	1	2027	1	32 Yeniköy	13	100	2020	1	2031	1	15 Autoproducer (Gas)
32	420.0	2027	1	2031	1	31 New Yeniköy	13	100	2021	1	2031	1	15 Autoproducer (Gas)
13	410.0	2005	1	2031	1	15 Bis Enerji Sanayi	13	100	2022	1	2031	1	15 Autoproducer (Gas)
13	188.5	2005	1	2031	1	15 Zorlu Enerji	13	100	2023	1	2031	1	15 Autoproducer (Gas)
13	144.8	2004	1	2031	1	15 Entek Kosekoç	13	100	2024	1	2031	1	15 Autoproducer (Gas)
13	142.8	2007	1	2031	1	15 Bosen Enerji Elektrik Ure	13	100	2025	1	2031	1	15 Autoproducer (Gas)
13	126.1	2007	1	2031	1	15 Cam Is Enerji (Mersin)	13	100	2026	1	2031	1	15 Autoproducer (Gas)
13	90.0	2005	1	2031	1	15 Zorlu Enerji	13	100	2027	1	2031	1	15 Autoproducer (Gas)
13	82.9	2005	1	2031	1	15 Alarko Altek	13	100	2028	1	2031	1	15 Autoproducer (Gas)
13	65.8	2007	1	2031	1	15 Zorlu Enerji (B.Karistiran	13	100	2029	1	2031	1	15 Autoproducer (Gas)
13	64.4	2005	1	2031	1	15 Cebi Enerji	13	100	2030	1	2031	1	15 Autoproducer (Gas)
13	50.4	2005	1	2031	1	15 Zorlu Enerji (Sincan)	2	1200	2017	1	2031	1	36 Nuclear I
13	145.9	2005	1	2031	1	15 Entek (Demirtas)	2	1200	2018	1	2031	1	36 Nuclear I
13	130.2	2007	1	2031	1	15 Enerji-Sa (Zeytinli)	2	1200	2019	1	2031	1	36 Nuclear I
13	127.2	2005	1	2031	1	15 Ak Enerji (K.Pasa)	2	1200	2020	1	2031	1	36 Nuclear I
13	126.6	2005	1	2031	1	15 Ak Enerji (Bozuyuk)	2	1200	2024	1	2031	1	36 Nuclear II
13	120.0	2007	1	2031	1	15 Enerji-Sa (Kentsa)	2	1200	2025	1	2031	1	36 Nuclear II
13	98.0	2005	1	2031	1	15 Ak Enerji (Cercezköy)	2	1200	2026	1	2031	1	36 Nuclear II
13	64.5	2007	1	2031	1	15 Enerji-Sa	2	1200	2027	1	2031	1	36 Nuclear II
13	64.1	2007	1	2031	1	15 Enerji-Sa (CANAKKALE)	7	700	2016	1	2031	1	12 New Gas 700 -1
11	1595.0	2002	1	2031	1	13 Adapazari-1	7	700	2017	1	2031	1	12 New Gas 700 -2
11	1590.0	2003	1	2031	1	13 Izmir	7	700	2018	1	2031	1	12 New Gas 700 -3
7	798.0	2007	1	2031	1	12 Ankara Baymina	7	700	2021	1	2031	1	12 New Gas 700 -4
11	797.7	2002	1	2031	1	13 Adapazari-2	7	700	2022	1	2031	1	12 New Gas 700 -5
11	504.0	1999	1	2031	1	13 Unimar	7	700	2023	1	2031	1	12 New Gas 700 -6
11	498.7	1999	1	2031	1	13 Enron	7	700	2026	1	2031	1	12 New Gas 700 -7
11	258.4	1997	1	2031	1	13 Ova Elektrik	7	700	2028	1	2031	1	12 New Gas 700 -8
13	188.5	1999	1	2031	1	15 Esenyurt	7	700	2028	1	2031	1	12 New Gas 700 -9
28	1320.0	2003	1	2031	1	28 Iskenderun Sugoçu (Iske	7	700	2029	1	2031	1	12 New Gas 700 -10
47	220.4	2007	1	2031	1	33 Isdemir (Iskederun)	7	700	2030	1	2031	1	12 New Gas 700 -11
21	75.0	2007	1	2031	1	24 Erdemir (Eregli)	27	600	2016	1	2031	1	28 New Coal 600 -1
11	224.5	2007	1	2031	1	13 Habas(Aliaga)	27	600	2017	1	2031	1	28 New Coal 600 -2
13	123.4	2007	1	2031	1	15 Colakoglu	27	600	2018	1	2031	1	28 New Coal 600 -3
13	84.8	2007	1	2031	1	15 Manisa Organize San.	27	600	2021	1	2031	1	28 New Coal 600 -4
13	80.0	2007	1	2031	1	15 Erdemir (Eregli)	27	600	2021	1	2031	1	28 New Coal 600 -5
13	73.0	2007	1	2031	1	15 Nuh Enerji-2	27	600	2022	1	2031	1	28 New Coal 600 -6
13	96.8	2007	1	2031	1	15 Modern Enerji (B:karistira	27	600	2023	1	2031	1	28 New Coal 600 -7
20	84.1	2007	1	2031	1	23 Tupras Rafineri (Yarimca	27	600	2024	1	2031	1	28 New Coal 600 -8
20	70.3	2007	1	2031	1	23 Ataer Enerji	27	600	2028	1	2031	1	28 New Coal 600 -9
13	59.0	2007	1	2031	1	15 Eskisehir End. Enerji(Esk	27	600	2029	1	2031	1	28 New Coal 600 -10
18	170.0	2007	1	2031	1	22 Petkim Aliaga	27	600	2029	1	2031	1	28 New Coal 600 -11
29	190.0	2007	1	2031	1	29 Colakoglu	27	600	2030	1	2031	1	28 New Coal 600 -12
29	130.0	2007	1	2031	1	29 Icdas Celik	27	600	2030	1	2031	1	28 New Coal 600 -13
10	1120.0	1988	1	2031	1	13 Hamitabat	14	600	2017	1	2031	1	18 New GT (Gas) -1
13	183.8	2007	1	2031	1	15 Aksa Enerji (Antalya)	14	600	2022	1	2031	1	18 New GT (Gas) -2
41	620.0	2007	1	2031	1	33 Park Termik	14	600	2024	1	2031	1	18 New GT (Gas) -3
21	171.9	2007	1	2031	1	24 Karkey (Silopi)							
21	131.3	2007	1	2031	1	24 Samsun 2							
21	131.3	2007	1	2031	1	24 Samsun 1							
21	62.4	2031	1	2031	1	24 Esenboga							
28	1210.0	2031	1	2031	1	28 Yumurtalik							
29	165.0	2009	1	2031	1	29 Eren Enerji Elektrik Uretim							
27	1213.0	2013	1	2031	1	28 Eren Enerji Elektrik Uretim							
29	410.3	2011	1	2031	1	29 Icdas Celik Enerji Tersan							
27	607.9	2012	1	2031	1	28 Icdas Celik Enerji Tersan							
27	607.9	2012	1	2031	1	28 ICDAS Elektrik Enerjisi U							
7	257.0	2011	1	2031	1	12 Aksa Enerji Uretim A.S.							
11	216.1	2011	1	2031	1	13 Aliaga Cakmaktepe Enerj							

3. Hydro data

(1) Wind & geothermal (Class 1)

1	100 Wind (100MW)											
30	30	30	30	30	30	30	30	30	30	30	30	30
30	30	30	30	30	30	30	30	30	30	30	30	30
30	30	30	30	30	30	30	30	30	30	30	30	30
30	30	30	30	30	30	30	30	30	30	30	30	30
30	30	30	30	30	30	30	30	30	30	30	30	30
30	30	30	30	30	30	30	30	30	30	30	30	30

2	100 Geothermal											
80	80	80	80	80	80	80	80	80	80	80	80	80
80	80	80	80	80	80	80	80	80	80	80	80	80
80	80	80	80	80	80	80	80	80	80	80	80	80
80	80	80	80	80	80	80	80	80	80	80	80	80
80	80	80	80	80	80	80	80	80	80	80	80	80
80	80	80	80	80	80	80	80	80	80	80	80	80

3	800 Wind 800MW											
240	240	240	240	240	240	240	240	240	240	240	240	240
240	240	240	240	240	240	240	240	240	240	240	240	240
240	240	240	240	240	240	240	240	240	240	240	240	240
240	240	240	240	240	240	240	240	240	240	240	240	240
240	240	240	240	240	240	240	240	240	240	240	240	240
240	240	240	240	240	240	240	240	240	240	240	240	240

(2) Small hydro (Class 2)

1	100 small hydro											
60	60	60	60	60	60	60	60	40	40	40	50	
30	30	30	30	30	30	30	30	20	20	20	25	
934	865	879	953	937	856	926	872	653	603	677	759	
60	60	60	60	60	60	60	60	60	60	60	60	
30	30	30	30	30	30	30	30	20	20	20	25	
934	865	879	953	937	856	926	872	653	603	677	759	
934	865	879	953	937	856	926	872	653	603	677	759	
29.0	24.2	27.2	28.6	29.1	25.7	28.7	27.0	19.6	18.7	20.3	23.5	

2	200 small hydro											
120	120	120	120	120	120	120	120	80	80	80	100	
60	60	60	60	60	60	60	60	40	40	40	50	
1868	1731	1757	1905	1875	1711	1853	1744	1306	1207	1355	1517	
120	120	120	120	120	120	120	120	120	120	120	120	
60	60	60	60	60	60	60	60	40	40	40	50	
1868	1731	1757	1905	1875	1711	1853	1744	1306	1207	1355	1517	
1868	1731	1757	1905	1875	1711	1853	1744	1306	1207	1355	1517	
57.9	48.5	54.5	57.2	58.1	51.3	57.4	54.1	39.2	37.4	40.6	47.0	

(3) Existing hydro (Class 3)

1	2400 Ataturk										
2398	2398	2399	2399	2400	2399	2397	2393	2390	2388	2388	2389
0	0	0	0	0	0	0	0	0	0	0	0
26830	26094	21499	18543	20366	20652	24320	24013	18726	18488	18578	19338
2398	2398	2399	2399	2400	2399	2397	2393	2390	2388	2388	2389
0	0	0	0	0	0	0	0	0	0	0	0
831	730	666	556	631	619	753	744	561	573	557	599
2	1800 Karakaya										
1797	1796	1797	1799	1800	1799	1797	1795	1793	1790	1790	1790
0	0	0	0	0	0	0	0	0	0	0	0
25169	20308	18107	19384	20487	18922	22756	22511	18737	17125	18573	18462
1797	1796	1797	1799	1800	1799	1797	1795	1793	1790	1790	1790
0	0	0	0	0	0	0	0	0	0	0	0
780	568	561	581	635	567	705	697	562	530	557	572
3	1330 Keban										
1318	1314	1311	1316	1324	1330	1329	1326	1323	1321	1318	1316
0	0	0	0	0	0	0	0	0	0	0	0
21422	17820	14588	16253	17637	16043	19367	19913	14650	14862	16245	16886
1318	1314	1311	1316	1324	1330	1329	1326	1323	1321	1318	1316
0	0	0	0	0	0	0	0	0	0	0	0
664	498	452	487	546	481	600	617	439	460	487	523
4	703 Altinkaya										
689.7	682.9	683.4	693.6	701.6	703	701.1	694	686.2	686.4	684.6	681.9
0	0	0	0	0	0	0	0	0	0	0	0
2327	1524	800	685	1205	1688	2119	2146	1231	1120	1440	1231
689.7	682.9	683.4	693.6	701.6	703	701.1	694	686.2	686.4	684.6	681.9
0	0	0	0	0	0	0	0	0	0	0	0
72	42	24	20	37	50	65	66	36	34	43	38
5	672 Biurecik										
671.7	671.8	672	671.7	671.7	671.7	670.9	671.1	670.9	671.2	671.9	671.6
0	0	0	0	0	0	0	0	0	0	0	0
7260	7072	6127	5380	5641	5983	6573	6511	5245	5425	5399	5907
671.7	671.8	672	671.7	671.7	671.7	670.9	671.1	670.9	671.2	671.9	671.6
0	0	0	0	0	0	0	0	0	0	0	0
225	198	189	161	174	179	203	201	157	168	161	183
6	540 Oymapinar										
494.7	495.9	496.6	513.7	533.3	540	530.4	525.7	525.1	518.2	507.7	504.6
0	0	0	0	0	0	0	0	0	0	0	0
2290	3875	4172	3679	2810	2216	1769	1418	1260	1127	1942	5350
494.7	495.9	496.6	513.7	533.3	540	530.4	525.7	525.1	518.2	507.7	504.6
0	0	0	0	0	0	0	0	0	0	0	0
71	108	129	110	87	66	54	43	37	34	58	165
7	510 Berke										
496.9	493.9	492.7	500.7	501.9	506.8	510	505.9	497.8	488.7	489.3	492.1
0	0	0	0	0	0	0	0	0	0	0	0
4083	3757	4562	4718	2553	2829	4877	5315	2953	1385	2191	3343
496.9	493.9	492.7	500.7	501.9	506.8	510	505.9	497.8	488.7	489.3	492.1
0	0	0	0	0	0	0	0	0	0	0	0
126	105	141	141	79	84	151	164	88	42	65	103
8	500 H. Ugurlu										
465.4	443.3	440.5	467.3	488	500	491.3	463.3	448.6	458.9	465.1	478.9
0	0	0	0	0	0	0	0	0	0	0	0
3189	2488	4533	4713	5264	3838	3560	2228	1397	1186	1549	3444
465.4	443.3	440.5	467.3	488	500	491.3	463.3	448.6	458.9	465.1	478.9
0	0	0	0	0	0	0	0	0	0	0	0
98	69	140	141	163	115	110	69	41	36	46	106
9	300 Borcka										
79	70	164	300	218	258	146	88	56	77	84	112
0	0	0	0	0	0	0	0	0	0	0	0
1229	1089	2531	4639	3374	3985	2252	1356	865	1190	1292	1731
79	70	164	300	218	258	146	88	56	77	84	112
0	0	0	0	0	0	0	0	0	0	0	0
38.1	30.5	78.4	139.1	104.6	119.5	69.8	42	25.9	36.9	38.7	53.6
10	283.5 Sir										
194.6	194.8	278.1	283.5	173.1	151.7	224.9	250.5	159.9	90.6	127.6	175.8
0	0	0	0	0	0	0	0	0	0	0	0
1734	1736	2478	2526	1542	1352	2004	2232	1425	807	1137	1566
194.6	194.8	278.1	283.5	173.1	151.7	224.9	250.5	159.9	90.6	127.6	175.8
0	0	0	0	0	0	0	0	0	0	0	0
53.7	48.6	76.8	75.7	47.8	40.5	62.1	69.2	42.7	25	34.1	48.5

11	278.4 Gokcekaya										
278.4	241.8	233.6	236.8	132.5	106.4	184.5	173	111.1	97.7	152.2	196.5
0	0	0	0	0	0	0	0	0	0	0	0
1672	1452	1403	1422	796	639	1108	1039	667	587	914	1180
278.4	241.8	233.6	236.8	132.5	106.4	184.5	173	111.1	97.7	152.2	196.5
0	0	0	0	0	0	0	0	0	0	0	0
51.8	40.6	43.5	42.6	24.6	19.1	34.3	32.2	20	18.2	27.4	36.5
12	198 Batman										
88.6	107.9	173.2	198	169	66.7	49.5	31.4	15.6	3.5	28.4	27.2
0	0	0	0	0	0	0	0	0	0	0	0
1114	1356	2177	2489	2125	838	622	395	196	44	357	342
88.6	107.9	173.2	198	169	66.7	49.5	31.4	15.6	3.5	28.4	27.2
0	0	0	0	0	0	0	0	0	0	0	0
34.5	37.9	67.5	74.6	65.8	25.1	19.2	12.2	5.8	1.3	10.7	10.6
13	189 Karkams										
186.8	189	180.9	160.5	160	165.1	179.9	169.8	133.3	140	151.2	167.1
0	0	0	0	0	0	0	0	0	0	0	0
1128	1141	1092	969	966	997	1086	1025	805	845	913	1009
186.8	189	180.9	160.5	160	165.1	179.9	169.8	133.3	140	151.2	167.1
0	0	0	0	0	0	0	0	0	0	0	0
34.9	31.9	33.8	29	29.9	29.9	33.6	31.7	24.1	26.2	27.4	31.2
14	170 Ozluce										
37.2	35.4	53.3	138.9	170	113.9	80.6	55	39	32.5	41.8	32.5
0	0	0	0	0	0	0	0	0	0	0	0
681	648	976	2544	3113	2085	1476	1007	714	595	766	595
37.2	35.4	53.3	138.9	170	113.9	80.6	55	39	32.5	41.8	32.5
0	0	0	0	0	0	0	0	0	0	0	0
21.1	18.1	30.2	76.3	96.5	62.5	45.7	31.2	21.4	18.4	23	18.4
15	168.9 Catalan										
115.2	130.8	158.3	155.5	143.7	160.2	168.9	101	60.8	66.8	72.8	81.3
0	0	0	0	0	0	0	0	0	0	0	0
1191	1352	1636	1607	1486	1656	1746	1044	629	691	753	840
115.2	130.8	158.3	155.5	143.7	160.2	168.9	101	60.8	66.8	72.8	81.3
0	0	0	0	0	0	0	0	0	0	0	0
36.9	37.8	50.7	48.2	46	49.6	54.1	32.3	18.8	21.4	22.6	26
16	160 Sanyar										
160	148.8	139.6	137.8	80.1	82.6	115.9	104.5	67.9	66.8	96.2	123.5
0	0	0	0	0	0	0	0	0	0	0	0
1154	1073	1007	994	578	596	836	754	490	482	694	891
160	148.8	139.6	137.8	80.1	82.6	115.9	104.5	67.9	66.8	96.2	123.5
0	0	0	0	0	0	0	0	0	0	0	0
35.7	30	31.2	29.8	17.9	17.8	25.9	23.3	14.7	14.9	20.8	27.6
17	159.4 Gezende										
86.5	97.3	151.4	159.4	82.7	41.2	29.3	28.1	19.8	18.8	60.1	73.7
0	0	0	0	0	0	0	0	0	0	0	0
1388	1561	2430	2558	1327	661	471	451	317	301	965	1183
86.5	97.3	151.4	159.4	82.7	41.2	29.3	28.1	19.8	18.8	60.1	73.7
0	0	0	0	0	0	0	0	0	0	0	0
43	43.7	75.3	76.7	41.1	19.8	14.6	14	9.5	9.3	28.9	36.6
18	138 Aslantas										
100.8	101.1	111.1	103.2	88	132.5	137.3	138	107.4	67.4	49.6	73.3
0	0	0	0	0	0	0	0	0	0	0	0
1516	1521	1671	1552	1324	1994	2066	2076	1616	1014	746	1103
100.8	101.1	111.1	103.2	88	132.5	137.3	138	107.4	67.4	49.6	73.3
0	0	0	0	0	0	0	0	0	0	0	0
46.9	42.6	51.8	46.5	41	59.8	64	64.3	48.4	31.4	22.3	34.2
19	128 Hirfanli										
92.6	66.1	43	30.5	83.5	106.3	128	122	80.3	51.8	63.3	62.9
0	0	0	0	0	0	0	0	0	0	0	0
495	353	230	163	446	568	684	652	429	277	338	336
92.6	66.1	43	30.5	83.5	106.3	128	122	80.3	51.8	63.3	62.9
0	0	0	0	0	0	0	0	0	0	0	0
15.3	9.9	7.1	4.8	13.8	17	21.2	20.2	12.8	8.5	10.1	10.4
20	120 Kilickaya										
41	20.9	32.9	102.5	120	79.7	81	71.5	49.2	32.7	34.2	37.6
0	0	0	0	0	0	0	0	0	0	0	0
594	303	477	1485	1738	1154	1173	1035	713	473	496	544
41	20.9	32.9	102.5	120	79.7	81	71.5	49.2	32.7	34.2	37.6
0	0	0	0	0	0	0	0	0	0	0	0
18.4	8.5	14.7	44.5	53.8	34.6	36.3	32	21.4	14.6	14.8	16.8

21	124 Menzelet										
85.5	77.9	112.6	124	86.7	82	98.9	115.3	86.2	73.5	68.1	77.8
0	0	0	0	0	0	0	0	0	0	0	0
1204	1097	1586	1747	1221	1155	1393	1624	1214	1035	960	1096
85.5	77.9	112.6	124	86.7	82	98.9	115.3	86.2	73.5	68.1	77.8
0	0	0	0	0	0	0	0	0	0	0	0
37.3	30.7	49.1	52.4	37.8	34.6	43.1	50.3	36.4	32	28.8	33.9
22	115 MMuratlienzelet										
85.5	77.9	112.6	124	86.7	82	98.9	115.3	86.2	73.5	68.1	77.8
0	0	0	0	0	0	0	0	0	0	0	0
1204	1097	1586	1747	1221	1155	1393	1624	1214	1035	960	1096
85.5	77.9	112.6	124	86.7	82	98.9	115.3	86.2	73.5	68.1	77.8
0	0	0	0	0	0	0	0	0	0	0	0
37.3	30.7	49.1	52.4	37.8	34.6	43.1	50.3	36.4	32	28.8	33.9
23	110 Dice										
80	100.2	110	84.9	49.7	31.1	53.9	52.8	44.7	28.9	44.2	70.2
0	0	0	0	0	0	0	0	0	0	0	0
647	811	890	687	402	252	436	427	362	234	358	568
80	100.2	110	84.9	49.7	31.1	53.9	52.8	44.7	28.9	44.2	70.2
0	0	0	0	0	0	0	0	0	0	0	0
20	22.7	27.5	20.6	12.4	7.5	13.5	13.2	10.8	7.2	10.7	17.6
24	103 Torul										
74.9	93.8	103	509.9	79.5	46.5	29.1	50.5	49.4	41.9	27.1	41.4
0	0	0	0	0	0	0	0	0	0	0	0
1796	2250	2471	1907	1115	697.4	1211	1184	1004	649.4	992.6	1575
74.9	93.8	103	79.5	46.5	29.1	50.5	49.4	41.9	27.1	41.4	65.7
0	0	0	0	0	0	0	0	0	0	0	0
55.7	63	76.6	57.2	34.5	20.9	37.5	36.7	30.1	20.1	28.8	48.8
25	100 Yamula										
46.1	53	68.1	73	89.3	97.8	100	92.5	95.1	49.7	45.4	37
0	0	0	0	0	0	0	0	0	0	0	0
474	545	700	750	918	1005	1028	951	978	511	467	380
46.1	53	68.1	73	89.3	97.8	100	92.5	95.1	49.7	45.4	37
0	0	0	0	0	0	0	0	0	0	0	0
14.7	15.2	21.7	22.5	28.4	30.1	31.8	29.5	29.3	15.8	14	11.7
26	94 Kralkizi										
50.5	52.1	18.8	32.4	44.2	50.5	87.6	94	77.2	43.8	31.5	32.4
0	0	0	0	0	0	0	0	0	0	0	0
346	357	129	222	303	346	600	644	529	300	216	222
50.5	52.1	18.8	32.4	44.2	50.5	87.6	94	77.2	43.8	31.5	32.4
0	0	0	0	0	0	0	0	0	0	0	0
10.7	10	4	6.6	9.3	10.3	18.6	19.9	15.8	9.3	6.4	6.9
27	90 Kokluce										
75	82	84.1	90	68.1	49.7	42.3	41.4	37.6	50.5	59.9	66.2
0	0	0	0	0	0	0	0	0	0	0	0
1152	1260	1293	1383	1046	764	650	636	578	776	921	1017
75	82	84.1	90	68.1	49.7	42.3	41.4	37.6	50.5	59.9	66.2
0	0	0	0	0	0	0	0	0	0	0	0
35.7	35.2	40.1	41.5	32.4	22.9	20.1	19.7	17.3	24	27.6	31.5
28	85 Kurtun										
9.2	15.5	56.3	81.2	85	41.6	13.4	6.5	3.8	11.9	17.5	12.3
0	0	0	0	0	0	0	0	0	0	0	0
128	214	779	1125	1177	576	185	90	52	165	243	171
9.2	15.5	56.3	81.2	85	41.6	13.4	6.5	3.8	11.9	17.5	12.3
0	0	0	0	0	0	0	0	0	0	0	0
3.9	6	24.1	33.7	36.5	17.2	5.7	2.8	1.5	5.1	7.2	5.3
29	76 Kesikkopru										
61.3	42.7	29.6	19.6	50.2	63.3	76	73.3	49.6	32.9	41.6	43.1
0	0	0	0	0	0	0	0	0	0	0	0
337	235	163	108	276	348	418	403	273	181	229	237
61.3	42.7	29.6	19.6	50.2	63.3	76	73.3	49.6	32.9	41.6	43.1
0	0	0	0	0	0	0	0	0	0	0	0
10.4	6.5	5	3.2	8.5	10.4	12.9	12.4	8.2	5.6	6.8	7.3
30	74.5 Dogankent										
21.1	28.8	54.8	73.4	74.5	58	24.8	11.4	9.4	22.1	30	21.8
0	0	0	0	0	0	0	0	0	0	0	0
427	584	1112	1488	1511	1176	502	231	191	449	609	443
42.7	58.4	74.5	74.5	74.5	74.5	50.2	23.1	19.1	44.9	60.9	44.3
0	0	0	0	0	0	0	0	0	0	0	0
13.2	16.3	34.4	44.6	46.8	35.2	15.5	7.1	5.7	13.9	18.2	13.7

31	70 Kadinak										
20.7	28.3	47.2	66.4	70	49.4	30	20.9	16.8	15.7	24.3	20.5
0	0	0	0	0	0	0	0	0	0	0	0
338	462	771	1085	1143	807	490	341	274	256	396	335
20.7	28.3	47.2	66.4	70	49.4	30	20.9	16.8	15.7	24.3	20.5
0	0	0	0	0	0	0	0	0	0	0	0
10.5	12.9	23.9	32.5	35.4	24.2	15.2	10.5	8.2	7.9	11.8	10.3
32	69 Demirkopru										
0.2	0	0.1	2.3	1.5	38.6	69	43.2	6.7	0.2	0.1	0
0	0	0	0	0	0	0	0	0	0	0	0
4	0	1	44	29	753	1346	843	130	3	1	0
0.2	0	0.1	2.3	1.5	38.6	69	43.2	6.7	0.2	0.1	0
0	0	0	0	0	0	0	0	0	0	0	0
0.1	0	0	1.3	0.9	22.5	41.7	26.1	3.9	0.1	0	0
33	69 S Ugurlu										
51.8	51.1	66.3	69	68.1	54.5	54.1	43.6	36.6	32.2	33.2	50.4
0	0	0	0	0	0	0	0	0	0	0	0
792	782	1014	1055	1042	834	827	666	559	492	508	771
51.8	51.1	66.3	69	68.1	54.5	54.1	43.6	36.6	32.2	33.2	50.4
0	0	0	0	0	0	0	0	0	0	0	0
24.5	21.8	31.4	31.6	32.3	25	25.6	20.6	16.7	15.2	15.2	23.9
34	62 Adiguzel										
0.3	0	1.5	17.8	18	34.5	62	46.4	19.1	1.5	0.2	0
0	0	0	0	0	0	0	0	0	0	0	0
4	0	23	265	268	514	925	692	285	23	3	0
0.3	0	1.5	17.8	18	34.5	62	46.4	19.1	1.5	0.2	0
0	0	0	0	0	0	0	0	0	0	0	0
0.1	0	0.7	7.9	8.3	15.4	28.6	21.4	8.5	0.7	0.1	0
35	60 Seyhan1										
34.1	43.4	50.5	41.6	42.8	60	55.9	38.2	23.6	14.8	14.7	15
0	0	0	0	0	0	0	0	0	0	0	0
570	726	845	695	716	1003	934	638	394	247	246	251
34.1	43.4	50.5	41.6	42.8	60	55.9	38.2	23.6	14.8	14.7	15
0	0	0	0	0	0	0	0	0	0	0	0
17.6	20.3	26.2	20.8	22.2	30	28.9	19.8	11.8	7.6	7.4	7.7
36	56.4 Derbent										
56.4	54	44.6	27.8	28.1	37.8	46.2	46	34.1	30	36.5	37.7
0	0	0	0	0	0	0	0	0	0	0	0
639	612	505	315	318	428	524	521	386	340	413	427
56.4	54	44.6	27.8	28.1	37.8	46.2	46	34.1	30	36.5	37.7
0	0	0	0	0	0	0	0	0	0	0	0
19.8	17.1	15.6	9.4	9.8	12.8	16.2	16.1	11.5	10.5	12.3	13.2
37	56 Kadinak2										
15.9	22.4	38	54.6	56	37.8	22.3	15	12	11.3	17.8	15
0	0	0	0	0	0	0	0	0	0	0	0
243	343	581	836	857	578	341	230	183	173	272	230
15.9	22.4	38	54.6	56	37.8	22.3	15	12	11.3	17.8	15
0	0	0	0	0	0	0	0	0	0	0	0
7.5	9.6	18	25	26.5	17.3	10.5	7.1	5.4	5.3	8.1	7.1
38	54 Kapulukaya										
48.5	36.1	23	17.4	37.2	45	54	52.4	41.6	20.6	27.9	28.7
0	0	0	0	0	0	0	0	0	0	0	0
363	270	172	130	278	337	404	392	311	154	209	215
48.5	36.1	23	17.4	37.2	45	54	52.4	41.6	20.6	27.9	28.7
0	0	0	0	0	0	0	0	0	0	0	0
11.2	7.5	5.3	3.9	8.6	10.1	12.5	12.1	9.3	4.7	6.2	6.6

(4) New hydro (Class 3)

40	670	DERINEF	2118									
265.6	238.8	446.6	684.5	491.9	548.9	395.4	328.2	229.6	243.0	245.6	306.4	
0	0	0	0	0	0	0	0	0	0	0	0	
4143	3723	7005	10872	7824	8749	6203	5071	3537	3786	3832	4808	
265.6	238.8	446.6	684.5	491.9	548.9	395.4	328.2	229.6	243.0	245.6	306.4	
0	0	0	0	0	0	0	0	0	0	0	0	
128.4	104.2	217.2	326.2	242.5	262.5	192.3	157.2	106.1	117.4	115.0	149.0	
41	309	ERMENE	1187									
167.7	188.6	293.5	309.0	160.3	79.9	56.8	54.5	38.4	36.4	116.5	142.9	
0	0	0	0	0	0	0	0	0	0	0	0	
3991	4491	6990	7357	3815	1899	1355	1300	911	863	2772	3397	
167.7	188.6	293.5	309.0	160.3	79.9	56.8	54.5	38.4	36.4	116.5	142.9	
0	0	0	0	0	0	0	0	0	0	0	0	
123.7	125.8	216.7	220.7	118.3	57.0	42.0	40.3	27.3	26.8	83.2	105.3	
42	160	ALPASLJ	488									
35.0	33.3	50.2	130.7	160.0	107.2	75.9	51.8	36.7	30.6	39.3	30.6	
0	0	0	0	0	0	0	0	0	0	0	0	
718	682	1027	2682	3282	2197	1554	1061	752	626	808	626	
35.0	33.3	50.2	130.7	160.0	107.2	75.9	51.8	36.7	30.6	39.3	30.6	
0	0	0	0	0	0	0	0	0	0	0	0	
22.2	19.1	31.8	80.5	101.8	65.9	48.2	32.9	22.6	19.4	24.3	19.4	
43	115	AKKÖPR	343									
105.4	105.6	105.8	109.4	113.6	115.0	113.0	112.0	111.8	110.4	108.1	107.5	
0	0	0	0	0	0	0	0	0	0	0	0	
817	1375	1484	1307	1001	784	621	495	440	391	689	1898	
105.4	105.6	105.8	109.4	113.6	115.0	113.0	112.0	111.8	110.4	108.1	107.5	
0	0	0	0	0	0	0	0	0	0	0	0	
25.3	38.5	46.0	39.2	31.0	23.5	19.3	15.3	13.2	12.1	20.7	58.8	
44	200	OBRUK	473									
196.2	194.3	194.4	197.3	199.6	200.0	199.5	197.4	195.2	195.3	194.8	194.0	
0	0	0	0	0	0	0	0	0	0	0	0	
2085	1216	695	579	1071	1448	1882	1911	1042	984	1245	1100	
196.2	194.3	194.4	197.3	199.6	200.0	199.5	197.4	195.2	195.3	194.8	194.0	
0	0	0	0	0	0	0	0	0	0	0	0	
64.6	37.7	21.5	18.0	33.2	44.9	58.3	59.2	32.3	30.5	38.6	34.1	
45	60	TOPÇAM	200									
36.3	39.7	40.7	43.5	33.0	24.0	20.5	20.0	18.2	24.4	29.0	32.0	
0	0	0	0	0	0	0	0	0	0	0	0	
662	653	743	769	601	425	373	365	321	445	512	584	
36.3	39.7	40.7	43.5	33.0	24.0	20.5	20.0	18.2	24.4	29.0	32.0	
0	0	0	0	0	0	0	0	0	0	0	0	
20.5	20.2	23.0	23.9	18.6	13.2	11.6	11.3	9.9	13.8	15.9	18.1	
46	140	Kigi	423									
30.6	29.2	43.9	114.4	140.0	93.8	66.4	45.3	32.1	26.8	34.4	26.8	
0	0	0	0	0	0	0	0	0	0	0	0	
622	591	890	2325	2845	1904	1347	920	652	543	701	543	
30.6	29.2	43.9	114.4	140.0	93.8	66.4	45.3	32.1	26.8	34.4	26.8	
0	0	0	0	0	0	0	0	0	0	0	0	
19.3	16.5	27.6	69.7	88.2	57.1	41.8	28.5	19.6	16.8	21.0	16.8	
47	1200	ILISU	3833									
1199.0	1199.0	1199.5	1199.5	1200.0	1199.5	1198.5	1196.5	1195.0	1194.0	1194.0	1194.5	
0	0	0	0	0	0	0	0	0	0	0	0	
13139	12779	10530	9084	9977	10113	11906	11764	9166	9060	9101	9471	
1199.0	1199.0	1199.5	1199.5	1200.0	1199.5	1198.5	1196.5	1195.0	1194.0	1194.0	1194.5	
0	0	0	0	0	0	0	0	0	0	0	0	
407.3	357.8	326.4	272.5	309.3	303.4	369.1	364.7	275.0	280.9	273.0	293.6	
48	110.3	Uluabat I	422.6									
110.3	95.8	92.6	93.8	52.5	42.2	73.1	68.5	44.0	38.7	60.3	77.9	
0	0	0	0	0	0	0	0	0	0	0	0	
1807	1568	1518	1536	858	689	1197	1123	721	635	988	1273	
110.3	95.8	92.6	93.8	52.5	42.2	73.1	68.5	44.0	38.7	60.3	77.9	
0	0	0	0	0	0	0	0	0	0	0	0	
56.0	43.9	47.0	46.1	26.6	20.7	37.1	34.8	21.6	19.7	29.6	39.5	
49	99.0	Darıca I	327.7									
59.9	65.5	67.1	71.9	54.4	39.7	33.8	33.1	30.0	40.3	47.8	52.9	
0	0	0	0	0	0	0	0	0	0	0	0	
1084	1069	1218	1261	984	696	611	598	525	729	838	957	
59.9	65.5	67.1	71.9	54.4	39.7	33.8	33.1	30.0	40.3	47.8	52.9	
0	0	0	0	0	0	0	0	0	0	0	0	
33.6	33.1	37.8	39.1	30.5	21.6	18.9	18.6	16.3	22.6	26.0	29.7	

50	84.0	Uzunçayır	322.0	260.8								
26.5	25.2	37.9	84.0	84.0	81.1	57.4	39.2	27.8	23.1	29.8	23.1	
0	0	0	0	0	0	0	0	0	0	0	0	
485	460	694	1811	1974	1483	1050	717	508	423	546	423	
25.9	24.6	37.0	84.0	84.0	79.2	56.0	38.3	27.1	22.6	29.1	22.6	
0	0	0	0	0	0	0	0	0	0	0	0	
15.0	12.9	21.5	54.3	61.2	44.5	32.5	22.2	15.2	13.1	16.4	13.1	
51	90.1	Akocak	257.4									
29.3	41.8	73.9	88.0	90.1	65.6	35.9	16.7	12.9	32.1	44.3	32.0	
0	0	0	0	0	0	0	0	0	0	0	0	
343	496	1175	1625	1673	1087	426	199	149	381	527	381	
29.3	41.8	73.9	88.0	90.1	65.6	35.9	16.7	12.9	32.1	44.3	32.0	
0	0	0	0	0	0	0	0	0	0	0	0	
10.6	13.9	36.4	48.7	51.8	32.6	13.2	6.2	4.5	11.8	15.8	11.8	
52	58.7	Çırakdan	140.0									
19.1	27.2	48.1	57.3	58.7	42.7	23.4	10.9	8.4	20.9	28.8	20.8	
0	0	0	0	0	0	0	0	0	0	0	0	
187	270	639	883	910	591	231	108	81	207	287	207	
19.1	27.2	48.1	57.3	58.7	42.7	23.4	10.9	8.4	20.9	28.8	20.8	
0	0	0	0	0	0	0	0	0	0	0	0	
5.8	7.5	19.8	26.5	28.2	17.7	7.2	3.4	2.4	6.4	8.6	6.4	
53	102.4	Cevizlik	395.9									
27.0	23.9	56.0	102.4	74.4	88.1	49.8	30.0	19.1	26.3	28.7	38.2	
0	0	0	0	0	0	0	0	0	0	0	0	
626	555	1288	2362	1719	2029	1147	690	440	606	657	881	
27.0	23.9	56.0	102.4	74.4	88.1	49.8	30.0	19.1	26.3	28.7	38.2	
0	0	0	0	0	0	0	0	0	0	0	0	
19.4	15.5	39.9	70.9	53.3	60.9	35.6	21.4	13.2	18.8	19.7	27.3	
54	58.8	Dereli	157.5									
19.1	27.2	48.2	57.4	58.8	42.8	23.4	10.9	8.4	20.9	28.9	20.9	
0	0	0	0	0	0	0	0	0	0	0	0	
210	303	719	994	1023	665	260	122	91	233	322	233	
19.1	27.2	48.2	57.4	58.8	42.8	23.4	10.9	8.4	20.9	28.9	20.9	
0	0	0	0	0	0	0	0	0	0	0	0	
6.5	8.5	22.3	29.8	31.7	20.0	8.1	3.8	2.7	7.2	9.7	7.2	
55	63.5	Ceyhan	259.0									
46.4	46.5	51.1	47.5	40.5	60.9	63.1	63.5	49.4	31.0	22.8	33.7	
0	0	0	0	0	0	0	0	0	0	0	0	
708	712	782	726	619	933	967	971	755	474	348	517	
46.4	46.5	51.1	47.5	40.5	60.9	63.1	63.5	49.4	31.0	22.8	33.7	
0	0	0	0	0	0	0	0	0	0	0	0	
22.0	19.9	24.3	21.8	19.2	28.0	30.0	30.1	22.7	14.7	10.4	16.0	
56	51.1	Erenler	96.5									
13.5	11.9	28.0	51.1	37.2	44.0	24.9	15.0	9.5	13.1	14.3	19.1	
0	0	0	0	0	0	0	0	0	0	0	0	
153	135	314	576	419	495	280	168	107	148	160	215	
13.5	11.9	28.0	51.1	37.2	44.0	24.9	15.0	9.5	13.1	14.3	19.1	
0	0	0	0	0	0	0	0	0	0	0	0	
4.7	3.8	9.7	17.3	13.0	14.8	8.7	5.2	3.2	4.6	4.8	6.7	
57	247.4	Alkumru	828.1									
110.7	134.8	216.4	247.4	211.2	83.3	61.9	39.2	19.5	4.4	35.5	34.0	
0	0	0	0	0	0	0	0	0	0	0	0	
2523	2772	4937	5456	4813	1836	1404	892	424	95	783	775	
110.7	134.8	216.4	247.4	211.2	83.3	61.9	39.2	19.5	4.4	35.5	34.0	
0	0	0	0	0	0	0	0	0	0	0	0	
78.2	85.9	153.1	169.2	149.2	56.9	43.5	27.7	13.2	2.9	24.3	24.0	
58	144.4	Hacınino	359.8									
99.6	90.7	131.1	144.4	101.0	95.5	115.2	134.3	100.4	85.6	79.3	90.6	
0	0	0	0	0	0	0	0	0	0	0	0	
928	764	1222	1304	941	861	1073	1252	906	796	717	844	
99.6	90.7	131.1	144.4	101.0	95.5	115.2	134.3	100.4	85.6	79.3	90.6	
0	0	0	0	0	0	0	0	0	0	0	0	
28.8	23.7	37.9	40.4	29.2	26.7	33.2	38.8	28.1	24.7	22.2	26.2	
59	317.0	Yedigöze	964.6									
216.2	245.5	297.1	291.9	269.7	300.7	317.0	189.6	114.1	125.4	136.6	152.6	
0	0	0	0	0	0	0	0	0	0	0	0	
2584	2647	3550	3375	3221	3473	3788	2261	1316	1498	1582	1820	
216.2	245.5	297.1	291.9	269.7	300.7	317.0	189.6	114.1	125.4	136.6	152.6	
0	0	0	0	0	0	0	0	0	0	0	0	
80.1	82.0	110.0	104.6	99.8	107.7	117.4	70.1	40.8	46.4	49.1	56.4	

60	105.1	Sarıgüze	281.6									
72.4	66.0	95.4	105.1	73.5	69.5	83.8	97.7	73.0	62.3	57.7	65.9	
0	0	0	0	0	0	0	0	0	0	0	0	
726	598	956	1020	736	674	839	980	709	623	561	660	
72.4	66.0	95.4	105.1	73.5	69.5	83.8	97.7	73.0	62.3	57.7	65.9	
0	0	0	0	0	0	0	0	0	0	0	0	
22.5	18.5	29.6	31.6	22.8	20.9	26.0	30.4	22.0	19.3	17.4	20.5	
61	217.6	Kandil Er	531.7									
150.0	136.7	197.5	217.6	152.1	143.9	173.5	202.3	151.2	129.0	119.5	136.5	
0	0	0	0	0	0	0	0	0	0	0	0	
1372	1129	1806	1927	1390	1272	1585	1850	1339	1177	1059	1247	
150.0	136.7	197.5	217.6	152.1	143.9	173.5	202.3	151.2	129.0	119.5	136.5	
0	0	0	0	0	0	0	0	0	0	0	0	
42.5	35.0	56.0	59.7	43.1	39.4	49.1	57.3	41.5	36.5	32.8	38.6	
62	233.6	Akköy 2	681.0									
76.0	108.2	191.5	228.0	233.6	170.0	93.1	43.3	33.5	83.2	114.8	82.9	
0	0	0	0	0	0	0	0	0	0	0	0	
908	1311	3107	4297	4424	2876	1126	526	395	1009	1394	1009	
76.0	108.2	191.5	228.0	233.6	170.0	93.1	43.3	33.5	83.2	114.8	82.9	
0	0	0	0	0	0	0	0	0	0	0	0	
28.2	36.7	96.3	128.9	137.2	86.3	34.9	16.3	11.9	31.3	41.8	31.3	
63	115.8	Tatar	364.3									
25.3	24.1	36.3	94.6	115.8	77.6	54.9	37.5	26.6	22.1	28.5	22.1	
0	0	0	0	0	0	0	0	0	0	0	0	
536	509	767	2002	2450	1640	1160	792	561	467	603	467	
25.3	24.1	36.3	94.6	115.8	77.6	54.9	37.5	26.6	22.1	28.5	22.1	
0	0	0	0	0	0	0	0	0	0	0	0	
16.6	14.2	23.8	60.1	76.0	49.2	36.0	24.6	16.8	14.5	18.1	14.5	
64	292.5	Göktaş	1117.7									
199.5	226.5	274.1	269.2	248.8	277.4	292.5	174.9	105.3	115.7	126.1	140.8	
0	0	0	0	0	0	0	0	0	0	0	0	
2994	3067	4113	3910	3732	4024	4389	2620	1525	1736	1834	2109	
199.5	226.5	274.1	269.2	248.8	277.4	292.5	174.9	105.3	115.7	126.1	140.8	
0	0	0	0	0	0	0	0	0	0	0	0	
92.8	95.1	127.5	121.2	115.7	124.7	136.1	81.2	47.3	53.8	56.8	65.4	
65	71.0	Feke II	223.4									
48.4	55.0	66.5	65.4	60.4	67.3	71.0	42.5	25.6	28.1	30.6	34.2	
0	0	0	0	0	0	0	0	0	0	0	0	
598	613	822	782	746	804	877	524	305	347	367	422	
48.4	55.0	66.5	65.4	60.4	67.3	71.0	42.5	25.6	28.1	30.6	34.2	
0	0	0	0	0	0	0	0	0	0	0	0	
18.6	19.0	25.5	24.2	23.1	24.9	27.2	16.2	9.5	10.8	11.4	13.1	
66	99.0	Güllübağ	312.1									
21.7	20.6	31.0	80.9	99.0	66.3	46.9	32.0	22.7	18.9	24.3	18.9	
0	0	0	0	0	0	0	0	0	0	0	0	
459	436	657	1715	2099	1405	994	679	481	400	517	400	
21.7	20.6	31.0	80.9	99.0	66.3	46.9	32.0	22.7	18.9	24.3	18.9	
0	0	0	0	0	0	0	0	0	0	0	0	
14.2	12.2	20.4	51.5	65.1	42.2	30.8	21.0	14.4	12.4	15.5	12.4	
67	86.8	Menge B	122.2									
59.2	67.2	81.4	79.9	73.8	82.3	86.8	51.9	31.2	34.3	37.4	41.8	
0	0	0	0	0	0	0	0	0	0	0	0	
327	335	450	428	408	440	480	287	167	190	201	231	
59.2	67.2	81.4	79.9	73.8	82.3	86.8	51.9	31.2	34.3	37.4	41.8	
0	0	0	0	0	0	0	0	0	0	0	0	
10.1	10.4	13.9	13.3	12.7	13.6	14.9	8.9	5.2	5.9	6.2	7.2	
68	102.3	Akıncı	410.8									
61.9	67.7	69.4	74.3	56.2	41.0	34.9	34.2	31.0	41.7	49.4	54.6	
0	0	0	0	0	0	0	0	0	0	0	0	
1359	1340	1527	1580	1234	872	765	750	659	914	1051	1199	
61.9	67.7	69.4	74.3	56.2	41.0	34.9	34.2	31.0	41.7	49.4	54.6	
0	0	0	0	0	0	0	0	0	0	0	0	
42.1	41.5	47.3	49.0	38.2	27.0	23.7	23.3	20.4	28.3	32.6	37.2	
69	122.4	Pembelik	367.5									
121.3	120.9	120.7	121.1	121.8	122.4	122.3	122.0	121.8	121.6	121.3	121.1	
0	0	0	0	0	0	0	0	0	0	0	0	
1259	944	857	923	1035	912	1137	1170	832	872	923	991	
121.3	120.9	120.7	121.1	121.8	122.4	122.3	122.0	121.8	121.6	121.3	121.1	
0	0	0	0	0	0	0	0	0	0	0	0	
39.0	29.3	26.6	28.6	32.1	28.3	35.3	36.3	25.8	27.0	28.6	30.7	

70	54.6	Daran		189.1								
29.6	33.3	51.8	54.6	28.3	14.1	10.0	9.6	6.8	6.4	20.6	25.2	
0	0	0	0	0	0	0	0	0	0	0	0	0
636	715	1113	1172	608	303	216	207	145	138	442	541	
29.6	33.3	51.8	54.6	28.3	14.1	10.0	9.6	6.8	6.4	20.6	25.2	
0	0	0	0	0	0	0	0	0	0	0	0	0
19.7	20.0	34.5	35.2	18.8	9.1	6.7	6.4	4.4	4.3	13.2	16.8	
71	51.2	Toros		239.4								
34.9	39.7	48.0	47.1	43.6	48.6	51.2	30.6	18.4	20.2	22.1	24.6	
0	0	0	0	0	0	0	0	0	0	0	0	0
641	657	881	838	799	862	940	561	327	372	393	452	
34.9	39.7	48.0	47.1	43.6	48.6	51.2	30.6	18.4	20.2	22.1	24.6	
0	0	0	0	0	0	0	0	0	0	0	0	0
19.9	20.4	27.3	26.0	24.8	26.7	29.1	17.4	10.1	11.5	12.2	14.0	
24	103	Torul		322								
33.5	47.7	84.5	100.5	103.0	75.0	41.1	19.1	14.8	36.7	50.6	36.6	
0	0	0	0	0	0	0	0	0	0	0	0	0
429	620	1469	2032	2092	1360	532	249	187	477	659	477	
33.5	47.7	84.5	100.5	103.0	75.0	41.1	19.1	14.8	36.7	50.6	36.6	
0	0	0	0	0	0	0	0	0	0	0	0	0
13.3	17.4	45.5	61.0	64.9	40.8	16.5	7.7	5.6	14.8	19.8	14.8	
39	84	Camlica		432								
38.7	44.5	57.2	61.3	75.0	82.2	84.0	77.7	79.9	41.7	38.1	31.1	
0	0	0	0	0	0	0	0	0	0	0	0	0
774	886	1142	1224	1495	1637	1674	1553	1594	832	762	616	
38.7	44.5	57.2	61.3	75.0	82.2	84.0	77.7	79.9	41.7	38.1	31.1	
0	0	0	0	0	0	0	0	0	0	0	0	0
24.0	24.8	35.4	36.7	46.3	49.1	51.9	48.1	47.8	25.8	22.8	19.1	
72	101.9	Akkoy I		325.0								
33.2	47.2	83.6	99.5	101.9	74.2	40.6	18.9	14.6	36.3	50.1	36.2	
0	0	0	0	0	0	0	0	0	0	0	0	0
433	626	1483	2051	2111	1373	537	251	189	482	665	482	
33.2	47.2	83.6	99.5	101.9	74.2	40.6	18.9	14.6	36.3	50.1	36.2	
0	0	0	0	0	0	0	0	0	0	0	0	0
13.4	17.5	46.0	61.5	65.5	41.2	16.7	7.8	5.7	14.9	20.0	14.9	

(5) Pumped Storage hydro (Class 4)

1	300 PSPP (300MW)											
300	300	300	300	300	300	300	300	300	300	300	300	300
2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
330	330	330	330	330	330	330	330	330	330	330	330	330
70	70	70	70	70	70	70	70	70	70	70	70	70
300	300	300	300	300	300	300	300	300	300	300	300	300
2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
330	330	330	330	330	330	330	330	330	330	330	330	330
70	70	70	70	70	70	70	70	70	70	70	70	70

Appendix 4-2

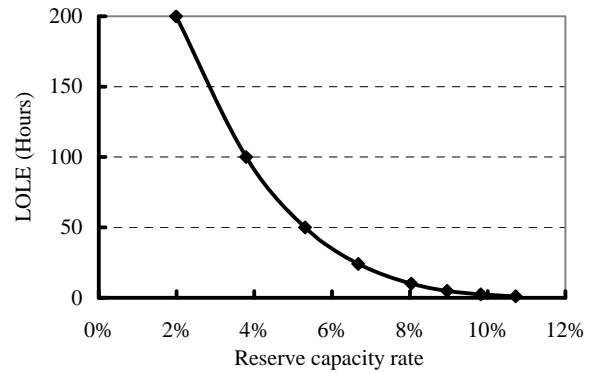
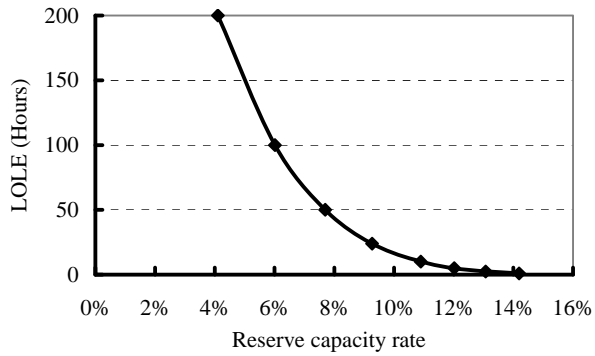
Calculation results on Chapter 4

1. Study of appropriate reserve capacity rate based on supply reliability (Chapter 4.4)

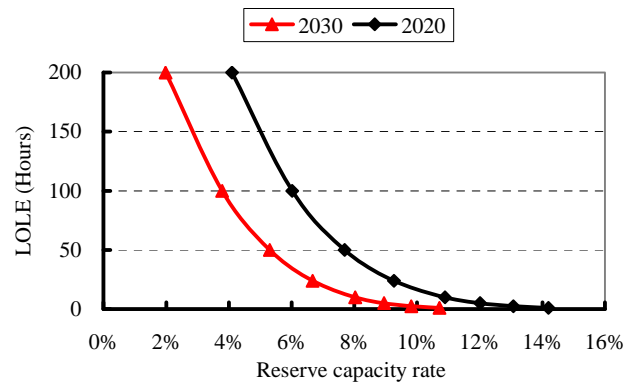
(1) Base case

2020		
56000		
14.2%	1	7950.92
13.1%	2.4	7320.69
12.0%	5	6729.9
10.9%	10	6103.03
9.3%	24	5189.53
7.7%	50	4308.82
6.0%	100	3369.04
4.1%	200	2296.27

2030		
80000		
10.7%	1	8573.26
9.8%	2.4	7855.99
9.0%	5	7164.54
8.0%	10	6426.13
6.7%	24	5336.17
5.3%	50	4242.37
3.8%	100	3027.93
2.0%	200	1587.27

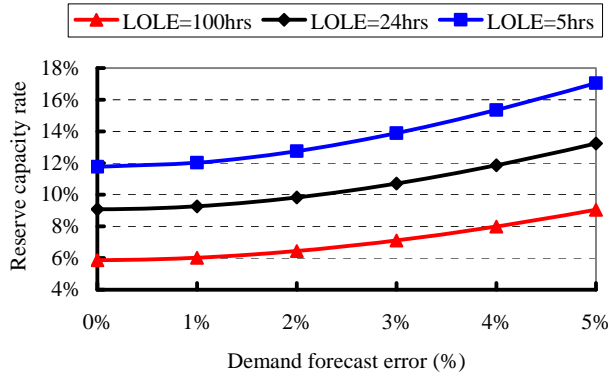


2030	2020	
10.7%	14.2%	1
9.8%	13.1%	2.4
9.0%	12.0%	5
8.0%	10.9%	10
6.7%	9.3%	24
5.3%	7.7%	50
3.8%	6.0%	100
2.0%	4.1%	200

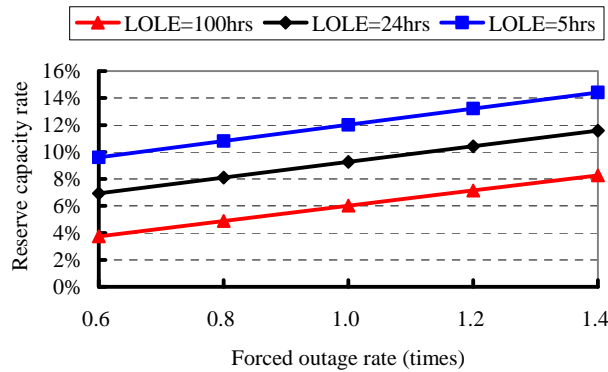


(2) Sensitivity analysis

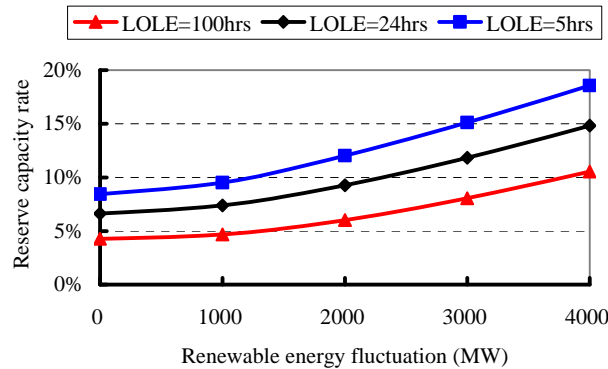
56000 Demand fc	100hrs	24hrs	5hrs	100hrs	24hrs	5hrs
0%	3287.84	5084.73	6587.57	5.9%	9.1%	11.8%
1%	3369.04	5189.53	6729.9	6.0%	9.3%	12.0%
2%	3604.56	5497.56	7142.82	6.4%	9.8%	12.8%
3%	3979.16	5992.4	7781.11	7.1%	10.7%	13.9%
4%	4473.14	6640.14	8596.43	8.0%	11.9%	15.4%
5%	5064.53	7409.74	9549.07	9.0%	13.2%	17.1%



56000 FOR	100hrs	24hrs	5hrs	100hrs	24hrs	5hrs
0.6	2099.38	3885.15	5373.85	3.7%	6.9%	9.6%
0.8	2734.26	4537.56	6051.72	4.9%	8.1%	10.8%
1	3369.04	5189.53	6729.9	6.0%	9.3%	12.0%
1.2	4000.92	5837.37	7402.11	7.1%	10.4%	13.2%
1.4	4633	6485.48	8073.92	8.3%	11.6%	14.4%



56000 Renewable	100hrs	24hrs	5hrs	100hrs	24hrs	5hrs
0	2393.15	3707.98	4727.65	4.3%	6.6%	8.4%
1000	2625.09	4136.65	5332.64	4.7%	7.4%	9.5%
2000	3369.04	5189.53	6729.9	6.0%	9.3%	12.0%
3000	4517.25	6623.52	8469	8.1%	11.8%	15.1%
4000	5901.07	8302.86	10403.35	10.5%	14.8%	18.6%

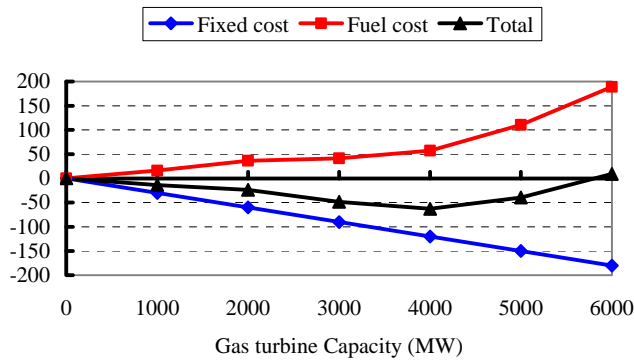


2. Study of optimal power supply configuration in 2030 (Chapter 4.6)

(1) Peak supply capacity

Reserve capacity rate = 8%

Gas CC	Gas GT	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
9100	0	1969337	2572920	4542257	0	0	0
8100	1000	1966338	2574530	4540868	1000	-29.99	16.1
7100	2000	1963337	2576568	4539905	2000	-60	36.48
6100	3000	1960338	2577071	4537409	3000	-89.99	41.51
5100	4000	1957338	2578654	4535992	4000	-119.99	57.34
4100	5000	1954338	2583993	4538331	5000	-149.99	110.73
3100	6000	1951338	2591824	4543162	6000	-179.99	189.04



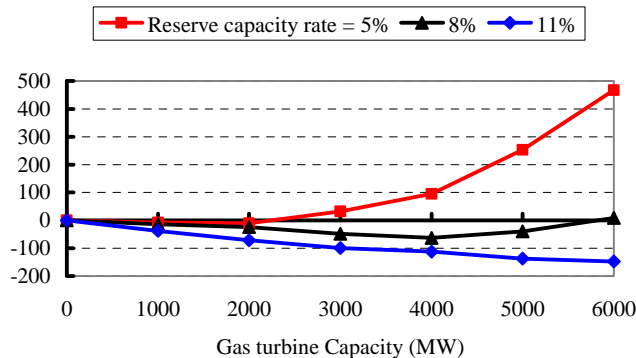
Reserve capacity rate = 5%

Gas CC	Gas GT	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
9100	0	1910777	2656215	4566992	0	0	0
8100	1000	1907778	2658438	4566216	1000	-29.99	22.23
7100	2000	1904777	2661163	4565940	2000	-60	49.48
6100	3000	1901778	2668430	4570208	3000	-89.99	122.15
5100	4000	1898778	2677691	4576469	4000	-119.99	214.76
4100	5000	1895778	2696499	4592277	5000	-149.99	402.84
3100	6000	1892778	2720925	4613703	6000	-179.99	647.1

Reserve capacity rate = 11%

Gas CC	Gas GT	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
9100	0	2027897	2495468	4523365	0	0	0
8100	1000	2024897	2494724	4519621	1000	-30	-7.44
7100	2000	2021897	2494309	4516206	2000	-60	-11.59
6100	3000	2018898	2494528	4513426	3000	-89.99	-9.4
5100	4000	2015898	2496229	4512127	4000	-119.99	7.61
4100	5000	2012898	2496794	4509692	5000	-149.99	13.26
3100	6000	2009898	2498693	4508591	6000	-179.99	32.25

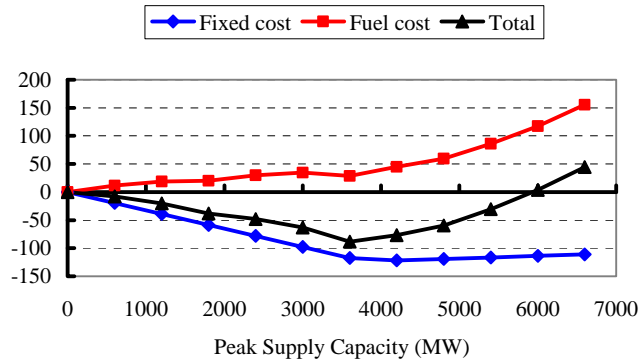
Reserve c	8%	11%
0	0	0
1000	-7.76	-13.89
2000	-10.52	-23.52
3000	32.16	-48.48
4000	94.77	-62.65
5000	252.85	-39.26
6000	467.11	9.05



Gas GT + PSPP

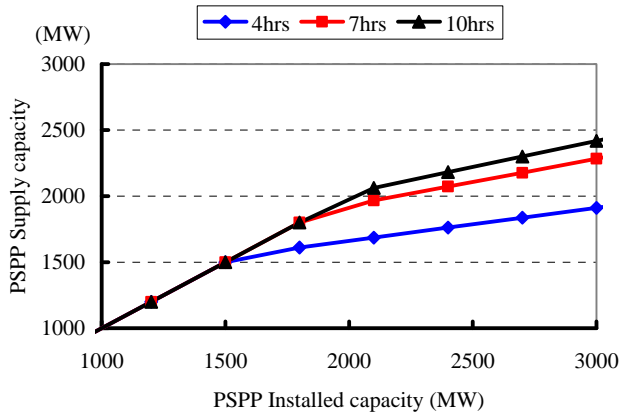
Reserve capacity rate = 8%

Gas CC	Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
9100	0	0	1969337	2572920	4542257	0	0	0
8500	300	300	1967383	2574085	4541468	600	-19.54	11.65
7900	600	600	1965429	2574804	4540233	1200	-39.08	18.84
7300	900	900	1963475	2574946	4538421	1800	-58.62	20.26
6700	1200	1200	1961520	2575920	4537440	2400	-78.17	30
6100	1500	1500	1959567	2576383	4535950	3000	-97.7	34.63
5500	1800	1800	1957612	2575805	4533417	3600	-117.25	28.85
5033	2100	2100	1957171	2577425	4534596	4200	-121.66	45.05
4627	2400	2400	1957424	2578888	4536312	4800	-119.13	59.68
4222	2700	2700	1957688	2581525	4539213	5400	-116.49	86.05
3818	3000	3000	1957963	2584665	4542628	6000	-113.74	117.45
3412	3300	3300	1958215	2588483	4546698	6600	-111.22	155.63

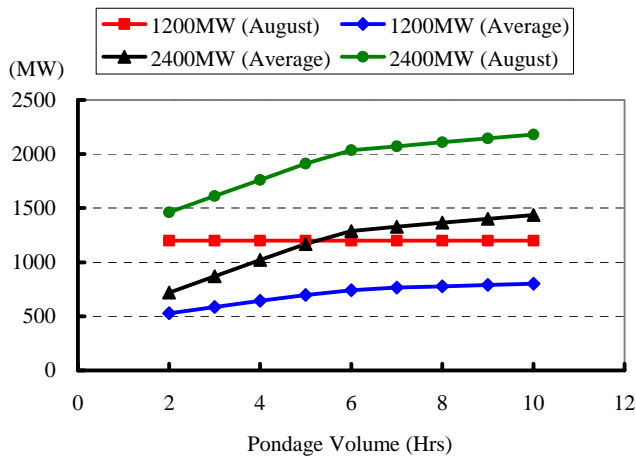


(2) Relation between Installed capacity and supply capacity

PSPP	4hrs	7hrs	10hrs
0	0	0	0
300	300	300	300
600	600	600	600
900	900	900	900
1200	1200	1200	1200
1500	1500	1500	1500
1800	1611	1800	1800
2100	1686	1967	2062
2400	1761	2072	2181
2700	1836	2177	2300
3000	1911	2283	2419
3300	1986	2388	2537
3600	2061	2487	2646
3900	2136	2579	2751

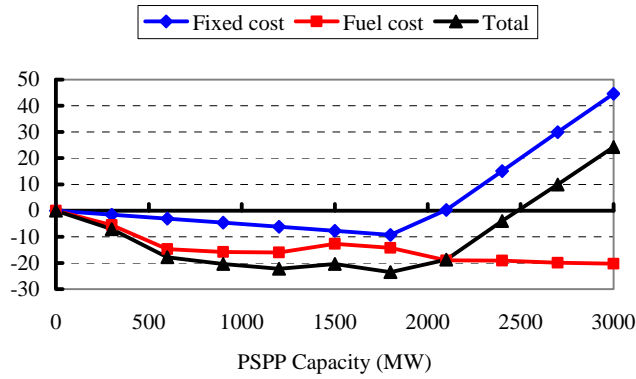


	2	3	4	5	6	7	8	9	10
1200MW (	1200	1200	1200	1200	1200	1200	1200	1200	1200
1200MW (	529	587	645	697	741	765	778	790	802
2400MW (	719	871	1022	1169	1287	1329	1365	1401	1437
2400MW (	1461	1611	1761	1911	2036	2072	2109	2145	2181



(3) Optimum capacity of PSPP (Base case)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3300	900	1956275	2578471	4534746	900	-4.63	-15.79
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33



kWh balance (GWh)

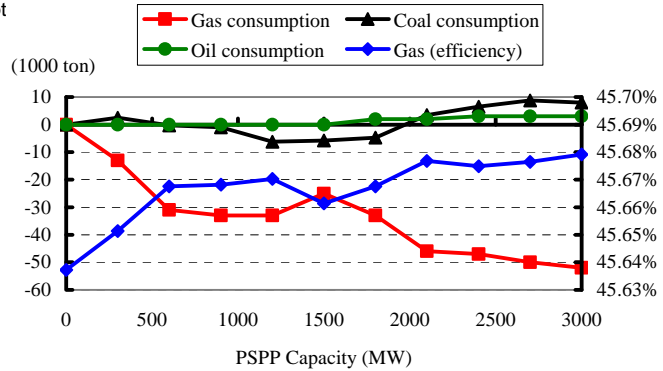
PSPP	PSPP	Nuclear	Gas	GT	Oil	Imp-Coal	Dom-Coal	Gene-total	Over flow	Shortage	Pumping-up
0	0	62396	150868	107	0	92185	64979	491175	2541	0	0
300	16	62395	150857	107	0	92197	64978	491189	2531	0	-24
600	32	62394	150830	108	0	92190	64975	491169	2487	0	-47
900	42	62393	150831	100	0	92189	64974	491169	2472	0	-62
1200	50	62392	150827	111	0	92182	64968	491171	2461	0	-76
1500	57	62392	150829	115	0	92177	64971	491182	2461	0	-87
1800	64	62391	150815	114	9	92177	64973	491184	2453	0	-97
2100	70	62391	150790	112	10	92199	64977	491189	2448	0	-107
2400	76	62391	150780	111	11	92208	64977	491195	2444	0	-117
2700	79	62391	150775	108	13	92213	64977	491197	2441	0	-122
3000	79	62391	150776	107	14	92212	64978	491196	2440	0	-122

Fuel consumption

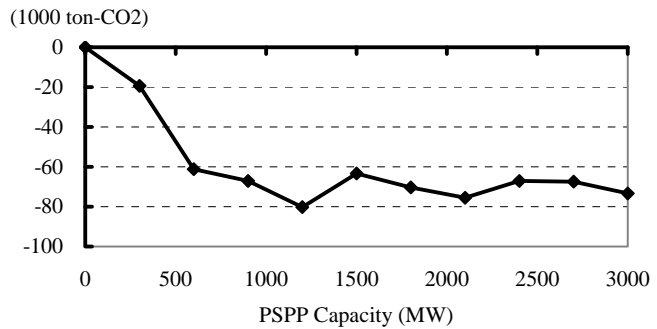
PSPP	Gas (Equiv.)	GT (Equiv.)	Oil (Equiv.)	Imp-Coal (Equiv.)	Dom-Coal (Equiv.)	Gene-total (Equiv.)	Over flow	Shortage	Pumping-up	
0	34031	29600	41	36	0	32775	20484	101675	15887	66007
300	34018	29589	41	36	0	32778	20486	101673	15886	65997
600	33999	29572	42	36	0	32776	20485	101670	15886	65979
900	34000	29573	39	34	0	32776	20485	101667	15886	65978
1200	33996	29569	43	38	0	32773	20483	101658	15884	65974
1500	34002	29574	45	39	0	32772	20482	101664	15885	65980
1800	33995	29569	44	38	2	32772	20482	101668	15886	65977
2100	33983	29558	43	38	2	32779	20487	101673	15886	65971
2400	33982	29557	43	37	3	32782	20488	101673	15886	65971
2700	33980	29556	42	36	3	32784	20490	101674	15887	65972
3000	33979	29555	41	36	3	32783	20489	101675	15887	65970

PSPP Gas (effi Gas cons Coal con: Oil consumpt

PSPP	Gas (effi)	Gas cons	Coal con:	Oil consumpt
0	45.64%	0	0.0	0
300	45.65%	-13	2.5	0
600	45.67%	-31	-0.3	0
900	45.67%	-33	-1.0	0
1200	45.67%	-33	-6.3	0
1500	45.66%	-25	-5.8	0
1800	45.67%	-33	-4.8	2
2100	45.68%	-46	3.5	2
2400	45.67%	-47	6.5	3
2700	45.68%	-50	8.8	3
3000	45.68%	-52	8.0	3



PSPP	C	CO2	CO2	
0	57860.1	212154	0	0.0
300	57854.8	212134	300	-19.4
600	57843.4	212092	600	-61.2
900	57841.8	212087	900	-67.1
1200	57838.2	212073	1200	-80.3
1500	57842.8	212090	1500	-63.4
1800	57840.9	212083	1800	-70.4
2100	57839.5	212078	2100	-75.5
2400	57841.8	212087	2400	-67.1
2700	57841.7	212086	2700	-67.5
3000	57840.1	212080	3000	-73.3



(4) Optimum capacity of PSPP (Sensitivity analysis)

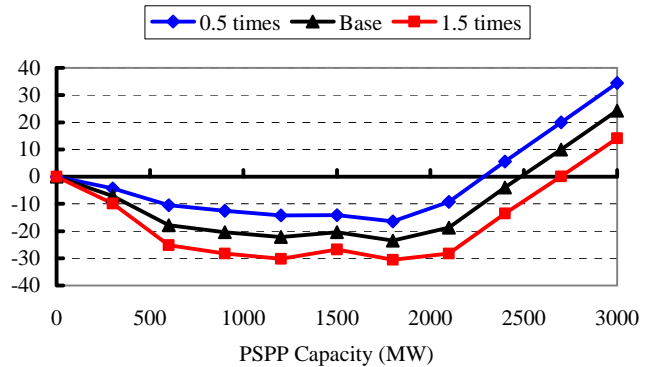
(a) Fuel price

Base	Nuclear	Gas	Oil	Coal				
	0.381	5.563	8.371	1.823				
Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total	
4200	0	1956738	2580050	4536788	0	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56	-7.11
3600	600	1956429	2578579	4535008	600	-3.09	-14.71	-17.8
3300	900	1956275	2578471	4534746	900	-4.63	-15.79	-20.42
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01	-22.18
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7	-20.41
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24	-23.5
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02	-18.76
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08	-3.95
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92	10
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33	24.29

Fuel=0.5 times	Gas	Oil	Coal					
	0.381	5.563	8.371	1.823				
	0.381	2.782	4.186	0.912				
Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total	
4200	0	1956738	1470663	3427401	0	0	0	0
3900	300	1956583	1470384	3426967	300	-1.55	-2.79	-4.34
3600	600	1956429	1469925	3426354	600	-3.09	-7.38	-10.47
3300	900	1956275	1469872	3426147	900	-4.63	-7.91	-12.54
3000	1200	1956121	1469860	3425981	1200	-6.17	-8.03	-14.2
2700	1500	1955967	1470025	3425992	1500	-7.71	-6.38	-14.09
2400	1800	1955812	1469949	3425761	1800	-9.26	-7.14	-16.4
2232	2100	1956764	1469709	3426473	2100	0.26	-9.54	-9.28
2128	2400	1958251	1469706	3427957	2400	15.13	-9.57	5.56
2023	2700	1959730	1469664	3429394	2700	29.92	-9.99	19.93
1917	3000	1961200	1469643	3430843	3000	44.62	-10.2	34.42

Fuel=1.5 times	Gas	Oil	Coal					
	0.381	5.563	8.371	1.823				
	0.381	8.345	12.557	2.735				
Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total	
4200	0	1956738	3690071	5646809	0	0	0	0
3900	300	1956583	3689236	5645819	300	-1.55	-8.35	-9.9
3600	600	1956429	3687865	5644294	600	-3.09	-22.06	-25.15
3300	900	1956275	3687704	5643979	900	-4.63	-23.67	-28.3
3000	1200	1956121	3687671	5643792	1200	-6.17	-24	-30.17
2700	1500	1955967	3688167	5644134	1500	-7.71	-19.04	-26.75
2400	1800	1955812	3687939	5643751	1800	-9.26	-21.32	-30.58
2232	2100	1956764	3687221	5643985	2100	0.26	-28.5	-28.24
2128	2400	1958251	3687211	5645462	2400	15.13	-28.6	-13.47
2023	2700	1959730	3687085	5646815	2700	29.92	-29.86	0.06
1917	3000	1961200	3687023	5648223	3000	44.62	-30.48	14.14

	0.5 times	1.5 times	Base	
	0	0	0	0
300	-4.34	-9.9	-7.11	
600	-10.47	-25.15	-17.8	
900	-12.54	-28.3	-20.42	
1200	-14.2	-30.17	-22.18	
1500	-14.09	-26.75	-20.41	
1800	-16.4	-30.58	-23.5	
2100	-9.28	-28.24	-18.76	
2400	5.56	-13.47	-3.95	
2700	19.93	0.06	10	
3000	34.42	14.14	24.29	



(b) Construction cost

Base

70000	11.23%	7861
50000	16.75%	8375

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3300	900	1956275	2578471	4534746	900	-4.63	-15.79
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33

1.1 times

77000	11.23%	8647.1
50000	16.75%	8375

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956820	2579494	4536314	300	0.82	-5.56
3600	600	1956901	2578579	4535480	600	1.63	-14.71
3300	900	1956983	2578471	4535454	900	2.45	-15.79
3000	1200	1957065	2578449	4535514	1200	3.27	-16.01
2700	1500	1957146	2578780	4535926	1500	4.08	-12.7
2400	1800	1957228	2578626	4535854	1800	4.9	-14.24
2232	2100	1958415	2578148	4536563	2100	16.77	-19.02
2128	2400	1960138	2578142	4538280	2400	34	-19.08
2023	2700	1961853	2578058	4539911	2700	51.15	-19.92
1917	3000	1963559	2578017	4541576	3000	68.21	-20.33

1.2 times

84000	11.23%	9433.2
50000	16.75%	8375

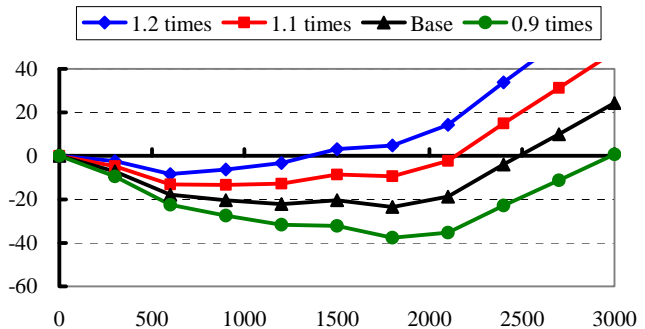
Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1957055	2579494	4536549	300	3.17	-5.56
3600	600	1957373	2578579	4535952	600	6.35	-14.71
3300	900	1957690	2578471	4536161	900	9.52	-15.79
3000	1200	1958008	2578449	4536457	1200	12.7	-16.01
2700	1500	1958325	2578780	4537105	1500	15.87	-12.7
2400	1800	1958643	2578626	4537269	1800	19.05	-14.24
2232	2100	1960066	2578148	4538214	2100	33.28	-19.02
2128	2400	1962025	2578142	4540167	2400	52.87	-19.08
2023	2700	1963975	2578058	4542033	2700	72.37	-19.92
1917	3000	1965917	2578017	4543934	3000	91.79	-20.33

0.9 times

63000	11.23%	7074.9
50000	16.75%	8375

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956348	2579494	4535842	300	-3.9	-5.56
3600	600	1955958	2578579	4534537	600	-7.8	-14.71
3300	900	1955568	2578471	4534039	900	-11.7	-15.79
3000	1200	1955178	2578449	4533627	1200	-15.6	-16.01
2700	1500	1954788	2578780	4533568	1500	-19.5	-12.7
2400	1800	1954398	2578626	4533024	1800	-23.4	-14.24
2232	2100	1955113	2578148	4533261	2100	-16.25	-19.02
2128	2400	1956365	2578142	4534507	2400	-3.73	-19.08
2023	2700	1957608	2578058	4535666	2700	8.7	-19.92
1917	3000	1958843	2578017	4536860	3000	21.05	-20.33

	1.2 times	1.1 times	Base	0.9 times
0	0	0	0	0
300	-2.39	-4.74	-7.11	-9.46
600	-8.36	-13.08	-17.8	-22.51
900	-6.27	-13.34	-20.42	-27.49
1200	-3.31	-12.74	-22.18	-31.61
1500	3.17	-8.62	-20.41	-32.2
1800	4.81	-9.34	-23.5	-37.64
2100	14.26	-2.25	-18.76	-35.27
2400	33.79	14.92	-3.95	-22.81
2700	52.45	31.23	10	-11.22
3000	71.46	47.88	24.29	0.72



(c) Reliability

Reserve capacity rate = 8% (Base)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3300	900	1956275	2578471	4534746	900	-4.63	-15.79
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33

Reserve capacity rate = 3%

Gas GT	PSPP	Fixed cost	Fuel cost	Shortage	Total	Fixed cost	Fuel cost	Shortage	Total
4200	0	1859138	2735338	217	4594693	0	0	0	0
3900	300	1858983	2734862	211	4594056	300	-1.55	-4.76	-6.37
3600	600	1858829	2734515	206	4593550	600	-3.09	-8.23	-11.43
3300	900	1858675	2734175	201	4593051	900	-4.63	-11.63	-16.42
3000	1200	1858521	2733835	846	4593202	1200	-6.17	-15.03	-21.49
2700	1500	1858367	2733337	1568	4593272	1500	-7.71	-20.01	-27.72
2400	1800	1858212	2733123	2292	4593627	1800	-9.26	-22.15	-31.41
2232	2100	1859164	2733313	2422	4594899	2100	0.26	-20.25	-19.99
2128	2400	1860651	2733338	2261	4596250	2400	15.13	-20	-4.87
2023	2700	1862130	2733491	2104	4597725	2700	29.92	-18.47	11.45
1917	3000	1863600	2733888	1955	4599443	3000	44.62	-14.5	30.12

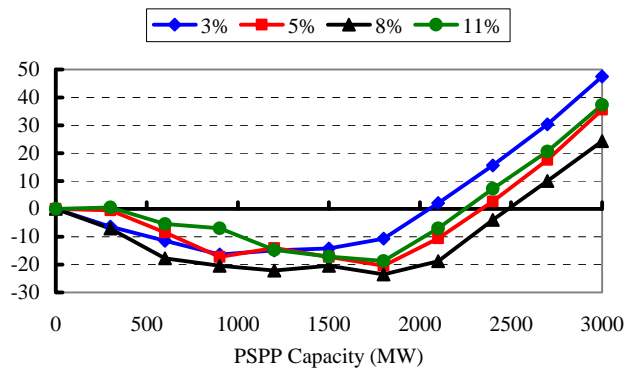
Reserve capacity rate = 5%

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1898178	2681055	4579233	0	0	0
3900	300	1898023	2681158	4579181	300	-1.55	1.03
3600	600	1897869	2680523	4578392	600	-3.09	-5.32
3300	900	1897715	2679796	4577511	900	-4.63	-12.59
3000	1200	1897561	2680264	4577825	1200	-6.17	-7.91
2700	1500	1897407	2680102	4577509	1500	-7.71	-9.53
2400	1800	1897252	2679939	4577191	1800	-9.26	-11.16
2232	2100	1898204	2679969	4578173	2100	0.26	-10.86
2128	2400	1899691	2679808	4579499	2400	15.13	-12.47
2023	2700	1901170	2679819	4580989	2700	29.92	-12.36
1917	3000	1902640	2680151	4582791	3000	44.62	-9.04

Reserve capacity rate = 11%

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	2015298	2496425	4511723	0	0	0
3900	300	2015143	2496636	4511779	300	-1.55	2.11
3600	600	2014989	2496190	4511179	600	-3.09	-2.35
3300	900	2014835	2496193	4511028	900	-4.63	-2.32
3000	1200	2014681	2495565	4510246	1200	-6.17	-8.6
2700	1500	2014527	2495484	4510011	1500	-7.71	-9.41
2400	1800	2014372	2495482	4509854	1800	-9.26	-9.43
2232	2100	2015324	2495700	4511024	2100	0.26	-7.25
2128	2400	2016811	2495635	4512446	2400	15.13	-7.9
2023	2700	2018290	2495494	4513784	2700	29.92	-9.31
1917	3000	2019760	2495698	4515458	3000	44.62	-7.27

	3%	5%	8%	11%
0	0	0	0	0
300	-6.37	-0.52	-7.11	0.56
600	-11.43	-8.41	-17.8	-5.44
900	-16.42	-17.22	-20.42	-6.95
1200	-14.91	-14.08	-22.18	-14.77
1500	-14.21	-17.24	-20.41	-17.12
1800	-10.66	-20.42	-23.5	-18.69
2100	2.06	-10.6	-18.76	-6.99
2400	15.57	2.66	-3.95	7.23
2700	30.32	17.56	10	20.61
3000	47.5	35.58	24.29	37.35



(d) Demand shape

Demand=8000MW (Base)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3300	900	1956275	2578471	4534746	900	-4.63	-15.79
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33
1812	3300	1962680	2578223	4540903	3300	59.42	-18.27
1712	3600	1964200	2578103	4542303	3600	74.62	-19.47

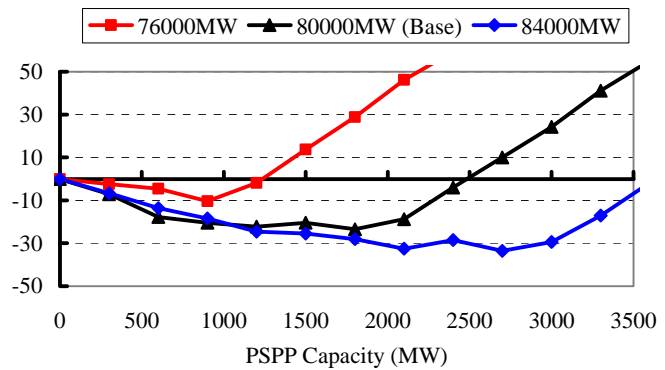
Demand=7600MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1878033	2530487	4408520	0	0	0
3900	300	1877878	2530399	4408277	300	-1.55	-0.88
3600	600	1877724	2530345	4408069	600	-3.09	-1.42
3300	900	1877570	2529911	4407481	900	-4.63	-5.76
3122	1200	1878438	2529897	4408335	1200	4.05	-5.9
3017	1500	1879916	2529971	4409887	1500	18.83	-5.16
2912	1800	1881395	2530005	4411400	1800	33.62	-4.82
2807	2100	1882874	2530268	4413142	2100	48.41	-2.19
2707	2400	1884395	2530053	4414448	2400	63.62	-4.34
2616	2700	1885991	2530466	4416457	2700	79.58	-0.21
2527	3000	1887604	2530523	4418127	3000	95.71	0.36

Demand=8400MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	2035442	2646299	4681741	0	0	0
3900	300	2035288	2645785	4681073	300	-1.54	-5.14
3600	600	2035134	2645244	4680378	600	-3.08	-10.55
3300	900	2034980	2644916	4679896	900	-4.62	-13.83
3000	1200	2034826	2644462	4679288	1200	-6.16	-18.37
2700	1500	2034671	2644525	4679196	1500	-7.71	-17.74
2400	1800	2034517	2644420	4678937	1800	-9.25	-18.79
2100	2100	2034363	2644125	4678488	2100	-10.79	-21.74
1800	2400	2034209	2644678	4678887	2400	-12.33	-16.21
1500	2700	2034054	2644329	4678383	2700	-13.88	-19.7
1341	3000	2035081	2643724	4678805	3000	-3.61	-25.75
1233	3300	2036535	2643500	4680035	3300	10.93	-27.99
1127	3600	2038006	2643559	4681565	3600	25.64	-27.4
1022	3900	2039484	2643520	4683004	3900	40.42	-27.79
917	4200	2040963	2643287	4684250	4200	55.21	-30.12

	84000MW	76000MW	80000MW (Base)
0	0	0	0
300	-6.68	-2.43	-7.11
600	-13.63	-4.51	-17.8
900	-18.45	-10.39	-20.42
1200	-24.53	-1.85	-22.18
1500	-25.45	13.67	-20.41
1800	-28.04	28.8	-23.5
2100	-32.53	46.22	-18.76
2400	-28.54	59.28	-3.95
2700	-33.58	79.37	10
3000	-29.36	96.07	24.29
3300	-17.06		41.15
3600	-1.76		55.15
3900	12.63		
4200	25.09		



(e) Renewable energy (especially Wind)

Wind=Base (15600MW)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3900	300	1956583	2579494	4536077	300	-1.55	-5.56
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3300	900	1956275	2578471	4534746	900	-4.63	-15.79
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2700	1500	1955967	2578780	4534747	1500	-7.71	-12.7
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2232	2100	1956764	2578148	4534912	2100	0.26	-19.02
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
2023	2700	1959730	2578058	4537788	2700	29.92	-19.92
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33

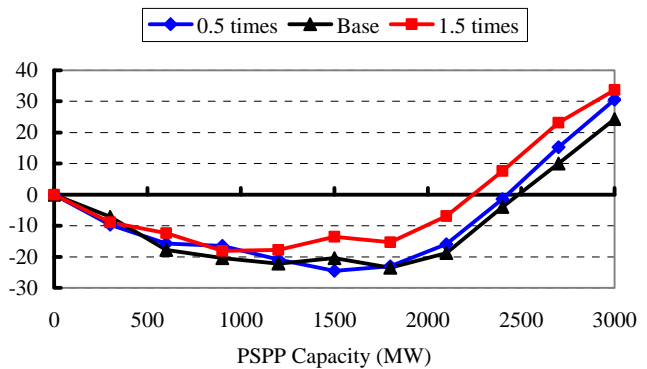
Wind=0.5times (7800MW)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1882442	2540642	4423084	0	0	0
3900	300	1882288	2539829	4422117	300	-1.54	-8.13
3600	600	1882134	2539380	4421514	600	-3.08	-12.62
3300	900	1881980	2539453	4421433	900	-4.62	-11.89
3000	1200	1881826	2539168	4420994	1200	-6.16	-14.74
2700	1500	1881672	2538957	4420629	1500	-7.7	-16.85
2400	1800	1881517	2539260	4420777	1800	-9.25	-13.82
2232	2100	1882469	2539025	4421494	2100	0.27	-16.17
2128	2400	1883956	2538983	4422939	2400	15.14	-16.59
2023	2700	1885435	2539174	4424609	2700	29.93	-14.68
1917	3000	1886905	2539240	4426145	3000	44.63	-14.02

Wind=1.5times (23400MW)

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	2031032	2620559	4651591	0	0	0
3900	300	2030878	2619824	4650702	300	-1.54	-7.35
3600	600	2030724	2619627	4650351	600	-3.08	-9.32
3300	900	2030570	2619212	4649782	900	-4.62	-13.47
3000	1200	2030416	2619393	4649809	1200	-6.16	-11.66
2700	1500	2030261	2619972	4650233	1500	-7.71	-5.87
2400	1800	2030107	2619953	4650060	1800	-9.25	-6.06
2232	2100	2031058	2619844	4650902	2100	0.26	-7.15
2128	2400	2032546	2619805	4652351	2400	15.14	-7.54
2023	2700	2034025	2619878	4653903	2700	29.93	-6.81
1917	3000	2035495	2619462	4654957	3000	44.63	-10.97

	0.5 times	1.5 times	Base
0	0	0	0
300	-9.67	-8.89	-7.11
600	-15.7	-12.4	-17.8
900	-16.51	-18.09	-20.42
1200	-20.9	-17.82	-22.18
1500	-24.55	-13.58	-20.41
1800	-23.07	-15.31	-23.5
2100	-15.9	-6.89	-18.76
2400	-1.45	7.6	-3.95
2700	15.25	23.12	10
3000	30.61	33.66	24.29



3. Power optimal plan for Peak Demand (Chapter 4.7)

Hydro=0MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
4200	0	1956738	2580050	4536788	0	0	0
3600	600	1956429	2578579	4535008	600	-3.09	-14.71
3000	1200	1956121	2578449	4534570	1200	-6.17	-16.01
2400	1800	1955812	2578626	4534438	1800	-9.26	-14.24
2128	2400	1958251	2578142	4536393	2400	15.13	-19.08
1917	3000	1961200	2578017	4539217	3000	44.62	-20.33

Hydro=600MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
3600	0	1962013	2572684	4534697	0	0	0
3000	600	1961705	2572291	4533996	600	-3.08	-3.93
2400	1200	1961397	2572057	4533454	1200	-6.16	-6.27
1800	1800	1961088	2571729	4532817	1800	-9.25	-9.55
1584	2400	1963996	2571676	4535672	2400	19.83	-10.08

Hydro=1200MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
3000	0	1967289	2566770	4534059	0	0	0
2400	600	1966981	2566114	4533095	600	-3.08	-6.56
1800	1200	1966672	2565755	4532427	1200	-6.17	-10.15
1250	1800	1966783	2566102	4532885	1800	-5.06	-6.68
1040	2400	1969740	2566095	4535835	2400	24.51	-6.75

Hydro=1800MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
2400	0	1972565	2559797	4532362	0	0	0
1800	600	1972257	2559882	4532139	600	-3.08	0.85
1200	1200	1971948	2559657	4531605	1200	-6.17	-1.4
710	1800	1972561	2559772	4532333	1800	-0.04	-0.25
508	2400	1975586	2559764	4535350	2400	30.21	-0.33

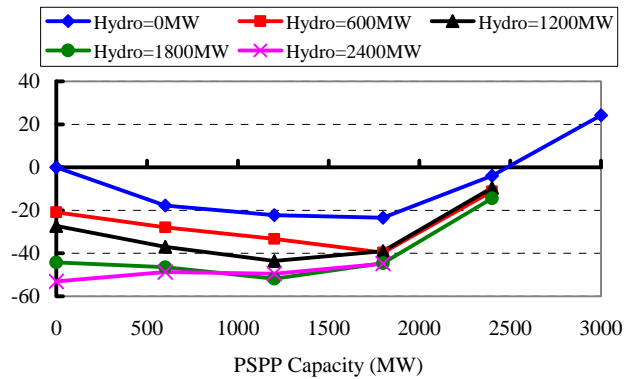
Hydro=2400MW

Gas GT	PSPP	Fixed cost	Fuel cost	Total	Fixed cost	Fuel cost	Total
1800	0	1977841	2553643	4531484	0	0	0
1200	600	1977532	2554386	4531918	600	-3.09	7.43
600	1200	1977224	2554617	4531841	1200	-6.17	9.74
182	1800	1978440	2553862	4532302	1800	5.99	2.19

Hydro construction cost =1600USD/kW

PSPP	H=0MW	H=600MW	H=1200MW	H=1800MW	H=2400MW
0	4536788	4534697	4534059	4532362	4531484
600	4535008	4533996	4533095	4532139	4531918
1200	4534570	4533454	4532427	4531605	4531841
1800	4534438	4532817	4532885	4532333	4532302
2400	4536393	4535672	4535835	4535350	
3000	4539217				

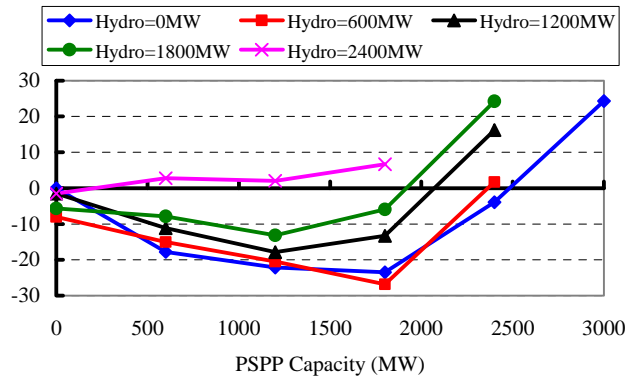
Hydro=0M	Hydro=600	Hydro=1200	Hydro=1800	Hydro=2400M
0	0	-20.91	-27.29	-44.26
600	-17.8	-27.92	-36.93	-46.49
1200	-22.18	-33.34	-43.61	-51.83
1800	-23.5	-39.71	-39.03	-44.55
2400	-3.95	-11.16	-9.53	-14.38
3000	24.29			



Hydro construction cost =1800USD/kW

PSPP	H=0MW	H=600MW	H=1200MW	H=1800MW	H=2400MW
0	4536788	4535985	4536634	4536225	4536634
600	4535008	4535284	4535670	4536002	4537068
1200	4534570	4534742	4535002	4535468	4536991
1800	4534438	4534105	4535460	4536196	4537452
2400	4536393	4536960	4538410	4539213	
3000	4539217				

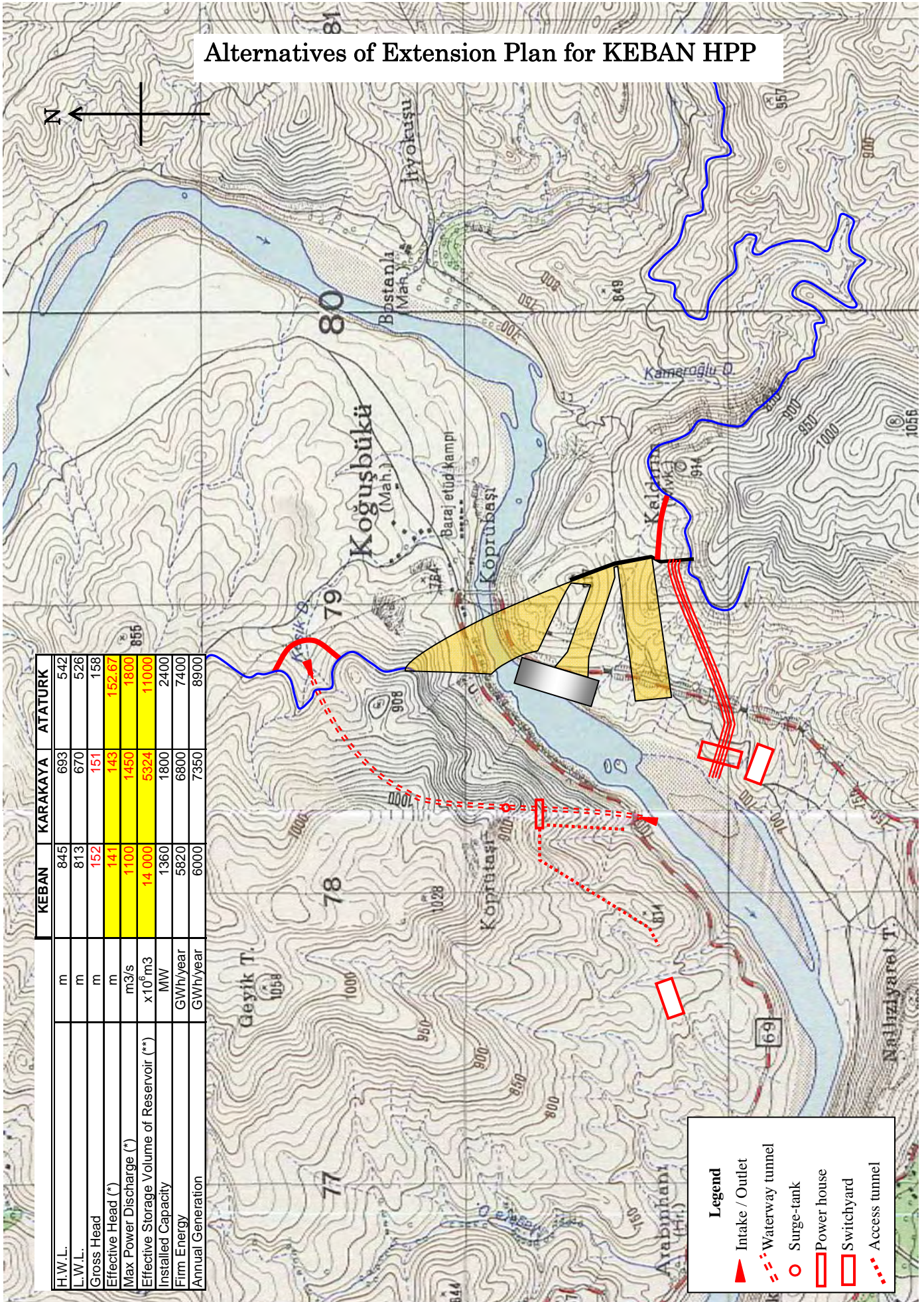
Hydro=0M	Hydro=600	Hydro=1200	Hydro=1800	Hydro=2400M
0	0	-8.035	-1.54	-5.635
600	-17.8	-15.045	-11.18	-7.865
1200	-22.18	-20.465	-17.86	-13.205
1800	-23.5	-26.835	-13.28	-5.925
2400	-3.95	1.715	16.22	24.245
3000	24.29			



Appendix 4-5

Potential Study on Extension of Existing Hydropower Plant

Alternatives of Extension Plan for KEBAN HPP



	KEBAN	KARAKAYA	ATATURK
H.W.L.	845	693	542
L.W.L.	813	670	526
Gross Head	152	151	158
Effective Head (*)	141	143	152.67
Max Power Discharge (*)	1100	1450	1800
Effective Storage Volume of Reservoir (**)	14 000	5324	11000
Installed Capacity	1360	1800	2400
Firm Energy	5820	6800	7400
Annual Generation	6000	7350	8900

Site Survey Results of Keban HPP

1. Profile and Operation records of Keban Dam and Reservoir

(1) Profile

The following data were obtained orally at the Keban, these data were quite different from the ones obtained by questionnaire for EIE. This expansion study is conducted based on these data.

- He=145m (EIE data : He=141m)
- Q=135m³/s/unit (EIE data : 160.35 or 161.88 m³/s/unit)
- P=1,343MW (168MW/unit) (EIE data : 1,330MW)
- Efficiency :
 - ✧ Turbine: 0.92
 - ✧ Generator: 0.96
 - ✧ Transformer: 0.99

(2) Operation Record of Keban reservoir

Based on the operation records of the reservoir in the last three years (2006-2008), the reservoir have been operated according to the rule curve. There has been no spilled water from the dam without power generation.

Although the low water level had been designed at EL. 813m in the original design, the current low water level was revised to EL. 820m for any reason.

- Maximum Water Level = EL. 845m
- Minimum Water Level = EL. 820m (Designed MOL = EL. 813m)

(3) Dam Bottom Outlet

As a discharge facility, the following outlet at the bottom of dam is installed except power discharge and spillway.

- There are dam bottom outlets utilizing two diversion tunnels during construction,
- Two double-sluice gate valves are installed in each diversion tunnel at EL. 690.81m (Diameter: 3.70m×Width: 1.85m×2units), and
- Those sluice gates have not been operated for long years. DSI has no idea if those can still be operational or not.

2. Topography

(1) Right bank plan

No topographical issues are observed. The crest length of a coffer dam at the intake site will be about 190m.

(2) Left bank plan

The bottom level of the outlet will be around EL.810m. However, since the water depth at the left bank upstream of the dam is shallow, it should be examined whether the intake for expansion can be set or not. Even if it can be installed, since bedrock around the intake should be excavated, damage on the dam by excavation should be considered.

(3) Left bank alternative plan

An alternative expansion plan which intake is installed at the left bank upstream cove in the reservoir in order to avoid damage on the dam is considered. As an economical disadvantage of this plan, headrace tunnels and surge tanks are required. However, the downstream of the mountain at the left bank was excavated up to EL. 820m as a quarry for construction of the existing dam and power station, it is available to make tunnel length short and surge tank open type.

3. Geology

Bedrock of Keban Dam belongs to Keban metamorphics in Permian to Triassic period. Keban Metamorphics consists of lower schist member, lower marble member, upper schist member, and upper marble member sequentially from right bank to left bank in the order of age. The geology around this expansion plan is the former two geological members. The former contains carbonate lenses. The above information is referred to the geologic map of the MALATYA_H27 quadrangle issued in 1988.

(1) Right bank plan

- Cracky marble and calcschist (Photo-6) crop out on the right bank. Though their relation was not identified at the site, but the marbles are lenticular rocks contained in the calcschist according to the existing literature.
- Weak zone caused by hydrothermal alteration was observed in the calcschist on the right bank. Fractured and altered calcschist is distributed at the northern side of crystalline limestone, and the surface is covered by coerture (Photo-7).
- Several limestone caves, maximum size is meter scaled, are observed at the existing quarry of right bank (Photo-8). Their alignment is irregular and their scales are different (Photo-16).
- According to the construction report, the bedrock of the right bank is impervious. However, there is a possibility that huge limestone caves exist along / around the water tunnel route and underground power house.
- Geological condition of the intake site is fairly good. However, there is a high possibility that weak rock zones due to hydrothermal alteration exist and cross the water tunnel, because hollow terrain of N40E exists on the waterway route (Photo-9) and this is estimated to be caused by hydrothermal alteration. These weak zones

suchlike photo-7 may make troubles in excavation works of tunnel.

(2) Left bank plan

- Hard and massive marble crops out continuously along the road on the left bank of the reservoir (Photo-10).
- According to the construction report, a 10 meter scale limestone cave exists underground of the left bank.
- Grouting was carried out after impounding water in the reservoir along the rim tunnel and the road of the left bank. Some of grouting holes remain on the road. (Photo-12, Photo-13)
- Small scale caves along cracks are scattered in the bedrock (Photo-11), and such caves may exist in the underground and form water leakage paths.
- The upper penstock in the alternative plan is located at the former quarry during construction of the existing dam, and massive marble is distributed uniformly (Photo -14).
- In conclusion, there are no serious issues in the bedrock of the left bank for excavation of the headrace tunnel, though there may be some small scaled caves.

4. Environmental and Social Aspects

(1) Current situation

Natural Environment

- There are no National parks and other environmentally protected areas around Keban Dam.
- There is no vegetation at the right bank and left bank. (Photo 15)
- There is no information of endangered species in the area, except two endemic species of fishes in the Firat River according to DSI officials.
- There are huge areas of the former quarry sites during Keban Dam construction at both of the right and left banks. Those areas can be utilized for soil disposal area for Keban Expansion. (Photo 16, 17)
- Water quality of the reservoir is relatively clean. The water quality data were obtained from DSI office of Keban Dam. Keban

Social Environment

- There are fish cages in the reservoir of Keban Dam, which is operated by Keban Alabalik. (Photo-18)
- There are several ponds for fish breeding at the left bank of downstream of the dam. Most of them are no more in operation, and only a few ponds are still used by EUAS. (Photo-19)
- There is Circir water fall, and Circir Selalesi operates a restaurant and a fish breeding

facilities at the left bank of downstream of Keban Dam, which are owned by the same owner as Keban Alabalik. The water fall is sourced by leakage water from Keban Dam. (Photo-20, 21)

(2) Anticipated Environmental Impacts

Since the additional construction is an extension work within the development areas of the existing dam and power plant, no crucial impacts on environment by the both options of right and left bank project is anticipated.



Photo-1 Keban Dam, view from downstream.



Photo-2 Right Bank Intake Site



Photo-3 Right Bank Outlet Site



Photo-4 Left Bank Intake Site



Photo-5 Left Bank Outlet Site



Photo-6 Hydrothermally transmuted Rocks



Photo-7 Schist



Photo-8 Cavern in Limestone



Photo-9 Weak Zone along Waterway Route



Photo-10 Limestone at Left Bank



Photo-11 Cavern along Cracks in Limestone



Photo-12 Grouting Pipe



Photo-13 Limb Grouting Tunnel



Photo-14 Quarry Site at Left Bank



Photo-15 Vegetation around Keban Dam



Photo-16 Quarry Site at Right Bank



Photo-17 Quarry Site at Left Bank



Photo-18 Fish Cages in Reservoir



Photo-19 Fish Ponds owned by EUAS

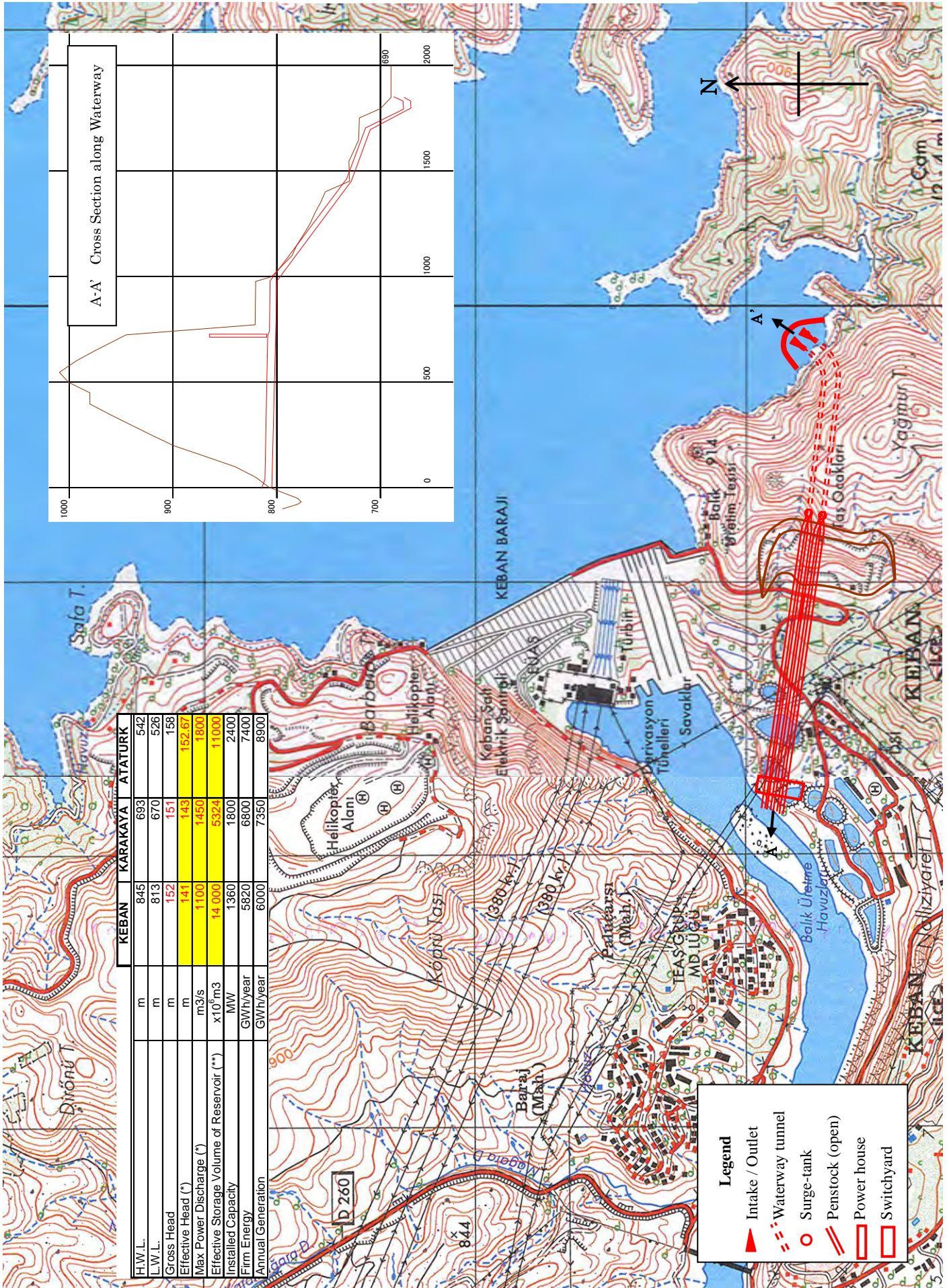


Photo-20 Restaurant utilizing Leakage Water



Photo-21 Fish ponds utilizing Leakage Water

Expansion Plan of Keban HPP



Appendix 5-3

Screening of PSPP Potential Sites

Appendix 5-3-1

Evaluation of PSPP Potential Sites selected by EIE

Evaluation of PSPP potential sites selected by EIE (1/3)

No.	101	102	103	104	105	106
Name	Yalova	Adiguzel	Asiantas	Bayramhacili	Demirkopru	Hasan Ugurlu
Province	Yalova	Denizli	Osmaniye	Kayseri	Izmir	Samsun
Map No.	G22-D4	L22-D2	N36B4	K34A4	K20C1	G36-B3, G37-A4
Installed Capacity (MW)	500	1.000	500	1.000	300	1.000
Design Discharge (m3)	148.5	484.0	379.0	720.0	165.9	204
Active Storage Cap. (m3)	1,800,000	5,300,000	4,100,000	7,777,000	1,830,000	2,200,000
Peak Duration hour (Hr)	3.4	3.0	3.0	3.0	3.1	3.0
Upper Reservoir	Latitude North	38° 10' 32"	36° 18' 37"	38° 47' 38"	38° 30' 05"	40° 51' 47"
	Longitude East	29° 02' 00"	37° 19' 33"	35° 03' 18"	28° 19' 00"	36° 29' 48"
Upper Reservoir	HWL (m)	850.0	300.0	1,150.0	450.0	760.0
	LWL (m)	837.5	665.0	1,140.0	435.0	745.0
Lower Reservoir	Dam Vol. (m3)					
	C.A (km2)					
Lower Reservoir	Latitude North	40° 32' 45"	38° 10' 43"	38° 47' 10"	38° 39' 01"	40° 51' 56"
	Longitude East	29° 02' 15"	29° 13' 27"	37° 19' 40"	35° 03' 21"	36° 29' 54"
Lower Reservoir	HWL (m)	450.0	454.5	146.0	981.0	190.0
	LWL (m)	430.0	406.0	125.0	975.0	150.0
Lower Reservoir	Crest Length (m)					
	Dam Height (m)					
Lower Reservoir	Dam Vol. (m3)					
	C.A (km2)					
Lower Reservoir	Max. Head (m)	420.0	274.0	175.0	175.0	228.2
	Waterway Length (m)	1,100	966	1,100	465	1,462
Lower Reservoir	L/H	2.62	3.53	6.29	2.66	6.41
	Cost (US\$/KW)	1.15	1.38	1.33	1.17	1.27
Distance from Demand Center						
Length of power line (km)						
Project Feature	Installed cap.: half of the criteria	-Installed cap.: half of the criteria	-Installed cap.: half of the criteria	-Upper dam: top of the ridge	-Installed cap.: one third of the criteria	-Upper dam: top of the ridge
	Upper dam: top of the ridge	-Design head: small	-Upper dam: top of the ridge	-Design head: too small	-Upper dam: top of the ridge	-Design head: too small
Project Feature	Peak duration hour: too short	-Peak duration hour: beyond limit	-Peak duration hour: too short	-Peak duration hour: too short	-Peak duration hour: too short	-Peak duration hour: too short
	Variable head (H _{max} /H _{gmin})					
Geological condition	-Vicinity of active fault			-In the Gypsum deposit area		
Environmental condition	KBA (MAR027) Game Animal Production Area	No Issue (?)	No Issue (?)	No Issue (?)	No Issue (?)	No Issue (?)
Preliminary Surevey Site	X	X	X	X	X	X

* KBA: Key Biodiversity Areas are places of international importance for the conservation of biodiversity at the global level. The areas may be designated as National/Natural Park in the future.

Evaluation of PSPP potential sites selected by EIE (2/3)

No.	107	108	109	110	111	112
Name	Kargi	Oymapinar	Sarıyar	Yamula	Iznik 1	Iznik 2
Province	Ankara	Antalya	Ankara	Kaiserı	Bursa	Bursa
Map No.	I27-A2, B1	O27-A1	H26-C3	K34-B2	H23-A1	H23-A1
Installed Capacity (MW)	1.000	500	1.000	500	1.500	500
Design Discharge (m3)	300	156	270	228	686.5	221
Active Storage Cap. (m3)	4,276,000	1,677,000	3,300,000	2,464,000	12,540,000	3,976,000
Peak Duration hour (Hr)	4.0	3.0	3.4	3.0	5.1	5.0
Upper Reservoir	Latitude North	36° 53' 44"	40° 00' 30"	38° 55' 21"	40° 30' 54"	40° 20' 43"
	Longitude East	31° 47' 43"	31° 34' 26"	31° 29' 00"	35° 26' 34"	29° 31' 40"
Lower Reservoir	LWL (m)	1.065	530	905	1,349	340
	Dam Vol. (m3)	1.055	540	890	1,340	320
Crest Length (m)	39° 55' 37"	36° 53' 44"	40° 01' 20"	38° 54' 41"	40° 30' 02"	40° 29' 10"
	31° 46' 02"	31° 34' 26"	31° 29' 30"	35° 27' 28"	29° 36' 31"	29° 31' 25"
Dam Height (m)	557.6	184	475	1100	84.69	84.69
	552.6	166	462	1070	84.01	84.01
C.A (km2)	New HPP dam	Existing reservoir	Existing reservoir	Existing reservoir	Natural Lake	Natural Lake
	512.4	384.0	443.0	279.0	256.0	264.0
Waterway Length (m)	2762	919	1797	1920	916	749
	5.39	2.39	4.06	6.88	3.58	2.84
Variable head (H _{pm} /H _{gmin})	1.09	1.14	1.13	1.23	1.15	1.19
Distance from Demand Center						
Length of power line (km)						
Project Feature	-Upper dam: top of the ridge	-Installed cap.: half of the criteria	-Upper dam: top of the ridge	-Installed cap.: half of the criteria	-Installed cap.: half of the criteria	-Installed cap.: half of the criteria
	-Peak duration hour: too short	-Upper dam: top of the ridge	-Peak duration hour: too short	-Design head: small	-Design head: small	-Upper dam: top of the ridge
Geological condition	-In the Limestone area	-In the Limestone area	-In the Gypsum deposit area	-In the Gypsum deposit area	-Vicinity of active fault	-Vicinity of active fault
Environmental condition	KBA (ORT001)	No Issue (?)	KBA (ORT001)	No Issue (?)	Natural Lake	Natural Lake
	Hunting Prohibited Area	Hunting Prohibited Area	Hunting Prohibited Area	Hunting Prohibited Area	KBA (MAR028)	KBA (MAR028)
Preliminary Surevey Site	Rvise to No.1 PSPP	Rvise to No.20 PSPP	X	X	X	X

* KBA: Key Biodiversity Areas are places of international importance for the conservation of biodiversity at the global level. The areas may be designated as National/Natural Park in the future.

Evaluation of PSPP potential sites selected by EIE (3/3)

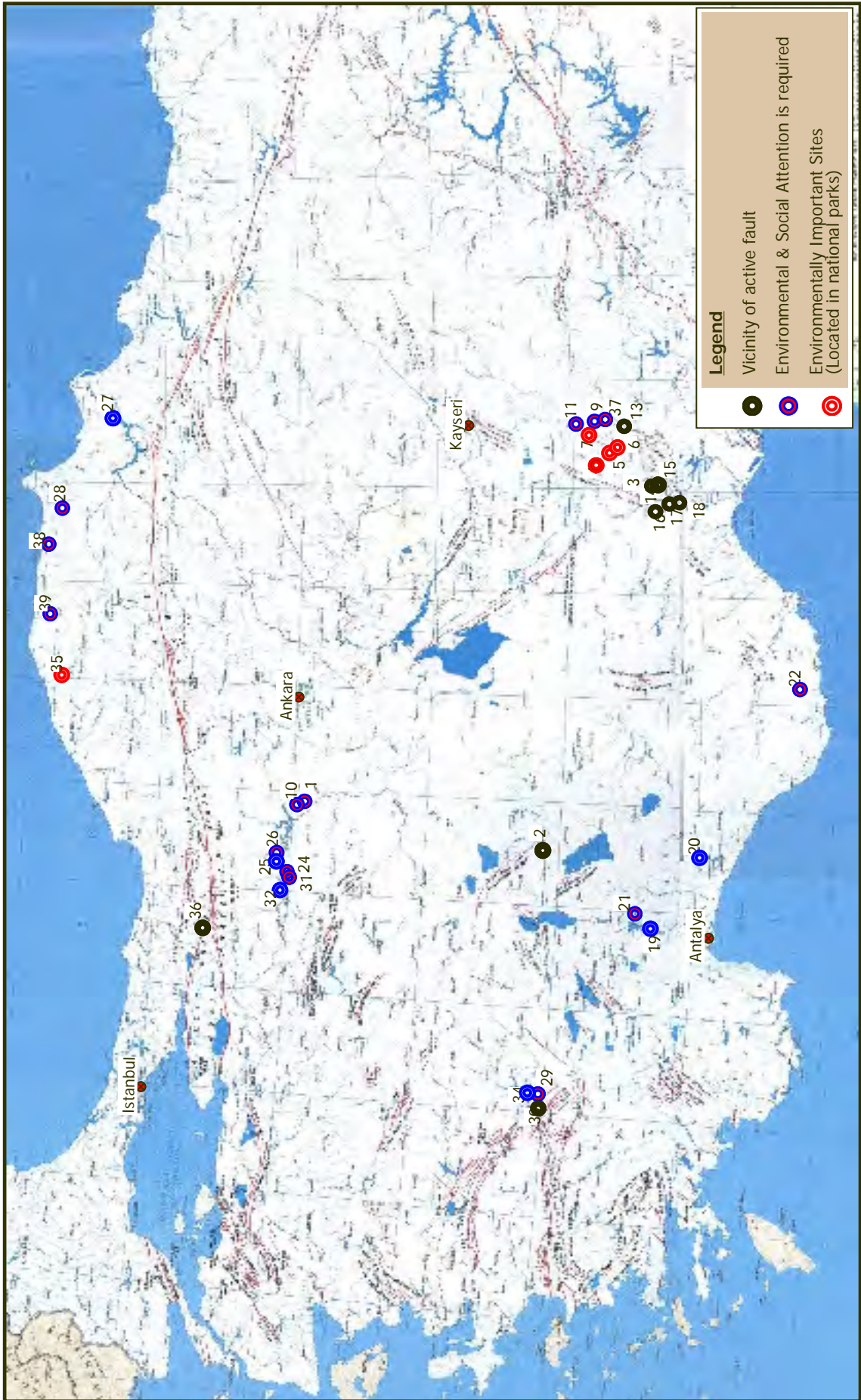
No.	113	114	115	116	117	118
Name	Iznik 3	Burdur Golu	Egirdir Golu	Gokcekaya	Karacaoren 1	Karacaoren 2
Province	Bursa	Burdur	Isparta	Eskisehir	Burdur	Burdur
Map No.	H23-A1	M24-D2	M25-B1	H26-d3	N25-B1	
Installed Capacity (MW)	200	1.000	1.000	1.600	500	1.000
Design Discharge (m3)	221	316	175	199	408	190
Active Storage Cap. (m3)	3.971.000	5.700.000	3.150.000	4.077.000	7.337.000	3.420.000
Peak Duration hour (Hr)	5.0	5.0	5.0	5.7	5.0	5.0
Upper	Latitude North	37° 40' 15"	37° 53' 53"	40° 01' 30"	37° 23' 04"	37° 10' 40"
	Longitude East	29° 31' 40"	30° 11' 45"	30° 47' 08"	31° 10' 30"	30° 49' 53"
Reservoir	HWL (m)	435	1.210	1.362	1.330	400
	Dam Vol. (m3)	430	1.195	1.550	1.330	385
Lower	Crest Length (m)	37° 41' 15"	37° 53' 43"	40° 02' 40"	37° 23' 21"	37° 19' 37"
	Dam Height (m)	29° 31' 40"	30° 10' 00"	30° 48' 18"	31° 10' 40"	30° 50' 12"
Reservoir	Dam Vol. (m3)	84.69	848	915	388	272.5
	C.A (km2)	84.01	823	908	376.5	230
Upper	Latitude North	40° 29' 50"	37° 41' 15"	37° 53' 43"	40° 02' 40"	37° 19' 37"
	Longitude East	29° 31' 40"	30° 10' 00"	30° 48' 18"	31° 10' 40"	30° 50' 12"
Lower	HWL (m)	84.69	848	915	388	272.5
	LWL (m)	84.01	823	908	376.5	230
Reservoir	Crest Length (m)	Iznik 2 reservoir	Natural Lake	Natural Lake	Existing reservoir	New HPP dam
	Dam Height (m)					
Upper	Dam Vol. (m3)					
	C.A (km2)					
Lower	Max. Head (m)	371.0	387.0	654.0	973.5	170.0
	Waterway Length (m)	550	1.500	2.033	2.610	655
Reservoir	L/H	1.48	3.88	3.11	2.68	3.85
	Variable head (H _{pmax} /H _{gmin})	1.14	1.18	1.09	1.10	1.60
Upper	Cost (US\$/kW)					
Lower	Distance from Demand Center					
	Length of power line (km)					
Project Feature						
		-Installed cap.: one fifth of the criteria -Upper dam: top of the ridge -Peak duration hour: short	-Upper dam: top of the ridge -Peak duration hour: short	-Upper dam: top of the ridge -Peak duration hour: short	-Design head: over criteria -Peak duration hour: short	-Installed cap.: half of the criteria -Upper dam: top of the ridge -Peak duration hour: short -Variable head: beyond limit	-Upper dam: top of the ridge -Peak duration hour: short
Geological condition		-Vicinity of active fault	-In the Limestone area	-In the Limestone area	-In the Limestone area	-In the Limestone area
Environmental condition		KBA (AKD024) Forest Reproduction Site / Wildlife Protection Site	Natural Lake KBA (AKD028)	KBA (ORT001) Wildlife Protection Site	No Issue (?)	No Issue (?)
Preliminary Surevey Site		X	X	X	X	X

* KBA: Key Biodiversity Areas are places of international importance for the conservation of biodiversity at the global level. The areas may be designated as National/Natural Park in the future.

Appendix 5-3-2

Screening by Geological Criteria

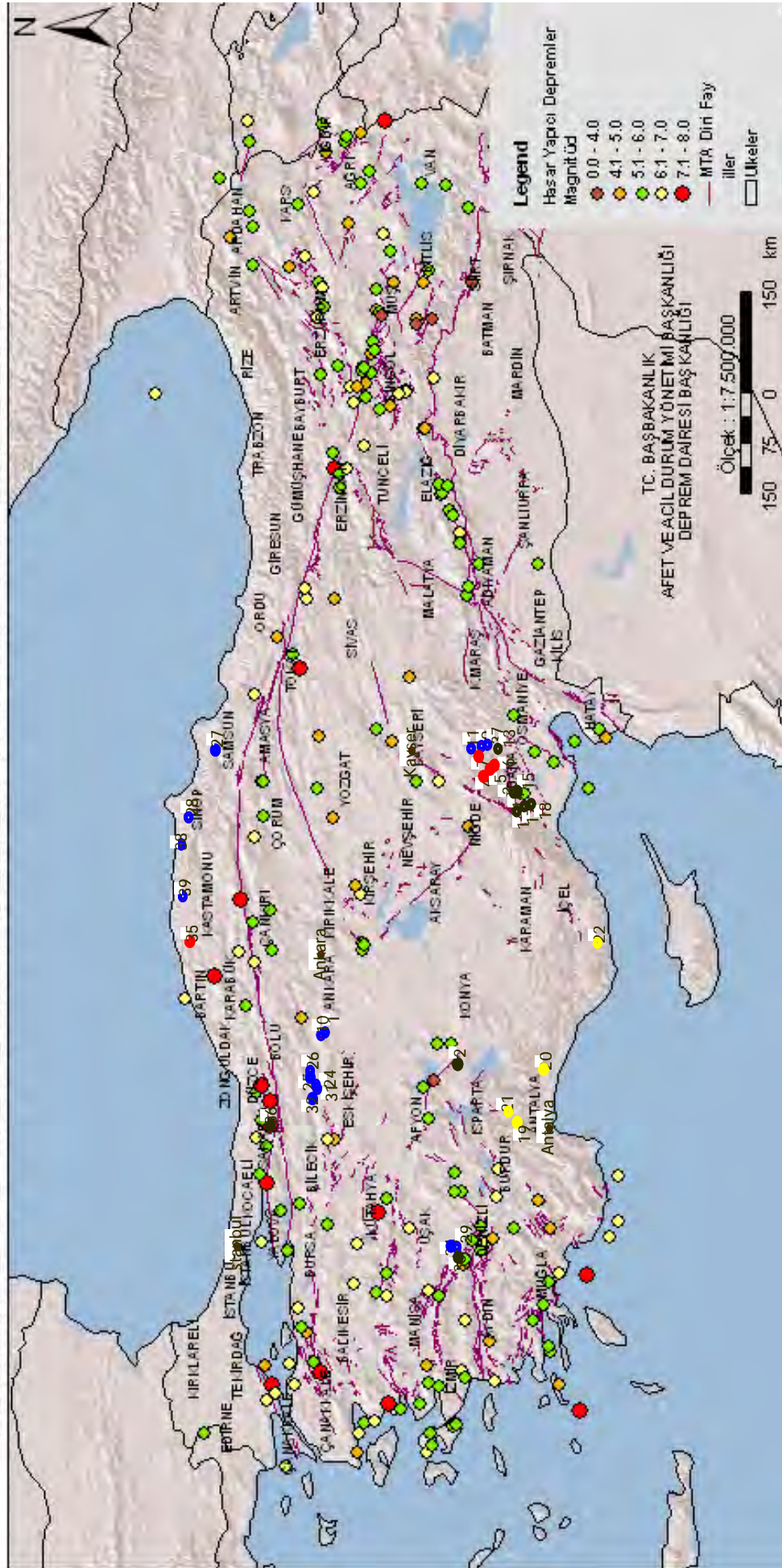
Active Faults of Turkey



(Source; MTA)

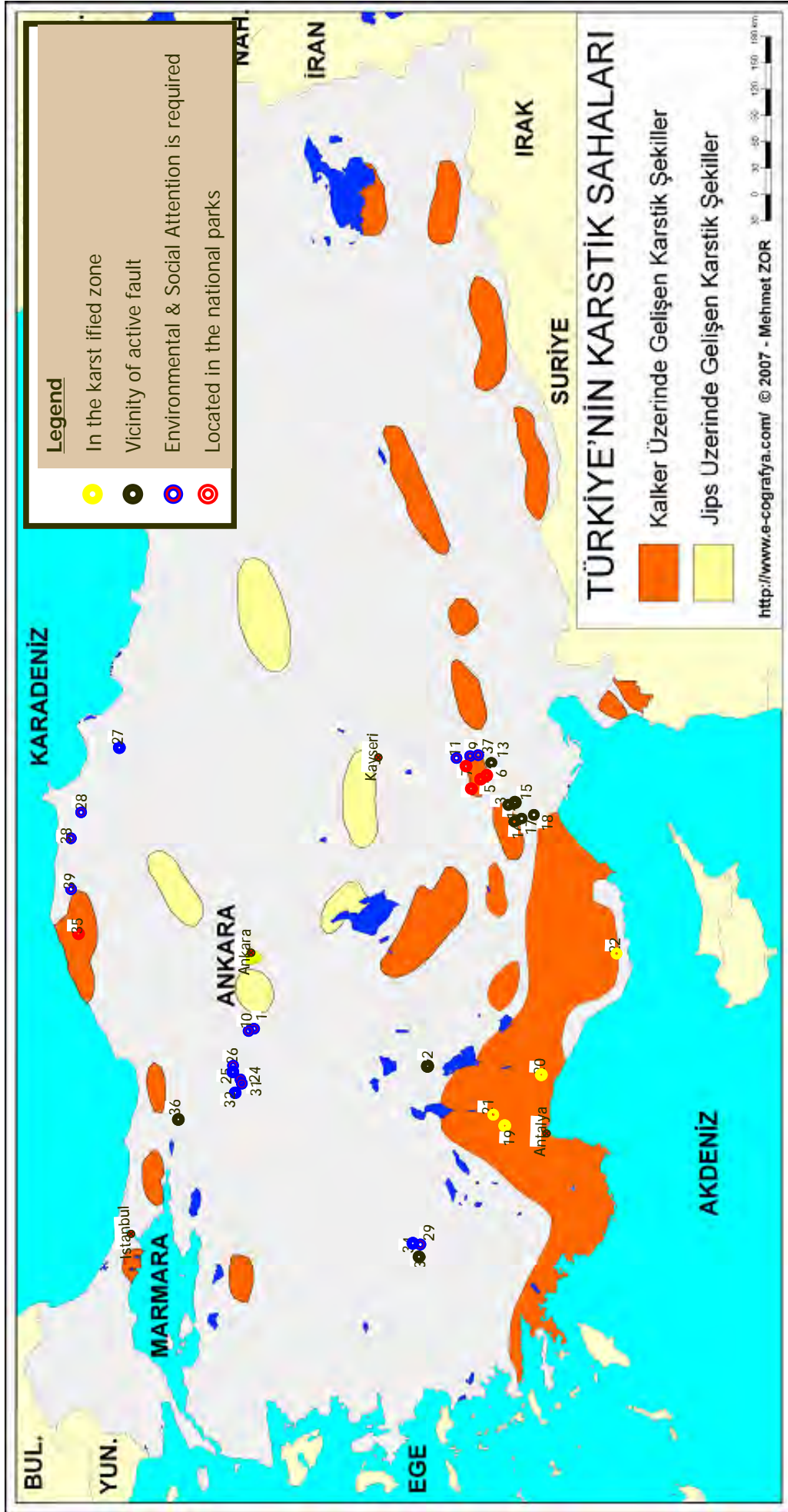
Epicenter distribution during 1900-2009

1900 - 2009 YILLARI ARASINDA TÜRKİYE'DE MEYDANA GELEN HASAR YAPICI DEPREMLER



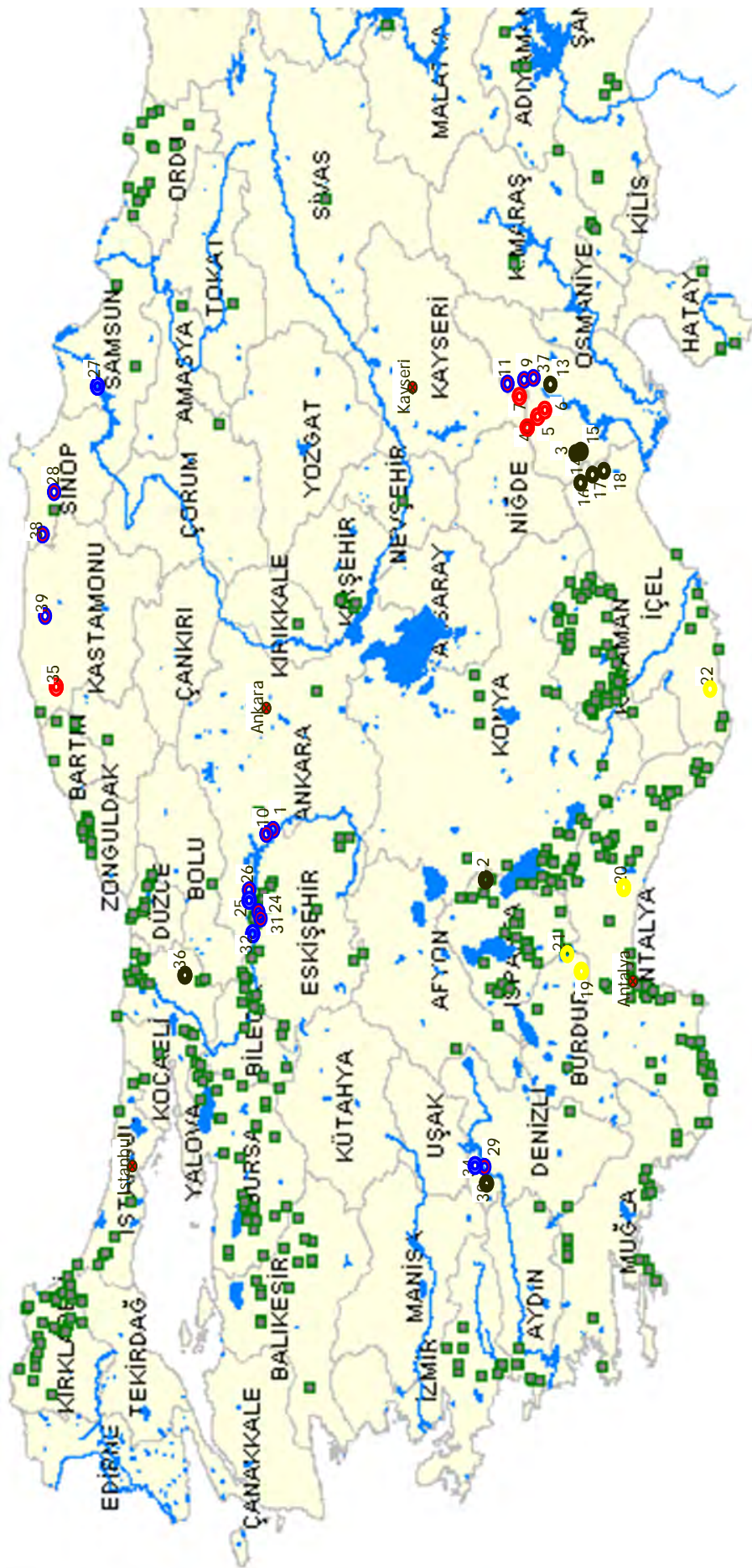
(Source; MTA)

Karstified zones caused by limestone and gypsum



(Source: MTA)

Limestone Cave Distribution

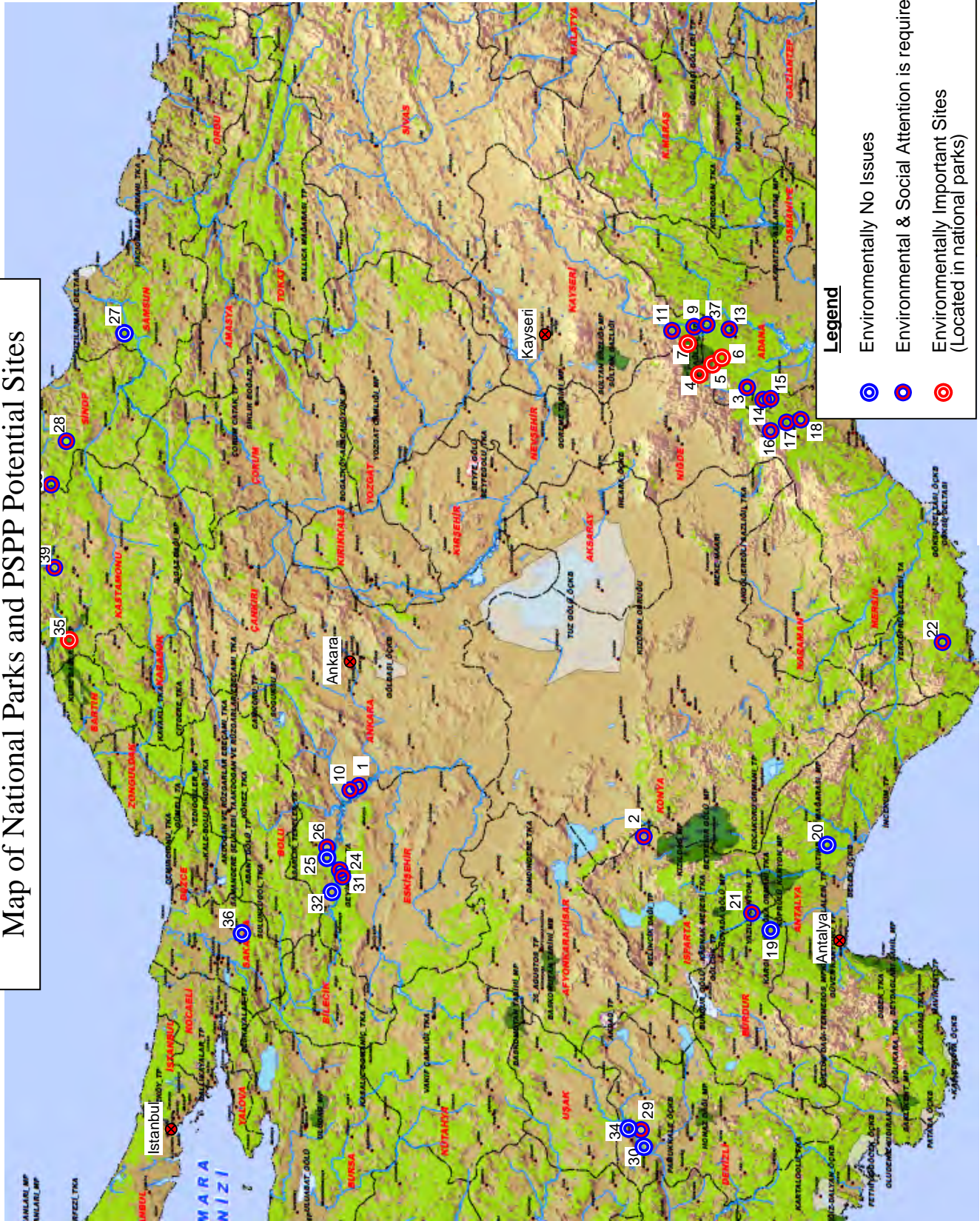


(Source: MTA)

Appendix 5-3-3

Location of National Park, Protected Area and PSPP Potential Sites

Map of National Parks and PSPP Potential Sites



Key Biodiversity Area (KBA)

Notes: Key biodiversity areas are places of international importance for the conservation of biodiversity at the global level. Criteria are as follows:

- 1) Globally threatened species;
- 2) Restricted-range species;
- 3) Congregations of species that concentrate in large numbers at particular sites during some stage in their life cycle; and
- 4) Biome-restricted assemblages.



Source : <http://www.sifiryokulus.org/english/index.php?page=kba>