Appendix 3

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
CAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CG	590.1	777.6	975.2	1070	1756	2146	2379	2307	2347	2177	1968	1948	1910	1930
CG.N	140.5	188.8	242.7	313.1	639.9	817.5	999.5	1124	1245	1223	1380	1676	1910	2151
CO2	0	18.46	18.61	22.64	24.66	29.22	31.73	36.63	34.4	38.31	34.41	36.08	37.69	45.26
COFN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CP	2248	2575	2749	3127	3793	4987	4970	5323	5431	5615	5360	5533	5943	6804
CP.N	435.1	526.7	598.8	752	1041	1457	1648	2173	2503	3027	3531	4653	5943	7771
CPI	5.5	5.8	6.2	6.9	8	8.8	10.2	12.8	13.9	15.7	19.4	23.8	28.3	32.5
CREX	0	-1475	-1625	-1918	-1957	-1687	-1921	-1791	-1566	-903	-271	-346	-773	-763
CREX.BD	3309	3979	4498	5277	5369	4671	5214	4867	4447	2407	796.7	714.6	1623	1719
CRPD	0	1689	1833	2142	2195	1950	2186	2078	1833	1203	531	540.5	979.7	986.6
CRPD.BD	3829	4540	5023	5861	6022	5350	5883	5663	5242	3168	1467	1316	2391	2442
CRPR	0	217.2	214.4	229.7	242.8	262.9	265.3	294.3	272.6	305.3	261.9	197.1	205.4	228.6
CRPT	0	-217	-214	-230	-243	-263	-265	-294	-273	-305	-262	-197	-205	-229
CRSC	0	3.28	5.95	5.63	4.05	0.07	0.34	6.73	5.4	5.3	1.86	2.57	-1.77	5.44
D.N	74.2	84.1	93.8	108.8	154.7	103.9	289.6	429.6	549.4	674.7	864.5	1034	1228	1474
DBLCA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DBLCR	-0.51	-0.12	-0.39	0.155	12.3	4.724	7.677	2.941	0.119	11.98	-2.44	-3.45	5.733	0.358
DBLER	0.511	0.122	0.392	-0.16	-12.3	-4.72	-7.68	-2.94	-0.12	-12	2.436	3.446	-5.73	-0.36
DBLTR	-0.12	0.43	0.33	1.84	12.62	7.97	8.44	6.9	8.29	10.5	1.65	-0.72	8.49	2.71
DBLTT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEX	1.55	2.49	2.9	5.58	19.24	19.67	21.21	21.53	18.66	20.2	12.5	12.8	20.33	20.81
DEXOL	1.27	2.15	2.46	4.95	18.65	19.07	20.67	20.9	18.12	19.39	11.85	12.46	20.05	20.46
DEXOT	0.28	0.34	0.44	0.63	0.58	0.59	0.54	0.63	0.54	0.81	0.65	0.34	0.28	0.36
DM	1.68	2.06	2.57	3.74	6.61	11.7	12.77	14.63	10.37	9.7	10.84	13.52	11.85	18.1
DMC	0.217	0.242	0.332	0.557	1.017	1.995	2.25	2.697	2.114	2.559	2.899	3.141	2.676	2.911
DMI	1.46	1.819	2.238	3.18	5.597	9.701	10.52	11.93	8.258	7.136	7.945	10.37	9.169	15.19
DMIC	0.391	0.483	0.642	0.906	1.331	3.489	3.803	4.019	2.908	1.835	1.738	2.149	2.308	4.352
DMII	1.069	1.336	1.596	2.274	4.266	6.212	6.713	7.91	5.35	5.301	6.207	8.225	6.861	10.84
DSERV	-0.4	-0.56	-0.73	-1.68	-0.29	-3.23	-0.75	-3.83	-8.16	1.498	-4.08	-2.73	-2.76	-2.35
DSETR	-0.39	-0.55	-0.72	-1.69	-0.32	-3.25	-0.76	-3.96	-8.17	1.483	-4.09	-2.73	-2.76	-2.35
DTRANS	0.004	0.004	0.004	-0	-0.03	-0.02	-0.02	-0.13	-0.02	-0.02	-0	0	0	0
DUM78	0	0	0	0	0	0	0	0	1	0	0	0	0	0
DUM7879	0	0	0	0	0	0	0	0	1	1	0	0	0	0
DUM79	0	0	0	0	0	0	0	0	0	1	0	0	0	0
DUM7982	0	0	0	0	0	0	0	0	0	1	1	1	1	0
DUM80	0	0	0	0	0	0	0	0	0	0	1	0	0	0
DUM8081	0	0	0	0	0	0	0	0	0	0	1	1	0	0
DUM81	0	0	0	0	0	0	0	0	0	0	0	1	0	0
DUM82	0	0	0	0	0	0	0	0	0	0	0	0	1	0
DUM83	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DUM8385	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DUM84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM85	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM8586	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM86	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM87	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM8889	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM89	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM90	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM9091	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM9092	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM9093	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM9192	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM92	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
CAP	0	0	0	0	0	0	0	0	0	0	0	0	0
CG	1811	1898	1508	1403	1396	1189	1337	1450	1552	1820	1953	0	0
CG.N	2190	2443	2371	2707	3199	3294	4054	5367	6927	13644	19798	0	0
CO2	48.75	53.44	48.38	52.11	52.95	64.79	68.93	78.11	83.73	82.51	87.18	0	0
COFN	0	0	0	0	0	0	0	0	0	0	0	0	0
CP	7170	7291	6544	6141	6172	6327	7564	8282	8725	8928	9199	0	0
CP.N	8927	9627	10439	12226	14906	18448	24071	31677	41187	51623	71911	0	0
CPI	35.9	38.4	47.5	60.6	78.1	91.8	100	120.7	150.1	184.4	249.3	372.4	0
CREX	-620	-652	-557	-635	-699	-727	-828	-910	-891	-907	-925	0	0
CREX.BD	1522	1568	1454	1710	1696	2120	2220	2420	2528	2600	2650	0	0
CRPD	867.6	907.5	796.6	891.7	933.3	1075	1192	1229	1333	1427	1382	0	0
CRPD.BD	2032	2192	2037	2298	2305	2814	3195	3428	3432	3425	3596	0	0
CRPR	251	262	233.7	230.6	247.2	305.4	317.7	360.9	362.8	415.1	453.1	0	0
CRPT	-251	-262	-234	-231	-247	-305	-318	-361	-363	-415	-453	0	0
CRSC	3.41	6.69	-5.95	-26.1	13.19	-43.1	-46.4	42.15	-79.3	-105	-3.68	0	0
D.N	1724	1867	2299	2886	3290	3957	5443	7601	9919	14276	0	0	0
DBLCA	0	0	0	0	0	0	0.295	6.032	4.699	5.563	-2.23	0	0
DBLCR	-0.41	-0.48	-5.16	-2.09	-1.87	-0.19	0.327	-9.45	-6.5	-3.77	4.585	0	0
DBLER	0.414	0.476	5.155	2.09	1.869	0.191	-0.92	1.319	1.639	-1.57	-1.13	0	0
DBLTR	2.53	3.02	-2.46	0.98	0.46	0.23	0.975	-6.53	-3.41	-1.21	6.375	0	0
DBLTT	0	0	0	0	0	0	-0.3	-2.1	-0.17	0.232	1.233	0	0
DEX	17.02	14.43	6.9	10.35	8.63	13.04	19.31	18.66	19.87	18.08	19.06	0	0
DEXOL	16.66	13.97	5.98	9.19	7.6	11.99	17.99	16.01	16.88	14.33	14.6	0	0
DEXOT	0.36	0.46	0.92	1.16	1.04	1.04	1.312	2.649	2.988	3.747	4.455	0	0
DM	14.49	11.41	9.36	9.37	8.18	12.81	18.33	25.19	23.27	19.29	12.86	0	0
DMC	2.317	1.576	1.695	1.662	1.479	2.344	2.505	3.441	3.141	2.233	0	0	0
DMI	12.18	9.832	7.66	7.707	6.698	10.46	16.22	26.24	26.41	17.65	0	0	0
DMIC	3.867	2.421	2.199	2.209	1.869	2.915	4.363	9.991	8.212	5.085	0	0	0
DMII	8.31	7.411	5.461	5.498	4.829	7.548	11.85	16.33	18.2	12.57	0	0	0
DSERV	-2.94	-3.5	-2.7	-3.07	-2.33	-2.92	-1.37	1.75	-5.09	-4.51	-2.99	0	0
DSETR	-2.94	-3.5	-2.7	-3.07	-2.33	-0.42	1.13	3.75	-3.09	-3.01	-1.79	0	0
DTRANS	0	0	0	0	0	2.5	2.5	2	1.996	1.5	1.2	0	0
DUM78	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM7879	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM79	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM7982	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM80	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM8081	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM81	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM82	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM83	0	0	0	0	0	0	0	0	0	0	0	0	0
DUM8385	1	1	0	0	0	0	0	0	0	0	0	0	0
DUM84	1	0	0	0	0	0	0	0	0	0	0	0	0
DUM85	0	1	0	0	0	0	0	0	0	0	0	0	0
DUM8586	0	1	1	0	0	0	0	0	0	0	0	0	0
DUM86	0	0	1	0	0	0	0	0	0	0	0	0	0
DUM87	0	0	0	1	0	0	0	0	0	0	0	0	0
DUM88	0	0	0	0	1	0	0	0	0	0	0	0	0
DUM8889	0	0	0	0	1	1	0	0	0	0	0	0	0
DUM89	0	0	0	0	0	1	0	0	0	0	0	0	0
DUM90	0	0	0	0	0	0	1	0	0	0	0	0	0
DUM9091	0	0	0	0	0	0	1	1	0	0	0	0	0
DUM9092	0	0	0	0	0	0	1	1	1	0	0	0	0
DUM9093	0	0	0	0	0	0	1	1	1	1	0	0	0
DUM91	0	0	0	0	0	0	0	1	0	0	0	0	0
DUM9192	0	0	0	0	0	0	0	1	1	0	0	0	0
DUM92	0	0	0	0	0	0	0	0	1	0	0	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
DUM93	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EFR	0	31.92	33.2	32.83	34.36	32.75	32.57	31.21	30.01	29.66	30.3	30.95	31.79	31.42
ELAG	0	0.07	0.08	0.13	0.16	0.19	0.22	0.25	0.26	0.3	0.4	0.51	0.68	0.89
ELAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ELCM	0	0.82	0.96	1.24	1.33	1.65	1.86	2.06	2.4	2.7	3.17	3.07	3.39	4.11
ELEL	0	3.23	4.04	5.48	6.57	7.51	8.36	9.26	10.22	11.43	11.69	13.17	15.48	17.94
ELFN	0	2.67	3.37	4.59	5.38	6.15	6.9	7.68	8.31	9.35	9.64	10.72	12.21	14.8
ELHO	0	0.58	0.72	0.84	0.95	1.2	1.54	1.9	2.23	2.76	3.01	3.42	4.32	5.21
ELIN	0	1.2	1.61	2.38	2.94	3.11	3.28	3.47	3.42	3.59	3.46	3.72	3.82	4.59
ELLO	0	-0.43	-0.51	-0.61	-0.84	-0.98	-1.02	-1.15	-1.41	-1.44	-1.8	-1.94	-2.07	-2.38
ELOU	0	-0.14	-0.16	-0.28	-0.35	-0.39	-0.44	-0.44	-0.49	-0.63	-0.39	-0.51	-0.62	-0.77
ELOW	0	-0.57	-0.67	-0.89	-1.19	-1.37	-1.46	-1.59	-1.9	-2.07	-2.19	-2.45	-2.69	-3.15
ELRE	0	1.4	1.68	2.08	2.28	2.85	3.4	3.96	4.63	5.46	6.18	6.49	7.71	9.32
ELSD	0	0.01	0	0	0	0.01	0	0.01	-0.01	-0.01	0.14	0	-0.58	0.01
EX	3505	4109	4699	5239	5159	4850	5404	4707	3457	2659	868.6	842.5	1726	1899
EX.N	153.7	240.6	298.5	642.4	1478	1440	1788	1754	1292	1706	883.1	945.3	1726	1878
EXOL	3355	3908	4503	5023	4938	4608	5173	4478	3275	2548	798.5	806.7	1697	1864
EXOL.BD	3519	4173	4675	5424	5532	4886	5330	4986	4575	2642	937.7	854.6	1804	1776
EXOL.N	127.6	203.4	257.2	583.6	1412	1364	1702	1652	1205	1643	832.8	914.8	1697	1840
EXOT	150.9	201.4	196.7	215.3	220.6	242.1	231.1	228.7	182.1	111.4	70.1	35.8	28.9	35.1
EXOT.N	26.1	37.2	41.3	58.8	65.6	76.1	85.9	101.3	86.4	62.3	50.3	30.5	28.9	38.7
EXREX	99.16	96.63	102.9	115.1	76.82	73.21	84.29	81.45	69.22	84.44	70.65	73.85	84.91	90.25
EXRM	94.29	96.75	97.7	92.35	102.2	96.33	96.86	102.6	106.4	94.97	100.5	93.2	105.6	102.2
EXROL	100.5	94.6	104.6	117.9	75.73	71.52	82.34	79.06	66.51	84.75	70.28	73.42	84.66	89.91
EXROT	93.21	109.4	93.86	93.33	113.1	129	159.1	160.8	160	76.91	77.38	89.71	103.2	107.5
FWPD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FWPR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAFN	0	88.15	55.02	67.27	71.49	66.51	66.48	97.55	27.1	46.7	24.19	25.43	40.86	44.24
GAIN	0	88.15	54.92	67.17	71.39	66.31	65.98	96.25	25.8	43.4	18.79	15.53	28.66	29.24
GANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GDP	3468	4622	5465	7590	9466	9441	11526	11588	10420	10551	9556	9321	10539	11936
GDP.N	660.7	861.4	1056	1596	3026	3377	4549	5364	5272	6163	6632	8009	10539	13377
GDPP	3223	5835	6596	8735	11136	11178	12450	13378	12731	12856	12207	12394	13432	14873
GNP	3367	4507	5424	7520	9395	9273	11353	11329	9926	10574	9560	9346	10539	11940
GNP.N	620.8	815.3	1027	1560	3015	3363	4533	5312	5086	6218	6658	8042	10539	13370
GPCE	124.5	199.4	269.7	370.2	825.7	969.4	1084	1248	1387	1495	1681	2032	2252	2523
GPDE	96.6	116	131.8	161.2	685.5	806.5	829.9	1244	820.7	566.2	570.6	674.7	915.9	1149
GPT	221.1	315.4	401.5	531.4	1511	1776	1914	2492	2208	2061	2252	2707	3167	3672
GROIL	85.6	155.3	178.2	311.3	1205	1247	1329	1590	1013	1220	888.8	1056	1690	1779
GROTR	26.2	20.8	21.3	22.5	31.9	64.5	72	92.8	220.2	203.8	119.5	210.9	214.3	218.4
GRPD	-38.7	-57.1	-99.4	-66.4	-116	-194	-170	-366	-509	-269	-903	-886	-650	-878
GRPSP	11.4	12	15	19.6	24.7	35.5	46.7	68.3	138.4	82.1	105.1	154.1	199.3	222.6
GRSTT	193.8	270.3	317.1	484.6	1420	1618	1791	2195	1838	1874	1454	1976	2717	3017
GRT	182.4	258.3	302.1	465	1395	1582	1744	2127	1699	1792	1349	1821	2518	2794
GRTAX	70.6	82.6	102.6	131.2	157.3	270.8	342.9	443.6	466	368.3	340.4	554.1	613.9	796.5
HDD	1541	1640	2264	1869	2095	1957	0	0	0	0	0	0	0	0
HYEL	0	-4.2	-5.5	-4.4	-5.3	-5.4	-6.2	-6.6	-9.8	-8.5	-8.8	-9.7	-10.1	-9.7
HYPD	0	4.2	5.5	4.4	5.3	5.4	6.2	6.6	9.8	8.5	8.8	9.7	10.1	9.7
HYPR	0	4.2	5.5	4.4	5.3	5.4	6.2	6.6	9.8	8.5	8.8	9.7	10.1	9.7
I	786.9	1043	1258	1415	1634	2457	3329	3231	2623	1816	1848	1724	1841	2552
I.N	184.8	220	293.3	387.1	541.5	948.1	1489	1784	1565	1177	1442	1528	1841	2870
IG	352.7	561.6	616.6	734.1	938.5	1249	1904	1781	1750	917.1	861.3	873	1057	1144
IG.N	100.6	121.5	142.2	206.1	323.4	485.7	863.7	1004	1062	611.3	687.3	782.7	1057	1262
IGC	252.3	457.1	527.9	598.7	663.9	921.5	1516	1313	1250	611.2	624	590.9	688.4	717.4
IGC.N	67.8	85.6	108	149.5	212	335	665.2	736.8	750.9	400.2	492.7	530.1	688.4	818.7
IGM	100.4	104.5	88.7	135.4	274.6	327.6	387.7	467.8	500	305.9	237.3	282.1	368.1	426.9
IGM.N	32.8	35.9	34.2	56.6	111.4	150.7	198.5	267.1	311.5	211.1	194.6	252.6	368.1	443.1
HP	0	0	0	0	0	0	0	0	82.1	82.5	77.3	87.5	100	121.9
HPCH	0	0	0	0	0	0	0	0	97	96.7	80	84.9	100	122.8

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
DUM93	0	0	0	0	0	0	0	0	0	1	0	0	0
EFR	31.42	30.75	31.56	31.6	31.68	32.3	32.48	33.55	32.85	32.07	34.55	0	0
ELAG	1.09	1.43	1.27	1.51	1.73	1.97	2.19	2.23	2.1	2.37	3.04	0	0
ELAU	0	0	0	0	0	0	0	0	0	0	0	0	0
ELCM	4.49	4.84	5.49	6.27	6.68	7.26	8.13	9.18	9.38	9.63	9.12	0	0
ELEL	20.05	21.59	22.96	25.02	25.74	28.65	32.28	35.11	37.5	41.94	46.53	0	0
ELFN	16.58	18.11	19.18	20.43	21.26	23.5	26.53	28.91	30.75	34.18	37.41	0	0
ELHO	5.92	6.65	7.3	8.04	8.23	9.29	10.2	11.25	11.47	13.02	13.21	0	0
ELIN	5.08	5.19	5.12	4.61	4.62	4.98	6.01	6.25	7.8	9.16	12.04	0	0
ELLO	-2.79	-2.75	-2.75	-3.36	-3.24	-4.22	-4.66	-4.45	-4.86	-5.66	-6.87	0	0
ELOU	-0.69	-0.72	-1.03	-1.27	-1.25	-1.51	-1.71	-1.75	-1.88	-2	-2.13	0	0
ELOW	-3.48	-3.47	-3.78	-4.63	-4.49	-5.73	-6.37	-6.2	-6.74	-7.66	-9	0	0
ELRE	10.41	11.49	12.79	14.31	14.91	16.55	18.33	20.43	20.85	22.65	22.34	0	0
ELSD	0.01	-0.01	0	0.04	0.01	0.58	0.62	0	-0.01	-0.1	-0.12	0	0
EX	1546	1400	1221	1557	1730	1866	2553	2529	2718	3155	3101	0	0
EX.N	1570	1251	533.2	837	1504	2773	5395	7439	9864	22617	31370	0	0
EXOL	1514	1364	1174	1531	1661	1745	2098	2320	2479	2829	0	0	0
EXOL.BD	1579	1608	1464	1713	1704	2158	2280	2508	2598	2670	2725	0	0
EXOL.N	1530	1204	479.1	751.5	808.9	1481	3500	3638	5403	16278	0	0	0
EXOT	32.1	36.2	46.3	26.5	68.5	121.3	154.3	208.9	239.3	326.4	0	0	0
EXOT.N	39.9	47.1	54.1	85.5	694.9	1292	1895	3802	4461	6339	0	0	0
EXREX	92.26	86.71	77.28	80.87	174.3	212.7	300.9	451.4	496.4	1251	1646	0	0
EXRM	110.8	111	99.89	101.4	214.7	280.5	362.8	328.5	529.4	1111	0	0	0
EXROL	91.85	86.19	80.12	81.77	106.4	123.5	210.7	263	320.1	1136	0	0	0
EXROT	110.8	102.4	58.8	73.71	668.2	1242	1447	1435	1492	1690	0	0	0
FWPD	0	0	0	0	0	0	0	0	0	0	0	0	0
FWPR	0	0	0	0	0	0	0	0	0	0	0	0	0
GAFN	61.28	61.93	46.37	49.88	54.79	91.85	102.7	110	141.6	136.5	157.6	0	0
GAIN	45.18	46.43	32.27	33.18	38.09	74.05	80.75	79.82	102.2	75.43	96.51	0	0
GANE	0	0	0	0	0	0	0	0	0	0	0	0	0
GDP	12044	12072	10249	10368	9468	9782	10930	12181	12879	13084	13336	0	0
GDP.N	14804	15775	16206	19949	22294	27787	36645	50107	66463	93610	1E+05	0	0
GDPP	15011	14633	12295	12250	11553	11792	12666	14111	14535	15441	0	0	0
GNP	12048	12058	10251	10359	9451	9797	10998	12378	12986	13371	13336	0	0
GNP.N	14793	15742	16188	19910	22177	27575	36381	50570	66396	91125	1E+05	0	0
GPCE	2476	2572	2410	2911	3394	3385	4285	5564	7784	13655	18841	0	0
GPDE	878	778.8	746.5	729.2	816.4	931.5	1766	2527	3192	7232	9071	0	0
GPT	3354	3351	3157	3641	4211	4317	6051	8091	10976	20887	27912	0	0
GROIL	1373	1189	416.8	766.2	667.9	1515	3369	3544	5141	14683	21480	0	0
GROTR	454.7	469	340.5	414.4	444.5	471.7	568.3	624	967.7	1614	2359	0	0
GRPD	-627	-659	-1375	-1430	-2112	-1142	-419	-1157	-1091	-528	1417	0	0
GRPSP	277.9	302.3	308.8	342.4	414.6	450	628.3	917.3	1284	1765	1809	0	0
GRSTT	3005	2994	2091	2553	2514	3625	6261	7851	11169	22124	31138	0	0
GRT	2727	2691	1782	2211	2099	3175	5633	6934	9885	20359	29329	0	0
GRTAX	898.7	1034	1025	1030	986.4	1188	1695	2765	3776	4061	5491	0	0
HDD	0	0	0	0	0	0	0	0	0	0	0	0	0
HYEL	-9	-8.7	-11.7	-13.1	-11.4	-11.7	-9.5	-11	-14.6	-15.3	-11.6	0	0
HYPD	9	8.7	11.7	13.1	11.4	11.7	9.5	11	14.6	15.32	11.6	0	0
HYPR	9	8.7	11.7	13.1	11.4	11.7	9.5	11	14.6	15.32	11.6	0	0
I	2562	2153	1646	1361	1143	1217	1379	1943	2077	2133	2205	0	0
I.N	3096	2759	2494	2662	2957	3709	5663	10844	14640	20657	0	0	0
IG	1078	890.7	760.7	569.7	464	468.8	613	797.6	934.3	889.7	0	0	0
IG.N	1262	1087	1094	1100	1201	1424	2616	4240	6003	9971	0	0	0
IGC	634.8	500.3	483.3	394.1	335.1	314.4	383.4	519.3	590.4	606.6	0	0	0
IGC.N	800.6	667.4	748.4	768	868.4	967.7	1739	2988	4054	6645	0	0	0
IGM	443	390.4	277.4	175.6	128.9	154.4	229.6	278.3	343.9	283.1	0	0	0
IGM.N	461.2	419.3	345.4	332.3	332.8	456.3	877.6	1252	1948	3326	0	0	0
HP	131.3	126.9	100.6	94.3	86.7	91	118.7	141.3	143.2	129.3	0	0	0
HPCH	134	127.9	108.7	113.6	95.6	116.6	161.6	176.2	167.1	158.7	0	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
HPFO	0	0	0	0	0	0	0	0	101	105.7	95.1	95.4	100	109.4
HPMN	0	0	0	0	0	0	0	0	85.9	73.5	70.2	88.9	100	136.8
HPNM	0	0	0	0	0	0	0	0	64.4	75.6	77.3	86.6	100	108.5
HPPA	0	0	0	0	0	0	0	0	90.2	90.6	64.3	74.3	100	116.4
HPPM	0	0	0	0	0	0	0	0	94.8	87.3	69.5	61.5	100	148.5
HPTX	0	0	0	0	0	0	0	0	63.6	72	76.3	93.3	100	115.6
HPWO	0	0	0	0	0	0	0	0	61.1	66.8	63.9	75.8	100	107
INPELE	0	-10.1	-12.2	-16.7	-19.1	-22.9	-25.7	-29.7	-34.1	-38.5	-38.6	-42.6	-48.7	-57.1
INT	0	0	0	0	0	0	3.7	5.6	6.3	8.5	10.2	10.6	11.1	10.6
IP	434.2	481	640.9	681.2	695.5	1208	1425	1450	873.1	898.7	987.1	851.2	784.3	1408
IP.N	84.2	98.5	151.1	181	218.1	462.4	625.7	780.1	502.2	565.2	754.8	745.3	784.3	1608
IPC	323.5	327.9	405.5	453.5	470.4	669.2	909	931	781.5	827	866.2	706.9	679.7	1114
IPC.N	51.7	51.3	69.9	95.6	126.7	214.6	361.8	483.7	445.7	515.7	656	616.2	679.7	1304
IPM	110.7	153.1	235.4	227.7	225.1	538.7	515.8	519.1	91.6	71.7	120.9	144.3	104.6	294.1
IPM.N	32.5	47.2	81.2	85.4	91.4	247.8	263.9	296.4	56.5	49.5	98.8	129.1	104.6	304.8
ISDUM	0	0	0	0	0	0	0	0	0	0.5	1	1	1	1
J	150.1	99.7	182.7	151.8	42.5	-401	-300	-136	-468	-37.2	726.9	337.5	-165	159.1
J.N	29.2	20.8	40.3	37.8	12.4	-122	-104	-53.9	-206	-20.1	519.7	294.6	-165	226.2
JSD	-3113	-3224	-3451	-2289	-1541	-3007	-2405	-1495	-1759	-512	684.7	562.6	369.5	633.6
JSD.N	-95	-115	-126	-154	1.1	-158	-139	29.6	-230	-48	485	467.2	369.5	556.3
KIG	2190	2634	3106	3669	4403	5405	7006	8398	9679	10049	10326	10580	10984	11432
KIGC	1766	2127	2538	2995	3491	4215	5492	6498	7381	7570	7747	7868	8063	8260
KIGM	424.2	506.8	568.8	673.6	911.5	1190	1514	1900	2298	2479	2579	2713	2921	3172
KIP	2678	3007	3475	3954	4417	5361	6467	7535	7960	8372	8838	9134	9334	10132
KIPC	1955	2172	2452	2762	3068	3552	4245	4920	5403	5896	6397	6705	6962	7630
KIPM	722.9	835.2	1023	1192	1349	1809	2222	2615	2557	2475	2442	2429	2372	2503
L	7059	7244	7639	7852	8383	8584	8799	8996	9196	9402	9611	10001	10302	10570
LGCM	0	0	0.07	0.07	0.07	0.14	0.35	0.92	0.92	2.32	3.8	6.97	8.59	10.48
LGEL	0	-1.01	-2.14	-4.48	-5.85	-6.68	-6.92	-9.5	-8.55	-14.5	-14.1	-14.6	-19.7	-22.4
LGEX	0	-35.6	-51.7	-54.7	-57.5	-60.3	-58.4	-59.1	-32.4	-22	0	0	0	0
LGFN	0	12	13.1	15.4	14.2	15	16.7	17.1	16.2	23.5	19.6	21.2	22	25.2
LGHO	0	0	0.03	0.03	0.03	0.06	0.15	0.38	0.38	0.98	1.6	2.93	3.61	4.52
LGIN	0	12	13	15.3	14.1	14.8	16.2	15.8	14.9	20.2	14.2	11.3	9.8	10.2
LGLG	0	48.61	66.94	74.58	77.55	81.98	82.02	85.7	57.15	59.97	33.72	35.83	41.69	47.64
LGOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LGPR	0	-35.6	-51.7	-54.7	-57.5	-60.3	-58.4	-59.1	-32.4	-22	0	0	0	0
LGRE	0	0	0.1	0.1	0.1	0.2	0.5	1.3	1.3	3.3	5.4	9.9	12.2	15
LGSD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LN	7339	7521	7917	8129	9173	9479	9796	10061	10333	10612	10899	11368	11753	12108
M	550.2	657.5	764.6	971	1335	1991	2151	2484	1679	1204	1175	1290	1251	1883
M.N	158.4	199.3	251.1	345.4	675.6	1127	1237	1501	1103	921.2	1089	1260	1251	1851
MACPR	230.2	278.4	364.7	494.2	704.6	1093	1517	1869	2199	2577	3060	3220	3485	4257
MACPU	147	176.4	221.4	298.4	245.9	624.8	960.2	1039	1435	2069	3317	4200	5203	6140
MAFA	28.8	65.3	98.6	171.5	549	558.9	729.5	898.8	882.5	1213	905.6	1212	1104	1037
MALC	113.9	168.7	201.8	329.9	682.9	795.7	986.2	1262	1208	1301	1385	1260	1836	1623
MAOTR	0	94.3	160.6	232.7	384.2	612	900.3	1134	1361	1647	1633	2267	3261	3490
MASUTL	406	614.4	845.3	1197	1884	2888	4107	4941	5878	7507	8916	10897	13053	14924
MATL	519.9	783.1	1047	1527	2567	3684	5093	6203	7087	8807	10302	12157	14888	16547
MC	71.07	77.24	98.77	144.6	205.4	339.5	379	458	342.2	317.7	314.2	299.7	282.5	302.8
MC.N	20.46	23.41	32.44	51.44	104	192.2	217.9	276.6	224.8	243	291.2	292.8	282.5	297.6
MI	478.2	580.6	665.8	825.6	1131	1651	1772	2026	1337	885.9	861	989.7	967.9	1580
MI.N	137.7	176	218.7	293.7	572.1	934.5	1019	1223	878.3	677.7	798.2	966.9	967.9	1553
MLADLC	5.3	9.5	14.1	30.7	158.3	99.6	115.1	169.5	172.8	166.9	203.7	208.8	139.9	360.6
MLCP	44.5	48	59.5	81.5	154.4	210.2	261.8	332	391.9	0	477.1	435	455.9	572.9
MLDF	57.2	99.9	132.5	211.1	384.9	518	840.1	700.9	781.5	1082	894.5	1097	1297	1415
MLFL	43.4	43.8	43.2	64.4	90.7	150.3	216.4	267.6	292.6	225.8	222.5	207.1	218.3	272.6
MLIMDP	7.5	10.3	15.7	26.1	22.1	28.2	36	34.3	30.1	29.2	26	18.8	23.9	31.6
MLLC	113.9	168.7	201.8	329.9	682.9	795.7	986.2	1262	1208	1301	1385	1260	1836	1623
MLM2	235.7	296.3	399.4	515.8	810.1	1446	1594	2097	2579	3550	4508	5236	6431	7514

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
IIPFO	114	120.7	104.1	95.2	92.5	93.3	108.6	120.2	125.2	120.3	0	0	0
IIPMN	151	133.4	83.6	71.6	65.2	64.6	104.8	153.6	158.3	128	0	0	0
IIPNM	114.7	116.6	108.5	115.3	108.4	119.2	135.1	143.8	154.6	148.8	0	0	0
IIPPA	131.7	117.8	81.2	77.7	88.2	90.5	134.4	123.1	126.1	120.9	0	0	0
IIPPM	171.4	116.1	133.6	105	108.1	123	202.6	251.8	255.5	227.2	0	0	0
IIPTX	120.2	121.8	102.3	95.3	84.8	82.2	90.9	102.8	100.3	93.5	0	0	0
IIPWO	116.2	102.4	96.4	99.6	97.2	114.2	112.2	114.1	125.1	108.2	0	0	0
INPELE	-63.8	-70.2	-72.8	-79.2	-81.3	-88.7	-99.4	-105	-114	-131	-135	0	0
INT	9	8	8.5	8.5	8.5	8.5	9	9	10	11.5	11.5	14	0
IP	1484	1263	885.2	790.9	679.3	748	765.8	1136	1143	1244	0	0	0
IP.N	1834	1672	1401	1562	1756	2285	3046	6604	8638	10687	0	0	0
IPC	1099	1036	842.2	721.6	558.9	549.8	534.7	642.6	637	663.6	0	0	0
IPC.N	1433	1429	1347	1431	1445	1700	2163	3387	4136	5350	0	0	0
IPM	385	226.2	43	69.3	120.4	198.2	231.1	493.7	506	580.1	0	0	0
IPM.N	400.8	242.9	53.5	131.1	310.7	585.4	883.7	3217	4502	5337	0	0	0
ISDUM	1	1	1	1	1	1	1	1	1	1	1	1	1
J	318	286	411.3	697.8	288.3	549.2	821.8	820.7	1010	80.5	-609	0	0
J.N	507.8	562	1098	2417	1296	2891	4827	5806	8867	6499	1948	0	0
JSD	602.7	635.9	277.5	911.8	-182	128.1	-327	-371	-566	-1591	-2288	0	0
JSD.N	626.5	961.7	1305	2467	1485	3157	4254	4529	6164	6499	1948	0	0
KIG	11769	11875	11822	11554	11169	10785	10545	10477	10535	10534	0	0	0
KIGC	8349	8279	8179	7977	7709	7420	7201	7111	7090	7083	0	0	0
KIGM	3420	3596	3643	3577	3460	3365	3344	3366	3445	3452	0	0	0
KIP	10953	11497	11620	11623	11495	11421	11346	11628	11886	12223	0	0	0
KIPC	8241	8748	9025	9153	9097	9018	8910	8901	8872	8859	0	0	0
KIPM	2712	2749	2595	2470	2398	2403	2436	2727	3014	3364	0	0	0
L	10847	10925	11036	11305	11450	11781	12189	12641	13450	14943	13863	0	0
LGCM	10.97	7.93	3.71	9.88	6.82	2.14	2.63	3.63	4.73	6.6	7.5	0	0
LGEL	-24.1	-24.8	-23.9	-33.8	-35.5	-42.5	-51.5	-56.4	-61.1	-71.2	-77.6	0	0
LGEX	0	0	0	0	0	0	-13.1	-19.7	-3.17	0	-0.84	0	0
LGFN	31.2	30.3	28.7	32.9	34	48.8	67.9	94.5	116.5	109	138.8	0	0
LGHO	5.13	7.57	10.39	6.82	9.88	15.66	19.27	26.57	34.65	54.49	53.58	0	0
LGIN	15.1	14.8	14.6	16.2	17.3	31	46	64.3	77.1	47.95	77.73	0	0
LGLG	55.28	55.05	52.6	66.69	69.51	164.6	213.4	263.7	280.5	254.5	259	0	0
LGOW	0	0	0	0	0	-73.2	-80.9	-93.1	-99.8	-74.3	-41.8	0	0
LGPR	0	0	0	0	0	0	-13.1	-19.7	-3.17	0	-0.84	0	0
LGRE	16.1	15.5	14.1	16.7	16.7	17.8	21.9	30.2	39.38	61.09	61.08	0	0
LGSD	0	0	0	0	0	0.01	0	0.04	0	-0.03	0.01	0	0
LN	12475	12647	12855	12997	13374	13756	14167	14592	15181	16690	15367	0	0
M	1638	1305	946.4	1006	791.4	945.7	1274	1651	1627	1362	834.5	0	0
M.N	1605	1266	935	950.3	1756	3594	6792	9749	12319	21431	0	0	0
MACPR	4501	5082	5578	6349	7479	9698	13157	18297	23590	30650	30776	0	0
MACPU	7056	7646	9446	11027	13252	14683	16096	17664	19919	31813	32012	0	0
MAFA	734.2	850.5	874.6	830.7	800.3	933.3	1612	1626	1857	11227	12314	0	0
MALC	1341	1466	1311	1401	1368	2006	2977	3878	5118	41025	42466	0	0
MAOTR	3567	4430	5139	6474	8606	9963	11538	16029	21056	40150	39577	0	0
MASUTL	15858	18008	21039	24680	30137	35278	42403	53616	66421	1E+05	1E+05	0	0
MATL	17199	19475	22350	26081	31505	37284	45381	57494	71540	2E+05	2E+05	0	0
MC	261.9	180.3	171.4	178.4	143.1	173.1	170.5	191.4	219.6	157.7	0	0	0
MC.N	256.7	174.9	169.3	168.6	317.5	657.6	908.9	1130	1663	2481	0	0	0
MI	1376	1125	774.5	827.1	648	772.4	1104	1460	1847	1246	0	0	0
MI.N	1349	1091	765.2	781.6	1438	2935	5884	8618	13980	19611	0	0	0
MLADLC	299.9	230.8	296.5	313.4	317.4	438.8	564.9	459.8	523.4	2223	2223	0	0
MLCP	574.9	543.5	535	524.1	481.1	490.5	449.3	690.1	1275	4726	4753	0	0
MLDF	1493	1394	1494	1784	1951	2131	2824	3417	3947	6206	5595	0	0
MLFL	100.8	107.6	130.3	123.3	139.8	177.6	259.9	442.7	508.4	12297	13415	0	0
MLIMDP	22	19.5	11.9	11.4	10.3	21.8	29.9	27.3	19.4	12	12	0	0
MLLC	1341	1466	1311	1401	1368	2006	2977	3878	5118	41025	42466	0	0
MLM2	7967	9002	10723	12668	15688	18753	22970	28628	35866	48125	48135	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
MLOTR	12.4	106.6	180.9	267.2	463.2	736.4	1044	1339	1631	2453	2585	3694	4300	4757
MLSUTL	406	614.4	845.3	1197	2084	3188	4107	4941	5878	7507	8916	10897	12955	14924
MLTL	519.9	783.1	1047	1527	2767	3984	5093	6203	7087	8807	10302	12157	14790	16547
NAGELE	1.663	1.821	2.342	2.663	3.097	3.374	3.9	4.307	4.17	4.73	6.2	8.206	10	13
NBUS	4.272	4.77	5.415	6.071	6.736	7.453	8.542	9.877	10.61	11.16	11.75	12.61	13.16	14.57
NBUSM	12.1	13.51	15.34	17.2	19.09	21.12	24.2	27.99	30.07	31.62	33.3	35.71	37.29	41.27
NCAR	277.8	324.1	388.7	462.5	579.7	757.7	941.9	1162	1265	1340	1417	1462	1485	1530
NCMELE	278	306	334	366	400	442	495	525	546	594	663	762	842	914
NCYC	180.2	207.2	225.1	242.7	258.1	254.2	266.2	239.5	237.4	196.2	297.9	437.1	451.5	449
NFA	-100	-116	-41.7	-70.1	-71.3	-168	-173	-259	-494	22.8	4.1	25	0	4.3
NFA.N	-39.9	-46.1	-29.4	-35.5	-10.5	-14.7	-15.6	-52.4	-186	54.8	25.6	32.9	0	-6.6
NGEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGFN	0	76.15	41.92	51.87	57.29	51.51	49.78	80.45	10.9	23.2	4.59	4.23	18.86	19.04
NGIN	0	76.15	41.92	51.87	57.29	51.51	49.78	80.45	10.9	23.2	4.59	4.23	18.86	19.04
NGLG	0	-49.9	-68.5	-76.5	-79.7	-84.1	-84.4	-88.3	-59.6	-63.7	-37.1	-39.4	-45.8	-52.4
NGPD	0	257.9	257.8	298.1	309.5	281.9	312.9	418	273.7	259.2	101.5	97.58	185.4	173.3
NGPR	0	126	110.4	128.4	137	135.6	134.1	168.8	70.5	86.93	41.64	43.59	64.67	71.4
NGSC	0	-132	-147	-170	-173	-146	-179	-249	-203	-172	-59.8	-54	-121	-102
NGSD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHO	5721	5807	5894	6031	5941	6381	6712	6783	7042	7428	7860	8148	8436	8798
NHOELE	1089	1195	1318	1510	1714	1953	2275	2553	2828	3208	3642	4189	4724	5182
NLN	599.4	772.5	1007	1534	2821	3084	4136	4695	4360	5538	5632	6883	9107	11450
NINELE	5.981	7.405	8.678	9.002	7.702	9.799	8.488	12.44	12.45	12.89	14	15.85	8	8
NITAX.N	57.9	66.3	78.2	85	39.4	74.9	107.2	186.9	176.5	4.8	161.3	125	204.4	446.5
NOFN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOPD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOPR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOX	0	124.3	115.1	144.6	160.8	192.7	205.5	243.9	211.9	234.2	213.6	217.8	239.9	282.8
NTRKL	24.75	27.84	31.13	34.66	39.65	54.34	69.73	91.31	106.7	113.7	120.6	125	129.8	149.6
NTRKS	37.13	41.75	46.69	51.99	59.47	81.51	104.6	137	160	170.6	181	187.5	194.7	224.3
NUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OR1	0	87.26	86.68	84.05	85.84	79.53	80.48	69.04	62.04	61.2	44.11	47.47	98.31	93.13
OR2	0	91.7	90.92	89.23	90.74	84.92	84.58	71.98	66.37	72.98	52.76	37.9	80.81	87.47
ORELE	33.55	26.79	29.56	37.16	36.65	40.27	40.48	35.04	24.34	26.11	20.8	21.9	26.67	30.41
OTCM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTFN	0	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5	3.5
OTHO	0	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5	3.5
OTHOOLD	21.5	20.49	19.37	18.97	17.85	17.24	17.24	17.14	17.85	17.14	17.85	17.04	18.36	24.84
OTIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTPD	0	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5	3.5
OTPR	0	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5	3.5
OTRE	0	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5	3.5
OTSD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	19.05	18.64	19.33	21.02	31.97	35.77	39.47	46.29	50.6	58.41	69.41	85.93	100	112.1
PC	19.35	20.46	21.78	24.05	27.45	29.22	33.16	40.82	46.09	53.91	65.88	84.09	100	114.2
PCG	23.81	24.28	24.89	29.27	36.43	38.1	42.01	48.74	53.07	56.17	70.1	86.05	100	111.5
PE	4.38	5.86	6.35	12.26	28.65	29.69	33.08	37.26	37.36	64.14	101.7	112.2	100	98.92
PELE	0	0	0	0	1.42	1.53	1.7	2.17	2.28	2.34	2.82	3.8	4.8	4.4
PELEA	0	0	0	0	0	0	0	0	0	0	0	2.5	1.5	1.3
PELEC	0	0	0	0	0	0	0	0	0	0	0	2.7	3.6	5
PELEH	0	0	0	0	0	0	0	0	0	0	0	4.5	5.1	3.8
PELEI	0	0	0	0	0	0	0	0	0	0	0	1.9	2.1	2.6
PEW	35	37.7	40.4	48.3	59.7	62.3	64.7	70.9	81.5	92.6	100.2	93.7	90.3	87
PEX	4.38	5.86	6.35	12.26	28.65	29.69	33.08	37.26	37.36	64.14	101.7	112.2	100	98.92
PEXOL	3.804	5.205	5.712	11.62	28.6	29.6	32.9	36.9	36.8	64.5	104.3	113.4	100	98.7
PEXOT	17.3	18.47	21	27.31	29.74	31.43	37.17	44.29	47.45	55.92	71.75	85.2	100	110.3
PG	25.57	23.17	24.18	28.78	35.75	38.39	43.5	52.06	56.33	59.28	73.05	87.16	100	111
PGAS	0	0	0	0	0	0	0	0	0	2.126	2.053	4.733	6.38	7.269

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MLOTR	5401	6711	7849	9256	11550	13265	15270	19950	24283	40242	40546	0	0
MLSUTL	15858	18008	21039	24680	30137	35278	42367	53616	66421	1E+05	1E+05	0	0
MLTL	17199	19475	22350	26081	31505	37284	45345	57494	71540	2E+05	2E+05	0	0
NAGELE	17	20	19	20	21	23	25	27	50	40	32	0	0
NBUS	16.44	18.36	19.17	19.51	19.44	19.62	19.72	21.09	0	0	0	0	0
NBUSM	46.58	52.03	54.32	55.27	55.09	55.59	55.88	59.75	0	0	0	0	0
NCAR	1590	1612	1561	1500	1427	1350	1267	1217	0	0	0	0	0
NCMELE	975	1071	1111	1206	1269	1327	1364	1452	1566	1447	1328	0	0
NCYC	456.4	450	433.9	404.9	350.8	305.6	255.6	231.5	0	0	0	0	0
NFA	4	-14.7	1.8	-8.9	-16.9	15.5	67.3	196.7	106.5	287	0	0	0
NFA.N	-11.1	-33.8	-18.7	-39.3	-116	-212	-263	462.5	-66.6	-2485	0	0	0
NGEX	0	0	0	0	0	0	0	0	0	0	0	0	0
NGFN	30.08	31.63	17.67	16.98	20.79	43.05	34.75	15.52	25.11	27.48	18.78	0	0
NGIN	30.08	31.63	17.67	16.98	20.79	43.05	34.75	15.52	25.11	27.48	18.78	0	0
NGLG	-60.8	-60.5	-54.8	-73.3	-76.4	-181	-233	-288	-312	-277	-292	0	0
NGPD	193.2	217.1	161.4	194.5	219.5	292.5	350.7	386	453.3	448.4	458	0	0
NGPR	90.83	92.12	72.47	90.26	97.18	223.9	268	303.2	336.8	304.5	311	0	0
NGSC	-102	-125	-89	-104	-122	-68.6	-82.7	-82.8	-117	-144	-147	0	0
NGSD	0	0	0	0	0	0	0	0	0	0	0	0	0
NHO	9126	9654	9757	9954	10156	10361	10571	10785	11004	11228	11456	0	0
NHOELE	5652	6182	6590	6919	7484	7941	8193	8549	8835	9380	9924	0	0
NLN	12507	13267	13297	16359	18347	22860	30049	41534	54415	76756	0	0	0
NINELE	9	10	11	11	7	6	7	7	7	18	46	0	0
NITAX.N	561.3	607.6	612.9	665	550.5	758.3	889.6	1435	2062	91.9	0	0	0
NOFN	0	0	0	0	0	0	0	0	0	0	0	0	0
NOPD	0	0	0	0	0	0	0	0	0	0	0	0	0
NOPR	0	0	0	0	0	0	0	0	0	0	0	0	0
NORE	0	0	0	0	0	0	0	0	0	0	0	0	0
NOX	305.4	333.4	304.7	325.6	331.5	360.7	372.7	413.5	436.5	444.8	490	0	0
NTRKL	171.3	193.2	197.5	198.1	192.8	186.3	182.3	189	0	0	0	0	0
NTRKS	256.9	289.8	296.2	297.2	289.1	279.5	273.4	283.5	0	0	0	0	0
NUEL	0	0	0	0	0	0	0	0	0	0	0	0	0
OR1	100.5	105.2	90.8	88	99.85	86.22	93.09	81.52	85.91	80.37	86.64	0	0
OR2	104.3	107	97.12	97.04	103.9	103.3	107	100.9	100.8	99.7	111.1	0	0
ORELE	33.63	38.04	39.32	39.56	43.24	40.24	47.31	50.56	46.67	47	0	0	0
OTCM	0	0	0	0	0	0	0	0	0	0	0	0	0
OTFN	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.39	0	0
OTHO	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.39	0	0
OTHOOLD	22.37	20.28	23.57	26.16	33	31.68	24.9	0	0	0	0	0	0
OTIN	0	0	0	0	0	0	0	0	0	0	0	0	0
OTPD	3.5	3.5	3.5	3.3	3.4	3.2	3.2	3.3	3.5	3.5	3.39	0	0
OTPR	3.5	3.5	3.5	3.3	3.4	3.2	3.2	3.3	3.5	3.5	3.39	0	0
OTRE	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.39	0	0
OTSD	0	-0.1	-0.2	0.1	-0.2	0	0.1	0	0	0	0	0	0
P	122.9	130.7	158.1	192.4	235.5	284.1	335.3	411.4	516.1	715.5	973.1	0	0
PC	124.5	132.1	159.5	199.1	241.5	291.6	318.3	382.5	472	578.2	781.7	0	0
PCG	120.9	128.7	157.2	193	229.1	276.9	303.3	370.1	446.3	749.6	1014	0	0
PE	101.6	89.38	43.68	53.75	86.95	148.6	211.4	294.2	362.9	716.9	0	0	0
PELE	4.87	4.8	4.92	5.17	5.35	5.37	5.68	8.5	10.5	17	28.5	0	0
PELEA	1.3	1.3	2	2	2	2	3	3	3	2.5	3.5	0	0
PELEC	5	5	4.9	7.9	8.45	8.45	8.45	12.5	15.5	24	58.5	0	0
PELEH	4	4	4.2	5.23	5.35	5.3	5.4	7	9.7	13.5	14.1	0	0
PELEI	1.6	1.6	1.7	3.5	3.7	3.5	4.4	9.1	9.5	18	40	0	0
PEW	84.5	90.5	105	116	121.8	122.5	133.8	129.8	134.5	129.5	0	0	0
PEX	101.6	89.38	43.68	53.75	86.95	148.6	211.4	294.2	362.9	716.9	1012	0	0
PEXOL	101.1	88.3	40.8	49.1	48.7	84.9	166.8	156.8	218	575.5	0	0	0
PEXOT	124.3	130.1	116.9	322.6	1014	1065	1228	1820	1864	1942	0	0	0
PG	119.5	126.6	152.7	193	236.5	284.5	342.1	427.4	520	871.4	0	0	0
PGAS	7.828	8.041	7.735	10.9	11.45	13.76	16.72	27.54	30.37	0	0	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
PGASC	0	0	0	0	0	0	0	0	0	2.2	2.2	5	5	5
PGASE	0	0	0	0	0	0	0	0	0	0.9	0.9	2	2	2
PGASH	0	0	0	0	0	0	0	0	0	2.2	2.2	5	5	5
PGASI	0	0	0	0	0	0	0	0	0	1.1	1.1	2	2	2
PGASO	0	0	0	0	6	6	6	8	10	10	30	30	30	30
PGC	23.81	24.28	24.89	29.27	36.43	38.1	42.01	48.74	53.07	56.17	70.1	86.05	100	111.5
PGNP	23.31	22.14	22.54	23.76	32.33	36.81	40.38	46.61	53.35	58.55	69.74	83.85	94.93	109.3
PGOIL	0	0	0	0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	3.01	3.01
PHO	0	0	0	0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
PI	23.48	21.1	23.32	27.35	33.14	38.59	44.74	55.22	59.65	64.79	78.02	88.62	100	112.5
PIG	28.52	21.63	23.06	28.08	34.46	38.88	45.36	56.37	60.71	66.66	79.8	89.66	100.1	110.3
PIGC	26.87	18.73	20.46	24.97	31.93	36.35	43.87	56.11	60.08	65.48	78.96	89.71	100	114.1
PIGM	32.67	34.35	38.56	41.8	40.57	46	51.2	57.1	62.3	69.01	82.01	89.54	100.2	103.8
PIP	19.39	20.48	23.58	26.57	31.36	38.28	43.91	53.8	57.52	62.89	76.47	87.56	100	114.3
PIPC	15.98	15.65	17.24	21.08	26.93	32.07	39.8	51.95	57.03	62.36	75.73	87.17	100	117.1
PIPM	29.36	30.83	34.49	37.51	40.6	46	51.16	57.1	61.68	69.04	81.72	89.47	100	103.6
PJ	19.45	20.86	22.06	24.9	29.18	30.5	34.6	39.69	44	54.03	71.5	87.29	100	142.2
PJSD	3	4	4	7	0	5	6	-2	13	9	71	83	100	88
PKERO	0	0	0	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PM	28.79	30.31	32.84	35.57	50.6	56.6	57.5	60.4	65.7	76.5	92.7	97.7	100	98.3
PNFA	39.82	39.91	70.5	50.64	14.73	8.76	9.04	20.25	37.6	240.4	624.4	131.6	0	-153
POIL	1.32	1.64	1.64	1.82	10.28	10.52	11.29	12.67	12.65	22.17	35.46	34.48	28.75	27.46
POILIR	1.84	2.29	2.13	2.84	10.35	11.01	11.78	12.97	12.99	19.9	38.82	38.64	29.21	29.35
POILJ	1.84	2.3	2.57	4.75	11.51	12.05	12.69	13.69	13.88	23.07	34.61	36.94	34.07	29.66
POILW	1.8	2.24	2.48	2.75	10.84	10.46	11.51	12.4	12.7	15.67	27	32	34	31.5
POILW93	6.7	7.99	8.57	8.94	31.76	28.08	29.22	29.55	28.1	31.15	47.29	50.77	50.85	45.64
POP	27970	28727	29499	30286	31089	31951	32818	33709	34736	36077	37991	39646	41221	42800
POP.H	4.889	4.947	5.005	5.021	5.233	5.007	4.89	4.97	4.932	4.857	4.833	4.866	4.886	4.865
PPOILW	26.87	28.04	28.94	30.76	34.13	37.25	39.39	41.96	45.2	50.31	57.1	63.03	66.86	69.02
PSD	3.807	4.098	4.574	7.845	0.714	1.377	1.673	-6.14	1.836	5.877	82.23	76.68	100	69.57
PTAG	0	4.67	5.05	6.14	6.82	8.39	9.84	11.77	11.65	11.7	12.08	13.27	15.39	18.36
PTAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PTCM	0	8.85	9.31	10.16	11.65	12.54	14.06	16.88	18.06	17.73	20.16	21.84	22.37	24.72
PTEL	0	-4.91	-4.53	-7.81	-7.97	-10.9	-12.6	-13.6	-15.7	-15.6	-15.7	-18.2	-18.9	-25
PTEX	0	-95.1	-93.8	-84.4	-85.2	-80	-59.6	-59.5	-52	-66.1	-44.3	-3.59	-4.49	-9.72
PTFN	0	86.58	90.97	104.2	118.5	145.2	158	186	185	194.8	185.6	178.7	196.9	235.6
PTHO	0	17.74	21.62	23.22	27.03	31.18	37.22	43.32	43.27	52.34	42.42	39.58	46.49	59.94
PTIM	0	0	0	0	2.32	5.46	0	5.31	8.31	5.83	1.05	37.49	34.82	69.79
PTIN	0	13.3	14.12	16.01	18.14	20.53	23.42	28.09	29.15	28.87	31.66	34.48	37.02	42.21
PTNE	0	22.9	19.69	22.74	24.99	35.29	28.13	30.69	26.86	27.11	26.61	18.24	18.23	18.98
PTOW	0	-15.9	-11.3	-18.5	-19.6	-20.1	-20.2	-22.1	-17	-16.9	-9.7	-19.8	-12.3	-13.6
PTPR	0	-95.1	-93.8	-84.4	-82.8	-74.6	-59.6	-54.2	-43.7	-60.3	-43.2	33.9	30.33	60.07
PTPT	0	202.5	200.8	215	228.5	251.1	250.1	275.9	261.6	287.7	254.2	182.6	197.6	213.9
PTPT.BD	0	554.8	550.1	588.9	626.1	687.9	685.1	755.8	716.8	788.2	696.4	500.3	541.4	586
PTPTO.BD	0	527.9	524.4	554.7	592.3	644.2	651.9	724.9	670	661	582.3	626.6	658.7	624
PTRE	0	26.59	30.93	33.38	38.68	43.72	51.28	60.2	61.33	70.07	62.58	61.42	68.86	84.66
PTSC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PTSD	0	-0.03	-0.15	-0.15	0.39	-0.39	0.21	0.05	-0.31	-0.15	0.02	0.17	0.17	0.15
PTTR	0	19.12	21.18	25.88	29.88	37.25	45.28	55.28	55.96	57.07	52.71	51.24	57.41	71.36
PTTRA	0	2.42	2.74	3.53	4.07	4.96	5.89	7.34	6	3.22	3.22	1.49	3.05	3.46
PTTRR	0	16.7	18.44	22.35	25.81	32.29	39.39	47.94	49.96	53.85	49.49	49.75	54.37	67.9
PTW	26.69	28.41	31.08	40.27	55.54	56.51	59.06	64.76	71.33	86.87	101.3	97.25	92.99	89.5
RCONVEL	0	31.92	33.2	32.83	34.36	32.75	32.57	31.21	30.01	29.66	30.3	30.95	31.79	31.42
RCONVLLG	0	2.566	2.206	2.561	2.673	2.544	2.762	2.977	4.111	5.9	8.988	8.969	8.994	9.015
RCONVLPT	0	6.764	6.335	6.429	5.858	4.485	5.759	6.272	4.024	5.765	2.929	7.343	3.802	6.447
RDUM	0	0	0	0	0	0	0	0	0.5	1	1	0.5	0	0
REFCAP	0	605	605	660	690	810	810	1050	1080	1080	1320	1320	670	670
RELE	0	0	0	0	14.83	18.27	22.6	31.95	37.05	42.53	52.42	79.57	118.1	125.5
RENE	0	0	0	0	66.41	80.51	96.95	138.8	163.6	185.1	349.7	381.2	461.2	548

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
PGASC	5	5	5	5	5	5	5	8	8	8	20	24	0
PGASE	2	2	2	2	2	2	2	3	3	3	6	7.2	0
PGASH	5	5	5	5	5	5	8	8	8	8	0	0	0
PGASI	2	2	2	2	2	2	2	5	9	9	20	24	0
PGASO	30	30	30	37.8	40.8	42.7	50	50	50	50	50	100	130
PGC	120.9	128.7	157.2	193	229.1	276.9	303.3	370.1	446.3	749.6	0	0	0
PGNP	121.9	127.5	156.1	192.1	233.9	280.9	338.4	415.1	532.6	700.1	973.1	0	0
PGOIL	3.01	3.01	3.054	4.63	4.72	4.72	4.72	10	10	10	10	20	20
PHO	1.2	1.2	1.2	2	2	2	2	2	5	5	5	10	20
PI	120.8	128.1	151.6	195.7	258.6	304.8	410.7	558.1	704.8	968.3	1267	0	0
PIG	117.1	122	143.8	193.1	258.9	303.8	426.8	531.6	642.5	1121	0	0	0
PIGC	126.1	133.4	154.9	194.9	259.2	307.8	453.5	575.4	686.7	1095	0	0	0
PIGM	104.1	107.4	124.5	189.2	258.2	295.5	382.2	449.9	566.5	1175	0	0	0
PIP	123.6	132.5	158.2	197.5	258.4	305.5	397.8	581.2	755.7	859.3	0	0	0
PIPC	130.4	137.9	159.9	198.3	258.5	309.2	404.5	527.1	649.3	806.2	0	0	0
PIPM	104.1	107.4	124.4	189.2	258.1	295.4	382.4	651.6	889.7	920	0	0	0
PJ	159.7	196.5	267	346.3	449.5	526.4	587.4	707.4	878	8073	0	0	0
PJSD	104	151	470	271	-818	2464	-1301	-1221	-1089	-409	-85	0	0
PKERO	2.5	2.5	2.5	4	4	4	4	4	4	15	15	20	30
PM	98.01	97	98.8	94.5	221.9	380	533.1	590.4	757.1	1573	2779	0	0
PNFA	-278	229.9	-1039	441.6	688.8	-1366	-391	235.1	-62.5	-866	0	0	0
POIL	26.73	24.32	12.88	17	14.09	16.7	20.11	16.6	0	0	0	0	0
POILIR	21.27	26.57	11.72	16.18	14.81	13.72	17.5	16.69	16.56	14.61	15.15	0	0
POILJ	29.14	27.29	13.81	18.15	14.79	17.86	23.34	18.89	19.29	16.73	17.32	0	0
POILW	29	28.5	14.38	18.43	14.96	18.2	23.21	20.05	19.37	17.07	0	0	0
POILW93	40.29	38.26	18.92	33.63	18.25	21.1	26.34	21.27	19.95	17.07	0	0	0
POP	44438	46201	47807	49363	50995	52672	54504	57800	59230	60710	62150	0	0
POP.H	4.869	4.786	4.9	4.959	5.021	5.083	5.156	5.359	5.382	5.407	5.425	0	0
PPOILW	71.98	74.49	76	54.8	81.97	86.26	88.12	94.26	97.09	100	0	0	0
PSD	41.69	114.2	-154	23.6	-40.2	-63	49.87	107.1	171.5	0	0	0	0
PTAG	19.53	22.3	21.59	23.64	23.27	24.19	25.48	27.39	28.49	35.59	25.61	0	0
PTAU	0	0	0	0	0	0	0	0	0	0	0	0	0
PTCM	26.9	27.49	17.98	18.3	18.39	19.4	16.18	16.65	18.56	20.65	32.7	0	0
PTEL	-30.7	-36.8	-37.2	-32.3	-34.4	-34.5	-38.4	-37.2	-38.5	-44.3	-45.4	0	0
PTEX	-0.79	-0.2	-2.98	-2.6	-4.8	-9.57	-13.2	-26.3	-24.3	-56.9	-57.4	0	0
PTFN	249.2	272.7	245.7	268.5	269.8	290.5	288.1	327.8	335.7	335.9	368.3	0	0
PTHO	60.14	66.47	53.39	61.65	61.53	70.59	68.32	81.35	82.53	96.98	76.3	0	0
PTIM	61.09	85.2	82.37	100.3	89.64	53.19	47.65	49.98	59.81	52.88	39.9	0	0
PTIN	45.5	48.73	53.95	56.49	56.3	57.21	58.34	61.72	62.18	51.28	56.99	0	0
PTNE	20.1	22.2	17	20	24.83	29	23	36	32.81	9.1	35.61	0	0
PTOW	-14.6	-15.4	-14.6	-14.8	-14	-11.5	-11.5	-11.5	-13.5	-9.1	-14.8	0	0
PTPR	60.3	85	79.39	97.7	84.84	43.62	34.41	23.72	35.47	-4.01	-17.5	0	0
PTPT	234.1	240.1	218	217.8	233.3	292.8	303.6	352.5	352.2	397.4	442.9	0	0
PTPT.BD	641.5	657.7	597.3	596.8	639.2	802.3	831.7	965.8	964.8	1089	1214	0	0
PTPTO.BD	618	647	558.4	541.2	614.1	669.9	723.3	780.1	822.2	877.6	946.1	0	0
PTRE	87.04	93.96	71.37	79.95	79.92	89.99	84.5	98	101.1	117.6	109	0	0
PTSC	0	0	0	0	0	0	0	0	0	0	0	0	0
PTSD	0.14	-0.25	0.04	0.02	-0.01	0.03	-0.02	0.31	0	-4.13	2.95	0	0
PTTR	77.07	85.47	81.79	88.38	85.46	90.13	96.8	104.7	111.2	122.3	141	0	0
PTTRA	3.35	3.2	3.33	3.65	2.88	2.72	3.54	4.12	4.55	5.01	5.77	0	0
PTTRR	73.72	82.28	78.46	84.74	82.59	87.41	93.26	100.6	106.6	117.3	135.3	0	0
PTW	86.75	87.5	88.5	97.25	100	102.3	112.5	107	108.5	104.3	0	0	0
RCONVEL	31.42	30.75	31.56	31.6	31.68	32.3	32.48	33.55	32.85	32.07	34.56	0	0
RCONVLLG	9.004	8.993	4.015	8.993	9.006	8.998	8.498	8.336	9.998	8.126	11.35	0	0
RCONVLPT	6.721	8.367	6.689	5.525	5.619	4.116	4.447	2.317	2.93	4.262	2.24	0	0
RDUM	0	0	0	0	0	0	0	0	0	0	0	0	0
REFCAP	615	615	615	615	615	777	777	957	957	1092	1092	0	0
RELE	155.3	164.8	179.6	205.7	219	244.6	291.5	474.5	626.1	1134	2109	0	0
RENE	614.6	670	653.2	865.5	904.5	1010	1230	1547	1898	2767	4037	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
RGAS	0	0	0	0	0	0	0	0	0	10.82	7.196	17.46	25.07	28.36
RLOSELLO	0	13.31	12.62	11.13	12.79	13.05	12.2	12.42	13.8	12.6	15.4	14.73	13.37	13.27
RLOSELOU	0	4.334	3.96	5.109	5.327	5.193	5.263	4.752	4.795	5.512	3.336	3.872	4.005	4.292
RLOSLGOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RLOSPTOW	0	7.852	5.628	8.606	8.577	8.005	8.078	8.011	6.498	5.874	3.816	10.84	6.224	6.358
RPT	0	0	0	0	51.57	62.24	74.36	106.9	126.6	131.7	290.1	284.2	318	394.2
SD	-3263	-3324	-3634	-2441	-1584	-2607	-2105	-1360	-1291	-475	-42.2	225.1	534.8	474.5
SD.N	-124	-136	-166	-192	-11.3	-35.9	-35.2	83.5	-23.7	-27.9	-34.7	172.6	534.8	330.1
SOCM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOFN	0	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9	8.4
SOHO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOIM	0	0	0	0.2	0.4	4.3	4	4.1	1.9	3.7	3.8	2.6	4.4	3.9
SOIN	0	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9	8.4
SOPD	0	1.6	2.5	4	4.2	4.2	4.4	4.4	3.3	3.8	4.1	4	4.5	4.5
SOPR	0	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9	8.4
SORE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOSC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOSD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOX	0	721.2	723.7	892.1	998.2	1225	1320	1526	1475	1556	1451	1479	1571	1871
TIME	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TLAG	0	4.74	5.13	6.27	6.98	8.58	10.06	12.02	11.91	12	12.48	13.78	16.07	19.25
TLAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TLCH	0	89.17	55.25	66.02	69.82	64.65	63.16	94.63	24.23	38.61	13.94	9.86	22.71	23.35
TLCM	0	9.67	10.34	11.47	13.05	14.33	16.27	19.86	21.38	22.75	27.13	31.88	34.35	39.31
TLEL	0	-6.89	-8.13	-11.2	-12.6	-15.4	-17.3	-20.4	-23.8	-27.1	-26.9	-29.4	-33.2	-39.2
TLEX	0	-1606	-1770	-2057	-2099	-1828	-2038	-1909	-1650	-991	-315	-350	-777	-773
TLFN	0	182.8	155.6	183.7	203.4	229.7	243.1	303.3	229	261.9	230.8	225	262.4	306.5
TLFO	0	2.51	2.99	3.96	4.54	5.64	6.32	6.95	6.56	7.46	7.98	8.42	9.74	10.77
TLHO	0	22.12	26.07	27.59	31.41	35.84	42.31	49.1	49.28	59.58	50.43	49.53	57.92	73.17
TLIM	0	0	0	0.2	2.72	9.76	4	9.41	10.21	9.53	4.85	40.09	39.22	73.69
TLIN	0	104.3	73.15	89.76	97.07	98.45	101.1	136.3	63.57	83.36	61.81	60.33	78.4	84.44
TLLG	0	-1.28	-1.51	-1.96	-2.13	-2.14	-2.33	-2.63	-2.45	-3.76	-3.33	-3.53	-4.12	-4.72
TLMN	0	0.66	0.78	1.03	1.19	1.47	1.65	1.81	1.71	1.95	2.08	2.2	3.17	4.21
TLNE	0	22.9	19.69	22.74	24.99	35.29	28.13	30.69	26.86	27.11	26.61	18.24	18.23	18.98
TLNM	0	9.55	11.34	15.03	17.26	21.41	24.01	26.39	24.91	28.34	30.32	31.96	33.73	33.76
TLOT	0	0	0	0	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
TLOW	0	-16.5	-12	-19.4	-20.8	-21.5	-21.7	-23.7	-18.9	-19	-11.9	-22.3	-15	-16.8
TLPA	0	0.28	0.33	0.44	0.51	0.63	0.71	0.78	0.73	0.83	0.89	0.94	0.9	0.94
TLPD	0	1956	2102	2452	2518	2245	2512	2511	2123	1478	648.8	655.4	1183	1178
TLPM	0	0.32	0.38	0.5	0.58	0.72	0.8	0.88	0.83	0.95	1.01	1.07	1.12	4.82
TLPR	0	222.2	190.9	231.2	252.7	280.9	299.5	368.4	285.4	329.5	280.4	294.5	322.9	381.7
TLPT	0	-14.7	-13.6	-14.8	-14.2	-11.8	-15.3	-18.5	-11	-17.6	-7.67	-14.5	-7.81	-14.7
TLRE	0	31.79	36.41	39.06	44.46	50.17	58.58	68.96	70.66	82.33	77.56	81.41	92.27	112.5
TLSC	0	-129	-142	-164	-168	-146	-178	-243	-198	-167	-58	-51.4	-123	-96.5
TLSD	0	-0.02	-0.15	-0.15	0.39	-0.38	0.21	0.06	-0.32	-0.16	0.14	0.17	-0.41	0.16
TLTR	0	19.12	21.18	25.88	29.88	37.25	45.28	55.28	55.96	57.07	52.71	51.24	57.41	71.36
TLTX	0	1.62	1.93	2.55	2.93	3.64	4.08	4.48	4.23	4.81	5.15	5.43	6.13	5.68
TLWO	0	0.13	0.16	0.21	0.24	0.3	0.34	0.37	0.35	0.4	0.43	0.45	0.89	0.9
TWM	1134	1204	1304	1446	1453	1439	1606	1654	1777	1903	1837	1891	1823	1914
TWM.N	302.7	342.1	405.3	582.1	806.7	813	948.5	1071	1268	1653	1860	1839	1696	1713
U	280	279	278	277	790	895	997	1065	1137	1210	1288	1367	1451	1538
URATE	3.815	3.71	3.511	3.408	8.612	9.442	10.18	10.59	11	11.4	11.82	12.02	12.35	12.7
VAG	1105	1115	1262	1344	1394	1530	1706	1640	1747	1851	1915	1953	2091	2193
VALCH	0	0	0	0	83.6	104.2	108.6	126.1	104.3	55.6	70.7	80.4	80.7	103.5
VALFM	0	0	0	0	96.8	82.7	176.5	160.8	127.9	125.7	138.7	178.8	181	236.9
VALFO	0	0	0	0	123.3	120.8	179.4	189.1	175	117.1	149.3	170.4	128.8	126.8
VALIN	0	0	0	0	527.9	526.8	727.8	770.8	556.4	568.8	688.6	809.3	767.1	890

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
RGAS	34.82	34.96	29.07	34.57	36.68	51.23	68.67	128.8	225.5	219.6	404.8	0	0
RLOSELLO	13.92	12.74	11.98	13.43	12.59	14.73	14.44	12.67	12.96	13.5	14.77	0	0
RLOSELOU	3.441	3.335	4.486	5.076	4.856	5.271	5.297	4.984	5.013	4.769	4.578	0	0
RLOSLGOW	0	0	0	0	0	44.5	37.9	35.32	35.57	29.17	16.12	0	0
RLOSPTOW	6.236	6.415	6.697	6.794	6.001	3.927	3.788	3.262	3.825	2.29	3.33	0	0
RPT	424.5	470.2	444.5	625.3	648.9	713.7	870.3	943.5	1046	1414	1524	0	0
SD	284.7	349.9	-134	214	-470	-421	-1149	-1192	-1576	-1671	-1678	0	0
SD.N	118.7	399.7	206.6	50.5	188.8	265.5	-573	-1277	-2702	0	0	0	0
SOCM	0	0	0	0	0	0	0	0	0	0	0	0	0
SOEL	0	0	0	0	0	0	0	0	0	0	0	0	0
SOEX	0	0	0	0	0	0	0	0	0	0	0	0	0
SOFN	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.5	6.54	7.01	0	0
SOHO	0	0	0	0	0	0	0	0	0	0	0	0	0
SOIM	1.9	1.5	1.6	1.4	1.3	0.9	1	2.9	1.4	3.15	2.76	0	0
SOIN	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.5	6.54	7.01	0	0
SOPD	4.6	4.9	4.7	4.8	5.1	3.8	3.7	3.7	4.8	3.39	4.25	0	0
SOPR	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.2	6.54	7.01	0	0
SORE	0	0	0	0	0	0	0	0	0	0	0	0	0
SOSC	0	0	0	0	0	0	0	0	0	0	0	0	0
SOSD	0	0	0	0	0	0	0	0	0.3	0	0	0	0
SOX	1993	2192	2011	2130	2148	2257	2267	2536	2608	2619	2881	0	0
TIME	26	27	28	29	30	31	32	33	34	35	36	37	37
TLAG	20.62	23.73	22.86	25.15	25	26.16	27.67	29.62	30.59	37.96	28.65	0	0
TLAU	0	0	0	0	0	0	0	0	0	0	0	0	0
TLCH	34.36	36.72	24.93	23.91	27.94	55.69	56.39	46.86	57.36	37.83	32.63	0	0
TLCM	42.36	40.26	27.18	34.45	31.89	28.8	26.94	29.46	32.67	36.88	49.32	0	0
TLEL	-43.8	-48.6	-49.8	-54.2	-55.5	-60.1	-67.1	-69.5	-76.6	-88.8	-88.1	0	0
TLEX	-621	-652	-560	-638	-704	-736	-854	-956	-918	-964	-983	0	0
TLFN	337.1	362.5	320.9	348.4	355.4	413.8	425.3	476.6	518.1	516.6	573.7	0	0
TLFO	10.47	11.52	13.28	13.25	12.87	19.74	21.63	24.9	28.1	24.22	32.4	0	0
TLHO	74.69	84.09	74.38	79.91	82.84	98.74	101.1	122.5	132.2	168	146.5	0	0
TLIM	62.99	86.7	83.97	101.7	90.94	54.09	48.65	52.88	61.21	56.03	42.66	0	0
TLIN	102.3	106.8	97.64	100.5	105.4	140.9	149.8	154.4	178.7	142.4	172.6	0	0
TLLG	-5.47	-5.44	-2.2	-6.59	-6.88	-16.3	-19.8	-24	-31.2	-22.5	-33.2	0	0
TLMN	4.08	4.53	3.99	4.48	4.66	6.08	6.67	7.67	8.66	7.46	9.98	0	0
TLNE	20.1	22.2	17	20	24.83	29	23	36	32.81	9.1	35.61	0	0
TLNM	37.89	38.07	40.07	41.09	40.58	41.21	45.15	51.98	58.66	50.56	67.64	0	0
TLOT	0.02	0.02	0.02	0.05	0.07	0.14	0.16	0.18	0.2	0.17	0.23	0	0
TLOW	-18.1	-18.9	-18.4	-19.4	-18.5	-90.5	-98.8	-111	-120	-91	-65.5	0	0
TLPA	1.24	1.4	0.88	1.05	1.13	1.55	1.7	1.96	2.21	1.9	2.55	0	0
TLPD	1078	1142	977.9	1107	1173	1386	1559	1633	1809	1897	1859	0	0
TLPM	7.35	7.35	7.5	9.36	10.75	7.88	8.63	9.93	11.21	9.66	12.93	0	0
TLPR	421.1	457.7	407	441.1	450.4	592.5	624.4	689	756.2	740.9	767.8	0	0
TLPT	-16.9	-21.9	-15.6	-12.7	-13.9	-12.6	-14.1	-8.36	-10.6	-17.7	-10.2	0	0
TLRE	117.1	124.4	101.6	114.4	114.7	127.5	128	151.9	164.8	204.9	195.8	0	0
TLSC	-98.9	-118	-94.9	-130	-109	-112	-129	-40.7	-196	-249	-151	0	0
TLSD	0.15	-0.36	-0.16	0.16	-0.2	0.62	0.7	0.35	0.29	-4.26	2.85	0	0
TLTR	77.07	85.47	81.79	88.38	85.46	90.13	96.8	104.7	111.2	122.3	141	0	0
TLTX	5.98	6.31	6.11	6.38	6.49	7.39	8.1	9.33	10.52	9.07	12.14	0	0
TLWO	0.87	0.83	0.87	0.92	0.92	1.25	1.37	1.58	1.78	1.53	2.05	0	0
TWM	2035	2125	2267	2500	2690	2883	2940	2999	3189	3315	0	0	0
TWM.N	1765	1859	2006	2431	2690	2948	3307	3221	3460	3456	0	0	0
U	1628	1722	1819	1692	1924	1975	1978	1951	1731	1747	1504	0	0
URATE	13.05	13.62	14.15	13.02	14.39	14.36	13.96	13.37	11.4	10.47	9.787	0	0
VAG	2354	2538	2651	2716	2648	2746	2968	3120	3352	3536	0	0	0
VALCH	121.5	115.3	118.2	126.6	125.7	153.9	192.8	208.4	197.7	202.8	0	0	0
VALFM	280.9	251.8	177.2	164.6	170.6	169.3	207.5	314.4	264.8	239.3	0	0	0
VALFO	117	129.1	117.5	86.8	127.7	148.2	182.4	206.3	195.1	206.3	0	0	0
VALIN	992.9	962.4	825.2	836.1	866.4	945.4	1164	1398	1404	1382	0	0	0

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
VALNM	0	0	0	0	45.6	48	69	75.9	69.8	79.8	90.9	108	113.2	129.9
VALOT	0	0	0	0	1.2	1.4	1.1	0.9	0.7	0.6	1.2	0.9	1.2	2
VALPA	0	0	0	0	26.9	16.1	20.5	24.6	21.9	27	20.7	24.3	24.3	28.7
VALPM	0	0	0	0	25.1	32.7	31.9	41	32	31.6	36.8	30.7	33.2	44.1
VALTX	0	0	0	0	117.9	114.4	133	142	133.9	124.1	169.8	205.8	191.8	206.3
VALWO	0	0	0	0	6.6	6.5	7.8	10.4	10.9	7.3	10.5	10	12.9	11.8
VSER	1090	1240	1463	1582	1979	2382	2727	2943	3004	3168	3166	3039	3023	2994
WDUM	0	0	0	0	0	0	0	0	0	0	0	0.5	1	1
WI	8.38	8.61	10.12	12.3	15.85	23.31	32.5	43.68	51.85	59.79	71.39	82.98	100	124.8
WODM	1776	1876	1975	2160	2164	2057	2219	2311	2330	2430	2315	2193	2816	2795
WPER	0	4504	5124	5420	5461	5501	5841	6050	6313	6511	6471	6406	6360	6428
WPI	5.8	6.2	6.5	6.9	8.7	9.2	10.4	11.9	13	15.6	20.4	24.3	27.64	29.8

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
VALNM	140.3	132.1	116.9	189.8	157.4	175.2	215.6	236.9	238.5	245.3	0	0	0
VALOT	2.2	2.2	1.7	2.7	2.2	1.9	2	2.8	2.5	3.9	0	0	0
VALPA	33.6	33.3	27.2	17.6	16.5	16.8	20.7	19.8	19.5	20.8	0	0	0
VALPM	70.2	78.8	64.1	71	93	105.7	130.1	171.2	249.8	231.8	0	0	0
VALTX	214	208.5	190.3	159.6	156.9	155.1	189.1	213.7	211.1	206.8	0	0	0
VALWO	13.2	11.3	12.1	17.4	16.4	19.3	23.7	24.1	25.1	25.2	0	0	0
VSER	3124	3295	2824	2655	2422	2377	2567	2771	2896	3261	3410	0	0
WDUM	1	1	1	1	0.5	0	0	0	0	0	0	0	0
WI	142.3	152.6	180	216.9	263.4	311.1	340.2	391.4	468.5	560	0	0	0
WODM	2843	2834	2921	2972	3059	3105	3035	3141	0	0	0	0	0
WPER	6721	6890	7069	7276	7517	7667	7732	7808	0	0	0	0	0
WPI	32.1	34.4	43.1	55.9	68.2	80.7	100	126.6	168.9	211.6	301.4	0	0

Appendix 4

(Units:MBOE)	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Production Total	1,956.4	2,102.4	2,451.9	2,517.7	2,245.0	2,512.4	2,510.7	2,123.3	1,477.7	648.8	655.4	1,183.2
Solid Fuel	1.6	2.5	4.0	4.2	4.2	4.4	4.4	3.3	3.8	4.1	4.0	4.5
Crude Oil	1,688.9	1,832.9	2,141.9	2,195.3	1,950.1	2,185.5	2,078.2	1,833.1	1,202.7	531.0	540.5	979.7
Natural Gas	257.9	257.8	298.1	309.5	281.9	312.9	418.0	273.7	259.2	101.5	97.6	185.4
Hydro	4.2	5.5	4.4	5.3	5.4	6.2	6.6	9.8	8.5	8.8	9.7	10.1
Others	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5
Import Total	0.0	0.0	0.2	2.7	9.8	4.0	9.4	10.2	9.5	4.9	40.1	39.2
Solid Fuel	0.0	0.0	0.2	0.4	4.3	4.0	4.1	1.9	3.7	3.8	2.6	4.4
Petroleum Products	0.0	0.0	0.0	2.3	5.5	0.0	5.3	8.3	5.8	1.1	37.5	34.8
Export Total	1,605.7	1,770.0	2,056.9	2,099.3	1,827.6	2,038.5	1,909.2	1,650.3	990.8	315.3	349.6	777.0
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude Oil	-1,475.0	-1,624.5	-1,917.8	-1,956.6	-1,687.3	-1,920.5	-1,790.6	-1,565.9	-902.7	-271.0	-346.0	-772.5
Petroleum Products+Bunker	-95.1	-93.8	-84.4	-85.2	-80.0	-59.6	-59.5	-52.0	-66.1	-44.3	-3.6	-4.5
Petroleum Products	-94.5	-92.5	-83.4	-84.3	-79.2	-59.0	-58.5	-51.3	-65.1	-44.3	-1.8	-4.3
Bunker	-0.6	-1.3	-1.0	-0.9	-0.8	-0.6	-1.0	-0.7	-1.0	0.0	-1.8	-0.2
Lean Gas	-35.6	-51.7	-54.7	-57.5	-60.3	-58.4	-59.1	-32.4	-22.0	0.0	0.0	0.0
Stock Change & Some loss	-128.6	-141.5	-164.0	-168.5	-146.2	-178.5	-242.5	-197.8	-167.0	-58.0	-51.4	-122.5
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude Oil	3.3	5.9	5.6	4.0	0.1	0.3	6.7	5.4	5.3	1.9	2.6	-1.8
Petroleum Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Gas	-131.9	-147.5	-169.7	-172.5	-146.3	-178.8	-249.3	-203.2	-172.3	-59.8	-54.0	-120.8
Flared Gas	-131.9	-147.5	-169.7	-172.5	-146.3	-173.5	-196.6	-131.2	-105.6	-44.0	-37.1	-74.9
Injected Gas	0.0	0.0	0.0	0.0	0.0	-5.3	-52.7	-72.0	-66.7	-15.8	-16.9	-45.8
Primary Energy Requirement	222.2	190.9	231.2	252.7	280.9	299.5	368.4	285.4	329.5	280.4	294.5	322.9
Solid Fuel	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9
Crude Oil	217.2	214.4	229.7	242.8	262.9	265.3	294.3	272.6	305.3	261.9	197.1	205.4
Petroleum Products	-95.1	-93.8	-84.4	-82.8	-74.6	-59.6	-54.2	-43.7	-60.3	-43.2	33.9	30.3
Natural Gas	126.0	110.4	128.4	137.0	135.6	134.1	168.8	70.5	86.9	41.6	43.6	64.7
Lean Gas	-35.6	-51.7	-54.7	-57.5	-60.3	-58.4	-59.1	-32.4	-22.0	0.0	0.0	0.0
Hydro	4.2	5.5	4.4	5.3	5.4	6.2	6.6	9.8	8.5	8.8	9.7	10.1
Others	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5
Conversion Sector												
Oil Refinery Loss	-14.7	-13.6	-14.8	-14.2	-11.8	-15.3	-18.5	-11.0	-17.6	-7.7	-14.5	-7.8
Crude Oil Input	-217.2	-214.4	-229.7	-242.8	-262.9	-265.3	-294.3	-272.6	-305.3	-261.9	-197.1	-205.4
Pet. Prod. Output	202.5	200.8	215.0	228.5	251.1	250.1	275.9	261.6	287.7	254.2	182.6	197.6
Electric Utility Loss	-6.9	-8.1	-11.2	-12.6	-15.4	-17.3	-20.4	-23.8	-27.1	-26.9	-29.4	-33.2
Solid Fuel for Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pet. Pro. for Power	-4.9	-4.5	-7.8	-8.0	-10.9	-12.6	-13.6	-15.7	-15.6	-15.7	-18.2	-18.9
Lean Gas for Power	-1.0	-2.1	-4.5	-5.9	-6.7	-6.9	-9.5	-8.6	-14.5	-14.1	-14.6	-19.7
Generation	3.2	4.0	5.5	6.6	7.5	8.4	9.3	10.2	11.4	11.7	13.2	15.5
Hydro for Power	-4.2	-5.5	-4.4	-5.3	-5.4	-6.2	-6.6	-9.8	-8.5	-8.8	-9.7	-10.1
Nuclear for Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auto Generation Loss												
Gas Refinery Loss	-1.3	-1.5	-2.0	-2.1	-2.1	-2.3	-2.6	-2.5	-3.8	-3.3	-3.5	-4.1
Natural Gas Input	-49.9	-68.5	-76.5	-79.7	-84.1	-84.4	-88.3	-59.6	-63.7	-37.1	-39.4	-45.8
Lean Gas Output	48.6	66.9	74.6	77.6	82.0	82.0	85.7	57.2	60.0	33.7	35.8	41.7
Own Use Total	-16.5	-12.0	-19.4	-20.8	-21.5	-21.7	-23.7	-18.9	-19.0	-11.9	-22.3	-15.0
Refinery	-15.9	-11.3	-18.5	-19.6	-20.1	-20.2	-22.1	-17.0	-16.9	-9.7	-19.8	-12.3
Power Plant	-0.6	-0.7	-0.9	-1.2	-1.4	-1.5	-1.6	-1.9	-2.1	-2.2	-2.5	-2.7
Own Use	-0.1	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5	-0.6	-0.4	-0.5	-0.6
Dist. & Trans.Losses	-0.4	-0.5	-0.6	-0.8	-1.0	-1.0	-1.2	-1.4	-1.4	-1.8	-1.9	-2.1
Injected Lean Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Statistical Difference TFL	-0.0	-0.1	-0.1	0.4	-0.4	0.2	0.1	-0.3	-0.2	0.2	0.2	-0.4
Solid Fuel	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum	-0.0	-0.1	-0.1	0.4	-0.4	0.2	0.1	-0.3	-0.1	0.0	0.2	0.2
Natural Gas	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.0
Lean Gas	0.0	0.0	0.0	0.0	-0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0
Electricity	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	0.1	0.0	-0.6
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Units:MBOE)	1,971.0	1,972.0	1,973.0	1,974.0	1,975.0	1,976.0	1,977.0	1,978.0	1,979.0	1,980.0	1,981.0	1,982.0
Final Energy Demand Total	182.8	155.6	183.7	203.4	229.7	243.1	303.3	229.0	261.9	230.8	225.0	262.4
Solid Fuel	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9

(Units:MBOE)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Production Total	1,177.6	1,077.9	1,141.7	977.9	1,107.4	1,172.7	1,386.3	1,559.3	1,632.6	1,809.3	1,897.4	1,859.2
Solid Fuel	4.5	4.6	4.9	4.7	4.8	5.1	3.8	3.7	3.7	4.8	3.4	4.3
Crude Oil	986.6	867.6	907.5	796.6	891.7	933.3	1,075.1	1,192.2	1,228.6	1,333.1	1,426.8	1,382.0
Natural Gas	173.3	193.2	217.1	161.4	194.5	219.5	292.5	350.7	386.0	453.3	448.4	458.0
Hydro	9.7	9.0	8.7	11.7	13.1	11.4	11.7	9.5	11.0	14.6	15.3	11.6
Others	3.5	3.5	3.5	3.5	3.3	3.4	3.2	3.2	3.3	3.5	3.5	3.4
Import Total	73.7	63.0	86.7	84.0	101.7	90.9	54.1	48.7	52.9	61.2	56.0	42.7
Solid Fuel	3.9	1.9	1.5	1.6	1.4	1.3	0.9	1.0	2.9	1.4	3.2	2.8
Petroleum Products	69.8	61.1	85.2	82.4	100.3	89.6	53.2	47.7	50.0	59.8	52.9	39.9
Export Total	773.1	620.8	652.4	560.0	637.6	704.1	736.2	854.4	955.8	918.5	963.7	983.4
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude Oil	-763.4	-620.0	-652.2	-557.0	-635.0	-699.3	-726.6	-828.1	-909.9	-891.0	-906.8	-925.2
Petroleum Products+Bunker	-9.7	-0.8	-0.2	-3.0	-2.6	-4.8	-9.6	-13.2	-26.3	-24.3	-56.9	-57.4
Petroleum Products	-9.4	-0.4	0.0	-2.1	-1.2	-3.3	-6.9	-11.3	-23.9	-21.8	-54.4	-54.5
Bunker	-0.3	-0.4	-0.2	-0.9	-1.4	-1.5	-2.7	-1.9	-2.4	-2.5	-2.5	-2.9
Lean Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-13.1	-19.7	-3.2	0.0	-0.8
Stock Change & Some loss	-96.5	-98.9	-118.2	-94.9	-130.3	-109.1	-111.7	-129.1	-40.7	-195.8	-248.8	-150.7
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crude Oil	5.4	3.4	6.7	-6.0	-26.1	13.2	-43.1	-46.4	42.2	-79.3	-104.9	-3.7
Petroleum Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Gas	-101.9	-102.3	-124.9	-89.0	-104.2	-122.3	-68.6	-82.7	-82.8	-116.5	-143.9	-147.0
Flared Gas	-76.5	-57.9	-64.0	-63.3	-65.6	-65.3	-57.7	-70.6	-68.5	-79.0	-72.2	-53.2
Injected Gas	-25.5	-44.4	-60.9	-25.6	-38.6	-57.0	-10.9	-12.1	-14.3	-37.6	-71.7	-93.8
Primary Energy Requirement	381.7	421.1	457.7	407.0	441.1	450.4	592.5	624.4	689.0	756.2	740.9	767.8
Solid Fuel	8.4	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.2	6.5	7.0
Crude Oil	228.6	251.0	262.0	233.7	230.6	247.2	305.4	317.7	360.9	362.8	415.1	453.1
Petroleum Products	60.1	60.3	85.0	79.4	97.7	84.8	43.6	34.4	23.7	35.5	-4.0	-17.5
Natural Gas	71.4	90.8	92.1	72.5	90.3	97.2	223.9	268.0	303.2	336.8	304.5	311.0
Lean Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-13.1	-19.7	-3.2	0.0	-0.8
Hydro	9.7	9.0	8.7	11.7	13.1	11.4	11.7	9.5	11.0	14.6	15.3	11.6
Others	3.5	3.5	3.5	3.5	3.3	3.4	3.2	3.2	3.3	3.5	3.5	3.4
Conversion Sector												
Oil Refinery Loss	-14.7	-16.9	-21.9	-15.6	-12.7	-13.9	-12.6	-14.1	-8.4	-10.6	-17.7	-10.1
Crude Oil Input	-228.6	-251.0	-262.0	-233.7	-230.6	-247.2	-305.4	-317.7	-360.9	-362.8	-415.1	-453.1
Pet. Prod. Output	213.9	234.1	240.1	218.0	217.8	233.3	292.8	303.6	352.5	352.2	397.4	442.9
Electric Utility Loss	-39.2	-43.8	-48.6	-49.8	-54.2	-55.5	-60.1	-67.1	-69.5	-76.6	-88.8	-88.1
Solid Fuel for Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pet. Pro. for Power	-25.0	-30.7	-36.8	-37.2	-32.3	-34.4	-34.5	-38.4	-37.2	-38.5	-44.3	-45.4
Lean Gas for Power	-22.4	-24.1	-24.8	-23.9	-33.8	-35.5	-42.5	-51.5	-56.4	-61.1	-71.2	-77.6
Generation	17.9	20.1	21.6	23.0	25.0	25.7	28.7	32.3	35.1	37.5	41.9	46.5
Hydro for Power	-9.7	-9.0	-8.7	-11.7	-13.1	-11.4	-11.7	-9.5	-11.0	-14.6	-15.3	-11.6
Nuclear for Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auto Generation Loss												
Gas Refinery Loss	-4.7	-5.5	-5.4	-2.2	-6.6	-6.9	-16.3	-19.8	-24.0	-31.2	-22.5	-33.2
Natural Gas Input	-52.4	-60.8	-60.5	-54.8	-73.3	-76.4	-180.8	-233.2	-287.7	-311.7	-277.0	-292.2
Lean Gas Output	47.6	55.3	55.1	52.6	66.7	69.5	164.6	213.4	263.7	280.5	254.5	259.0
Own Use Total	-16.8	-18.1	-18.9	-18.4	-19.4	-18.5	-90.5	-98.8	-110.8	-120.0	-91.0	-65.5
Refinery	-13.6	-14.6	-15.4	-14.6	-14.8	-14.0	-11.5	-11.5	-11.5	-13.5	-9.1	-14.8
Power Plant	-3.2	-3.5	-3.5	-3.8	-4.6	-4.5	-5.7	-6.4	-6.2	-6.7	-7.7	-9.0
Own Use	-0.8	-0.7	-0.7	-1.0	-1.3	-1.3	-1.5	-1.7	-1.8	-1.9	-2.0	-2.1
Dist. & Trans.Losses	-2.4	-2.8	-2.8	-2.8	-3.4	-3.2	-4.2	-4.7	-4.5	-4.9	-5.7	-6.9
Injected Lean Gas	0.0	0.0	0.0	0.0	0.0	0.0	-73.2	-80.9	-93.1	-99.8	-74.3	-41.8
Statistical Difference TTL	0.2	0.1	-0.4	-0.2	0.2	-0.2	0.6	0.7	0.4	0.3	-4.3	2.8
Solid Fuel	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Petroleum	0.2	0.1	-0.2	0.0	0.0	-0.0	0.0	-0.0	0.3	0.0	-4.1	3.0
Natural Gas	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.0
Lean Gas	0.0	0.0	0.0	-0.0	0.0	-0.0	0.0	0.0	0.0	-0.0	-0.0	0.0
Electricity	0.0	0.0	-0.0	0.0	0.0	0.0	0.6	0.6	0.0	-0.0	-0.1	-0.1
Others	0.0	0.0	-0.1	-0.2	0.1	-0.2	0.0	0.1	0.0	0.0	0.0	0.0
(Units:MBOE)	1,983.0	1,984.0	1,985.0	1,986.0	1,987.0	1,988.0	1,989.0	1,990.0	1,991.0	1,992.0	1,993.0	1,994.0
Final Energy Demand Total	306.5	337.1	362.5	320.8	348.4	355.4	413.8	425.3	476.6	518.1	516.6	573.7
Solid Fuel	8.4	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.5	6.5	7.0

Petroleum	86.6	91.0	104.2	118.5	145.2	157.9	186.0	184.9	194.8	185.6	178.6	196.9
Gas	88.2	55.0	67.3	71.5	66.5	66.5	97.6	27.1	46.7	24.2	25.4	40.9
Natural Gas	76.2	41.9	51.9	57.3	51.5	49.8	80.5	10.9	23.2	4.6	4.2	18.9
Lean Gas	12.0	13.1	15.4	14.2	15.0	16.7	17.1	16.2	23.5	19.6	21.2	22.0
Electricity	2.7	3.4	4.6	5.4	6.2	6.9	7.7	8.3	9.4	9.6	10.7	12.2
Others	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5
Non-Commercial												
Industrial Sector Total	104.3	73.2	89.8	97.1	98.5	101.1	136.3	63.6	83.4	61.8	60.3	78.4
(exclude Pet.chemi Gas Use)	16.7	19.8	26.3	30.2	37.4	42.0	46.2	43.6	49.6	53.0	55.9	59.3
Solid Fuel	1.6	2.5	4.2	4.6	8.5	8.4	8.5	5.2	7.5	7.9	6.6	8.9
Petrolium Total	13.3	14.1	16.0	18.1	20.5	23.4	28.1	29.2	28.9	31.7	34.5	37.0
Gas	88.2	54.9	67.2	71.4	66.3	66.0	96.3	25.8	43.4	18.8	15.5	28.7
Natural Gas(Pet.chemi)	76.2	41.9	51.9	57.3	51.5	49.8	80.5	10.9	23.2	4.6	4.2	18.9
Lean Gas	12.0	13.0	15.3	14.1	14.8	16.2	15.8	14.9	20.2	14.2	11.3	9.8
Pet.chemi	11.4	11.4	11.6	9.6	9.5	9.3	9.7	9.1	10.6	4.2	0.2	0.2
Others	0.6	1.6	3.7	4.5	5.3	6.9	6.1	5.8	9.6	10.0	11.1	9.6
Electricity	1.2	1.6	2.4	2.9	3.1	3.3	3.5	3.4	3.6	3.5	3.7	3.8
Food	2.5	3.0	4.0	4.5	5.6	6.3	7.0	6.6	7.5	8.0	8.4	9.7
Textile	1.6	1.9	2.6	2.9	3.6	4.1	4.5	4.2	4.8	5.2	5.4	6.1
Wood & Products	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.9
Paper & Pulp	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.7	0.8	0.9	0.9	0.9
Chemical	89.2	55.2	66.0	69.8	64.6	63.2	94.6	24.2	38.6	13.9	9.9	22.7
Ceramics & Non-metal	9.5	11.3	15.0	17.3	21.4	24.0	26.4	24.9	28.3	30.3	32.0	33.7
Primary Metal	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.8	0.9	1.0	1.1	1.1
Machinery	0.7	0.8	1.0	1.2	1.5	1.7	1.8	1.7	1.9	2.1	2.2	3.2
Other Manufacturing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation Sector Total	19.1	21.2	25.9	29.9	37.3	45.3	55.3	56.0	57.1	52.7	51.2	57.4
Petrolium Total	19.1	21.2	25.9	29.9	37.2	45.3	55.3	56.0	57.1	52.7	51.2	57.4
for Road & Train	16.7	18.4	22.3	25.8	32.3	39.4	47.9	50.0	53.8	49.5	49.7	54.4
Gasoline	7.8	8.8	10.7	12.8	16.3	20.7	25.5	27.8	31.6	26.5	24.5	25.1
Gas Oil	8.9	9.6	11.7	13.0	16.0	18.7	22.4	22.2	22.3	23.0	25.3	29.3
for Air	2.4	2.7	3.5	4.1	5.0	5.9	7.3	6.0	3.2	3.2	1.5	3.0
Jet fuel	2.4	2.7	3.5	4.1	5.0	5.9	7.3	6.0	3.2	3.2	1.5	3.0
Agricultural Sector Total	4.7	5.1	6.3	7.0	8.6	10.1	12.0	11.9	12.0	12.1	13.8	16.1
Petroleum Prod.	4.7	5.1	6.1	6.8	8.4	9.8	11.8	11.7	11.7	12.1	13.3	15.4
Electricity	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.0	0.5	0.7
Residential/Commercial TTL	31.8	36.4	39.1	44.5	50.2	58.6	69.0	70.7	82.3	77.6	81.4	92.3
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum	26.6	30.9	33.4	38.7	43.7	51.3	60.2	61.3	70.1	62.6	61.4	68.9
Lean Gas	0.0	0.1	0.1	0.1	0.2	0.5	1.3	1.3	3.3	5.4	9.9	12.2
Electricity	1.4	1.7	2.1	2.3	2.9	3.4	4.0	4.6	5.5	6.2	6.5	7.7
Others	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5
Household Sector Total	22.1	26.1	27.6	31.4	35.8	42.3	49.1	49.3	59.6	50.4	49.5	57.9
Solid Fuel												
Petroleum	17.7	21.6	23.2	27.0	31.2	37.2	43.3	43.3	52.3	42.4	39.6	46.5
Lean Gas	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.4	1.0	1.6	2.9	3.6
Electricity	0.6	0.7	0.8	1.0	1.2	1.5	1.9	2.2	2.8	3.0	3.4	4.3
Others	3.8	3.7	3.5	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.5
Commercial Sector Total	9.7	10.3	11.5	13.1	14.3	16.3	19.9	21.4	22.8	27.1	31.9	34.4
Solid Fuel												
Petroleum	8.9	9.3	10.2	11.7	12.5	14.1	16.9	18.1	17.7	20.2	21.8	22.4
Gas	0.0	0.1	0.1	0.1	0.1	0.4	0.9	0.9	2.3	3.8	7.0	8.6
Electricity	0.8	1.0	1.2	1.3	1.7	1.9	2.1	2.4	2.7	3.2	3.1	3.4
Others	0.6	0.7	0.9	1.0	1.3	1.6	1.7	2.0	2.2	2.4	2.8	2.9
Public Use	0.2	0.2	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.8	0.3	0.5
Others												
Non-Energy Use Total	22.9	19.7	22.7	25.0	35.3	28.1	30.7	26.9	27.1	26.6	18.2	18.2
Petrolium	22.9	19.7	22.7	25.0	35.3	28.1	30.7	26.9	27.1	26.6	18.2	18.2

Petroleum	235.6	249.2	272.7	245.7	268.5	269.8	290.5	288.1	327.8	335.7	335.9	368.3
Gas	44.2	61.3	61.9	46.4	49.9	54.8	91.9	102.7	110.0	141.6	136.5	157.6
Natural Gas	19.0	30.1	31.6	17.7	17.0	20.8	43.1	34.8	15.5	25.1	27.5	18.8
Lean Gas	25.2	31.2	30.3	28.7	32.9	34.0	48.8	67.9	94.5	116.5	109.0	138.8
Electricity	14.8	16.6	18.1	19.2	20.4	21.3	23.5	26.5	28.9	30.8	34.2	37.4
Others	3.5	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.4
Non-Commercial												
Industrial Sector Total	84.4	102.3	106.8	97.6	100.5	105.4	140.9	149.8	154.4	178.7	142.4	172.5
(exclude Pet.chemi Gas Use)	65.2	72.0	74.9	79.8	82.8	82.8	93.7	102.7	118.2	133.3	114.9	153.8
Solid Fuel	8.4	6.5	6.4	6.3	6.2	6.4	4.7	4.7	6.6	6.5	6.5	7.0
Petrolium Total	42.2	45.5	48.7	54.0	56.5	56.3	57.2	58.3	61.7	62.2	51.3	57.0
Gas	29.2	45.2	46.4	32.3	33.2	38.1	74.1	80.8	79.8	102.2	75.4	96.5
Natural Gas(Pet.chemi)	19.0	30.1	31.6	17.7	17.0	20.8	43.1	34.8	15.5	25.1	27.5	18.8
Lean Gas	10.2	15.1	14.8	14.6	16.2	17.3	31.0	46.0	64.3	77.1	48.0	77.7
Pet.chemi	0.2	0.2	0.2	0.2	0.7	1.8	4.2	12.4	20.7	20.2	0.0	0.0
Others	10.0	14.9	14.6	14.4	15.5	15.5	26.8	33.6	43.6	56.9	48.0	77.7
Electricity	4.6	5.1	5.2	5.1	4.6	4.6	5.0	6.0	6.3	7.8	9.2	12.0
Food	10.8	10.5	11.5	13.3	13.3	12.9	19.7	21.6	24.9	28.1	24.2	32.4
Textile	5.7	6.0	6.3	6.1	6.4	6.5	7.4	8.1	9.3	10.5	9.1	12.1
Wood & Products	0.9	0.9	0.8	0.9	0.9	0.9	1.3	1.4	1.6	1.8	1.5	2.1
Paper & Pulp	0.9	1.2	1.4	0.9	1.0	1.1	1.6	1.7	2.0	2.2	1.9	2.5
Chemical	23.4	34.4	36.7	24.9	23.9	27.9	55.7	56.4	46.9	57.4	37.8	32.6
Ceramics & Non-metal	33.8	37.9	38.1	40.1	41.1	40.6	41.2	45.2	52.0	58.7	50.6	67.6
Primary Metal	4.8	7.3	7.3	7.5	9.4	10.8	7.9	8.6	9.9	11.2	9.7	12.9
Machinery	4.2	4.1	4.5	4.0	4.5	4.7	6.1	6.7	7.7	8.7	7.5	10.0
Other Manufacturing	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Transportation Sector Total	71.4	77.1	85.5	81.8	88.4	85.5	90.1	96.8	104.7	111.2	122.3	141.0
Petrolium Total	71.4	77.1	85.5	81.8	88.4	85.5	90.1	96.8	104.7	111.2	122.3	141.0
for Road & Train	67.9	73.7	82.3	78.5	84.7	82.6	87.4	93.3	100.6	106.6	117.3	135.3
Gasoline	32.9	36.5	39.8	37.3	39.7	38.3	42.3	45.8	49.5	53.5	58.9	67.9
Gas Oil	35.0	37.2	42.5	41.1	45.0	44.3	45.1	47.5	51.0	53.1	58.4	67.4
for Air	3.5	3.3	3.2	3.3	3.6	2.9	2.7	3.5	4.1	4.6	5.0	5.8
Jet fuel	3.5	3.3	3.2	3.3	3.6	2.9	2.7	3.5	4.1	4.6	5.0	5.8
Agricultural Sector Total	19.3	20.6	23.7	22.9	25.2	25.0	26.2	27.7	29.6	30.6	38.0	28.6
Petroleum Prod.	18.4	19.5	22.3	21.6	23.6	23.3	24.2	25.5	27.4	28.5	35.6	25.6
Electricity	0.9	1.1	1.4	1.3	1.5	1.7	2.0	2.2	2.2	2.1	2.4	3.0
Residential/Commercial TTL	112.5	117.1	124.4	101.6	114.4	114.7	127.5	128.0	151.9	164.8	204.9	195.8
Solid Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum	84.7	87.0	94.0	71.4	80.0	79.9	90.0	84.5	98.0	101.1	117.6	109.0
Lean Gas	15.0	16.1	15.5	14.1	16.7	16.7	17.8	21.9	30.2	39.4	61.1	61.1
Electricity	9.3	10.4	11.5	12.8	14.3	14.9	16.6	18.3	20.4	20.9	22.7	22.3
Others	3.5	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.4
Household Sector Total	73.2	74.7	84.1	74.4	79.9	82.8	98.7	101.1	122.5	132.1	168.0	146.5
Solid Fuel												
Petroleum	59.9	60.1	66.5	53.4	61.7	61.5	70.6	68.3	81.4	82.5	97.0	76.3
Lean Gas	4.5	5.1	7.6	10.4	6.8	9.9	15.7	19.3	26.6	34.6	54.5	53.6
Electricity	5.2	5.9	6.7	7.3	8.0	8.2	9.3	10.2	11.3	11.5	13.0	13.2
Others	3.5	3.5	3.4	3.3	3.4	3.2	3.2	3.3	3.3	3.5	3.5	3.4
Commercial Sector Total	39.3	42.4	40.3	27.2	34.5	31.9	28.8	26.9	29.5	32.7	36.9	49.3
Solid Fuel												
Petroleum	24.7	26.9	27.5	18.0	18.3	18.4	19.4	16.2	16.7	18.6	20.7	32.7
Gas	10.5	11.0	7.9	3.7	9.9	6.8	2.1	2.6	3.6	4.7	6.6	7.5
Electricity	4.1	4.5	4.8	5.5	6.3	6.7	7.3	8.1	9.2	9.4	9.6	9.1
Others	3.3	3.7	4.1	4.6	5.4	5.6	6.4	7.0	8.0	8.2	8.8	8.1
Public Use	0.8	0.8	0.8	0.9	0.9	1.1	0.9	1.1	1.2	1.2	0.8	1.0
Others												
Non-Energy Use Total	19.0	20.1	22.2	17.0	20.0	24.8	29.0	23.0	36.0	32.8	9.1	35.6
Petrolium	19.0	20.1	22.2	17.0	20.0	24.8	29.0	23.0	36.0	32.8	9.1	35.6

6. BASIC DIRECTION OF POLICY FOR ENERGY CONSERVATION IN THE INDUSTRIAL SECTOR

6. BASIC DIRECTION OF POLICY FOR ENERGY CONSERVATION IN THE INDUSTRIAL SECTOR

6.1 "Measures" and "Policy" for Energy Conservation

6.1.1 What are the "Measures" ?

(1) Basic Technical Measures for Energy Conservation in the Industrial Sector

"Measures" for energy conservation are defined here as technical measures adopted for energy conservation in individual factories. Generally, the following are included.

a. Improvement of fuel combustion
b. Improvement of heating and cooling
c. Prevention of heat loss
d. Recovery of waste heat
e. Improvement of conversion from heat to power
f. Prevention of electric resistance loss
g. Improvement of conversion from electricity to power

Energy conservation measures described in Chapter 2 in this Volume and in the third Volume belong to any of these basic technical measures.

(2) Three Categories of Measures for Energy Conservation in the Industrial Sector

Energy conservation measures in factories can be divided into three categories from the viewpoint of being implemented easily or with difficulties, costly or not costly :

The first category: Measures which can be implemented through the proper management of operations and maintenance of factories, equipment, and others. In other words, they can be said to be implemented to keep the designed value (or the value guaranteed by maker) of energy consumption of factories, equipment, and others as high as possible. These measures usually do not require any significant costs.

The second category: Measures which can be implemented by improving or adding to existing equipment, machines, etc. They can be said to be implemented to improve the designed value of energy consumption of the equipment, machines, etc. and usually require a certain cost.

The third category: Measures which can be implemented by replacing or modernizing of existing equipment or machines. They can be said to be implemented by introducing new equipment or machines with improved level designed value of energy consumption, and usually require a significant cost.

6.1.2 What is the Policy ?

The "policy" is defined here as one set of policy measures adopted to promote or support "measures" implemented in individual factories as mentioned above.

T. Haugland, who is Senior Economist of ECON Centre for Economic Analysis in Norway, wrote, in his paper on energy conservation policy in Norway, "Obviously, the simple engineering studies, based strictly on technical data and calculations, do not account for behavioral features." (Reference 1). If we use his words, the "policy" can be defined as policy measures adopted by the government for promoting or accelerating the behavior of people.

Generally, there are compulsory policies and discretionary ones (those based upon education or suggestions). Examples of the former are the closure of gas stations on certain days and the prohibition of using certain kinds of equipment. Increases in energy prices and favorable treatment for some kinds of equipment in the taxation system are two examples of the latter.

According to T.Haugland, four sets of factors are particularly important for energy consumers to save energy.

a. Inefficient pricing policy with end-use energy price set at levels below the full social costs of additional supplies.
b. Separation of expenditures and benefits which, for example, may discourage owners from renovating buildings if only the tenants receive benefits.
c. Lack of knowledge and technical skills which lead to investments and operations that are economically sub-optimal and result in high energy use.
d. Payback requirements for energy-saving investments that generally are higher than comparable requirements for energy supply investments.

He states that items c. and d. are the two principal variables by which conservation programs can affect consumer's decisions and stem from behavioral features, although item a. needs to be addressed to be via price reform and item b. requires organizational changes.

Three sets of measures affecting the behavioral causes he pointed out are:

a. Information: includes information campaigns, training, energy audits, and labeling of energy usage in machinery and appliances.
b. Standards: cover voluntary and mandatory technical standards on the specific energy efficiency for machinery, appliances, and in building codes.
c. Financial incentives: cover a large number of instruments such as grants, soft loans, tax incentives.

Attention should be paid to his views especially in terms of the "policy" being defined as one which affects the behavior of consumers, although we cannot necessarily agree with him that pricing policies are not included in policy measures which affect behavioral causes. Needless to say, energy conservation will never be accomplished if energy consumers do not "behave" to save energy, even if there is a large scope for savings. Accordingly, the "policy" should be one which urges or accelerates the consumers energy-saving behavior.

From such a viewpoint, the "policy" for accelerating the "measures" in category 1, which are those for improving the management of factories in a broad sense, should be considered first as the most important one in this study. This is mainly because such measures can be implemented financially even in the short period of three to five years while measures in categories 2 and 3 cannot be justified financially in the short term.

The "policy" for supporting measures in categories 2 and 3 are considered second as those which can be implemented mainly in the medium and long term.

6.2 Considerations on Energy Conservation Measures

6.2.1 Energy Conservation due to Good Management

(1) Current status of management in the Iranian factories

The "Factory Energy Audit" in this study proposed many energy conservation measures for improving the management of operations and maintenance, which are equivalent to those in category 1 above. These measures were also introduced in Chapter 2 of the first volume of this study report.

The following are measures for improving management which are often common to each industry:

a. Improving yields of products --------- This is proposed for iron and steel, sheet glass, textiles, and sugar. Improving yields of products is one of the most basic measures for improving productivity, as well as decreasing production costs in factories, which naturally results in energy conservation. The fact that Iranian factories are facing big problems in basic measures for improving management efficiency means that they need to tackle such basic measures to solve as the first step if they are to be successful in promoting energy conservation.

b. Improving management of combustion in boilers, furnaces, and others --------- This is proposed for iron and steel, cement, petroleum refining, sheet glass, textiles, and vegetable oil. These measures are also among the most basic ones for promoting energy conservation in factories. In the same sense as above, the facts that such measures are proposed for many factories means that the Iranian factories need to improve management efficiency at its most basic level.

c. Improving management of unnecessary lighting --------- This is proposed for petroleum refining and sugar. Although it is proposed for only two factories by the "Factory Energy Audit," it can be supposed that there are many factories facing the same problem. This measure is also one of the most basic measures for avoiding waste in factories, which means that the Iranian factories need to implement energy conservation efforts from the most basic level.

(2) Some examples of the proper management

As already mentioned above, usually in existing factories, measures for energy onservation are implemented in the following order: first, efforts to improve the management of operations and maintenance, second, improvements to existing machines or equipment, and then introduction of new processes.

Taking the experiences of Japanese oil refineries as an example, the measure of improving the air ratio proceeded as follows:

The first step was monitoring and measuring the air ratio in heating furnaces and boilers, measures for which are among the most important for energy conservation in oil refineries. Because this is done using an analytical device, installation or repair will be necessary if this device is not installed or is out of order in the plants.

The next step is controlling the air supply. It is the operator's job to control the damper air register finely by hand.

The third step is to prevent air leakages. Materials such as aluminum tape, asbestos yarn, etc. are used for stopping holes. The installation of stopcocks on burners as well as improving

check-windows are also necessary .
After taking these measures mainly in category 1, low O_2 burners, the automatic damper control system, and other devices for measures in category 2, were introduced.

The measure of improving the air ratio is usually done in the steps mentioned above. As can be seen in this example, both "fine" ideas and sufficient skills on the level of production lines in factories are necessary for the proper management of equipment.
It is reported that in Japanese oil refineries operators or workers on production lines are responsible for proposing ideas and doing the work in many cases. The same can be said in other industries.
In addition, measures in category 1 are not the only measures undertaken by operators or workers for effective energy conservation. But they play a very important role in proposing the ideas as well as implementing measures in all categories, particularly in categories 1 and 2.

Looking at the history of energy conservation activities in power plants in Japan, our attention is turned to the following facts when proposing ideas on energy conservation and on implementing measures based upon such ideas:
First, many ideas on energy conservation were proposed by operators at power plants.
What should not be forgotten here, however, is the fact that they were motivated by the basic guidelines and systems or organizations for energy conservation which the management of firms or factories established. This is shown by the fact that many ideas were proposed in proposal systems (including invitations for proposals as well as rewards for adopted proposals) prepared by the management of firms or factories.
Second, "groups" or "circles" were organized for executing energy conservation measures to play a big role in their execution. In particular, we should pay attention to the example in which a "combustion management group" in a power plant was successful in persuading operators to fine-tune management, acting as a core for all operators.
What promoted the "behavior" of such operators ?

(2) System and Mechanism determining Management Efficiency in Factories (or Firms)

According to studies done by the "Comparative Institutional Analysis" school, which originated at Stanford University in California in the early 1990s, the following differences in the "Coordination System" can be found between the automobile industry in the U.S. and Japan:
In the Japanese industry, workers are requested to have common knowledge on the whole production system. They are qualified to stop production lines, and also requested to react and cope with emergencies including out-of-order of machines, for instance (Note).

(Note) M. Aoki, Professor of Stanford University, wrote "I mentioned that in the Japanese firm more responsibilities are delegated to workers and less specialized, overlapping responsibilities are assigned to workers---------.
--------- It is important to note that, when workers co-operate under such a scheme, they are acting in their own self-interest rather than out of loyalty to the group."(Reference 2)

Such a production system contrasts to that in the U.S. automobile industry in the period around 1970 to 1980. Duties were distributed more strictly there in the way that production lines were under the control of centralized management and emergencies were dealt with by staff who had specialized knowledge.

Table 6.1 shows simplified and generalized differences. As can be seen in the table, the "Comparative Institutional Analysis" insists that workers' behavior is determined not only by the "Coordination System" but also by the "Incentive Mechanism." In Japan, the "Incentive Mechanism," of which "permanent employment," "seniority payment," and "seniority promotion" are characteristics, support the "behavior" of workers (Reference 3 and 4).

Table 6.1 System and Mechanism determining the Efficiency of Management of Firms (Factories) in Japan and U.S.A.
(According to the "Comparative Institutional Analysis")

1. Coordination System in Firms (Factories)

[U.S.] / [Japan]

1-1. Production lines----Top executives / Staffs (Workers)

1-2. Reaction to accident----Specialists (Experts)/ Staffs (Workers)

1-3. Management of stocks----Specialist (Experts)/ Staffs (Workers)

2. Incentive Mechanism in Firms (Factories)

[U.S.] / [Japan]

2-1. Employment----Lay-off (but Seniority system) / Long term

2-2. Wages (Salaries)-----Ability / Seniority

2-3. Promotion----Ability / Seniority

What kind of "Coordination System" and "Incentive Mechanism" are desirable for promoting energy conservation in factories?

Items a. to d. below are to be considered and discussed to identify the "Coordination System" and the "Incentive Mechanism" appropriate for factories and firms in I.R. Iran.

As shown in Figure 6.1, the "Coordination Systems" in Japan and the U.S. have been developed from the classical hierarchy to similar ones that are the horizontal hierarchy and the de-centralized information system, respectively. Basically, however, the Japanese system has made automobile and electric appliances industries in Japan, for instance, highly competitive in the international market, and the U.S.-type has made petro-chemical and information industries competitive. The "Comparative Institutional Analysis" concludes that the main and ruling "Coordination System" in a country does not make all of the industries in the country highly competitive. Based upon such an analysis the following items are to be considered.

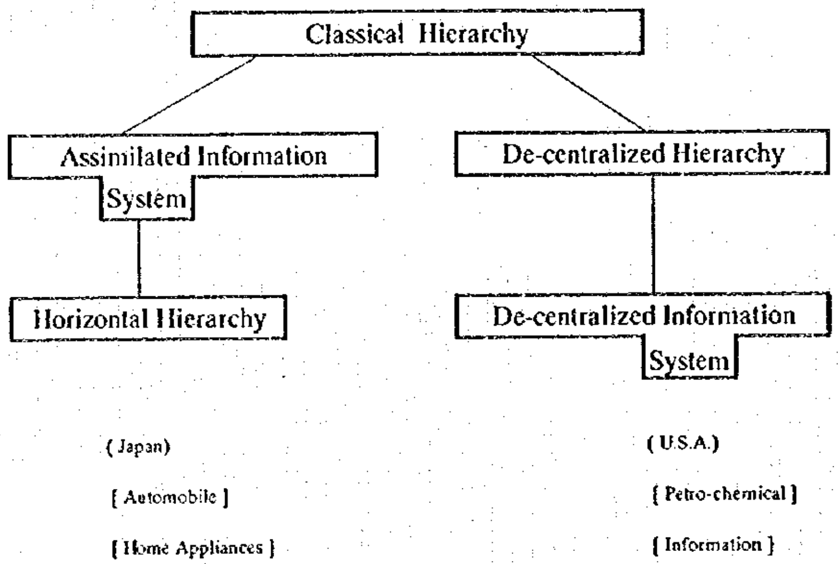
a. Energy conservation is an activity which is common to all industries including those mentioned above. The Japanese "System," however, may be appropriate for promoting energy conservation mainly because energy conservation in the industrial sector has been very successful in Japan.

b. The "Coordination System" in a country has been formulated in the historical development of the country. Therefore, its simple transfer from one country to another is impossible. Nevertheless, if we look at the U.S. automobile industry, which has recovered its competitive strength by learning from the Japanese "System," it can be said that industries in I.R.Iran will be successful by adopting some parts of the Japanese "System."

c. In parallel, some parts of the U.S. "System" and others may be able to be transferred to Iranian industries.

d. A similar consideration can be made for the "Incentive Mechanism," again taking into account the characteristics of the Iranian "Mechanism."

Figure 6.1 Evolution of Coordination Systems in Firms (Factories) in Japan and U.S.A.



6.2.2 Costs and Benefits of Energy Conservation Measures

(1) Necessity for Comparing Costs and Benefits of Measures

A comparison of costs and benefits of energy conservation measures is indispensable to the consideration of economic incentives. Namely, it is indispensable in such cases (a) that a company determines the priorities of the measures, or estimates their effect, and (b) that the government examines economic incentives for energy conservation, or estimates the expenditures necessary for the incentives.

(2) Method of evaluation

Costs and benefits of energy conservation measures are evaluated according to the method shown in the Chapter 2 in this Volume of the Study Report.

First, the costs of machines and equipment introduced for energy conservation are estimated assuming that they are sent from Japan to I.R.Iran to be installed by Iranians.

Second, the benefits are estimated for each measure adopted based upon experiences in Japan.

Third,

When

C = Cost of Investment (or expenditure) for a measure for energy conservation at the time of investment (or expenditure)

B = Effect of the measure (Present value of energy saved by the measure for three or ten years)

And if

$$B > C$$

Then, the measure is evaluated as being "feasible" economically.

Fourth, every price is expressed in real terms at 1993 prices. The exchange rate is also that in 1993, that is, U.S.$ 1 = 100 yen = 1,750 Rial.

Fifth, the discount rate is 10% for calculating B.

Sixth, the following two scenarios are established for energy prices as explained in detail later.

a. Energy conservation scenario --------- Energy prices will increase at the annual rate of 8% after 1994.

b. Accelerated energy conservation scenario --------- Energy prices will increase to the level reflecting their costs, and be maintained after that.

(2) Results of the Evaluation

The results of the evaluation are described in detail in Chapter 2. The following is a summary.

a. Measures in category 1

Many measures belonging to the category 1 are evaluated as "feasible." There are, however, measures in the category 1 which do have a cost. At least some of them may not be viable financially if energy prices increase at the rate scheduled in the Five-year plan (See the "Energy Conservation Scenario" in Table 6.4 in Section 6.3 below).

In Japanese firms, the costs of measures in category 1 are not classified into investment costs but into the usual costs for maintenance of equipment, machines, etc.

In I.R.Iran, where prices of energy carriers are very low, such costs should receive careful attention in evaluating the benefits of measures.

In the table, it is assumed that energy prices will increase at the rate of 8% per annum from 1995 in the "Energy Conservation" scenario, and that they will reach the level representing their costs in 2000 in the "Accelerated Energy Conservation" scenario. Eight percent above is estimated according to the assumption in the Five-year plan that energy prices will increase around at the rate of 20% per annum and annual inflation will be around 12%.

Looking at inflation in recent years and foreseeing future one, increasing energy prices at the rate shown in the "Energy Conservation" scenario is thought to face difficulties.

Table 6.2 shows the results of an evaluation of costs and benefits of measures for energy conservation in factories. The measure of "Improving the raw mill" will not be viable only in the case of three years, but realistically the case of ten years might also not be viable if we take into consideration what is mentioned above.

The measure of "Converting screen plate in finishing mill" will be able to recover its costs both in the cases of three and ten years , but the same can be said in the case of three years as was for "Improving the raw mill" above.

These examples of measures in category 1, which are proposed to implement in the report of the factory energy audit, imply that it is not necessarily easy for such measures to be executed despite of their costs being much less than those in categories 2 and 3.

Table 6.2 Comparison of Costs and Benefits of Energy Conservation Measures in the Industrial Sector (In the Case of Cement Industry in 2000)

Examples of Measures	Costs of Measures	Present Value of Benefits (E. C.)				Present Value of Benefits (A. E. C.)			
		Electricity		Fuel Oil		Electricity		Fuel Oil	
		3years	10years	3years	10years	3years	10years	3years	10years
	(Rl/ton-cem.)	(Rl/ton-cem.)		(Rl/ton-cem.)		(Rl/ton-cem.)		(Rl/ton-cem.)	
Improvement of Raw Mill	410	260	820	----	----	650	1,600	----	----
Conversion of Screen Plate in Finishing Mill	460	500	1,580	----	----	1,240	3,070	----	----
Conversion of Wet Kiln to NSP Kiln	23,450	----	----	3,190	9,990	----	----	14,170	35,020

(Note) Measures in the Table are those which are proposed in the report on the factory energy audit.

b. Measures in categories 2 and 3

The measure of "Converting wet kiln to NSP kiln," which is proposed in the same study result, will not be viable financially both in the cases of three and ten years in the "Energy Conservation" scenario. In addition, it will also not be viable in the case of three years in the "Accelerated Energy Conservation" scenario.

The evaluation of "Converting dry kiln to NSP kiln," "Converting satellite cooler to grate cooler," and some others, all of which are not included in the table, shows that they will also not be financially viable in many cases.

(3) The results of evaluation and the implementation of "measures" and "policies"

The results of an economic evaluation of measures provide very important information for companies to determine whether to implement them or not. The company will not implement the measures if they are not economically viable, as far as there are not any special conditions.

The government will consider what policies can invite or promote companies to implement energy conservation measures, when it has sufficient reason for doing so. In such a case, comparison of costs and benefits of energy conservation measures is indispensable to quantitative examinations on policy measures (For instance, an examination on what subsidies are necessary for companies to implement the measures).

6.3 Consideration of Basic Policy Direction for Energy Conservation

6.3.1 Basic Policy for Proper Management

(1) Problems to be solved in the Iranian factories

As already mentioned, improving the "Coordination System" and the "Incentive Mechanism" for the realities in I.R.Iran is necessary for firms or factories to improve their management of equipment and machines for promoting energy conservation.

The following are "some sample key deficiencies in the existing entities" in the electric power industry, which we consider can be applicable to other industries in many cases (Reference 5).

a. Salaries are often based on complex formula, and pay differentials are small. A suitable salary system should be developed, which reflects adequate differentials for responsibility and takes account of the scarcity of skills concerned;
b. Job descriptions, where they exist, do not focus on individual accountability and responsibilities, nor are they part of an overall organization plan. For every position, a complete job description should be written, highlighting the required qualifications and experience;
c. There is no comprehensive, long-term, training programme for the industry. A thorough analysis of training needs for all the different jobs should be carried out and required training modules should be developed;
d. No formal performance management review and improvement processes, or development systems or incentives exist for employees. A system of performance management incorporating target setting and performance appraisal should be established;
e. Much of the decision-making is generally carried out at quite a senior level, so that operational decisions are often referred upwards when responsibility could be delegated to lower levels of management. It is necessary to develop clear statements of corporate and departmental objectives, roles, and responsibilities.

We think attentions should be turned to these suggestions for improving the "System" and the "Mechanism" in factories. Taking into account the views of experts on this issue including those above, the following items should be considered.

a. The project on improving the management efficiency of a whole factory on a top-down basis
   1) The top management's leadership is thought to be very critical for such a project. Accordingly, serious attention should be paid to comments made by the World Bank --------- "Management appointments should be based on professional qualifications and experience, and management training should be expanded." (Reference 6)
   2) System or organization for preparing a program on the project and executing it is also critical for the project to be successful. The program should contain a wide range of large and small issues including establishing "realistic" targets, developing the method of collecting and organizing data and information, and others shown below.
b. Some examples of important issues to be considered
   1) How middle management can be urged to accomplish targets?
   --------- It is also critical that middle management be positioned as the core for promoting the project and accelerated achieving of targets.

2) Economic incentives for proposing and executing the measures

---------Economic incentives are one of the factors accelerating workers and others to propose and execute energy conservation measures even in Japan. Considering current "Coordination System" and "Incentive Mechanism" in I.R.Iran, this will be dealt with as much more important factor in preparing the program.

(2) Issues to be Considered by the Government

We considered that the following policy measures are to be adopted by the government for solving the problems in factories mentioned in (1) above.

a. Management of public enterprises

--------- Improving the method of making management appointments (Professional qualifications and experience should be considered.)

--------- Management training (For management to improve various abilities for coping with following problems; To prepare proper job descriptions for employees, to prepare proper performance management for employees, and to provide for efficient and appropriate decision-making at each level of operations)

b. Workers in factories

--------- Improving labor laws (According to factory managers, labor laws in I.R.Iran have been preventing increases in productivity. Therefore, it is necessary for the government to improve the laws) (Note).

(Note) "The labor regulations in Iran are comprehensive and detailed. In general, they are intended to provide protection to workers, specifying minimum conditions of work and remuneration. An important element of the regulations is the set of procedures and conditions restricting dismissal under Article 27 and 165 of the Labor Law of Iran."

"Current indications from factory managers in Iran are that the labor laws are a major impediment to increasing labor productivity. A comment repeated on several occasions by factory managers in Iran was that it was easier to get a divorce than to dismiss an inefficient worker." (Reference 6)

--------- Improving salary system (To prepare a system that reflects adequate differentials for responsibility and skill)

--------- Training workers (To develop the method and the system of training workers for improving operations and maintenance, as mentioned in 6.2.1 above)

To prepare above mentioned policy measures for implementing them as concrete andrealistic ones, the following items should be studied under the guidance of the government.

a. To consider policy measures for energy conservation in factories

--------- Concrete policy measures for supporting and accelerating realistic programs for promoting energy conservation in factories should be prepared by experts inside the government and/or specialized consultants. They will also consider the other policy measures mentioned below.

b. To establish systems or organizations for energy conservation in each group of public enterprises

--------- To prepare guidelines on the programs for energy conservation in factories, the "Energy Conservation Committee" should be established in each group of public enterprises. The guidelines will also include other aspects of measures for energy conservation in factories than improving management efficiency (Note). The results of such studies may be disclosed to private enterprises for their reference.

(Note) Most of public enterprises in I.R. Iran belong to one of following groups (Reference 7):

1) Those which are under NIIO (National Iranian Industrial Organization) and IDRO (Industrial Development and Renovation Organization). Both of NIIO and IDRO are holding companies of the Ministry of Industry .
2) Those which are under NISC (National Iranian Steel Corporation). NISC is a holding company of the Ministry of Mines and Metals.
3) Those which are under BIM (the Bank of Industry and Mines).
4) Those which are under MJF (Mostazafan and Janbazan Foundation).

According to a brochure of MJF, "Moatazafan and Janbazan Foundation (The Foundation for the Oppressed & Disabled of the Islamic Revolution) as a non-governmental complex, is a huge economic and cultural conglomerate establishment founded on 28th Feb., 1979 by a decree of the great leader of the Islamic Revolution, the late Imam Khomeini."

In Ahwaz Steel and Mobarakeh Steel, both of which are under NISC, sections in charge of energy conservation have already been established.
MJF consists of "Economic Section" and "Janbazan Section," and there are seven Organizations under the former, including "Mines and Petroleum Products Organization" where the "EnergyCommittee" has already been established for the purpose of promoting energy conservation. And also the "Energy Sub-committee," which has the same purpose as the "Committee," has been established in each factory under the Organization.

c. Model factories for energy conservation

--------- At least one model factory should be selected in each group where the project on improving management efficiency will be implemented in consultation with outside experts on management efficiency and energy conservation. If necessary, foreign consultants and experts will be invited.

6.3.2 Policy Measures for Recovering Investments (or Expenditures)

The following are policy measures for recovering investments (or expenditures). First, we describe their current status in I.R.Iran, and then propose what policy measures should be taken.

(1) Energy pricing

a. Current status

Prices of energy carriers have already been increased in the second five year plan, where an average increase of 20% per annum is envisaged during the period from March 1995 to March 2000.

b. Future policy

Present prices of energy carriers are significantly lower than their costs. According to the estimate made by the PBO team, the price of fuel oil, for instance, was 10.7 Rial/l in 1995, which can be compared to the cost of 75Rial/l (Both are those delivered to factories, and in 1993 prices in real terms).

The difference between the costs and the prices has been actually subsidized by the government. Increasing prices mentioned above is aimed at decreasing the government's budget deficit by decreasing or abolishing subsidies, as well as promoting energy conservation.

The Iranian government, however, has been very careful in its approach to increasing energy prices partly because it may have a bad and serious effect on poor people. A 20% increase per annum in energy prices means an average annual increase of around 8% in real terms, because around 12% inflation is assumed in the five year plan. In fact, commodity prices were increasing at an annual rate of dozens of percent during these years (For instance, the consumer price index increased at an annual rate of 32% from 1990 to 1994, and it is estimated that around the same percentage increase was recorded after 1994). As a result, the prices of energy carriers, which were increased since 1995, have declined in real terms, having less effect on energy conservation than expected.

Nevertheless, we think that it is desirable for the government to continue to increase energy prices at least around 20% annually for the period of the current five year plan, not only for energy conservation, but also for decreasing the government's budget deficit.

In the period after 2000, energy prices can be increased in real terms, because such economic indicators as GDP growth rates and commodity prices will be improved, as described in detail when explaining the results of the "Energy demand forecast" above.

(2) Taxation

a. Current status

There has been no policy measure for energy conservation in the taxation system.

b. Future policy

Discussions with the PBO team concluded that, for at least short term, tax incentives will not be effective for promoting energy conservation. The reasons are as follows:

--------- In general, the current effective rate of taxes is so low in I.R.Iran that any favorable taxation treatment will not have a big influence on energy conservation measures (Note 1).

--------- Because the Iranian government has recently started its efforts to re-establish an effective taxation system, it is desirable for it to hammer out tax policy measures for energy conservation after the re-establishment (Note 2).

(Note 1) According to a report of the World Bank, the effective rate of taxation is low in the Iranian taxation system, which has following characteristics:

"The income taxation system in Iran is characterized by relatively high nominal tax rates and a vast array of attractive exemptions or incentives."

"The high income tax rates and low tax receipts suggest that, in combination, the effects of exemptions and avoidance are high." (Reference 6)

(Note 2) According to The Economist Intelligence Unit, a British consulting firm, the Iranian government is now planning to expand tax revenues, which is very low at present.

"A major weakness in current government economic planning is the relatively low level of tax revenue upon which it can count. With the development of Iran's economy, it is accepted that a parallel development of a tax culture and rise in tax revenue is essential."

"The Iranian government has announced an ambitious programme of increasing the proportion of tax revenue collected during the Second Five-Year Development Plan(1995-2000) to 26% of entire government revenue, from a figure of around 17.5% in fiscal year 1995/96."

Looking at the current situations of the Iranian taxation system above, we think that it is desirable for the government not to hammer out any tax measure for energy conservation during the period until 2000.

In the period after 2000, however, favorable taxation treatment including tax credits and special depreciation can be implemented for energy conservation, assuming the taxation system will have been re-established by that time.

For reference, we show the current system of taxation for promoting energy conservation in Japan --------- (a) Objective: Energy efficient equipment specified by laws and regulations. (b) Tax exemption: Either of the following; 1) Tax exemption equivalent to 7% of the equipment acquisition cost (which should be not more than 20% of income tax or corporate tax payable), 2) Special depreciation of 30% of the acquisition cost in the year of acquisition, in addition to ordinary depreciation.

(3) Financing

a. Current status

There has been no policy of assisting factories to finance energy conservation measures. For reference, however, the five-year plan states that such measures should be adopted for energy conservation: "The necessary criteria for granting financial support with preferential rates to the industries and organizations will be announced and implemented in order to execute operations for improving the structure of energy consumption." (Article 19. f.5).

b. Future policy

It is desirable that the policy of low-interest, long-term loans will be implemented for factories to adopt energy conservation measures in the period from 1997 to 2000 and be continued in the period from 2000 to 2005.

The loans, however, should be given to factories only for measures evaluated as economically "feasible" in both periods, while carefully monitoring the re-establishing of the taxation system, mainly because the government's budget balance might not necessarily be much improved, as explained in the results of the "Energy demand forecast".

For reference, we show the current system of financing for promoting energy conservation in Japan (loan by the Japan Development Bank) --------- (a) Objective: Energy efficient equipment specified by law and regulation. (b) Financing ratio: Within 40%. (c) Interest rate: 3.15% (As of November 28, 1995)

(4) Subsidies

a. Current status

There has been no policy measure on subsidizing factories for promoting energy conservation.

b. Future policy

As mentioned above, the government has been suffering from the burden of subsidies given for many commodities, and has already hammered out the general direction of decreasing or abolishing subsidies. Subsidization for energy conservation, however, does not contradict the general direction, if it can satisfy a certain condition, because energy conservation is one of important policies on which the government has put priority.

"A certain condition" above means that the costs of importing equipment for an energy conservation measure are to some extent less than the export price of energy (oil) saved by the measure, as was explained in detail for the results of a study on the "Energy utilization plan" above. The scale of "to some extent" depends upon the prices of energy (oil) for domestic use and for export. In establishing policy scenarios mentioned below, we assumed that measures will be subsidized if their benefits exceed 50% of cost.

For reference, we show the current system of energy conservation subsidies (in a broad meaning) in Japan --------- (a) Objective: Photovoltaic power generation system for household.

(b) Amount of subsidy (As of fiscal year 1995): A * B

A: Lower one of the following

1) 850 thousand yen plus consumption tax

2) 1/2 of the system cost per 1kW

B: Maximum output of solar battery module (kW)(5kW is the upper limit)

6.3.2 Other Policy Measures

The following are other policy measures for promoting energy conservation. As many of them can be implemented without a large investment, such policy measures should be adopted as soon as possible.

(1) Establishing the standards and the targets of energy consumption on machines and equipment in factories.

(2) Designating energy intensive factories

(3) Obligation for nominating energy managers in factories

(4) Assistance on research and development for energy conservation --------- The current five-year plan states that "0.2% of income that accrues from sales of energy carriers during the Plan period will be allocated to research by the relevant ministries necessary for saving and managing energy consumption." (Article 19 f.5)

(5) Reducing electricity consumption --------- The plan states that "the seasonal program of factory and industry works will be regulated by the relevant ministries to reduce the electricity and energy consumption during the months subject to the highest consumption." (Article 19 f.4)

(6) Providing information on energy conservation --------- Factory energy audit made by experts; publishing guideline for energy conservation; demonstration for energy conservation; awarding successful cases on energy conservation; others

6.4 Establishing Policy Scenarios for Energy Conservation

We have established policy scenarios to estimate the potential for energy conservation, based upon the examinations above. Factors (policy measures) incorporated in the scenarios have to be suitable for quantitative examinations because they are to be established for estimating potential. We have selected as such factors (a) energy prices, (b) economic incentives (financing, taxation, subsidies, etc.), and (c) improvement in management.

The following scenarios are established by incorporating the policy measures above:

◆ Energy Conservation (E. C.) Scenario

◆ Accelerated Energy Conservation (A. E. C.) Scenario

Estimation of potential for energy conservation, however, is made only for the E. C. scenario for the reasons mentioned in the next chapter. Table 6.3 shows an outline of policy scenarios.

Table 6.3 Scenarios for Forecasting Energy Demand in the Industry Sector

Scenarios	Energy Conservation	Accelerated Ene. Con.
Energy Price	*1995-2000;According to 5 year plan *2001-2005 ; The same as above	*1995-2000;To reach price representing real cost. *2001-2005;To be maintained
Incentives or Subsidization	*1995-2000; Subsidy & loan *2001-2005 Subsidy, loan & taxation	*1995-2000; Subsidy & loan *2001-2005; Subsidy, loan & taxation
Improved Management	*1995-2000; To be strengthened *2001-2005 ; The same as above	*1995-2000 ; To be much more strengthened. *2001-2005 ; The same as above
Others (R & D;etc)	To be considered only qualitatively	The same as "Ene. Con."

a. Energy prices

As mentioned already, energy prices are assumed to increase at a rate of around 8% per annum at real prices in 1993 in the E. C. scenario.
In the A.E.C. scenario, energy prices are assumed to increase to a level representing real costs at the real prices in 1993 in 2000, and to be maintained at the same level after that.
Table 6.4 shows the assumptions of energy prices by scenario.

Table 6.4 Assumption of Energy Prices by Scenario

	Electricity (Rl/kWh)		Natural Gas (Rl / m^3)		Fuel Oil (RL / l)		Gas Oil (RL / l)		Coal (US$ / t)	
	Ene. Con.	Acc. Ene. Con.	Ene. Con.	Acc. Ene. Con.	Ene. Con.	Acc. Ene. Con.	Ene. Con.	Acc. Ene. Con.	Ene. Con.	Acc. Ene. Con.
1993	N.A.	N.A.	18.2	18.2	15	15	20	20	N.A.	N.A.
1994	28.6	28.6	15.7	15.7	10.7	10.7	14.3	14.3	N.A.	N.A.
1995	25.6	25.6	14.1	14.1	10.7	10.7	16	16	N.A.	N.A.
1996	27.7		15.2		11.5		17.3			
1997	29.9		16.4		12.4		18.7			
1998	32.3		17.7		13.4		20.2			
1999	34.8		19.2		14.5		21.8			
2000	37.6	100	20.7	123	15.7	75	23.5	474		60
2001	40.6	100	22.4	123	16.9	75	25.4	474		60
2002	43.9	100	24.1	123	18.3	75	27.4	474		60
2003	47.4	100	26.1	123	19.8	75	29.6	474		60
2004	51.2	100	28.2	123	21.3	75	32	474		60
2005	55.3	100	30.4	123	23	75	34.6	474		60
2006	59.7	100	32.8	123	24.9	75	37.3	474		60
2007	64.5	100	35.5	123	26.9	75	40.3	474		60
2008	69.7	100	38.3	123	29	75	43.5	474		60
2009	75.2	100	41.4	123	31.3	75	47	474		60
2010	81.3	100	44.7	123	33.9	75	50.8	474		60

(Note) Prices are in the real term of 1993 price, including the transportation costs except for electricity. The costs are 10 % of the price for natural gas, 10 Rials for fuel oil and gas oil, and negligible for coal.

b. Economic incentives

The following two kinds of policy measures are assumed to be adopted in the future:

First, the government will give a company or a factory a "subsidy" for an energy conservation measure in 2000 and after, which is evaluated as "not feasible " according to the evaluation explained previously, providing the condition below is satisfied (See the previous chapter on B and C):

$$B / C > 0.5$$

The amount of the subsidy is the same as the difference between C and B. This formula means that the subsidy is given to the company or the factory if the present value of total energy saved by the measure exceeds half of the cost of the measure.
Only measures, the cost of which is less than 1,750 million Rial for 2000 and 8,750 million for 2005, will be subsidized, taking into account the difficulties of financing investment costs including foreign currency.

Second, the government will finance 40% of the cost of an energy conservation measure under favorable conditions in 2000 and after, which is evaluated as "feasible" according to the economic evaluation, providing the costs do not reach 1,750 million Rial for 2000 and 8,750 million Rial for 2005, respectively.

c. Improvement in management

Management of operation and maintenance in factories are assumed to be improved through the efforts mentioned above in this chapter.

6.5 Estimating Potential for Energy Conservation

We have estimated the economic potential of energy conservation in seven industries according to the B. C. scenario.

6.5.1 Iron and Steel

We have estimated the potential by factory in the iron and steel industry.

a. 2000

◆ Esfahan Steel
We have assumed that any measures for which the cost exceeds 1,750 million Rials cannot be implemented from the viewpoint of financing even if they are evaluated as "feasible." Other measures will result in a total saving of more than 11% of the energy intensity from 1994.
Accordingly, the potential which can be actually realized is assumed around 10% of the 1994 energy intensity.

◆ Mobarakeh Steel
We have made the same estimation as that for Esfahan Steel, assuming the energy intensity of Mobarakeh Steel in 2000 will be 12.5% lower than that in 1994.

◆ Khouzestan Steel
We have made the same estimation as that for Esfahan Steel, assuming the energy intensity of Khouzestan Steel in 2000 will be 15% lower than that in 1994.

b. 2005

◆ Esfahan Steel
Two additional measures of "Yield increase" and "Low coke operation" will be "feasible" by 2005, and energy intensity will be decreased about 2% by the measures.
Accordingly, the energy intensity in 2005 is assumed to decline to 87.5% of that in 1994.

◆ Mobarakeh Steel
In existing facilities, a further 2-3% reduction of energy intensity can be achieved. Accordingly, we have assumed that the intensity in 2005 will be 85% of that in 1994.
In addition, we have assumed that new facilities with a capacity of producing around 500 thousand tons of crude steel equivalent per annum will have been completed by 2005, and that the energy intensity of the facilities will be around 6,500 Mcal/t.

◆ Khouzestan Steel
In existing facilities, a further 5-6% reduction of energy intensity can be achieved. Accordingly, we have assumed that the intensity in 2005 will be 80% of that in 1994.
We have also assumed that new facilities with the capacity for producing around 1,000 thousand tons of crude steel equivalent per annum will have been completed by 2005, and that the energy intensity of the facilities will be 6,500 Mcal/t.

The estimation of potential above shows that the energy intensity in the iron and steel industry will decrease from 8,830 Mcal/t in 1994 to 7,760 Mcal/t in 2000 and 7,340 Mcal/t in 2005. Future production of crude steel and energy consumption in the iron and steel industry are shown in Table 6.5and Table 6.6, respectively.

Table 6.5 Future Production of Crude Steel in I.R.Iran

	1994		2000		2005	
	Capacity	Product.	Capacity	Product.	Capacity	Product.
	(1,000t/y)		(1,000t/y)		(1,000t/y)	
Esfahan	2,100	1,880	2,100	2,100	2,100	2,100
Mobarake.	2,770	1,480	2,770	2,600	3,270 (500)	3,000 (430)
Khuzest.	1,700	1,350	1,700	1,600	2,700 (1,000)	2,200 (900)
Total	6,570	4,710	6,570	6,300	8,070	7,300

(Note) Figures in parentheses are additional capacity and crude steel produced by the additional capacity, respectively.

Table 6.6 Future Consumption of Energy and Energy Intensity in the Iron and Steel Industry in I.R.Iran

	1994	2000		2005	
		No Meas.	Measures	No Meas.	Measures
	(Mcal/t-c.s.)	(Mcal/t-c.s.)		(Mcal/t-c.s.)	
Esfahan	9,140	9,140	8,230	9,140	8,000
Mobarak.	8,890	8,890	7,780	8,890	7,410
Khuzest.	8,350	8,350	7,100	8,350	6,610
Total	8,830	8,840	7,760	8,430	7,340
Energy Consumpt. (Mill. Mcal/y)	41,536	55,690 (100)	48,890 (88)	61,540 (100)	53,580 (87)

6.5.2 Cement

We have estimated the potential in five groups of production lines in the cement industry.

a. 2000

Looking at measures belonging to "Improvement in management," we have estimated that "feasible" measures can reduce energy intensity in 1994 by 6-8% in Sepahan Cement. It is also estimated that, in No.6 kiln of Tehran Cement and No.4 kiln of Soufian Cement, "feasible" measures can decrease energy intensity by 5-10% and 6-7%, respectively (See the "Factory Energy Audit" on these three factories).

Accordingly, we have assumed that around 10% energy conservation can be accomplished by these measures in the whole industry (which means each of five groups can accomplish this scale of energy saving).

On the other hand, we have assumed that facilities which will have been operating for more than 30 years by 2000 will be replaced or scrapped. In our forecast, many facilities in the "Wet kiln – Planetary cooler" group will be replaced or scrapped by 2000, and the production capacity of this group will decrease from 2,200 t/d in 1994 to only 300 t/d in 2000.

In contrast, a large number of new facilities will be built by 2000 to replace the facilities mentioned above and to fill increased demand. We forecast the production capacity of these new ones will reach 20,970 t/d in 2000.

Such replacement, scrapping, and new construction will result in a big decline of the energy intensity in the industry.

b. 2005

First, we have assumed that an energy saving of around 2.5% can be additionally accomplished by measures belonging to "Improvement in management." Second, measures for the raw mill and the cement mill, which belong to "Modification of equipment and facilities," will be "feasible" by 2005. If these measures are adopted by three groups excluding the "Dry kiln – Planetary cooler" group (No line in "Wet kiln – Planetary cooler" group will exist in 2005), the energy intensity in the whole industry will decline another 2.5% by 2005.

The estimation of the potential above shows that the energy intensity in the existing facilities will decline from 1,370 Mcal/t-cem to 1,220 Mcal/t-cem in 2000 and 1,140 Mcal/t-cem in 2005.

On the other hand, new facilities will be built from 2000 to 2005, the production capacity of which is forecast to be 10,660 t/d in 2005. The energy intensity of these facilities is forecast to be 960 Mcal/t.

These developments will result in an energy intensity of 1,060 Mcal/t in the industry by 2005.

Future cement production and energy consumption are shown in Tables below.

Table 6.7 Future Production of Cement in I.R.Iran

Group	1994 Capacity (1,000t/d)	1994 Product. (1,000t/y)	2000 Capacity (1,000t/d)	2000 Product. (1,000t/y)	2005 Capacity (1,000t/d)	2005 Product. (1,000t/y)
<Existing>						
Wet-Plan.	2,200		300		0	
	(5)		(1)		0	
Dry-Plan.	8,100		8,100		4,000	
	(5)		(5)		(3)	
SP-Plan.	19,750		16,850		16,850	
	(11)		(5)		(8)	
SP-Grate	18,000		17,000		14,450	
	(10)		(9)		(6)	
NSP-Grate	6,050		8,050		8,050	
	(3)		(4)		(4)	
Total	54,100	16,840	50,300	12,570	43,350	10,840
	(34)		(27)		(21)	
<Newly built>						
SP(NSP)- Grate.	0	0	20,970	6,290	31,630	9,490
Grand Tot.	54,100	16,840	71,270	18,860	74,980	20,330

(Note) Figures in parenthesis are the number of kiln-line.

Table 6.8 Future Consumption of Energy and Energy Intensity in the Cement Industry in I.R.Iran

	1994	2000		2005	
		No Meas.	Measures	No Meas.	Measures
	(Mcal/t-c.)	(Mcal/t-c.)		(Mcal/t-c.)	
<Existing>					
Wet-Plan.	1,960	1,960	1,760	1,960	0
Dry-Plan.	1,510	1,510	1,360	1,510	1,320
SP-Plan.	1,390	1,390	1,250	1,390	1,180
SP-Grate	1,280	1,280	1,150	1,280	1,090
NSP-Grat.	1,230	1,230	1,110	1,230	1,050
Total	1,370	1,350	1,220	1,340	1,140
<Newly built> SP(NSP)-Grate	0	960	960	960	960
Grand Tot.	1,370	1,220	1,130	1,160	1,060
Energy Consump (Mill. Mcal/y)	23,070	23,010 (100)	21,310 (93)	23,580 (100)	21,560 (91)

6.5.3 Sheet Glass

We have estimated the potential for energy conservation by factory in the sheet glass industry.

a. 2000

First, "Improvement of yield" and "Combustion control," both of which belong to "Improvement in management" will be "feasible" for implementation by all factories by 2000. The energy saving achieved by these measures is around 2% and 4% for the whole industry, respectively. Supposing that other measures belonging to "Improvement in management" can be added, however, we have estimated that around 10% energy saving can be accomplished by these measures in the industry.

Second, "Light insulation" and "Improvement productivity" will be "feasible," depending upon the government's economic incentives.

Furthermore, the commissioning of Azar Glass (Float process) in 2000 will contribute to decreasing the average intensity of energy in the industry.

These measures will decrease the energy intensity of the industry to 5,290 Mcal/t-product in 2000 from 6,710 Mcal/t-product in 1995, taking into account the effects of a deterioration in efficiency caused by the duration of operations.

b. 2005

First, we have assumed that there will remain almost no room for measures belonging to "Improvement in management" to decrease energy intensity.

Second, we have assumed that the Float process will be installed by Ghazvin Glass around

2002-2003, and that, accordingly, the capacity of existing four furnaces will be curtailed.
Third, Azar Glass can improve its energy intensity by increasing capacity utilization, which will have been low soon after its commissioning in 2000.
All the measures above will reduce energy intensity in the industry to 4,090 Mcal/t in 2005 from 5,290 Mcal/t in 2000.
The tables below show future production of sheet glass and consumption of energy in the sheet glass industry.

Table 6.9 Future Production of Sheet Glass in I.R.Iran

	1995		2000		2005	
	Capacity	Product.	Capacity	Product.	Capacity	Product.
	(1,000t/y)		(1,000t/y)		(1,000t/y)	
Gazvin	130	89	130	125	260	160
Abguineh	98	72	98	93	98	82
Saveh Jam	60	56	60	20	60	50
Iran	14	11	14	10	14	10
Azar	0	0	100	56	100	80
Total	302	228	402	304	532	382

Table 6.10 Future Consumption of Energy and Energy Intensity in the Sheet Glass Industry in I.R.Iran

	1995	2000		2005	
		No Meas.	Measures	No Meas.	Measures
	(Mcal/t-p.)	(Mcal/t-p.)		(Mcal/t-p.)	
Gazvin	7,230	6,440	5,300	4,020	3,650
Abguineh	7,010	7,010	5,920	7,010	5,920
Saveh Jam	4,170	4,170	3,570	4,170	3,570
Iran	8,040	8,040	6,850	8,040	6,850
Azar	0	3,480	3,480	3,480	3,090
Total	6,450 <6,710>	5,970 <6,210>	5,090 <5,290>	4,670 <4,860>	3,930 <4,090>
Energy Consump. (Mill. Mcal/y)	1,530	1,890 (100)	1,610 (85)	1,860 (100)	1,560 (84)

(Note) 6,440 Mcal/t-p. for Gazvin in 2000 is the actual record in 1994.
Figures in <parenthesis> are those reflecting the effect of deterioration in efficiency caused by the duration of operation.

6.5.4 Textiles

For the following three industries, a more simplified method has been adopted, mainly because of the availability of data and information by factory.

According to the "Factory Energy Audit," we have estimated that "feasible" measures belonging to "Improvement in management" can contribute to reducing the energy intensity by 8-9% in Polyacryl Iran. In addition, "feasible" measures belonging to "Conversion of equipment and facilities" are estimated to decrease around another 3% in the factory.
For Kashan Velvet, we have estimated that "feasible" measures can contribute to a decline of electricity intensity by around 7%, based upon the results of the "Factory Energy Audit."
In addition, the energy intensity of Iranian textile factories is significantly higher than that of Japanese factories or the standard values, as explained in Chapter 2, which implies there is a lot of room for saving energy in the Iranian textile industry.
Based upon these figures and considerations, we have assumed that the energy intensity of existing factories in the Iranian textile industry will decline to 90 in 2000 and 85 in 2005, taking the value in 1995 as 100.
According to our forecast, no additional facilities will be needed by 2005.

6.5.5 Sugar

a. Beet Sugar

Based upon the "Factory Energy Audit," we have estimated that measures belonging to "Improvement in management" will contribute to reducing energy intensity by around 10% by 2000 in Abkouh Sugar. It is also assumed that another 5% energy saving can be accomplished by 2005.
If all of beet sugar factories follow, their energy intensity will decrease to 90 in 2000 and 85 in 2005, taking the value in 1995 as 100.

b. Cane Sugar

In Karun Agro, which was targeted for the "Factory Energy Audit," around 10% energy saving can be accomplished by effectively using baggasse by 2000. We have estimated that some additional measures, including those which will be "feasible" with the government's economic incentives, can accomplish around a 7% energy saving by 2005 in the factory.
Depending upon these measures in Karun Agro, we have assumed that the energy intensity of cane sugar factories in I.R.Iran will decline to 85 in 2000 and 80 in 2005, taking the value in 1995 as 100.

c. Refining

The energy intensity of sugar refiners will decline to 90 in 2000 and 85 in 2005, taking the value in 1995 as 100, assuming the beet sugar factories above.

6.5.6 Vegetable Oil

The energy intensity of vegetable oil factories is estimated to be 2,980 Mcal/ t-product in 1994. In the Behshar factory targeted for the "Factory Energy Audit," "feasible" measures belonging to "Improvement in management" can accomplish a 6-7% energy saving by 2000. Depending upon this estimate, as well as taking into consideration the fact that production of Behshar accounts for about one third of the total in the industry, we have estimated that around a 10% energy saving can be accomplished in the whole industry by 2000.

Although concrete figures are not available on the estimate of the economic potential for energy conservation, we have assumed that another 5% saving can be accomplished mainly by measures belonging to "Improvement in management" by 2005.

6.5.7 Petroleum Refining

Two opposing trends will affect energy consumption in the Iranian petroleum refining industry in the future.

One is the direction in which energy consumption will increase by installing cracking, reforming, de-sulfurizing, and other energy intensive facilities. Another is one where energy savings will be accomplished by improving management of operations and maintenance, and other measures.

Taking into account these two trends, we have assumed that the energy intensity of Iranian petroleum refineries will decline to 90 in 2000, taking the value in1994 as 100, but will remain at 90 in 2005.

6.6 Conclusion

We have estimated the potential for energy conservation in seven industries by acting on the policy scenario. The following are the conclusions of the estimation (See Table 6.11).

Table 6.11 Future Consumption of Energy in Targeted Industries

	1994	2000		2005	
		No Meas.	Measures	No Meas.	Measures
	(Tcal)	(Tcal)		(Tcal)	
Iron & Steel	41,540	55,690	48,890	61,540	53,580
Cement	23,100	23,010	21,310	23,580	21,560
Glass	1,530	1,890	1,610	1,860	1,630
Textile	5,650	6,240	5,600	7,220	6,130
Sugar	7,630	10,280	9,320	12,220	10,640
Vegetable Oil	2,190	2,880	2,600	3,430	2,900
Sub-total	81,640	99,990	89,330	109,850	96,440
Petroleum Refining	54,780	67,900	61,110	81,790	69,520
Grand Total	136,420	167,890	150,440	191,640	165,960

(Note) Figures for glass, textile, and sugar in the 1994 column are those in 1995.

First, energy consumption in six industries excluding petroleum refining will increase from 81,600 Tcal in 1994 to 89,300 Tcal in 2000 and 96,400 Tcal in 2005.

Second, energy consumption will increase to 100,000 Tcal in 2000 and 110,000 Tcal in 2005, if no measures are taken for energy conservation in existing facilities.

In other words, energy consumption in the case of "measures for energy conservation" will be 89 in 2000 and 88 in 2005 if energy consumption in the case of "no measures for energy conservation" is 100, which means that measures can reduce energy consumption in the industry by around 10% in the future. The difference between energy consumption in the case of "measures for energy conservation" and that in "no measures" is estimated to be 1,150 thousand kl in 2000 and 1,450 thousand kl in 2005 in six industries.

Third, in the petroleum refining industry, the difference between energy consumption in the case of "measures" and "no measures" is estimated to be 730 thousand kl in 2000 and 1,330 thousand kl in 2005.

Finally, in seven industries including the petroleum refining industry, the potential for energy conservation, that is, the difference between energy consumption in the case of "measures" and that with "no measures," is estimated to be 1,880 thousand kl in 2000 and 2,780 thousand kl in 2005.

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7. MASTER PLAN FOR ENERGY CONSERVATION IN SIX INDUSTRIES

7. MASTER PLAN FOR ENERGY CONSERVATION IN SIX INDUSTRIES

7.1 Current Status of Energy Use in Six Industries

The current status of energy use in seven industries is as follows.

a. The energy intensity of each industry in I.R.Iran is significantly higher than that of the comparable Japanese industry or its standard value of the similar process. Some examples comparing Iranian figures set at 100 with their Japanese counterparts include.

- ◆ Iron and steel (Esfahan) 60
- ◆ Cement (Whole industry) 70
- ◆ Sheet glass (Whole industry) 44
- ◆ Sugar (Whole industry) 65

b. These figures show that the technical potential for energy conservation of Iranian industries are very large.

c. The big differences in energy intensity between Iranian and Japanese industries are due to (1) insufficient management of operations and maintenence in factories, (2) few measures adopted for energy conservation with equipment and facilities, and (3) some obsolete processes being still operated.

7.2 Economic Evaluation of Measures for Energy Conservation

We considered measures for energy conservation based upon the current status of energy use in the industries.

Next, we considered the government's policies for supporting and promoting the measures in factories and industries, and incorporated them into policy scenarios for energy conservation: Energy Conservation (E. C.) scenario and Accelerated Energy Conservation (A. E. C.) scenario.

Then, we made an economic evaluation of the measures, using the assumption of future energy prices, which is one of main factors incorporated into the policy scenarios.

The results of the economic evaluation made by acting on the E. C. scenario, which we thought more realistic, are as follows:

a. Many measures belonging to "Improvement in management of operations and maintenance" are evaluated as "feasible."

b. On the contrary, many of measures belonging to "Modification of equipment and facilities" and "Modification of processes" are evaluated as "not feasible."

However, we should note that energy prices used for the evaluation are lower than those in other countries including Japan, even in the A. E. C. scenario, although they are much higher than those in the E. C. scenario.

7.3 Estimate of the Economic Potential for Energy Conservation in Six Industries

We estimated the economic potential for energy conservation in seven industries, based upon the economic evaluation of the measures above. The results of the estimation are as follows:

a. Six industries excluding petroleum refining can save energy by more than 10 % in 2000 and

2005, respectively, by implementing measures for energy conservation with support from government's policies.

b. Petroleum refining also may be able to save energy by the same percentage as other industries in 2000 and 2005, respectively.

c. Seven industries including petroleum refining can save 1,880 thousand kl (crude oil equivalent) in 2000 and 2,780 thousand kl in 2005.

7.4 Evaluation of Policy Scenarios and Investments for Energy Conservation

We have evaluated policy scenarios and investments for energy conservation. The results are as follows.

7.4.1 Evaluation of Policy Scenarios

a. Increase in energy prices may unfavorably affect GDP growth, commodity prices, and other indicators of the macro-economy.

b. Consequently, it is very important for the government to put priority on measures that can be taken even without any increase in energy prices, among those belonging to the first category or "Improvement in management."

c. It is also very important to make institutional arrangements for collecting and organizing data and information, as well as developing proper methodologies for forecasting energy supply and demand and evaluating policy scenarios.

7.4.2 Evaluation of Optimal Investments for Energy Conservation

Individual measures for energy conservation in factories, if they are implemented by obtaining government's economic incentives, do not necessarily have positive effects on the Iranian economy as a whole. Usually, the "net benefit" of measures for energy conservation, which is the difference between the benefit of expanded oil exports and the cost of importing equipment and facilities for energy conservation, will become "negative" during implementing the measures.

In promoting energy conservation policies, the government should pay a careful attention to this fact.

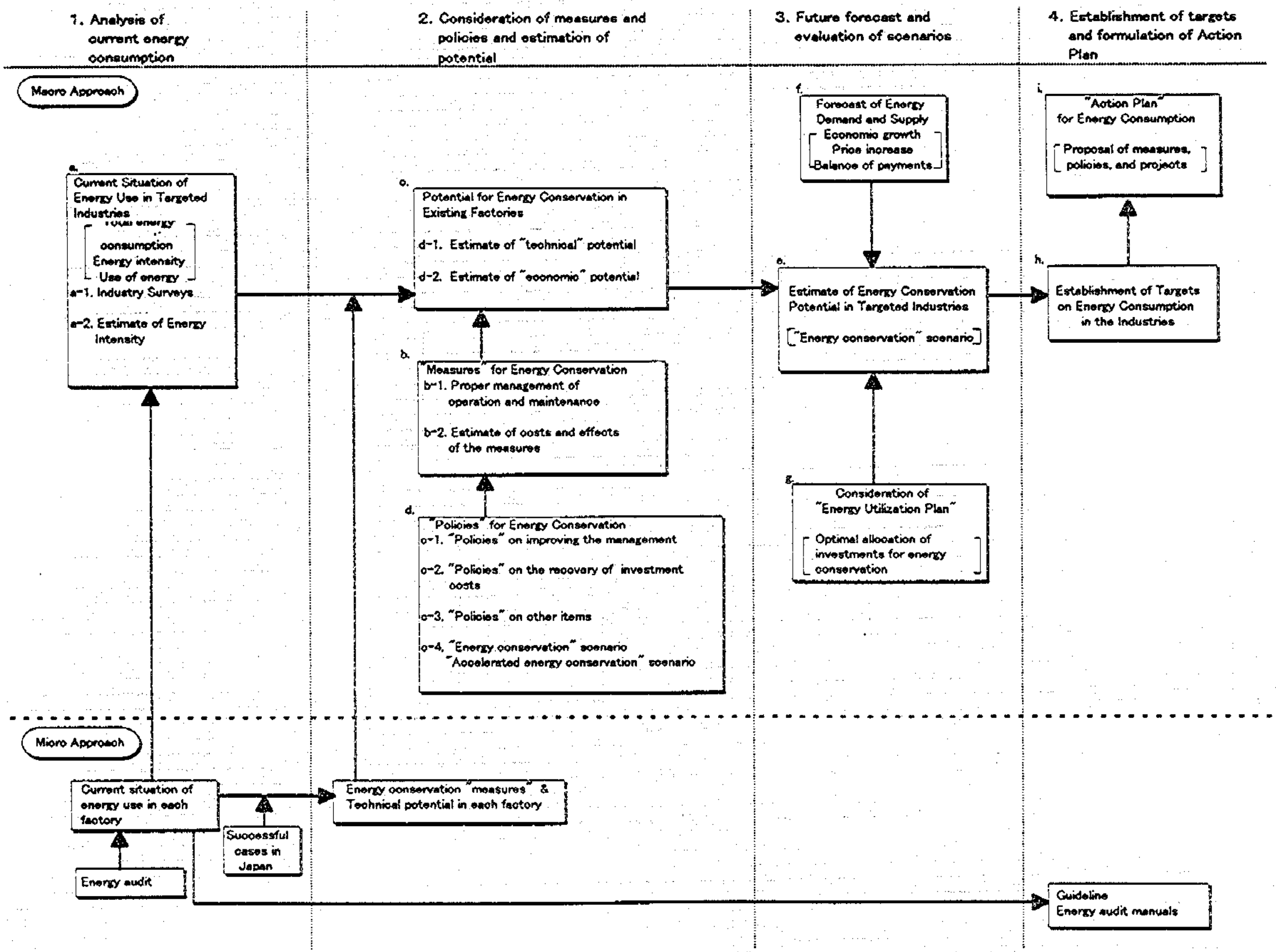
7.5 Establishing Targets and "Action Plan"

The results of examinations on energy conservation in seven industries are summarized above(See Figure 7.1).

We propose the Action Plan, which includes "policy measures" for energy conservation as well as "items to be discussed" for making the "policy measures" more concrete and realistic, for the period from 1997 to 2005, based upon the results of the examinations.

First, we present our view on the general framework of policy for energy conservation in the industrial sector, as the prerequisite for considering the "Action Plan" for energy conservation.

Figure 7.1 The Conceptual Flow of Studying the Master Plan for Energy Conservation in Industries



7.5.1 The Framework of Policies for Energy Conservation

The following is the framework of energy conservation policies, which is prepared mainly based upon experiences in Japan. Initially, basic "policies" for energy conservation are determined and announced, then, "policy measures" are considered and implemented, based upon the policy.

a. Determination and announcement of basic policies for energy conservation
   - a-1. Formulation of a master plan including the targets for energy conservation
   - a-2. Incorporation of the master plan into the national economic and social plan
   - a-3. Legislation of energy conservation policies
   - a-4. Incorporation of the energy conservation targets into the national energy supply and demand forecast
   - a-5. Preparing a fund for energy conservation policies
   - a-6. Determination of pricing policy for energy carriers

b. Improvement of management's and workers' awareness of energy conservation
   - b-1. Appointment of proper persons to management
   - b-2. Management education and training
   - b-3. Establishment of a system or an organization for promoting energy conservation in company groups
   - b-4. Education of employees on energy conservation

c. Designation of factories for energy conservation
   - c-1. Compulsory arrangement of energy managers in factories
   - c-2. Compulsory reporting of energy consumption of factories
   - c-3. Establishment of an organization for promoting energy conservation in factories

d. Economic policy measures for energy conservation
   - d-1. Taxation --------- tax credit, tax exemption, special depreciation, etc.
   - d-2. Subsidy --------- on a certain part of costs for a energy conservation measure
   - d-3. Finance --------- loans with low interest and long term
   - d-4. Allocation of foreign currency --------- for imports of machines and equipment for energy conservation measures

e. Providing information for promoting energy conservation
   - e-1. Dispatching experts on energy conservation to factories
   - e-2. Establishment of guidelines for promoting energy conservation in factories
   - e-3. Holding seminars on energy conservation
   - e-4. Preparation of standards on energy consumption of machines and equipment

f. Research and development for promoting energy conservation
   - f-1. Assistance to private companies, universities, and others

g. Other general policy measures for energy conservation
   - g-1. Improvement of labor laws

g-2. Improvement of salary system

g-3. Improvement of education system

7.5.2 Proposing the "Action Plan"

In proposing the "Action Plan" based upon the framework of policy measures for energy conservation mentioned above, we followed the three guidelines shown below, which were introduced from the results of this study.

First, the government should be careful in its approach to increasing energy prices so that general commodity prices will not drastically rise and economic growth rates will not be significantly decreased (From the conclusion of the "Energy demand forecast").
Second, the government should put priority on policy measures that can be implemented without any increase in energy prices, as policy measures at least for the short term (Same as above).
Third, the government should confirm in advance of policy implementation whether an energy conservation measure, for which it is going to give an economic incentive to a company or a factory, can provide a "net benefit" or not from the viewpoint of the government or the national economy (From the conclusion of studying the "Energy utilization plan").

The "Action Plan" is composed of the following which are shown for each of several periods in the future:

(1) Targets of energy conservation,
(2) Policy measures adopted for achieving the targets, and
(3) Items to be studied, in parallel to implementing the policy measures mentioned above, for preparing more concrete and realistic policy measures for energy conservation.

Outlines of "policy measures" and "items to be discussed" are shown in Tables 7.1 and 7.2, respectively. In the tables, policy measures are described according to three categories, which are those on "Improvement in management," "Recovery of investments," and "Others," based upon the results of this study.

(1) Future Period

We divided the period from 1995 to 2005 into "March 1995 to March 2000" and "March 2000 to March 2005." These correspond to the second and the third five-year plan period, respectively.
According to the conclusion of the "Energy demand forecast," economic indicators will be generally improved in the latter period compared to the former, which can make the government adopt a wider range of policies, economic incentives in particular, in the latter period.

(2) Outlook of Economic Situations

According to the "Reference" scenario, the economic outlook for I.R.Iran is as follows:

Table 7.1 Targets and Policies for Energy Conservation in the Industry Sector

Period	1990-1994	March 1995-March 2000	March 2000-March 2005
Economic background	• Economic growth…4.6%/y • Consumer price…32%/y • Gov. budget…△0.5Trill.Rl (93) • Capital account…△2.2Bill US$ (94) • Unemployment…8.3% (1994)	• Economic growth…2.3%/y • Consumer price…27%/y • Gov. budget…△7 Trill. Rl (2000) • Capital account…0 (2000) • Unemployment…4.9% (2000)	• Economic growth…3.2%/y • Consumer price…13%/y • Gov. budget…△47 Trill. Rl (2005) • Capital account…0 (2005) • Unemployment…3.2% (2005)
Policy 1: Improvement of management		• Improvement of appointment of directors in companies & factories • Training system for directors • Improvement of labor laws including salary system • Training system for workers	• The same as the previous period
Policy 2: Economic incentives		• Energy pricing…According to 5 year plan (20% increase per annum in nominal terms) • Finance…low interest and long-term loan • Subsidy…paid for "not feasible" measures * in case of sheet glass industry: Subsidy: 0.5 Bill Rl (price in 1993)	• Energy pricing…at least around a 5% increase per annum in real terms • Finance…to be continued • Subsidy…to be continued • Taxation…tax incentives or special depreciation * in case of steel industry: Finance: 2.8 Bill Rl (price in 1993) Subsidy: 1.5 Bill Rl (price in 1993) * in case of sugar industry: Finance: 0.5 Bill Rl (price in 1993)
Policy 3: Others		• Standards and targets for equipment and facilities • Designated factories • Energy managers • Research and development • Leveling-off of electricity demand • Factory energy audit by expert groups • Others…successful cases, bills, information, etc.	• The same as the previous period
Target of energy conservation		around 7~8% (2000)	around 10~12% (2005)

Table 7.2 Items to be studied for Promoting Energy Conservation

Title of Items	Contents of Items
◎Collection and organization of data and information for energy conservation	• To improve institutional arrangements for collecting and organizing data and information for energy conservation • To develop methodologies for estimating data for energy conservation
◎Development of methodologies for evaluating energy conservation policies	• To improve institutional arrangements for developing methodologies for evaluating energy conservation policies • To develop methodologies for energy modeling for energy conservation
◎Preparing guidelines on programs for energy conservation in each group of public enterprises	• To establish systems or organizations for preparing guidelines in each group of public enterprises • To prepare guidelines for improving management efficiency, as well as other aspects of measures for energy conservation in factories
◎Preparing programs for energy conservation in each factory of the groups	• To establish systems or organizations for preparing programs in each factory • To prepare programs for improving management efficiency, as well as other aspects of measures for energy conservation in each factory
◎Selection of model energy conservation factories	• To select one model factory in each group of public enterprises • To implement the project on improving management efficiency in the model factory

a. 1995 to 2000

---- economic growth: increase of 2.3% per annum, which is lower than 4.6% per annum during the period from 1990 to 1994.

---- commodity prices: increase of 27% per annum, which is still at a high level, although it is a little lower than the 32% per annum experienced during the period from 1990 to 1994.

---- government's budget balance: the deficit of 7 Trillion Rial in 2000, which means the deficit will continue.

---- international capital account: the balance of zero in 2000, as the result of the government's efforts for the last few years, which can be compared to 2.2 Billion Rial in 1994. A British consulting firm predicts that the Iranian foreign debt will decrease from US$30 Billion (49% of GDP) in 1995 to US$23 Billion (17% of GDP) in 2000.

---- unemployment: the rate of unemployment of 4.9% in 2000, which can be compared to 8.3% in 1994.

b. 2000 to 2005

---- economic growth: increase of 3.2% per annum, which shows some improvement compared to the previous period.

---- commodity prices: increase of 13% per annum, which also shows a significant improvement compared to the previous period.

---- government's budget balance: the deficit of 47 Trillion Rial in 2005, which will grow together with economic growth.

---- international capital account: the balance of zero in 2005, which is the same as in 2000.

---- unemployment: the rate of unemployment of 3.2% in 2005, which means it will be improved further after 2000.

(3) Establishing the Targets of Energy Conservation

We established the targets of energy conservation in seven industries as follows:

---- In 2000: around 7-8% (Compared to energy consumption in the case that no energy conservation measures will be implemented in existing factories.)

---- In 2005: around 10-12%

For 2000, energy conservation potential of around 10% has been estimated in the "Energy conservation" scenario as already mentioned in Chapter 3 in this study report. We, however, proposed in the "Action Plan" that energy prices should be increased at an annual rate of 20% in nominal terms, which means energy prices will be decreasing in real terms. Accordingly, we can expect less potential energy conservation than that in the "Energy conservation" scenario, which will be around 7-8%.

In 2005, the potential of around 13% has been estimated in the same scenario. However, we established the targets at 10-12%, because the increase of energy prices until 2000 is proposed to be lower than that assumed in the "Energy conservation" scenario as stated above and also the increase from 2000 to 2005 is proposed to be 5% per annum in real terms as stated below.

(4) Proposing the "Policies" for Energy Conservation

In the "Factory energy audit," we considered and proposed many energy conservation measures for factories. They are shown together with their potential results in Table 7.3. In addition to these measures, we considered and proposed many energy conservation measures in targeted industries.
Based upon these examinations, we propose the following as desirable policies for promoting energy conservation in the industrial sector.

a. Policies for "Improvement in Management"

We propose the policy measures considered in "6.3" above to be implemented in the period from 1995 to 2000 and the period from 2000 to 2005.
< 1995 to 2000 >
---- To improve management appointment for the public enterprises or their factories
---- To prepare systems for training managers
---- To improve labor laws including salary system (During this period, the rate of unemployment will be lower than that in the previous one)
---- To prepare systems for training workers
< 2000 to 2005 >
---- To continue the policy measures above (We have only three years from now to 2000, which is not enough time for the government to substantially implement policy measures. Thus, the government will need to continue its policies during this period)

b. Policies for Recovering Investments

< 1995 to 2000 >
---- energy prices: To increase energy prices at the rate of 20% per annum in nominal terms according to the five year plan (Energy prices will decline in real terms because general commodity prices will rise much more than energy prices).
---- finance: To provide favorable loans for measures evaluated economically "feasible" (For 2000, we estimated no loan would be given to seven industries targeted in this study, because measures will not be found that satisfy the conditions mentioned already).
---- subsidy: To provide subsidy to some of measures which are evaluated economically "not feasible" (We estimated that a subsidy of 450 million Rial would be provided to the sheet glass industry in 2000).
< 2000 to 2005 >
---- energy prices: To increase energy prices at the rate of at least 5% per annum in real terms (The governments need to very carefully monitor general commodity prices so that they do not rise drastically).
---- finance: To continue the same policy as that in the previous period (We estimated that loans of 2.8 billion Rial would be provided to the iron and steel industry in 2005).

Table 7.3 Proposal Items for Energy Conservation Measures and Saved Energy

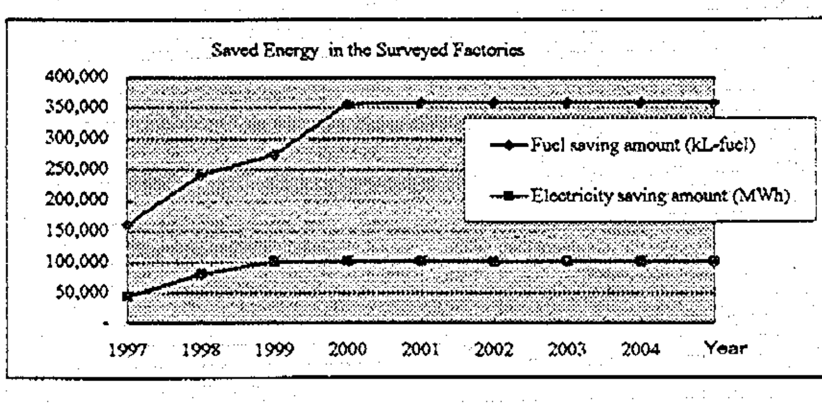
Saved energy is shown in cells from the biginning year of implementation of energy conservation measures

Note 1. Saved energy: Fuel oil(kL), Natural gas(1000m³) and electricity[MWh]

Note 2. Energy price: Fuel oil = 17.0Rial/L, Natural gas = 22.4Rial/Nm³, electricity = 40.7Rial/kWh (Average price in 2000-2002)

No.	Industry	Energy conservation measures	1997	1998	1999	2000	2001	2002	2003	2004	2005	Saving energy	Saving money	Investment	Feasiblity
	Factory	Feasible measures in accelerated energy										kL-oil	Million Rial	Million.Rial	in energy
		conservation case										1000m³-NG			conservation
												[MWh]			case
1	Iron & steel industry														
1.1	Esfahan Steel														
	1) Coke oven	1) Optimization of combustion air ratio	2717	2717	2717	2717	2717	2717	2717	2717	2717	24453	547,747	0	feasible
		2) Optimization of cooking temperature			5863	5863	5863	5863	5863	5863	5863	41041	919,318	3,500	not feasible
		3) Review of steam utilization method	7580	7580	7580	7580	7580	7580	7580	7580	7580	68220	1,528,128	0	feasible
	2) Sintering plant	1) Yield increase		10927	10927	10927	10927	10927	10927	10927	10927	87416	1,958,118	1,750	feasible for 10 ys
		2) Installation of high-efficiency burner			12230	12230	12230	12230	12230	12230	12230	85610	1,917,664	3,500	not feasible
		3) Develop. of low coke operation tech.			26002	26002	26002	26002	26002	26002	26002	182014	4,077,114	5,250	not feasible
		4) Prevention of leak air			[7104]	[7104]	[7104]	[7104]	[7104]	[7104]	[7104]	[49728]	1,657,630	525	feasible
	3) Blast furnace	1) Reduction of fuel ratio				81480	81480	81480	81480	81480	81480	488880	10,950,912	8,750	feasible for 10 ys
		2) Low oxygen operation of hot stove			2520	2520	2520	2520	2520	2520	2520	17640	395,136	175	feasible for 10 ys
	4) Steel-making	1) Reduction of blowing oxygen	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[69408]	2,824,906	0	feasible
	process	2) Reduction of electricity in converter	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[7712]	[69408]	2,824,906	0	feasible
		3) Reduction of fuel in converter process	22117	22117	22117	22117	22117	22117	22117	22117	22117	199053	4,458,787	0	feasible
		4) Reduction of fuel in steel-making plant	41340	41340	41340	41340	41340	41340	41340	41340	41340	372060	8,334,144	0	feasible
		5) Improve. of LD boiler combustion	8268	8268	8268	8268	8268	8268	8268	8268	8268	74412	1,666,829	0	feasible
	5) Rolling process	1) Improvement of production control	47782	47782	47782	47782	47782	47782	47782	47782	47782	430038	9,632,851	0	feasible
		2) Review of reheating furnace operation		30202	30202	30202	30202	30202	30202	30202	30202	241616	5,412,198	875	feasible
		3) Combustion control of reheating fce		11269	11269	11269	11269	11269	11269	11269	11269	90152	2,019,405	875	feasible for 10 ys
		4) Improvement of hot charge ratio		15777	15777	15777	15777	15777	15777	15777	15777	126216	2,827,238	875	feasible for 10 ys
		5) Improve. of yield in rolling process	6085	6085	6085	6085	6085	6085	6085	6085	6085	54765	1,226,736	0	feasible
	6)Energy utilization facilities														
	a) Power station	1) Combustion control of boiler & others	4341	4341	4341	4341	4341	4341	4341	4341	4341	39069	875,146	175	feasible
	b) Oxygen plant	1) Improvement of compressor operation	[13167]	[13167]	[13167]	[13167]	[13167]	[13167]	[13167]	[13167]	[13167]	[118503]	4,823,072	0	feasible
	c) Energy distribution	1) Reduction of oxygen supply loss	[11286]	[11286]	[11286]	[11286]	[11286]	[11286]	[11286]	[11286]	[11286]	[101574]	4,134,062	0	feasible
	d) Water pump station	1) Improvement of water pump operation		[13080]	[13080]	[13080]	[13080]	[13080]	[13080]	[13080]	[13080]	[104640]	4,258,848	175	feasible
2	Petroleum refinery														
2.1	Tehran Refinery	1) Improve. of heating furnace refractory			538	538	538	538	538	538	538	3766	64,022	350	not feasible
		2) Improve. of heating furnace air ratio			16983	16983	16983	16983	16983	16983	16983	118881	2,020,977	1,575	feasible
		3) Enhance. of heat recovery from cooler			1781	1781	1781	1781	1781	1781	1781	12467	211,939	1,085	not feasible
		4) Replacement of pump motor		[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[120]	4,884	12	not feasible
		5) Pump impeller cutting		[899]	[899]	[899]	[899]	[899]	[899]	[899]	[899]	[7192]	292,714	53	feasible
		6) Turning off unnecessary light	[91]	[91]	[91]	[91]	[91]	[91]	[91]	[91]	[91]	[819]	33,333	0	feasible
3	Cement Industry														
3.1	Sepahan Cement	1) Capacity up of EP induced draft fan	3780	3780	3780	3780	3780	3780	3780	3780	3780	34020	578,340	168	feasible
		2) Raw mill fan operation control		[5400]	[5400]	[5400]	[5400]	[5400]	[5400]	[5400]	[5400]	[43200]	1,758,240	753	feasible
		3) Total process draft control		9451	9451	9451	9451	9451	9451	9451	9451	75608	1,285,336	105	feasible
		4) Replace of cement mill screen plate		[10000]	[10000]	[10000]	[10000]	[10000]	[10000]	[10000]	[10000]	[80000]	3,256,000	849	feasible
3.2	Tehran Cement	1) No.3 kiln: Modification to NSP					42527	42527	42527	42527	42527	212635	3,614,795	79,625	not feasible
		2) No.4 kiln: Replacement of cooler (fuel)					10385	10385	10385	10385	10385	51925	882,725	39,900	not feasible
		2) No.4 kiln: Replacement of cooler (elec)					[8190]	[8190]	[8190]	[8190]	[8190]	[44550]	1,813,185		
		3) No.6 kiln: Improve. of operation(fuel)			6593	6593	6593	6593	6593	6593	6593	46151	784,567	1,278	feasible
		3) No.6 kiln: Improve. of operation(elec)			[14400]	[14400]	[14400]	[14400]	[14400]	[14400]	[14400]	[100800]	4,102,560		
3.3	Soufian Cement	1) Improvement of kiln operation		4343	4343	4343	4343	4343	4343	4343	4343	34744	590,648	1,663	not feasible
		2) No.3 kiln: Modification to NSP					34286	34286	34286	34286	34286	171430	2,914,310	100,100	not feasible
		3) No.4 kiln: Replacement of cooler			6593	6593	6593	6593	6593	6593	6593	46151	784,567	23,153	not feasible
4	Glass industry														
4.1	Ghazvin Glass	1) Excess air 25% to 15% in melting furnace		2863	2863	2863	2863	2863	2863	2863	2863	22904	389,368	175	feasible
		2) No.2, 3 & 4 furnace light insulation	1320	1320	2640	2640	3955	3955	3955	3955	3955	27695	470,815	875	not feasible
		3) Production yield improvement	1500	1500	3000	3000	4728	4728	4728	4728	4728	32640	554,880	0	feasible
		4) Checker height increase	2500	2500	5000	5000	7910	7910	7910	7910	7910	54550	927,350	3,500	not feasible
		5) Compressed air leakage stop	[217]	[217]	[217]	[217]	[217]	[217]	[217]	[217]	[217]	[1953]	79,487	0	feasible
5	Textile industry														
5.1	Polyacryl Iran	1) Improvement of Dowtherm boiler air ratio	290	290	290	290	290	290	290	290	290	2610	58,464	0	feasible
		2) Review of quench cooling		[2000]	[2000]	[2000]	[2000]	[2000]	[2000]	[2000]	[2000]	[16000]	651,200	350	feasible for 10 ys
		3) Recovery of waste heat in acryl process			2282	2282	2282	2282	2282	2282	2282	15974	357,818	262	feasible for 10 ys
		4) Replacement of chiller system pump			[996]	[996]	[996]	[996]	[996]	[996]	[996]	[6972]	283,760	648	not feasible
		5) Improve. of gas turbine utilization rate	7442	7442	7442	7442	7442	7442	7442	7442	7442	66978	1,500,307	0	feasible
		6) Reduction of supply/waste water		[1818]	[1818]	[1818]	[1818]	[1818]	[1818]	[1818]	[1818]	[14544]	591,941	525	feasible for 10 ys
		7) Optimization of pump capacity		[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[24000]	976,800	438	feasible for 10 ys
		8) Rational use of compressed air	[3400]	[3400]	[3400]	[3400]	[3400]	[3400]	[3400]	[3400]	[3400]	[30600]	1,245,420	525	feasible for 10 ys
5.2	Kashan Velvet &	1) Reduction of pneumatic waste rate	[375]	[375]	[375]	[375]	[375]	[375]	[375]	[375]	[375]	[3375]	137,363	0	feasible
	Rayon Mills	2) Stopping of return fan	[101]	[101]	[101]	[101]	[101]	[101]	[101]	[101]	[101]	[909]	36,996	0	feasible
		3) Enhance. of condensate recovery rate	360	360	360	360	360	360	360	360	360	3240	55,080	105	not feasible
		4) Recovery of heat of dyeing washing water		1124	1124	1124	1124	1124	1124	1124	1124	8992	152,864	700	not feasible
		5) Improvement of boiler air ratio	147	147	147	147	147	147	147	147	147	1323	22,491	0	feasible
		6) Control of number of air compressor	[65]	[65]	[65]	[65]	[65]	[65]	[65]	[65]	[65]	[585]	23,810	0	feasible
6	Food industry														
6.1	Behshahr Industry	1) Reduction of steam in deodorizing process	5534	5534	5534	5534	5534	5534	5534	5534	5534	49806	1,115,654	0	
		2) Boiler combustion control		1342	1342	1342	1342	1342	1342	1342	1342	10736	240,486	525	not feasible
		3) Recovery of exhaust heat of diesel engine			798	798	798	798	798	798	798	5586	125,126	875	not feasible
6.2	Karun Cane	1) Automatic control of crystallizing pan			2594	2594	2594	2594	2594	2594	2594	18158	406,739	525	not feasible
		2) Adoption of soft type ion exchange resin			4790	4790	4790	4790	4790	4790	4790	33530	751,072	1,750	not feasible
6.3	Abkouh Sugar	1) Automatic control of crystallizing pan			2217	2217	2217	2217	2217	2217	2217	15519	347,626	350	feasible for 10 ys
		2) Reduction of steam pressure	255	255	255	255	255	255	255	255	255	2295	51,408	0	
		3) Turning of unnecessary light	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[135]	5,495	0	
	Accelerated energy conservation case		1997	1998	1999	2000	2001	2002	2003	2004	2005				
	Total	Fuel saving amount (kL-fuel)	163358	250656	347760	429240	522391	522391	522391	522391	522391	3802969	*1 115,823,857	*1 289,222	Fuel+
		Electricity saving amount (MWh)	44141	80353	102853	102853	111043	111043	111043	111043	111043	885415			Electricity
	Energy saving ratio	Fuel (consumption: 3,498,787 kL/y)	4.7%	7.2%	9.9%	12.3%	14.9%	14.9%	14.9%	14.9%	14.9%				
	(%)	Electricity (consumption: 1,155,133 MWh/y)	3.8%	7.0%	8.9%	8.9%	9.6%	9.6%	9.6%	9.6%	9.6%				
	Saved energy in energy conservation case		1997	1998	1999	2000	2001	2002	2003	2004					
	Total	Fuel saving amount (kL-fuel)	160498	240987	274402	355882	358925	358925	358925	358925	358925	2826394	*1 96,428,578	*1 21,581	Fuel+
		Electricity saving amount (MWh)	44141	80338	101857	101857	101857	101857	101857	101857	101857	837478			Electricity
	Energy saving ratio	Fuel (consumption: 3,498,787 kL/y)	4.6%	6.9%	7.8%	10.2%	10.3%	10.3%	10.3%	10.3%	10.3%				Payback year,
	(%)	Electricity (consumption: 1,155,133 MWh/y)	3.8%	7.0%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%				10 years or less

*1: Saved energy and investment for fuel and electricity
Fuel saving amount and electricity saving amount for payback of 10 years or less



---- subsidy: To continue the same policy as that in the previous period (We estimated that subsidies of billion Rial and 450 million Rial would be provided to the iron and steel and the sugar industries, respectively).

---- taxation: To provide favorable taxation treatment (tax credit, tax exemption, and special depreciation) for measures evaluated economically "feasible" (This policy measure can be implemented due to the re-establishment of the taxation system by the early 2000s. However, serious attention should be turned to the fact that this policy measure as well as finance and subsidies will have to be affected with a balanced government budget).

c. Other Policy Measures

< 1995 to 2000 >

---- To establish the standards and the targets for energy consumption of machines and equipment used in factories.

---- To designate factories where energy consumption is to be managed (Stipulated in the five year plan).

---- To prepare systems for allocating energy managers in factories.

---- To assist private companies or universities on research and development for promoting energy conservation (Same as above).

---- To decrease electricity consumption in factories (Same as above).

---- Others (Awarding successful cases of energy conservation, providing information on energy conservation, factory energy audit by experts, etc.).

< 2000 to 2005 >

---- To continue the same policies as those in the previous period.

(5) Proposing Items to be Studied for Promoting Energy Conservation

To make policy measures more concrete and realistic, it is desirable for the government to carry out the following policy measures:

a. To collect and organize data and information for promoting energy conservation, including institutional arrangements.

b. To develop methodologies for evaluating energy conservation policies, including institutional arrangements.

c. To establish a system or an organization in five groups of public enterprises for preparing concrete and realistic guidelines for energy conservation in factories according to policies formulated by the government (The "Guideline", which was prepared by the JICA team, will contribute to preparing the guidelines above).

d. To establish a system or an organization for preparing concrete and realistic programs according to the guidelines above in each factory of the groups (The "Guidelines" also will contribute to preparing programs above).

e. To select at least one "model" factory in each group where a project on improving management efficiency will be executed in consultation with outside experts.

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