Memorandum

To: *GA-EPD Ad Hoc Energy Group*
CC: *Jennifer Welte, GA EPD*

From: *Bill Davis, CDM Smith*

Date: *June 28, 2016*
Subject: *Update of GA Energy Needs & Generating Facilities*

This memorandum summarizes the approach used in the prior ("Round 1") state water planning effort to estimate water requirements for power generation, and steps taken to update these water requirement estimates for the current update of the state water plan.

- Round 1 Methodology
- Population Update
- Updated Projected Need
- Statewide Generating Capacity
- Updated Power Generation
- The Updated List of Georgia Generating Facilities
- Water Withdrawal & Consumption
- Geographic Distribution of Water Demand

Round 1 Methodology

In Round 1 the water requirements (both total withdrawal and estimated consumption) for thermoelectric power generation facilities in the state were estimated as follows:

1. Estimates of future energy demand in megawatt hours (MWh) were developed based on the historic relationship between population and energy usage (in MWh), and the projected statewide population. A "high" demand scenario was also estimated.

2. A list of all power generating facilities in the state (including one on the west bank of the Chattahoochee River that has a GA water use permit), including the fuel type (coal, natural gas, bio-fuel, or nuclear), prime mover (steam or gas), and cooling system (once-through

cooling, or cooling tower), and total generating capacity of each generating unit. (Note that some facilities have multiple generating units of different configurations.) In addition, EPD had air quality permits for new and planned facilities to the year 2017.

3. Research was conducted by CDM Smith and reviewed by the EPD Ad Hoc Energy group to develop water use estimates of water withdrawal and water consumption by 5 different configurations of fuel type, prime mover and cooling system.

4. A maximum sustainable generating capacity was identified by the Ad Hoc group for each of the 5 configurations.

5. The aggregate generating capacity of all existing (and facilities expected to be on line by 2017) was compared with the estimate of statewide future energy demand. It was assumed that 1% of the statewide energy demand would be met from renewable (solar and wind) sources.

6. The aggregate generating capacity of the existing and planned facilities was determined to be insufficient to meet the expected demand in either the high or baseline demand scenario. Therefore, starting after 2017, it was assumed that the statewide generating capacity would be expanded at a rate of 1 GW per year based upon a planning scenario provided by the Governor's Energy Policy Council Staff Research Brief (as provided by GEFA). This scenario provided adequate generating capacity statewide to meet the projected energy demand under both the baseline and high demand scenarios.

7. The location of the additional generating capacity was assumed to be co-located with existing (or planned) facilities. No effort was conducted to identify or evaluate potential new locations of generating facilities.

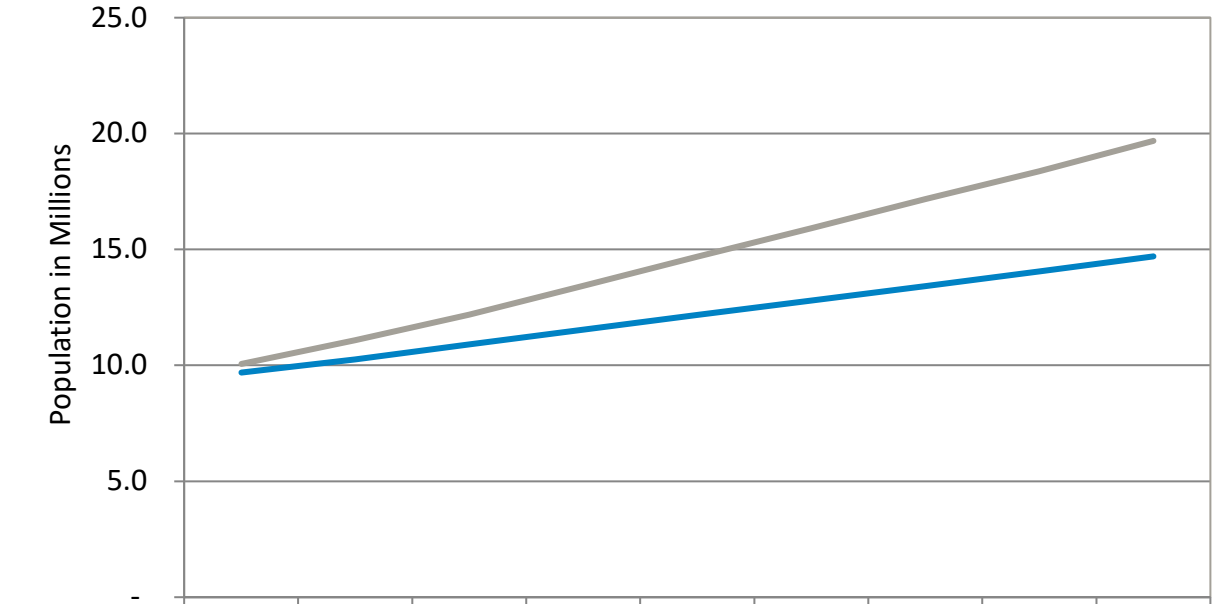
8. The water withdrawal requirements and water consumption rates (in gallons per MWh) were multiplied by the power generation (MWh) of each power generating configuration to estimate the withdrawal and consumptive use. The power generation at each generating unit was increased up to the maximum sustainable generating capacity for each unit. New generating capacity was assumed to be distributed among the 5 generating configurations proportional to the current mix of generating capacity configurations, and located proportionally by generating capacity.

9. The locations of power generating facilities was known by region, watershed and node. Thus, the estimated water withdrawals and consumptive use were allocated among the regions, watersheds and nodes.

Population Update

For the Update of the statewide energy water demands new projections of energy demand are estimated from the new population projections and the relationship between population and energy demand as previously estimated. The prior population projections were released in 2008.

These projections were developed prior to the recession and prior to the 2010 Census. Statewide, the 2010 Census showed that the 2010 population was less than had been projected in the 2008 projections. The updated 2015 population projections, developed after the recession, show a more modest future growth rate, as illustrated in **Figure 1**, and project almost 5 million less people in the state in 2050 than previously estimated.



	2010	2015	2020	2025	2030	2035	2040	2045	2050
Round 1	10.07	11.08	12.19	13.43	14.69	15.91	17.17	18.37	19.69
Update	9.69	10.25	10.90	11.54	12.17	12.80	13.41	14.04	14.71

Figure 1. Updated Statewide Population Projections

Updated Projected Need

As in Round 1, a baseline and high demand scenario have been estimated using the revised population projections. The same regression relationship between historic power generation and population was used to generate the updated estimates of power need. The regression model standard error is used to estimate the upper limit 95% confidence interval projection for the high growth need scenario.

However, the regression model estimate of 2010 GWh of 141,162 GWh is higher than the actual 2010 generation of 137,577 GWh. Therefore, the intercept of the regression model was lowered such that the 2010 model estimate of power generation matched the actual generation. The updated projection of need as calibrated to 2010 GWh is shown in **Table 1**.

Figure 2 shows the Round 1 and Updated estimates of future power needs, as well as the historic power generation since 1990. The 2010 power generation was on par with power generation in 2005. Statewide, power generation peaked in 2007 at 145,155 GWh just prior to the economic recession. The updated need projections are lower than before. Both the Updated Expected 2050 need estimate and the Updated High scenario 2050 need estimate are below the Round 1 Expected 2050 need estimate.

Table 1. Estimated Future Statewide Power Needs in GWh

		2010	2015	2020	2030	2040	2050
Round 1	High GWh	179,361	195,242	212,791	252,200	291,270	331,037
	Expected GWh	146,495	160,550	176,080	210,957	245,533	280,726
Update	High GWh	137,577	169,810	179,984	200,144	219,702	240,141
	Expected GWh		145,428	154,432	172,273	189,582	207,670

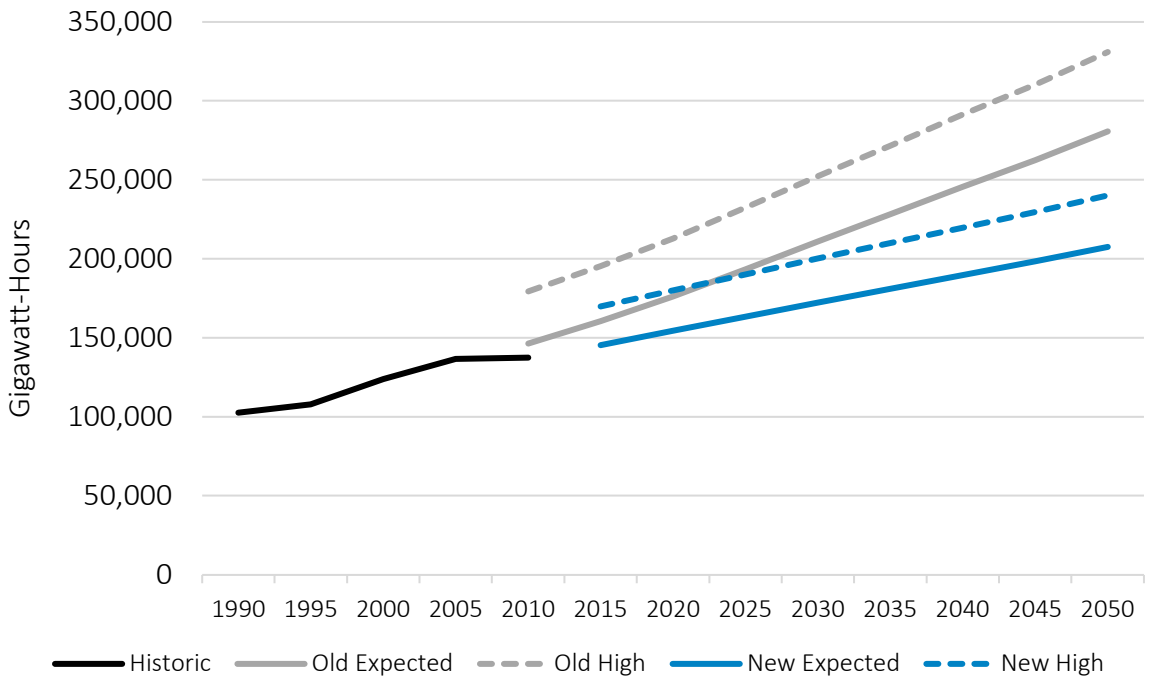


Figure 2. Updated Statewide Power Needs in GWh

Statewide Generating Capacity

Table 2 shows the EIA 2015 electric power generating capacity (MW). Capacity factors were determined from similar 2014 EIA that reported both generating capacity (MW) and generation (MWh) by fuel source for the State of Georgia. Given the 2014 capacity factors and the 2015 capacity, the generation is estimated for each fuel source. Fossil fuels (coal and petroleum) is about one-third of capacity and generation, natural gas is about 42% of capacity but only a quarter of generation, and nuclear is only about 11% of capacity but almost one-quarter of generation statewide. Biomass (renewable wood and wood products) is about 6 % of capacity and 7% of generation. At this point in time, wind and solar power are negligible sources of power for electric utilities, although increasing as power sources for businesses and industries.

Table 2. Current Power Capacity and Generation for State of Georgia

Fuel Source	Capacity MW & %		Capacity	Generation MWh & %	
Coal	10,085	28.2%	60%	53,006,760	37.8%
Natural gas CC	7,962	22.3%	48%	33,478,618	23.9%
Natural gas CT	7,823	21.9%	5%	3,426,474	2.4%
Natural gas ST	707	2.0%	10%	619,332	0.4%
Nuclear	4,061	11.4%	90%	32,016,924	22.8%
Petroleum	1,083	3.0%	10%	948,708	0.7%
Hydroelectric	1,862	5.2%	38%	6,198,226	4.4%
Renewable (biomass)	2,048	5.7%	57%	10,226,074	7.3%
Renewable (wind)	0	0.0%	0.0%	0	0.0%
Renewable (solar)	89	0.2%	3%	23,389	0.0%
Other (Methane)	44	0.1%	57%	219,701	0.2%
Total electric industry	35,764	100.0%	45%	140,164,205	100.00%

This generating capacity for the state can be compared with the projected generating capacity for the SeRC Area, which includes both Georgia and Alabama, as reported in the 2015 annual report of the SERC Reliability Review Subcommittee as shown in **Table 3**. Coal is estimated to be about 32% of capacity, natural gas about 46%, and nuclear increases to almost 13% of capacity.

Table 3. Anticipated Capacity by Fuel Source for SeRC (Georgia & Alabama)

Fuel Source	2015		2019		2024	
	MW	%	MW	%	MW	%
Coal	21,983	34.86%	20,235	32.48%	20,235	31.99%
Gas	29,124	46.19%	29,017	46.58%	28,874	45.65%
Hydro	4,970	7.88%	4,970	7.98%	4,970	7.86%
Nuclear	5,818	9.23%	6,918	11.10%	8,018	12.68%
Oil	912	1.45%	912	1.46%	912	1.44%
Renw/Other	245	0.39%	245	0.39%	245	0.39%
Total	63,052	100%	62,297	100%	63,254	100%

A review of the Georgia Power 2016 Integrated Resource Plan (IRP) indicates a plan to develop 525 MW from renewable resources (wind, solar and/or biomass) through 2019. In addition, the IRP describes programs for demand side management (i.e., energy conservation and efficiency programs for residential and commercial customers) to reduce peak demand by about 1,900 MW by 2019. The IRP indicates that Georgia Power has sufficient capacity to meet the needs of its customers through 2024 with reserve sharing with other Southern Company Operating Companies, after which the sources for additional power generation will likely be natural gas – simple cycle, natural gas – combined cycle, and nuclear.

Updated Power Generation

In Round 1 it was assumed that hydroelectric power would remain constant into the future. Therefore, for the Update it is assumed that hydropower will generate 6,198 GWh per year as shown in Table 2 above. Similarly, the power generation from biomass (renewable wood and wood products) of 10,226 GWh from Table 2 is assumed throughout the planning horizon. It is assumed that solar and wind power will contribute an additional 525 MW every 5 years, if the cost of solar panels continues to come down, (and assuming 5% capacity factor after 2015), and demand management will reduce demand by 350 GWh every 5 years.

These amounts are deducted from the projected energy need, as shown in **Table 4**. The remaining power need to be met by thermoelectric power generation ranges from 128,630 GWh in 2015 up to 189,247 GWh by 2050 in the Expected growth scenario, and from 153,012 GWh in 2015 up to 221,719 GWh by 2050 in the High growth scenario.

Table 4. Projected Thermoelectric Power Need for Georgia in GWh

		2015	2020	2030	2040	2050
Projected Need	High GWh	169,810	179,984	200,144	219,702	240,141
	Expected GWh	145,428	154,432	172,273	189,582	207,670
	Hydroelectric	6,198	6,198	6,198	6,198	6,198
	Renewable (biomass)	10,226	10,226	10,226	10,226	10,226
	Renewable (wind & solar)	23	269	729	1,189	1,649
	Demand Mngmt.	350	350	350	350	350
Remaining Need	High GWh	153,012	162,941	182,641	201,739	221,719
	Expected GWh	128,630	137,389	154,770	171,618	189,247

In Round 1 it was assumed that maximum generating capacity factors by generation configuration are as shown in **Table 5**. These same generating capacity factors will be used in the update to limit the projected generation at each individual facility.

Table 5. Maximum Capacity Factors

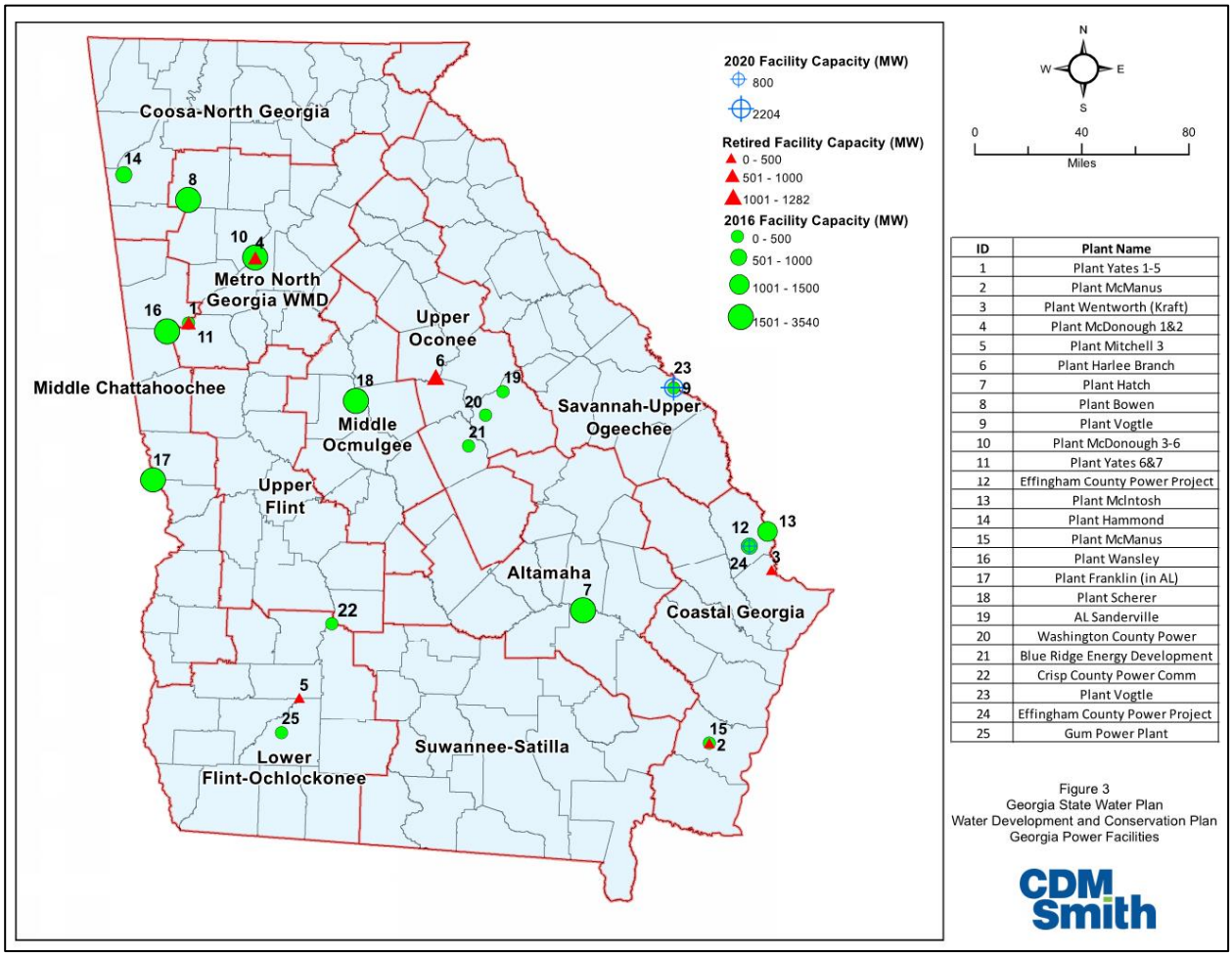
FUEL TYPE	COOL TYPE	PRIME MOVER	Max Cap
NG	CT	CC	50%
FOSSIL/BIOMASS	N/A	GT	15%
FOSSIL/BIOMASS	OT	ST	85%
FOSSIL/BIOMASS	CT	ST	85%
NUCLEAR	CT	ST	93%

The Updated List of Georgia Generating Facilities

In Round 1, the remaining statewide power needs were compared with the generating potential of 17 thermoelectric power generating facilities. Note that some of these facilities had multiple generating units, often of different fuel/mover/cooling configurations. Since the Round 1 study, some of these facilities, or generating units at facilities, have been retired or converted to a new generating configuration. In addition, new generating units have been brought on-line, or are expected to be on-line in by 2020.

It has been primarily coal-fired facilities with once-through cooling have been either taken off line, are in the process of being retired, or converted to more efficiency generating configurations. These generating facilities are also the most water intensive in terms of water requirements per MWh generated. The new facilities are more water efficiency generating configurations.

The updated list of existing facilities, facilities under construction and planned & permitted new facilities is illustrated in **Figure 3** and summarized in **Table 6**. Power plants Yates 1-5, McManus, Wentworth (Kraft), McDonough 1 & 2, Mitchell 3, and Harlee Branch are either retired or will be in the near future. Note that some data on capacity or generated MWh is missing for some facilities. These data are highlighted in yellow. Estimates for these values were derived from available capacity or generation and capacity factors for the generating configuration.



ID	Plant Name
1	Plant Yates 1-5
2	Plant McManus
3	Plant Wentworth (Kraft)
4	Plant McDonough 1&2
5	Plant Mitchell 3
6	Plant Harlee Branch
7	Plant Hatch
8	Plant Bowen
9	Plant Vogtle
10	Plant McDonough 3-6
11	Plant Yates 6&7
12	Effingham County Power Project
13	Plant McIntosh
14	Plant Hammond
15	Plant McManus
16	Plant Wansley
17	Plant Franklin (in AL)
18	Plant Scherer
19	AL Sanderville
20	Washington County Power
21	Blue Ridge Energy Development
22	Crisp County Power Comm
23	Plant Vogtle
24	Effingham County Power Project
25	Gum Power Plant

Figure 3. Location of Power Generating Facilities

Table 6. Power Generating Facilities

Plant Name	County	Basin	Fuel type	Mover	Cooling	Cap. MW	2014 Gen MWh	2014 With MGD
GA Power Plant Hatch	Appling	Altamaha	Nuclear	ST	CT	1,721	14,509,992	57.8
GA Power Plant Bowen	Bartow	Coosa	Coal	ST	CT	3,540	15,955,741	38.4
GA Power Plant Vogtle 1&2	Burke	Savannah R	Nuclear	ST	CT	2,217	18,060,190	65.0
GA Power Plant Vogtle 3&4	Burke	Savannah R	Nuclear	ST	CT	2,204		
GA Power Plant Wentworth (Kraft)	Chatham	Savannah R	Coal/Oil	ST	OT	352	500,554	158.1
GA Power Plant McDonough 1&2	Cobb	Chattahoochee	Coal	ST	CT	517		11.1
GA Power Plant McDonough	Cobb	Chattahoochee	NG - CC	GT	CT	1,682	11,128,224	
GA Power Plant McDonough	Cobb	Chattahoochee	NG - CC	GT	CT	841	5,893,736	
GA Power Plant Yates	Coweta	Chattahoochee	Coal	ST	CT	579	680,369	21.7
GA Power Plant Yates	Coweta	Chattahoochee	NG	ST	CT	404	29,625	
GA Power Plant Yates	Coweta	Chattahoochee	Fuel Oil	ST	CT		6,060	
Bainbridge Power	Decatur	Flint	Fuel Oil	GT		170	316	
Effingham County Power Project	Effingham	Savannah R	NG - CC	ST	CT	800	1,448,272	
GA Power Plant McIntosh	Effingham	Savannah R	Coal	ST	OT	163	254,890	66.3
GA Power Plant McIntosh	Effingham	Savannah R	NG - CC	GT	CT	1319	33,032	
GA Power Plant McIntosh	Effingham	Savannah R	Fuel Oil	GT	OT	640	20,810	
GA Power Plant Hammond	Floyd	Coosa	Coal	ST	OT	843	1,130,526	250.3
GA Power Plant McManus	Glynn	Satilla	Fuel Oil	ST	OT	482	3,618	3.9
Wansley Unit 8	Heard	Chattahoochee	NG - CC	GT	CT	458	3,020,533	46.8
GA Power Plant Wansley	Heard	Chattahoochee	Coal	ST	CT	1,740	4,850,225	
Wansley Combined-Cycle	Heard	Chattahoochee	NG - CC	GT	CT	1,073		
Wansley Unit 9	Heard	Chattahoochee	NG - CC	GT	CT	531	1,622,571	
Southern Power Plant Franklin	Lee	Chattahoochee	NG - CC			1,857	321,407	4.7
GA Power Plant Scherer	Monroe	Ocmulgee	Coal	ST	CT	3,272	18,894,546	48.0
AL Sandersville	Washington	Oconee	NG	CC	CT	86.5	9,041	
Washington County Power, LLC	Washington	Oconee	NG	CC	CT	199.4	61,274	
Blue Ridge Energy Development, LLC - PT Power Project	Wilkinson	Altamaha				3.6		
Crisp County Power Comm - Steam	Worth	Flint	Coal	ST		12.5	269	0.13
Crisp County Power Comm - Steam	Worth	Flint	NG	ST		5	256	

For each scenario, the capacity factors by configuration are increased such that the resulting generation is sufficient to meet the thermoelectric power need. In the Expected Growth Scenario, additional capacity is added after 2025 at the rate of 1 GW per year. This added capacity is evenly distributed among natural gas – simple cycle, natural gas – combined cycle, and nuclear. The added capacity is increased to 1.5 GW in 2045 and 2 GW in 2050. The assumed capacity factors and added capacity for the Expected Growth scenario are shown in **Table 7**.

Table 7. Capacity Factors and Added Capacity for Expected Growth Scenario

Generation Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	40.0%	41.8%	45.8%	47.6%	49.4%	50.0%	50.0%	50.0%
NG/SC	10.0%	10.5%	11.7%	12.3%	12.8%	13.5%	13.8%	13.8%
FF/ST/OT	62.0%	65.0%	71.8%	74.9%	77.9%	81.7%	83.8%	83.8%
FF/ST/CT	62.0%	65.0%	71.8%	74.9%	77.9%	81.7%	83.8%	83.8%
NU/ST/CT	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
Hydroelectric	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%
Renewable (wood)	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%
Renewable (solar & wind)	3.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
ADDED CAPACITY in MW				1,000	1,000	1,000	1,500	2,000

Similarly, the capacity factors by configuration are increased in the High Growth scenario such that the resulting generation is sufficient to meet the thermoelectric power need. Additional capacity is added at the rate of 2 GW per year after 2015. This added capacity is evenly distributed among natural gas – simple cycle, natural gas – combined cycle, and nuclear. The assumed capacity factors and added capacity for the High Growth scenario are shown in **Table 8**.

Table 8. Capacity Factors and Added Capacity for High Growth Scenario

Generation Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	50.0%	49.4%	49.7%	49.9%	50.0%	50.0%	50.0%	50.0%
NG/SC	9.7%	9.5%	9.6%	9.7%	10.1%	10.5%	11.0%	11.9%
FF/ST/OT	60.5%	59.5%	60.0%	60.4%	62.4%	64.7%	67.7%	72.8%
FF/ST/CT	85.0%	83.9%	84.5%	84.9%	85.0%	85.0%	85.0%	85.0%
NU/ST/CT	93.0%	91.8%	92.4%	92.9%	93.0%	93.0%	93.0%	93.0%
Hydroelectric	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%
Renewable (wood)	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%
Renewable (solar & wind)	3.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
ADDED CAPACITY in MW		2,000	2,000	2,000	2,000	2,000	2,000	2,000

Water Withdrawal & Consumption

The same water withdrawal and consumptive use factors by generating configuration are maintained from Round 1. These water use factors are shown in **Table 9**.

Table 9. Water Use Factors by Generating Combination

WATER WITHDRAWALS	
Power Generation Combination	**Gal/MWh**
Fossil Fuel/Biomass, Steam Turbine, Once-Through Cooling	41,005
Fossil Fuel/Biomass, Steam Turbine, Cooling Tower	1,153
Fossil Fuel/Biomass, Gas (Combustion) Turbine	0
Natural Gas, Combined-Cycle, Cooling Tower	225
Nuclear, Steam Turbine, Cooling Tower	1,372
WATER CONSUMPTION	
Power Generation Combination	**Gal/MWh**
Fossil Fuel/Biomass, Steam Turbine, Once-Through Cooling	0
Fossil Fuel/Biomass, Steam Turbine, Cooling Tower	567
Fossil Fuel/Biomass, Gas (Combustion) Turbine	0
Natural Gas, Combined-Cycle, Cooling Tower	198
Nuclear, Steam Turbine, Cooling Tower	880

Applying these water use factors to the generation by configuration for the two scenarios results in estimates of water withdrawals and consumptive use by configuration as shown in **Tables 10** and **11** for the Expected growth scenario, respectively, and **Tables 12** and **13** for the High growth scenario, respectively.

Note that the water withdrawals (32 MGD) and consumption (16 MGD) for renewable wood generation is accounted for in the industrial water demand forecast and therefore excluded from this analysis.

Table 10. WITHDRAWALS in MGD for the Expected Growth Scenario

Generating Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	17	20	22	23	24	25	26	28
NG/SS	0	0	0	0	0	0	0	0
FF/ST/OT	1,529	380	420	438	456	478	490	490
FF/ST/CT	149	136	150	157	163	171	175	175
NU/ST/CT	124	192	192	195	205	215	226	243
HYDRO	119,609	119,609	119,609	119,609	119,609	119,609	119,609	119,609
ADDED CAPACITY	0	0	0	8	8	8	13	17
TOTAL	121,428	120,337	120,393	120,430	120,466	120,507	120,540	120,562
without hydro	1,819	728	784	820	856	898	931	953

Table 11. CONSUMPTION in MGD for the Expected Growth Scenario

Generating Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	15	17	19	20	21	22	23	24
NG/SS	0	0	0	0	0	0	0	0
FF/ST/OT	0	0	0	0	0	0	0	0
FF/ST/CT	73	67	74	77	80	84	86	86
NU/ST/CT	80	123	123	126	133	139	147	158
HYDRO	0	0	0	0	0	0	0	0
ADDED CAPACITY	0	0	0	4	4	5	7	9
TOTAL	168	207	216	227	239	250	263	278

Table 12. WITHDRAWALS in MGD for the High Growth Scenario

Generating Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	22	23	25	27	29	31	33	34
NG/SS	-	-	-	-	-	-	-	-
FF/ST/OT	1,492	348	351	353	365	379	396	426
FF/ST/CT	204	176	177	178	178	178	178	178
NU/ST/CT	124	194	216	237	258	278	299	319
HYDRO	119,609	119,609	119,609	119,609	119,609	119,609	119,609	119,609
ADDED CAPACITY	-	17	17	17	17	17	17	17
TOTAL	121,451	120,368	120,396	120,422	120,456	120,493	120,532	120,585
without Hydro	1,842	758	786	813	847	883	922	975

Table 13. CONSUMPTION in MGD for the High Growth Scenario

Generating Configuration	2015	2020	2025	2030	2035	2040	2045	2050
NG/CC/CT	19	21	22	24	26	27	29	30
NG/SS	0	0	0	0	0	0	0	0
FF/ST/OT	0	0	0	0	0	0	0	0
FF/ST/CT	100	86	87	87	88	88	88	88
NU/ST/CT	80	127	141	154	168	181	194	207
HYDRO	0	0	0	0	0	0	0	0
ADDED CAPACITY	0	9	9	9	9	9	9	9
TOTAL	199	243	259	275	290	305	320	334

Geographic Distribution of Water Demand

The location of facilities listed in Table 6 includes the county, region, basin and node for each facility. This information is used to distribute the estimate of water use by generating combination geographically among the planning regions, basins, assign the surface water withdrawals to specific stream nodes for the surface water analysis, and groundwater withdrawals to aquifers.

Tables 14 and **15** show the water withdrawals and consumptive use in MGD by planning regions for the Expected growth scenario, respectively, and **Tables 16** and **17** for the High growth scenario, respectively. Note that water use associated with the added capacities shown in Tables 7 and 8 for the two scenarios are not distributed among the regions but listed separately.

Table 14. WITHDRAWALS in MGD for the Expected Growth Scenario

REGION	2015	2020	2025	2030	2035	2040	2045	2050
Altamaha	54	54	54	55	57	60	63	68
Coastal	344	75	82	86	90	94	97	97
Coosa	440	315	347	363	377	396	405	405
Lower Flint-Ochlockonee	87	5	5	5	6	6	6	6
Middle Chattahoochee	32	33	37	38	40	42	43	44
Middle Ocmulgee	48	49	54	57	59	62	63	63
Savannah-Upper Ogeechee	70	138	138	140	148	155	163	175
Suwannee-Satilla	0	0	0	0	0	0	0	0
Upper Flint	0	0	0	0	0	0	0	0
Upper Oconee	669	1	1	1	1	1	1	1
Metro District	73	59	65	68	70	74	76	76
ADDED CAPACITY	0	0	0	8	8	8	13	17
TOTAL	1,819	728	784	820	856	898	931	953

Table 15. CONSUMPTION in MGD for the Expected Growth Scenario

REGION	2015	2020	2025	2030	2035	2040	2045	2050
Altamaha	35	34	34	35	37	39	41	44
Coastal	8	9	10	11	11	12	12	13
Coosa	0	0	0	0	0	0	0	0
Lower Flint-Ochlockonee	0	0	0	0	0	0	0	0
Middle Chattahoochee	19	19	21	22	23	24	25	26
Middle Ocmulgee	24	24	27	28	29	30	31	31
Savannah-Upper Ogeechee	45	89	89	91	95	100	106	114
Suwannee-Satilla	0	0	0	0	0	0	0	0
Upper Flint	0	0	0	0	0	0	0	0
Upper Oconee	0	0	1	1	1	1	1	1
Metro District	38	31	34	36	37	39	40	40
ADDED CAPACITY	0	0	0	4	4	5	7	9
TOTAL	168	207	216	227	239	250	263	278

Table 16. WITHDRAWALS in MGD for the High Growth Scenario

REGION	2015	2020	2025	2030	2035	2040	2045	2050
Altamaha	54	54	60	66	72	78	84	89
Coastal	340	73	74	75	78	80	84	89
Coosa	429	288	290	292	302	313	328	353
Lower Flint-Ochlockonee	85	4	4	4	5	5	5	5
Middle Chattahoochee	43	42	43	44	45	46	46	47
Middle Ocmulgee	66	64	64	64	64	64	64	64
Savannah-Upper Ogeechee	70	140	155	171	186	200	215	230
Suwannee-Satilla	0	0	0	0	0	0	0	0
Upper Flint	0	0	0	0	0	0	0	0
Upper Oconee	654	1	1	1	1	1	1	1
Metro District	100	75	76	77	78	78	79	79
ADDED CAPACITY	0	17	17	17	17	17	17	17
TOTAL	1,842	758	786	813	847	883	922	975

Table 17. CONSUMPTION in MGD for the High Growth Scenario

REGION	2015	2020	2025	2030	2035	2040	2045	2050
Altamaha	35	36	39	43	47	51	54	58
Coastal	10	11	12	13	13	14	14	15
Coosa	0	0	0	0	0	0	0	0
Lower Flint-Ochlockonee	0	0	0	0	0	0	0	0
Middle Chattahoochee	25	24	25	26	26	27	27	28
Middle Ocmulgee	32	31	32	32	32	32	32	32
Savannah-Upper Ogeechee	45	91	101	111	121	130	140	149
Suwannee-Satilla	0	0	0	0	0	0	0	0
Upper Flint	0	0	0	0	0	0	0	0
Upper Oconee	1	1	1	1	1	1	1	1
Metro District	51	39	40	41	41	42	42	43
ADDED CAPACITY	0	9	9	9	9	9	9	9
TOTAL	199	243	259	275	290	305	320	334