

**Some Results of Model Run**

Year	Base Run						
	Annual Total Installed Capacity (MW) @ CAGR of	Annual Total Scrapped Capacity (MW)	Annual Available Capacity (MW) @ 0.52 Availability Factor	Annual Total Wheeling Capacity (MW)	Annual Total Electricity Generation (TWH)	Annual Total Electricity Distributed (TWH)	Annual Effective Electricity Consumption (TWH)
	0.0234						
2005	6,060	303	3,151	2,568	22.08	19.21	13.45
2006	5,797	289.86	3,015	2,778	21.13	18.38	12.87
2007	5,672	283.62	2,950	3,007	20.67	17.98	12.59
2008	5,681	284.07	2,954	3,259	20.70	18.01	12.61
2009	5,792	289.58	3,012	3,534	21.11	18.36	12.85
2010	5,975	298.73	3,107	3,834	21.77	18.93	13.25
2015	7,430	371.48	3,863	5,790	27.07	23.23	16.26
2020	9,317	465.85	4,845	8,798	33.95	28.08	19.66
2025	11,707	585.36	6,088	13,442	42.66	32.97	23.08
2030	15,017	750.84	7,809	20,626	54.72	38.07	26.65
2035	19,902	995.09	10,349	31,748	72.53	43.58	30.51
2040	27,345	1,367	14,219	48,974	99.65	49.68	34.78

Year	Base Run Results						
	Electricity Demand (TWH)	Annual Effective Electricity Consumption (TWH)	Difference between Electricity Demand and Consumption (TWH)	Generation Capacity needed to Meet Demand (MW)	Total Installed Capacity or Needed to Be Installed (MW) @ CAGR of	Effective per Capita Electricity Consumption (kWh/Cap)	GDP (US\$ Billions)
2005	41.05	13.45	27.6	5,858	6,060	104.06	180.46
2006	39.27	12.87	26.4	5,604	5,797	97.33	206.22
2007	38.44	12.59	25.85	5,485	5,672	93.13	210.70
2008	38.54	12.61	25.93	5,499	5,681	91.28	231.29
2009	39.35	12.85	26.5	5,615	5,792	91.12	233.63
2010	40.69	13.25	27.44	5,807	5,975	92.11	337.47
2011	42.41	13.75	28.66	6,051	6,209	93.85	377.32
2012	44.39	14.33	30.06	6,334	6,480	96.04	422.75
2013	46.57	14.95	31.62	6,645	6,778	98.50	474.64
2014	48.89	15.60	33.29	6,977	7,095	101.10	534.00
2015	51.33	16.26	35.07	7,324	7,430	103.75	602.03
2016	53.85	16.94	36.91	7,683	7,778	106.41	680.13
2017	56.44	17.61	38.83	8,054	8,141	109.04	769.96
2018	59.10	18.29	40.81	8,433	8,517	111.62	873.46
2019	61.82	18.97	42.85	8,822	8,909	114.16	992.92
2020	64.61	19.66	44.95	9,220	9,317	116.64	1,131.04
2021	67.47	20.34	47.13	9,628	9,745	119.07	1,291.05
2022	70.40	21.02	49.38	10,046	10,195	121.46	1,476.73
2023	73.41	21.70	51.71	10,475	10,669	123.81	1,692.59
2024	76.49	22.39	54.1	10,915	11,172	126.13	1,944.01
2025	79.67	23.08	56.59	11,369	11,707	128.43	2,237.36
2026	82.94	23.78	59.16	11,836	12,278	130.71	2,580.28
2027	86.32	24.48	61.84	12,317	12,890	132.98	2,981.88
2028	89.80	25.19	64.61	12,814	13,546	135.25	3,453.06
2029	93.40	25.92	67.48	13,327	14,254	137.52	4,006.90
2030	97.12	26.65	70.47	13,858	15,017	139.80	4,659.10
2031	100.96	27.39	73.57	14,407	15,842	142.09	5,428.56
2032	104.95	28.15	76.8	14,976	16,736	144.39	6,338.05
2033	109.07	28.92	80.15	15,564	17,705	146.71	7,415.05
2034	113.35	29.71	83.64	16,174	18,757	149.04	8,692.80
2035	117.78	30.51	87.27	16,807	19,902	151.41	10,211.54
2036	122.38	31.32	91.06	17,462	21,147	153.79	12,020.10
2037	127.14	32.16	94.98	18,143	22,502	156.21	14,177.83
2038	132.09	33.01	99.08	18,848	23,979	158.65	16,756.98
2039	137.22	33.89	103.33	19,580	25,589	161.12	19,845.65
2040	142.54	34.78	107.76	20,340	27,345	163.63	23,551.44

Year	Scenario 1 Run – Increased Generation Capacity						
	Total Installed Capacity or Needed to Be Installed (MW) @ CAGR of 0.0468	Annual Total Scrapped Capacity (MW)	Annual Available Capacity (MW) @ 0.78 Availability Factor	Annual Total Wheeling Capacity (MW)	Annual Total Electricity Generation (TWH)	Annual Total Electricity Distributed (TWH)	Annual Effective Electricity Consumption (TWH)
2005	6060	303	4726.8	4395.916	33.12541	30.80658	26.18559
2006	5814.143	290.7072	4535.031	4217.571	31.7815	29.55674	25.12323
2007	5770.289	288.5144	4500.825	4185.759	31.54178	29.3338	24.93373
2008	5925.599	296.28	4621.967	4298.421	32.39075	30.12334	25.60484
2009	6233.429	311.6714	4862.074	4521.721	34.07342	31.68822	26.93499
2010	6651.359	332.5679	5188.06	4824.888	36.35792	33.81281	28.74089
2011	7147.711	357.3856	5575.215	5184.942	39.0711	36.33607	30.88566
2012	7700.322	385.0161	6006.25	5585.805	42.0918	39.14532	33.27352
2013	8294.34	414.717	6469.585	6016.706	45.33885	42.16508	35.84032
2014	8920.323	446.0162	6957.852	6470.794	48.76063	45.34733	38.54523
2015	9572.753	478.6377	7466.747	6944.067	52.32696	48.66402	41.36442
2016	10248.92	512.4462	7994.16	7434.561	56.02308	52.10141	44.28619
2017	10948.12	547.4063	8539.537	7941.761	59.84507	55.65586	47.30749
2018	11671.04	583.5518	9103.408	8466.162	63.79669	59.33086	50.43123
2019	12419.3	620.9653	9687.058	9008.956	67.8869	63.13476	53.66455
2020	13195.23	659.7613	10292.28	9571.809	72.12827	67.07924	57.01735
2021	14001.53	700.0767	10921.2	10156.7	76.53574	71.17818	60.50145
2022	14841.25	742.0626	11576.18	10765.83	81.12584	75.44698	64.12993
2023	15717.6	785.8798	12259.72	11401.54	85.91615	79.90196	67.91667
2024	16633.91	831.6957	12974.45	12066.23	90.92496	84.56016	71.87613
2025	17593.65	879.6823	13723.04	12762.42	96.17109	89.43906	76.02319
2026	18600.31	930.0156	14508.24	13492.66	101.6738	94.55654	80.37306
2027	19657.5	982.8752	15332.85	14259.54	107.4526	99.9309	84.94126
2028	20768.89	1038.445	16199.74	15065.75	113.5277	105.5808	89.74364
2029	21938.23	1096.912	17111.82	15913.99	119.9196	111.5252	94.79643
2030	23169.38	1158.469	18072.12	16807.06	126.6494	117.7839	100.1163
2031	24466.32	1223.316	19083.73	17747.86	133.7388	124.377	105.7205
2032	25833.16	1291.658	20149.86	18739.36	141.2102	131.3255	111.6266
2033	27274.15	1363.708	21273.84	19784.66	149.087	138.6509	117.8533
2034	28793.74	1439.687	22459.12	20886.97	157.3935	146.3759	124.4195
2035	30396.55	1519.828	23709.31	22049.65	166.1548	154.524	131.3454
2036	32087.42	1604.371	25028.19	23276.21	175.3976	163.1197	138.6517
2037	33871.42	1693.571	26419.71	24570.32	185.1493	172.1888	146.3605
2038	35753.86	1787.693	27888.01	25935.84	195.4392	181.7584	154.4946
2039	37740.32	1887.016	29437.45	27376.82	206.2977	191.8568	163.0783
2040	39836.68	1991.834	31072.61	28897.52	217.7569	202.5138	172.1368

Year	Scenario 1 Run Continued						GDP (US\$ Billions)
	Electricity Demand (TWH)	Annual Effective Electricity Consumption (TWH)	Difference between Electricity Demand and Consumption (TWH)	Generation Capacity needed to Meet Demand (MW)	Total Installed Capacity or Needed to Be Installed (MW) @ CAGR of 0.0468	Effective per Capita Electricity Consumption (kWh/Cap)	
2005	49.74	26.19	23.55	7,096.92	6,060.00	189.1093	180.46
2006	47.72	25.12	22.59	6,809.00	5,814.14	177.3766	206.22
2007	47.36	24.93	22.42	6,757.64	5,770.29	172.099	210.70
2008	48.63	25.60	23.03	6,939.52	5,925.60	172.7759	231.29
2009	51.16	26.93	24.22	7,300.02	6,233.43	177.6839	233.63
2010	54.59	28.74	25.85	7,789.47	6,651.36	185.3539	335.37
2011	58.66	30.89	27.78	8,370.75	7,147.71	194.7281	371.86
2012	63.20	33.27	29.92	9,017.92	7,700.32	205.0882	412.32
2013	68.07	35.84	32.23	9,713.58	8,294.34	215.9653	457.19
2014	73.21	38.55	34.67	10,446.68	8,920.32	227.0664	506.94
2015	78.56	41.36	37.20	11,210.75	9,572.75	238.2206	562.09
2016	84.11	44.29	39.83	12,002.62	10,248.92	249.3394	623.26
2017	89.85	47.31	42.55	12,821.46	10,948.12	260.389	691.07
2018	95.79	50.43	45.35	13,668.07	11,671.04	271.3705	766.27
2019	101.93	53.66	48.26	14,544.37	12,419.30	282.3064	849.64
2020	108.30	57.02	51.28	15,453.06	13,195.23	293.2314	942.09
2021	114.91	60.50	54.41	16,397.34	14,001.53	304.1861	1,044.60
2022	121.80	64.13	57.67	17,380.74	14,841.25	315.2133	1,158.26
2023	129.00	67.92	61.08	18,407.04	15,717.60	326.355	1,284.29
2024	136.52	71.88	64.64	19,480.15	16,633.91	337.6516	1,424.03
2025	144.39	76.02	68.37	20,604.10	17,593.65	349.1407	1,578.98
2026	152.66	80.37	72.28	21,783.02	18,600.31	360.8569	1,750.79
2027	161.33	84.94	76.39	23,021.11	19,657.50	372.8322	1,941.29
2028	170.45	89.74	80.71	24,322.67	20,768.89	385.0956	2,152.52
2029	180.05	94.80	85.25	25,692.10	21,938.23	397.6739	2,386.73
2030	190.15	100.12	90.04	27,133.91	23,169.38	410.5916	2,646.43
2031	200.80	105.72	95.08	28,652.77	24,466.32	423.8718	2,934.39
2032	212.02	111.63	100.39	30,253.48	25,833.16	437.5357	3,253.68
2033	223.84	117.85	105.99	31,941.05	27,274.15	451.6036	3,607.70
2034	236.31	124.42	111.89	33,720.66	28,793.74	466.095	4,000.26
2035	249.47	131.35	118.12	35,597.73	30,396.55	481.0286	4,435.52
2036	263.35	138.65	124.69	37,577.93	32,087.42	496.4227	4,918.14
2037	277.99	146.36	131.63	39,667.19	33,871.42	512.2953	5,453.28
2038	293.44	154.49	138.94	41,871.73	35,753.86	528.6645	6,046.65
2039	309.74	163.08	146.66	44,198.10	37,740.32	545.548	6,704.58
2040	326.95	172.14	154.81	46,653.17	39,836.68	562.9641	7,434.10

**Scenario 2 Run – Increased Electricity Consumption for Industrialization**

<b>Year</b>	<b>Total Installed Capacity or Needed to Be Installed (MW) @ CAGR of 0.0936</b>	<b>Annual Total Scrapped Capacity (MW)</b>	<b>Annual Available Capacity (MW) @ 0.78 Availability Factor</b>	<b>Annual Total Wheeling Capacity (MW)</b>	<b>Annual Total Electricity Generation (TWH)</b>	<b>Annual Total Electricity Distributed (TWH)</b>	<b>Annual Effective Electricity Consumption (TWH)</b>
2005	6,060.00	303.00	4726.80	4395.92	33.13	30.81	26.19
2006	5,895.92	294.80	4598.82	4276.89	32.23	29.97	25.48
2007	6,226.59	311.33	4856.74	4516.76	34.04	31.65	26.91
2008	7,019.12	350.96	5474.91	5091.66	38.37	35.68	30.33
2009	8,133.04	406.65	6343.77	5899.70	44.46	41.35	35.14
2010	9,450.85	472.54	7371.66	6855.64	51.66	48.04	40.84
2011	10,893.29	544.66	8496.77	7901.99	59.55	55.38	47.07
2012	12,413.30	620.66	9682.37	9004.60	67.85	63.10	53.64
2013	13,987.49	699.37	10910.24	10146.52	76.46	71.11	60.44
2014	15,608.97	780.45	12174.99	11322.74	85.32	79.35	67.45
2015	17,281.84	864.09	13479.83	12536.24	94.47	87.85	74.68
2016	19,017.21	950.86	14833.42	13795.08	103.95	96.68	82.17
2017	20,830.43	1041.52	16247.73	15110.38	113.86	105.89	90.01
2018	22,739.21	1136.96	17736.59	16495.02	124.30	115.60	98.26
2019	24,762.52	1238.13	19314.77	17962.72	135.36	125.88	107.00
2020	26,919.87	1345.99	20997.50	19527.66	147.15	136.85	116.32
2021	29,231.04	1461.55	22800.21	21204.19	159.78	148.60	126.31
2022	31,716.00	1585.80	24738.48	23006.78	173.37	161.23	137.05
2023	34,394.98	1719.75	26828.08	24950.11	188.01	174.85	148.62
2024	37,288.63	1864.43	29085.13	27049.16	203.83	189.56	161.13
2025	40,418.27	2020.91	31526.25	29319.40	220.94	205.47	174.65
2026	43,806.11	2190.31	34168.76	31776.94	239.45	222.69	189.29
2027	47,475.51	2373.78	37030.90	34438.73	259.51	241.35	205.14
2028	51,451.27	2572.56	40131.99	37322.75	281.24	261.56	222.32
2029	55,759.85	2787.99	43492.68	40448.18	304.80	283.46	240.94
2030	60,429.61	3021.48	47135.09	43835.63	330.32	307.20	261.12

2031	65,491.11	3274.56	51083.06	47507.24	357.99	332.93	282.99
2032	70,977.30	3548.87	55362.29	51486.93	387.98	360.82	306.70
2033	76,923.83	3846.19	60000.59	55800.54	420.48	391.05	332.39
2034	83,369.26	4168.46	65028.02	60476.05	455.72	423.82	360.24
2035	90,355.34	4517.77	70477.16	65543.76	493.90	459.33	390.43
2036	97,927.34	4896.37	76383.33	71036.48	535.29	497.82	423.15
2037	106,134.31	5306.72	82784.76	76989.82	580.16	539.54	458.61
2038	115,029.39	5751.47	89722.92	83442.30	628.78	584.76	497.05
2039	124,670.20	6233.51	97242.75	90435.75	681.48	633.77	538.71
2040	135,119.20	6755.96	105392.98	98015.45	738.59	686.89	583.86

Year	Scenario 2 Run Continued					
	Electricity Demand (TWH)	Annual Effective Electricity Consumption (TWH)	Generation Capacity needed to Meet Demand (MW)	Total Installed Capacity or Needed to Be Installed (MW) @ CAGR of 0.0936	Effective per Capita Electricity Consumption (kWh/Cap)	GDP (US\$ Billions)
2005	49.74	26.19	8,188.76	6,060.00	189.11	180.46
2006	48.39	25.48	7,967.43	5,895.92	179.87	206.22
2007	51.10	26.91	8,419.25	6,226.59	185.71	210.70
2008	57.61	30.33	9,506.31	7,019.12	204.66	231.29
2009	66.75	35.14	11,043.95	8,133.04	231.83	233.63
2010	77.56	40.84	12,877.34	9,450.85	263.37	338.65
2011	89.40	47.07	14,902.97	10,893.29	296.77	380.41
2012	101.88	53.64	17,060.87	12,413.30	330.61	428.69
2013	114.80	60.44	19,323.42	13,987.49	364.20	484.66
2014	128.10	67.45	21,685.67	15,608.97	397.33	549.72
2015	141.83	74.68	24,157.94	17,281.84	430.06	625.51
2016	156.08	82.17	26,760.44	19,017.21	462.66	714.05
2017	170.96	90.01	29,519.49	20,830.43	495.43	817.75
2018	186.62	98.26	32,465.16	22,739.21	528.72	939.51
2019	203.23	107.00	35,629.72	24,762.52	562.88	1,082.88
2020	220.94	116.32	39,046.86	26,919.87	598.23	1,252.12
2021	239.90	126.31	42,751.42	29,231.04	635.05	1,452.45
2022	260.30	137.05	46,779.37	31,716.00	673.62	1,690.22
2023	282.28	148.62	51,168.08	34,394.98	714.17	1,973.20
2024	306.03	161.13	55,956.70	37,288.63	756.92	2,310.91
2025	331.72	174.65	61,186.56	40,418.27	802.09	2,715.04
2026	359.52	189.29	66,901.73	43,806.11	849.86	3,200.00
2027	389.64	205.14	73,149.48	47,475.51	900.44	3,783.58
2028	422.27	222.32	79,980.81	51,451.27	954.01	4,487.79
2029	457.63	240.94	87,451.03	55,759.85	1,010.76	5,339.96
2030	495.95	261.12	95,620.26	60,429.61	1,070.89	6,374.08
2031	537.50	282.99	104,554.00	65,491.11	1,134.61	7,632.54

2032	582.52	306.70	114,323.74	70,977.30	1,202.14	9,168.36
2033	631.33	332.39	125,007.57	76,923.83	1,273.70	11,047.97
2034	684.22	360.24	136,690.84	83,369.26	1,349.53	13,354.92
2035	741.56	390.43	149,466.83	90,355.34	1,429.88	16,194.42
2036	803.70	423.15	163,437.59	97,927.34	1,515.03	19,699.44
2037	871.06	458.61	178,714.70	106,134.31	1,605.25	24,038.35
2038	944.06	497.05	195,420.16	115,029.39	1,700.85	29,425.00
2039	1023.19	538.71	213,687.41	124,670.20	1,802.15	36,131.61
2040	1108.94	583.86	233,662.41	135,119.20	1,909.48	44,505.73

## NEPS Four Sector Model Equations

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.Control

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Simulation Control Parameters

(01) FINAL TIME = 2040

Units: Year

(02) INITIAL TIME = 2005

Units: Year

(03) SAVEPER = 1

Units: Year [0,?]

(04) TIME STEP = 0.0625

Units: Year [0,?]

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(05) Access Lvl=

0.46

Units: Fraction

(06) All Plant Types:

Thermal,Hydro,Others

(07) application rate=

0.1

Units: Fraction/Year\*Year

(08) approval rate=

0.1

Units: Fraction/Year

(09) approved application[All Plant Types]=

TotGenCapUndRev[All Plant Types]\*approval rate

Units: MW/Year

(10) Availability factor=



0.9

Units: Fraction/Year

(11) Available capacity[All Plant Types]=

Total Installed Capacity[All Plant Types]\*Availability factor

Units: MW/Year

(12) Average mortality rate=

0.018

Units: Fraction/Year

(13) Avg Tariff=

Paid Tariff+Subsidy

Units: \$/kWh

(14) birth rates=

0.04065

Units: Fraction/Year

(15) births=

birth rates\*Population

Units: Persons/Year

(16) Cancellation rates=

0.0012

Units: Fraction/Year

(17) cap specific consumption=

3.4843

Units: MJ/kWh

(18) capacity addition[All Plant Types]=

Capacity under construction[All Plant Types]\*Total CAGR[All Plant Types]

Units: MW/Year

(19) capacity factor=

0.8

Units: Dmnl

(20) Capacity under construction[Thermal]= INTEG (

GenCap Proj Startup[Thermal]-capacity addition[Thermal],

0)

Capacity under construction[Hydro]= INTEG (  
GenCap Proj Startup[Hydro]-capacity addition[Hydro],

0)

Capacity under construction[Others]= INTEG (  
GenCap Proj Startup[Others]-capacity addition[Others],

0)

Units: MW

(21) CapUnderRev[All Plant Types]=

10000

Units: MW

(22) CapWPerm=

100

Units: MW

(23) Connectivity rate=

0.022

Units: Fraction/Year

(24) ConvFac MWhtokWh=

1000

Units: kWh/(MW\*Hours)

(25) ConvFackWhtoMWh=

0.001

Units: MW\*Hours/kWh

(26) ConvFact=

1e-006

Units: MW\*Hours/kWh

(27) deaths=

Average mortality rate\*Population

Units: Persons/Year

(28) Distribution Losses=

0.05

Units: Fraction/Year

- (29) Economic Growth Rate= WITH LOOKUP ( Time,  
[(2005,0)-(2040,0.2)],(2005,0.062),(2006,0.069),(2007,0.053),(2008,0.064),  
(2009,0.053),(2040,0.0795) )

Units: Fraction/Year\*Year

- (30) Effective Electricity Consumption[All Plant Types]=  
Wheeling Capacity[All Plant Types]\*capacity factor\*hours in a year\*(1-Losses  
)\*ConvFac MWhtokWh

Units: kWh/Year

- (31) effective per capita electricity consumption=  
Effective Electricity Consumption[Thermal]/(Population)

Units: kWh/(Person\*Year)

- (32) Electricity Demand=  
(Avg Tariff\*Electricity intensity\*GDP/price of electricity substitute)

Units: kWh/Year

- (33) Electricity Distributed[All Plant Types]=  
Electricity Generation[All Plant Types]\*(1-(Own Use[All Plant Types]+Tx Losses  
)-(outage capacity\*outage duration\*capacity factor)

Units: MW\*Hours

- (34) Electricity Generation[All Plant Types]=  
Available capacity[All Plant Types]\*capacity factor\*hours in a year

Units: MW\*Hours

- (35) Electricity intensity=  
effective per capita electricity consumption/GDP per capita

Units: kWh/(\$\*Year)\*Year

- (36) Export of goods and services=  
5.71287e+010

Units: \$/Year

- (37) Final Consumption Expenditure=  
IF THEN ELSE(Time>2009,((Govt Consumption Exp+Private Consumption Exp)\*

- (1+Economic Growth Rate)^T), (Govt Consumption Exp+Private Consumption Exp) )
- Units: \$/Year
- (38) fuelprice=
- 0.029
- Units: \$/MJ
- (39) Future Generation Capacity needed=
- Electricity Demand/(capacity factor\*hours in a year)\*ConvFackWhtoMWh
- Units: MW/Year
- (40) Fxd Cost=
- "Fxd O&M Cost"
- Units: \$/kWh
- (41) "Fxd O&M Cost"=
- 0.01
- Units: \$/kWh
- (42) GDP=
- IF THEN ELSE(Time<2006, (Final Consumption Expenditure+Gross capital formation
- +Net Exports) , (Final Consumption Expenditure+Gross capital formation+Net Exports
- )\*(1+Economic Growth Rate)^T )
- Units: \$/Year
- (43) GDP per capita=
- GDP/Population
- Units: \$/(Person\*Year)
- (44) Gen Cap under Review[All Plant Types]= INTEG (
- licensing initiation[All Plant Types]-approved application[All Plant Types
- ]-refused application[All Plant Types],
- CapUnderRev[All Plant Types])
- Units: MW
- (45) GenCap Proj Startup[All Plant Types]=
- TotNCapGencPerm[All Plant Types]\*Startup Rate
- Units: MW/Year

(46) Govt Consumption Exp=

1.22849e+010

Units: \$/Year

(47) Gross capital formation=

IF THEN ELSE(Time <2010, (Gross Fixed Capital Formation+Gross national savings), (Gross Fixed Capital Formation+Gross national savings)\*(1+Economic Growth Rate)^T)

Units: \$/Year

(48) Gross Fixed Capital Formation=

9.85139e+009

Units: \$/Year

(49) Gross national savings=

1.44709e+007

Units: \$/Year

(50) hours in a year=

8760

Units: Hours

(51) HydroNew=

Future Generation Capacity needed\*0.1

Units: MW/Year

(52) Import of goods and services=

3.44526e+010

Units: \$/Year

(53) Installed capacity[Thermal]= INTEG (

capacity addition[Thermal]-scrapped gen capacity[Thermal],  
4500)

Installed capacity[Hydro]= INTEG (

capacity addition[Hydro]-scrapped gen capacity[Hydro],  
1560)

Installed capacity[Others]= INTEG (

capacity addition[Others]-scrapped gen capacity[Others],

0)

Units: MW

(54) licensing initiation[All Plant Types]=  
(HydroNew+OthersNew+ThermNew)\*application rate

Units: MW/Year

(55) Losses=  
NonTech Losses+Distribution Losses

Units: Fraction/Year

(56) Net Exports=  
IF THEN ELSE(Time<2010, (Export of goods and services-Import of goods and services  
services  
) , (Export of goods and services-Import of goods and services  
)\*(1+Economic Growth Rate)^T )

Units: \$/Year

(57) New GenCap with permission[All Plant Types]= INTEG (  
approved application[All Plant Types]-Permission cancelled[All Plant Types  
]-GenCap Proj Startup[All Plant Types],  
CapWPerm)

Units: MW

(58) No of Pple with Access=  
Access Lvl\*Population\*(1+Connectivity rate)

Units: Persons/Year

(59) NonBilled Losses=  
0.115

Units: Fraction/Year\*Year

(60) NonTech Losses=  
0.1

Units: Fraction/Year

(61) Op cost=  
Fxd Cost+var op unit cost

Units: \$/kWh

- (62) OthersNew=  
Future Generation Capacity needed\*0.05  
Units: MW/Year
- (63) outage capacity=  
23  
Units: MW/Year
- (64) outage duration=  
3  
Units: Hours/Year\*Year
- (65) Own Use[All Plant Types]=  
0.01  
Units: Fraction/Year\*Year
- (66) Paid Tariff=  
0.07093  
Units: \$/kWh
- (67) Permission cancelled[All Plant Types]=  
New GenCap with permission[All Plant Types]\*Cancellation rates  
Units: MW/Year
- (68) Population= INTEG (  
births-deaths,  
1.38468e+008)  
Units: Person
- (69) price of electricity substitute=  
0.1053  
Units: \$/kWh
- (70) Private Consumption Exp=  
1.35635e+011  
Units: \$/Year
- (71) refusal rate=  
0.01  
Units: Fraction/Year

- (72) refused application[All Plant Types]=  

$$\text{TotGenCapUndRev[All Plant Types]*refusal rate}$$
Units: MW/Year
- (73) scrapped gen capacity[Thermal]=  

$$\text{Installed capacity[Thermal]*scrapping rate}$$
scrapped gen capacity[Hydro]=  

$$\text{Installed capacity[Hydro]*scrapping rate}$$
scrapped gen capacity[Others]=  

$$\text{Installed capacity[Others]*scrapping rate}$$
Units: MW/Year
- (74) scrapping rate=  

$$0.05$$
Units: Fraction/Year
- (75) Startup Rate=  

$$0.5$$
Units: Fraction/Year
- (76) Subsidy=  

$$0$$
Units: \$/kWh
- (77) Systems Financial Profit[All Plant Types]= INTEG (  

$$\text{Total Revenue Stream[All Plant Types]-Total Cost Stream[All Plant Types],}$$

$$1\text{e}+006)$$
Units: \$
- (78) T= WITH LOOKUP (  
Time,  

$$((2005,0)-(2040,40)],(2005,1),(2040,36) )$$
Units: Dmnl
- (79) ThermNew=  

$$\text{Future Generation Capacity needed*0.85}$$
Units: MW/Year
- (80) Total CAGR[All Plant Types]=



$$0.0468*2$$

Units: Fraction/Year

(81) Total Cost Stream[All Plant Types]=

$$(\text{Op cost} + \text{Tx cost}) * \text{Electricity Generation[All Plant Types]} * \text{ConvFac MWhtokWh}$$

Units: \$/Year

(82) Total Electricity Generation[All Plant Types]=

$$\text{SUM (Electricity Generation[All Plant Types!])}$$

Units: MW\*Hours/Year\*Year

(83) Total Installed Capacity[All Plant Types]=

$$\text{SUM (Installed capacity[All Plant Types!])}$$

Units: MW

(84) Total Revenue Stream[All Plant Types]=

$$\text{Avg Tariff} * \text{Effective Electricity Consumption[All Plant Types]} - (\text{Avg Tariff} * \text{Effective Electricity Consumption[All Plant Types]} * \text{NonBilled Losses})$$

Units: \$/Year

(85) TotGenCapUndRev[All Plant Types]=

$$\text{SUM (Gen Cap under Review[All Plant Types!])}$$

Units: MW

(86) TotNCapGencPerm[All Plant Types]=

$$\text{SUM (New GenCap with permission[All Plant Types!])}$$

Units: MW

(87) TotScrappedCap[All Plant Types]=

$$\text{SUM (scrapped gen capacity[All Plant Types!])}$$

Units: MW/Year

(88) Tx cost=

$$0.008$$

Units: \$/kWh

(89) Tx Losses=

$$0.06$$

Units: Fraction/Year

(90) var op unit cost=

cap specific consumption\*fuelprice

Units: \$/kWh

(91) Wheeling Capacity[All Plant Types]=

Electricity Distributed[All Plant Types]/(capacity factor\*hours in a year)

Units: MW/Year