

Comparison of the existing Florida ES GHG forecast and the FRCC's 10-year forecast for Florida

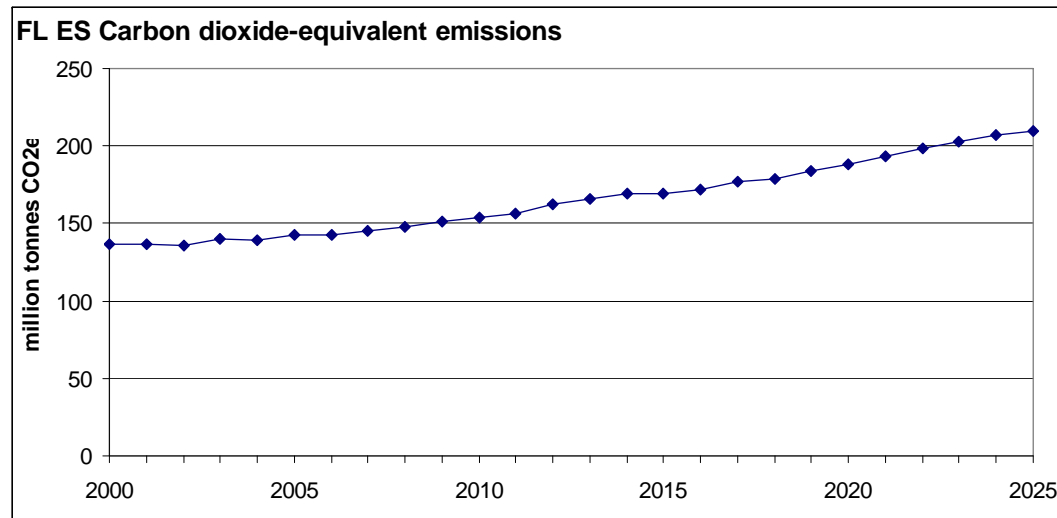
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Outline

- Sales
- Transmission and distribution losses
- Electricity generation (including imports/exports)
- Primary energy
- Summary charts
- Conclusions

Background

- Initial GHG forecast for the Florida (FL) electric supply (ES) sector was completed in December 2007;
- A revision to this forecast was prepared and submitted in May 2008, together with a technical report describing the methodology used to prepare the forecast;
- The latest version of the forecast is based on the following:
 - EGRID data for the base year 2000;
 - EIA's Annual Energy Outlook data for the years 2001 through 2025 (based on outputs of AEO2007)
- Below is a summary of the GHG forecast



Background (continued)

- At a recent FL ES TWG meeting, the ES TWG requested that a comparison be made regarding:
 - the existing FL ES forecast prepared by CCS and
 - the forecast by the Florida Reliability Coordinating Council (FRCC) in its report entitled: "2008 Regional Load & Resource Plan" that was published in July 2008

Comparison essentials

- The spatial coverage for the comparison includes the following regions:
 - The FRCC region (all Florida except a portion of the panhandle which is considered outside the FRCC region)
 - The panhandle region outside the FRCC region
- This presentation provides an overview of this comparison of forecasts regarding:
 - Retails electricity sales
 - Transmission & distribution losses
 - Net generation
 - Gross generation
 - Primary energy

Comparison essentials (continued)

- The FL ES GHG forecast is for the period 2007-2017
- The FRCC forecast for Florida is for the period 2000-2025
- There are a number of generation and primary energy categories in the FRCC forecast that are underdetermined
 - *for this comparison, default assumptions have been made, which need to be vetted by the ESD TWG*
- Assumptions have also been made regarding the extrapolation of the FRCC forecast for Florida over the 2018-2025 period

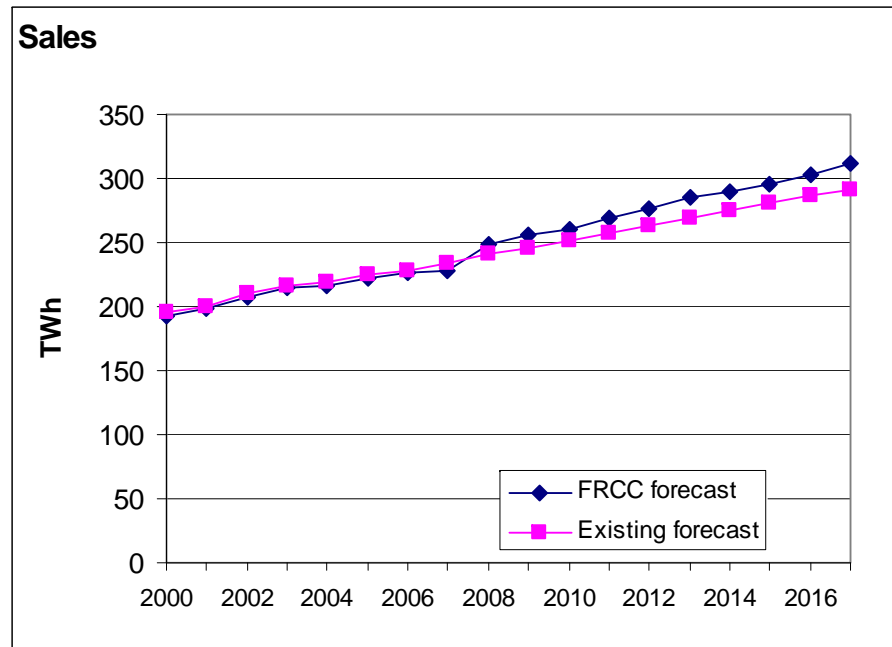
Sales

Retail electricity sales (TWh) during the 2000-2017 period

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
FRCC only	182.8	187.9	196.8	203.6	204.6	211.1	213.7	216.7	225.8	231.8	236.6	244.2	251.8	259.6	263.0	269.2	276.0	282.7
SERC portion of Florida	10.1	10.2	10.8	10.9	11.0	11.2	12.4	11.5	23.3	23.9	24.4	24.8	25.2	25.8	26.4	27.0	27.6	28.3
Florida	192.9	198.1	207.6	214.5	215.6	222.3	226.2	228.2	249.1	255.7	261.0	269.0	277.1	285.4	289.5	296.3	303.6	311.1
Based on AEO2007	195.8	199.5	209.9	215.5	218.4	224.9	227.6	233.5	240.7	245.9	251.5	257.2	263.3	268.9	274.6	280.2	286.1	291.3
Diff relative to FRCC	1.5%	0.7%	1.1%	0.5%	1.3%	1.2%	0.7%	2.3%	-3.4%	-3.8%	-3.6%	-4.4%	-5.0%	-5.8%	-5.1%	-5.4%	-5.8%	-6.4%

Key observations:

- In 2017, the existing sales forecast is 6.4% below the FRCC forecast
- The range is between 1.5% more (year 2000) and 6.4% less than the FRCC forecast (2017)



Retail electricity sales (TWh) during the 2017-2025 period

	2018	2019	2020	2021	2022	2023	2024	2025
FRCC only								
SERC portion of Florida								
Florida								
Based on AEO2007	296.7	302.4	308.7	314.0	320.1	326.3	332.8	338.9
Diff relative to FRCC								

- Note:**

Since the FRCC forecast does not include a sales forecast for the 2018-2025 period, a reasonable estimate of growth rates is needed; several potential options have been considered as follows:

2018-2025 estimate based on average annual growth rate over period:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2000-2017 (17 years)							2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%
2005-2017 (12 years)							2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%
2007-2017 (10 years)							3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
2012-2017 (5 years)							2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%

2018-2025 estimate based on trend of annual growth rate over period:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2012-2017 (5 years)	3.0%	3.0%	1.4%	2.3%	2.5%	2.5%	2.1%	2.0%	1.9%	1.8%	1.7%	1.6%	1.5%	1.5%
2013-2017 (4 years)		3.0%	1.4%	2.3%	2.5%	2.5%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
2014-2017 (3 years)			1.4%	2.3%	2.5%	2.5%	3.0%	3.3%	3.6%	3.9%	4.3%	4.6%	4.9%	5.2%
2015-2017 (2 years)				2.3%	2.5%	2.5%	2.5%	2.6%	2.7%	2.7%	2.8%	2.8%	2.9%	2.9%
2016-2017 (1 year)					2.5%	2.5%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.3%	2.3%

Retail electricity sales (TWh) during the 2017-2025 period (cont'd)

- **Results:**

The default assumption is the stream of annual growth rates as follows:

2018-2025 estimate based on trend of annual growth rate over period:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2013-2017 (4 years)	3.0%	1.4%	2.3%	2.5%	2.5%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%

- **Which leads to the following forecast (only 2010-2025 period shown):**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
FRCC only	236.6	244.2	251.8	259.6	263.0	269.2	276.0	282.7	289.3	296.0	302.9	309.9	317.0	324.3	331.8	339.4
SERC portion of Florida	24.4	24.8	25.2	25.8	26.4	27.0	27.6	28.3	29.0	29.7	30.4	31.1	31.8	32.5	33.3	34.0
Florida	261.0	269.0	277.1	285.4	289.5	296.3	303.6	311.1	318.3	325.7	333.2	340.9	348.8	356.8	365.0	373.4
Based on AEO2007	251.5	257.2	263.3	268.9	274.6	280.2	286.1	291.3	296.7	302.4	308.7	314.0	320.1	326.3	332.8	338.9
Diff relative to FRCC	-3.6%	-4.4%	-5.0%	-5.8%	-5.1%	-5.4%	-5.8%	-6.4%	-6.8%	-7.1%	-7.4%	-7.9%	-8.2%	-8.6%	-8.8%	-9.2%

- **Note that the difference of the existing forecast is between 6.8% less (year 2018) and 9.2% less (2025) than the extrapolated FRCC forecast**

T&D losses

Transmission and distribution losses during the 2000-2017 period

T&D losses over total period

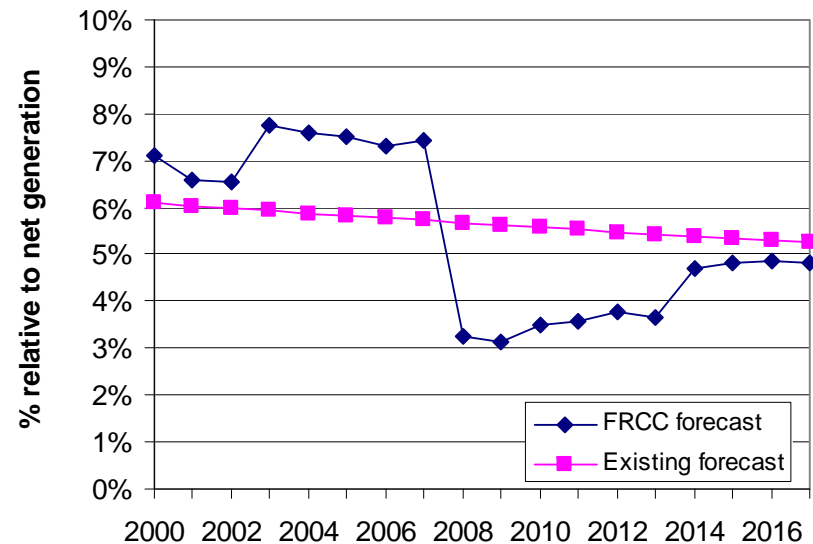
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Florida sales (TWh)	192.9	198.1	207.6	214.5	215.6	222.3	226.2	228.2	249.1	255.7	261.0	269.0	277.1	285.4	289.5	296.3	303.6	311.1
Florida net generation (TWh)	207.6	212.1	222.2	232.5	233.4	240.3	244.0	246.5	257.4	263.9	270.5	279.0	287.9	296.2	303.8	311.3	319.1	326.9
FL T&D losses (TWh)	14.8	14.0	14.6	18.0	17.7	18.0	17.9	18.3	8.3	8.2	9.5	10.0	10.8	10.8	14.3	15.0	15.5	15.8
FL T&D losses (%)	7.11%	6.60%	6.56%	7.74%	7.59%	7.49%	7.32%	7.42%	3.24%	3.11%	3.50%	3.58%	3.76%	3.66%	4.71%	4.82%	4.85%	4.83%
AEO2007 T&D losses (%)	6.09%	6.04%	5.99%	5.93%	5.88%	5.83%	5.78%	5.73%	5.68%	5.63%	5.58%	5.53%	5.48%	5.43%	5.38%	5.34%	5.29%	5.24%
Difference (%)	-1.02%	-0.56%	-0.57%	-1.81%	-1.71%	-1.66%	-1.54%	-1.69%	2.44%	2.51%	2.08%	1.95%	1.72%	1.77%	0.68%	0.51%	0.44%	0.41%

Observations:

In 2017, the existing T&D loss forecast is 0.41% greater than the FRCC forecast

The range is between 1.02% less (year 2000) and 2.51% more than the FRCC forecast (2009)

T&D losses



Transmission and distribution losses during the 2017-2025 period

T&D losses over period where direct outputs are available from FRCC report

	2018	2019	2020	2021	2022	2023	2024	2025
FRCC T&D losses (%)								
AEO2007 T&D losses (%)	5.20%	5.15%	5.10%	5.11%	5.10%	5.11%	5.10%	5.11%

- Note:**

*Since the FRCC forecast does not include T&D losses for the 2018-2025 period, a reasonable estimate of losses is needed
Several potential options have been considered as follows:*

2018-2025 estimate of losses based on average annual growth rate over period:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2000-2017 (17 years)							-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%
2005-2017 (12 years)							-3.6%	-3.6%	-3.6%	-3.6%	-3.6%	-3.6%	-3.6%	-3.6%
2007-2017 (10 years)							-4.2%	-4.2%	-4.2%	-4.2%	-4.2%	-4.2%	-4.2%	-4.2%
2012-2017 (5 years)							5.1%	5.1%	5.1%	5.1%	5.1%	5.1%	5.1%	5.1%

2018-2025 estimate based on trend of annual growth rate over period:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2012-2017 (5 years)	5.1%	-2.8%	28.6%	2.5%	0.5%	-0.2%	2.1%	2.0%	1.9%	1.8%	1.7%	1.6%	1.5%	1.5%
2013-2017 (4 years)		-2.8%	28.6%	2.5%	0.5%	-0.2%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
2014-2017 (3 years)			28.6%	2.5%	0.5%	-0.2%	3.0%	3.3%	3.6%	3.9%	4.3%	4.6%	4.9%	5.2%
2015-2017 (2 years)				2.5%	0.5%	-0.2%	2.5%	2.6%	2.7%	2.7%	2.8%	2.8%	2.9%	2.9%
2016-2017 (1 year)					0.5%	-0.2%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.3%	2.3%

Transmission and distribution losses during the 2017-2025 period (cont'd)

- Results:**

The default assumption is the stream of annual growth rates as follows:

	2018	2019	2020	2021	2022	2023	2024	2025
2000-2017 (17 years)	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%

- Which leads to the following forecast and comparison (only 2010-2025 period shown):**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Florida sales (TWh)	261.0	269.0	277.1	285.4	289.5	296.3	303.6	311.1	318.3	325.7	333.2	340.9	348.8	356.8	365.0	373.4
Florida net generation (TWh)	270.5	279.0	287.9	296.2	303.8	311.3	319.1	326.9	334.1	341.5	349.0	356.7	364.5	372.5	380.7	389.1
FL T&D losses (TWh)	9.5	10.0	10.8	10.8	14.3	15.0	15.5	15.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7
FL T&D losses (%)	3.50%	3.58%	3.76%	3.66%	4.71%	4.82%	4.85%	4.83%	4.73%	4.62%	4.52%	4.41%	4.32%	4.22%	4.12%	4.03%
AEO2007 T&D losses (%)	5.58%	5.53%	5.48%	5.43%	5.38%	5.34%	5.29%	5.24%	5.20%	5.15%	5.10%	5.11%	5.10%	5.11%	5.10%	5.11%
Difference (%)	2.08%	1.95%	1.72%	1.77%	0.68%	0.51%	0.44%	0.41%	0.47%	0.53%	0.58%	0.69%	0.78%	0.89%	0.98%	1.07%

- Note that the difference of the existing forecast is between 0.47% more (year 2018) and 1.07% more (2025) than the extrapolated FRCC forecast**

Electric generation

Net generation (TWh) during the 2000-2017 period

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal								72.2	72.8	72.9	71.5	74.2	73.0	74.0	77.3	78.5	78.2	77.3
Natural Gas								95.7	104.8	117.6	128.4	140.9	144.7	153.2	159.7	165.4	174.8	177.7
Petroleum								16.5	12.0	8.3	8.6	4.7	4.6	4.6	4.1	4.8	4.0	3.6
<i>diesel</i>								1.9	0.5	0.5	1.7	0.6	0.6	0.7	0.5	0.7	0.5	0.5
<i>residual</i>								14.6	11.5	7.8	6.9	4.1	4.0	3.9	3.6	4.1	3.5	3.1
Nuclear								29.4	32.8	30.7	30.9	30.8	34.7	36.3	37.3	36.3	42.7	52.2
Hydroelectric								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewables								1.6	2.0	2.1	2.1	3.1	3.7	3.7	3.4	3.3	3.3	3.2
Other								14.2	15.2	14.3	14.3	14.5	15.4	13.9	13.1	13.8	13.0	12.5
NUG								3.6	3.9	3.2	3.0	2.9	2.9	2.7	1.8	1.8	1.8	1.8
Exports								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Imports								13.2	14.0	14.7	11.6	7.8	8.8	8.0	7.0	7.4	1.1	0.0
Total (production-based)								233.3	243.5	249.2	258.8	271.2	279.1	288.2	296.7	303.9	317.9	328.4
Total (consumption-based)	207.6	212.1	222.2	232.5	233.4	240.3	244.0	246.5	257.4	263.9	270.5	279.0	287.9	296.2	303.8	311.3	319.1	326.9

- **Note:**
 No data by fuel type is provided for the 2000-2006 period, and **3 categories are underdetermined, as follows:**
 - **“Renewables”**
 - **“Other”**
 - **“NUG”**

Assumed net generation (TWh) for the “NUG” category

Assumptions for the category "NUG" (TWh)

	Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Gas	100%								3.6	3.9	3.2	3.0	2.9	2.9	2.7	1.8	1.8	1.8	1.8
Petroleum									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>diesel</i>									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>residual</i>									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydroelectric									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewables									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NUG									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	TRUE								3.6	3.9	3.2	3.0	2.9	2.9	2.7	1.8	1.8	1.8	1.8

- Note:**

The default assumption, pending stakeholder review and comment, is that net generation for this category is 100% NG-fired over the period 2007-2017

Assumed net generation (TWh) for the “Renewables” category

Assumptions for the category "Renewables" (TWh)

	Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Geothermal									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solar/PV									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MSW Landfill gas									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biomass	100%								1.6	2.0	2.1	2.1	3.1	3.7	3.7	3.4	3.3	3.3	3.2
Other wastes									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	TRUE								1.6	2.0	2.1	2.1	3.1	3.7	3.7	3.4	3.3	3.3	3.2

- **Note:**

The default assumption, pending stakeholder review and comment, is that net generation for this category is 100% biomass-fired over the period 2007-2017

Assumed net generation (TWh) for the “Other” category

Assumptions for the category "Other" (TWh)

	Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Gas	0.699								9.9	10.6	10.0	10.0	10.1	10.8	9.7	9.1	9.6	9.1	8.7
Other gases	0.001								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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>diesel</i>									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>residual</i>									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydroelectric									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solar/PV									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MSW Landfill gas	0.300								4.3	4.6	4.3	4.3	4.3	4.6	4.2	3.9	4.1	3.9	3.7
Biomass									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other wastes	0.000								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	TRUE								14.2	15.2	14.3	14.3	14.5	15.4	13.9	13.1	13.8	13.0	12.5

- Note:**

The default assumption, pending stakeholder review and comment, is that net generation for this category is 69.9% natural gas-fired, 0.1% other gases-fired, and 30% MSW-fired over the 2007-2017 period

Florida net generation (TWh) reflecting the previous assumptions

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal								72.2	72.8	72.9	71.5	74.2	73.0	74.0	77.3	78.5	78.2	77.3
Natural Gas								109.3	119.3	130.9	141.4	154.0	158.4	165.5	170.6	176.8	185.7	188.2
Other Gases								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum								16.5	12.0	8.3	8.6	4.7	4.6	4.6	4.1	4.8	4.0	3.6
Nuclear								29.4	32.8	30.7	30.9	30.8	34.7	36.3	37.3	36.3	42.7	52.2
Hydroelectric								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solar/PV								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MSW Landfill gas								4.3	4.6	4.3	4.3	4.3	4.6	4.2	3.9	4.1	3.9	3.7
Biomass								1.6	2.0	2.1	2.1	3.1	3.7	3.7	3.4	3.3	3.3	3.2
Other wastes								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pumped Storage								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Imports								13.2	14.0	14.7	11.6	7.8	8.8	8.0	7.0	7.4	1.1	0.0
Total (production-based)								233.3	243.5	249.2	258.8	271.2	279.1	288.2	296.7	303.9	317.9	328.4
Total (consumption-based)	207.6	212.1	222.2	232.5	233.4	240.3	244.0	246.5	257.4	263.9	270.5	279.0	287.9	296.2	303.8	311.3	319.1	326.9

- Observations (relative to in-state production):**
NG-fired generation increases from 47% in 2007 to 57% in 2017
Coal-fired generation decreases from 31% in 2007 to 24% in 2017
Oil-fired generation decreases from 7% in 2007 to 1% in 2017

Overall in-state net generation (TWh) for the 2018-2025 period

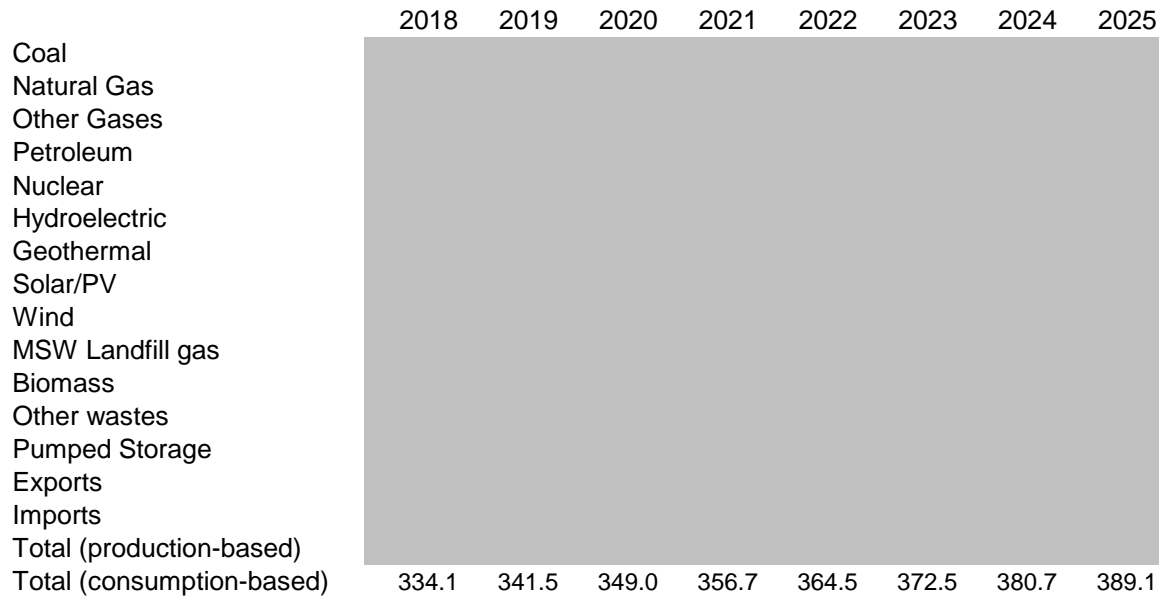
- **Potential assumptions (Option #1 has been selected as a default):**

Assumptions regarding "Total (production-based)" for the period 2018-2025

1

- 1 Average annual growth in total production for the 2018-2025 period is the same as in the 2007-2017 period (10-year trend of 3.5% per year)
- 2 Average annual growth in total production for the 2018-2025 period is the same as in the 2012-2017 period (5-year trend of 3.3% per year)
- 3 Average annual growth in total production for the 2018-2025 period is the same as in the 2015-2017 period (2-year trend of 4.0% per year)

- **Leading to the following projection:**



Fuel-specific, in-state net generation (TWh) for the 2018-2025 period

- Potential assumptions (Option #1 has been selected as a default):

Assumptions regarding future energy shares of individual resource categories for the period 2018-2025

1

- 1 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2007-2017 period (10-year trend)
- 2 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2012-2017 period (5-year trend)
- 3 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2015-2017 period (2-year trend)
- 4 Resource shares for the 2018-2025 period are the same as in 2017 (1-year trend)

- Leading to the following projections of the generation mix:

		Assumed shares (final iteration)							
		2018	2019	2020	2021	2022	2023	2024	2025
Coal		22.7%	21.9%	21.1%	20.3%	19.6%	18.9%	18.2%	17.5%
Natural Gas		57.8%	58.5%	59.2%	59.9%	60.5%	61.1%	61.7%	62.2%
Other Gases		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Petroleum		0.9%	0.7%	0.6%	0.5%	0.4%	0.3%	0.3%	0.2%
Nuclear		16.1%	16.3%	16.6%	16.8%	17.1%	17.3%	17.5%	17.7%
Hydroelectric		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Geothermal		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Solar/PV		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wind		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MSW Landfill gas		1.1%	1.0%	1.0%	0.9%	0.9%	0.8%	0.8%	0.7%
Biomass		1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%
Other wastes		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pumped Storage		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Exports		0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Imports		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100%	100%	100%	100%	100%	100%	100%	100%

Fuel-specific, in-state gross generation (TWh) for the 2010-2025 period

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Coal	71.8	74.6	73.4	74.3	77.7	78.9	78.6	77.7	78.0	77.9	77.9	77.7	77.4	77.1	76.8	76.5
Natural Gas	142.2	154.8	159.2	166.4	171.5	177.7	186.6	189.1	199.1	208.6	218.5	228.5	238.9	249.6	260.7	272.1
Other Gases	0.0	0.0	0.0	0.0	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	8.7	4.7	4.6	4.6	4.1	4.8	4.1	3.6	3.1	2.7	2.3	1.9	1.6	1.4	1.2	1.0
Nuclear	31.1	31.0	34.9	36.4	37.5	36.5	42.9	52.5	55.4	58.2	61.2	64.2	67.3	70.6	73.9	77.4
Hydroelectric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solar/PV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MSW Landfill gas	4.3	4.4	4.7	4.2	3.9	4.2	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.3	3.2	3.2
Biomass	2.1	3.1	3.8	3.7	3.4	3.4	3.4	3.2	3.5	3.7	3.9	4.2	4.4	4.7	4.9	5.2
Other wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pumped Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.8	1.8
Imports	11.7	7.9	8.8	8.1	7.1	7.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (production-based)	260.2	272.6	280.5	289.6	298.2	305.3	319.4	329.9	341.3	353.2	365.6	378.2	391.4	404.9	419.0	433.5
Total (consumption-based)	271.9	280.5	289.4	297.7	305.3	312.8	320.6	328.4	335.6	343.0	350.7	358.4	366.2	374.2	382.4	390.8

Difference between FRCC and existing forecast

Difference between AEO2007 and FRCC outputs (%)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Exports	0%	0%	0%	0%	0%	0%	0%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%
Imports	137%	205%	254%	303%	352%	224%	2406%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total (production-based)	-10%	-11%	-14%	-16%	-16%	-14%	-17%	-19%	-19%	-20%	-21%	-22%	-24%	-25%	-27%	-28%
Total (consumption-based)	-4%	-5%	-6%	-7%	-8%	-9%	-9%	-10%	-11%	-12%	-12%	-13%	-14%	-15%	-15%	-16%

- **Observations (relative to FRCC):**
Biggest change for imports and exports
In-state production levels of existing forecast are between 10% (2010) and 28% (2025) less than FRCC
Total production levels for load of existing forecast are between 4% (2010) and 16% (2025) less than FRCC

Primary energy

Primary energy (trillion btu) during the 2000-2017 period

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal								740	738	749	744	777	757	769	807	817	816	798
Natural Gas								709	793	858	937	1,023	1,048	1,106	1,173	1,221	1,284	1,295
Petroleum								193	151	124	124	90	89	87	83	90	83	81
<i>diesel</i>								45	45	47	55	48	48	48	47	50	48	49
<i>residual</i>								148	105	77	69	42	41	39	36	41	35	32
Nuclear								317	357	337	334	334	374	394	404	394	458	550
Hydroelectric								0	0	0	0	0	0	0	0	0	0	0
Renewables								17	21	22	21	32	39	38	35	35	34	33
Other								199	206	238	230	223	229	229	227	222	219	223
NUG																		
Exports																		
Imports																		
Total (production-based)								2,174	2,266	2,329	2,390	2,478	2,536	2,623	2,729	2,779	2,895	2,981
Total (consumption-based)																		

- **Observations:**

No data by fuel type is provided for the 2000-2006 period

No data provided for “NUG”, exports, imports, total (consumption)

- **Note:**

Input is sought regarding the “other” category (page S-17). I suspect that either I do not understand what this category refers to or there is a units problem. The default is that these units, as reported on page S-17, are off by a factor of 10 and have adjusted accordingly in the table above.

Assumed primary energy (trillion btu) for the “NUG” category

Assumptions for primary energy for gross generation of the category "NUG" (trillion btu)

	Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal									0	0	0	0	0	0	0	0	0	0	0
Natural Gas	100%								27	30	24	22	21	21	19	13	13	13	13
Petroleum									0	0	0	0	0	0	0	0	0	0	0
<i>diesel</i>									0	0	0	0	0	0	0	0	0	0	0
<i>residual</i>									0	0	0	0	0	0	0	0	0	0	0
Nuclear									0	0	0	0	0	0	0	0	0	0	0
Hydroelectric									0	0	0	0	0	0	0	0	0	0	0
Renewables									0	0	0	0	0	0	0	0	0	0	0
Other									0	0	0	0	0	0	0	0	0	0	0
NUG									0	0	0	0	0	0	0	0	0	0	0
Exports									0	0	0	0	0	0	0	0	0	0	0
Imports									0	0	0	0	0	0	0	0	0	0	0
Total	TRUE								27	30	24	22	21	21	19	13	13	13	13

- Observation:**
 The default assumption, pending review and comment, is that net generation for this category is 100% NG-fired
 The average annual heat rate for NG-fired generation was used to compute primary energy consumption

Assumed primary energy (trillion btu) for the “Renewables” category

Assumptions for primary energy for gross generation for the category "Renewables" (trillion btu)

	Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Geothermal									0	0	0	0	0	0	0	0	0	0	0	0
Solar/PV									0	0	0	0	0	0	0	0	0	0	0	0
Wind									0	0	0	0	0	0	0	0	0	0	0	0
MSW Landfill gas									0	0	0	0	0	0	0	0	0	0	0	0
Biomass	100%								17	21	22	21	32	39	38	35	35	34	33	
Other wastes									0	0	0	0	0	0	0	0	0	0	0	0
Total	TRUE								17	21	22	21	32	39	38	35	35	34	33	

- **Observation:**

The default assumption, pending review and comment, is that net generation for this category is 100% biomass-fired

The average annual heat rate for biomass-fired generation was used to compute primary energy consumption

Assumed primary energy (trillion btu) for the “Other” category

Assumptions for primary energy for gross generation for the category "Other" (trillion btu)

Share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal								0	0	0	0	0	0	0	0	0	0	0
Natural Gas	0.749							149	154	178	173	167	171	171	170	166	164	167
Other gases	0.0010							0	0	0	0	0	0	0	0	0	0	0
Petroleum								0	0	0	0	0	0	0	0	0	0	0
<i>diesel</i>								0	0	0	0	0	0	0	0	0	0	0
<i>residual</i>								0	0	0	0	0	0	0	0	0	0	0
Nuclear								0	0	0	0	0	0	0	0	0	0	0
Hydroelectric								0	0	0	0	0	0	0	0	0	0	0
Geothermal								0	0	0	0	0	0	0	0	0	0	0
Solar/PV								0	0	0	0	0	0	0	0	0	0	0
Wind								0	0	0	0	0	0	0	0	0	0	0
MSW Landfill gas	0.250							50	51	60	58	56	57	57	57	56	55	56
Biomass								0	0	0	0	0	0	0	0	0	0	0
Other wastes	0.000							0	0	0	0	0	0	0	0	0	0	0
Total	TRUE							199	206	238	230	223	229	229	227	222	219	223

- Observation:**

The default assumption, pending review and comment, is that net generation for this category is 74.9% natural gas-fired, 0.10% other gas-fired, and 25% MSW-fired

The average annual heat rates for these resources were used to compute primary energy consumption

Primary energy (trillion btu) including the previous assumptions

FL primary energy for gross generation (trillion btu)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal								740	738	749	744	777	757	769	807	817	816	798
Natural Gas								885	976	1,060	1,131	1,211	1,240	1,297	1,356	1,400	1,461	1,475
Other Gases								0	0	0	0	0	0	0	0	0	0	0
Petroleum								193	151	124	124	90	89	87	83	90	83	81
Nuclear								317	357	337	334	334	374	394	404	394	458	550
Hydroelectric								0	0	0	0	0	0	0	0	0	0	0
Geothermal								0	0	0	0	0	0	0	0	0	0	0
Solar/PV								0	0	0	0	0	0	0	0	0	0	0
Wind								0	0	0	0	0	0	0	0	0	0	0
MSW Landfill gas								50	51	60	58	56	57	57	57	56	55	56
Biomass								17	21	22	21	32	39	38	35	35	34	33
Other wastes								0	0	0	0	0	0	0	0	0	0	0
Pumped Storage								0	0	0	0	0	0	0	0	0	0	0
Exports								0	0	0	0	0	0	0	0	0	0	14
Imports								128	135	141	112	75	84	76	67	70	11	0
Total (production-based)								2,201	2,295	2,353	2,412	2,499	2,557	2,642	2,743	2,792	2,908	2,994
Total (consumption-based)								2,329	2,430	2,494	2,524	2,574	2,641	2,718	2,809	2,862	2,919	2,980

- **Observations (relative to in-state production):**
NG-fired generation increases from 40% in 2007 to 49% in 2017
Coal-fired generation decreases from 34% in 2007 to 27% in 2017
Oil-fired generation decreases from 9% in 2007 to 3% in 2017

Overall in-state primary energy (trillion btu) for the 2018-2025 period

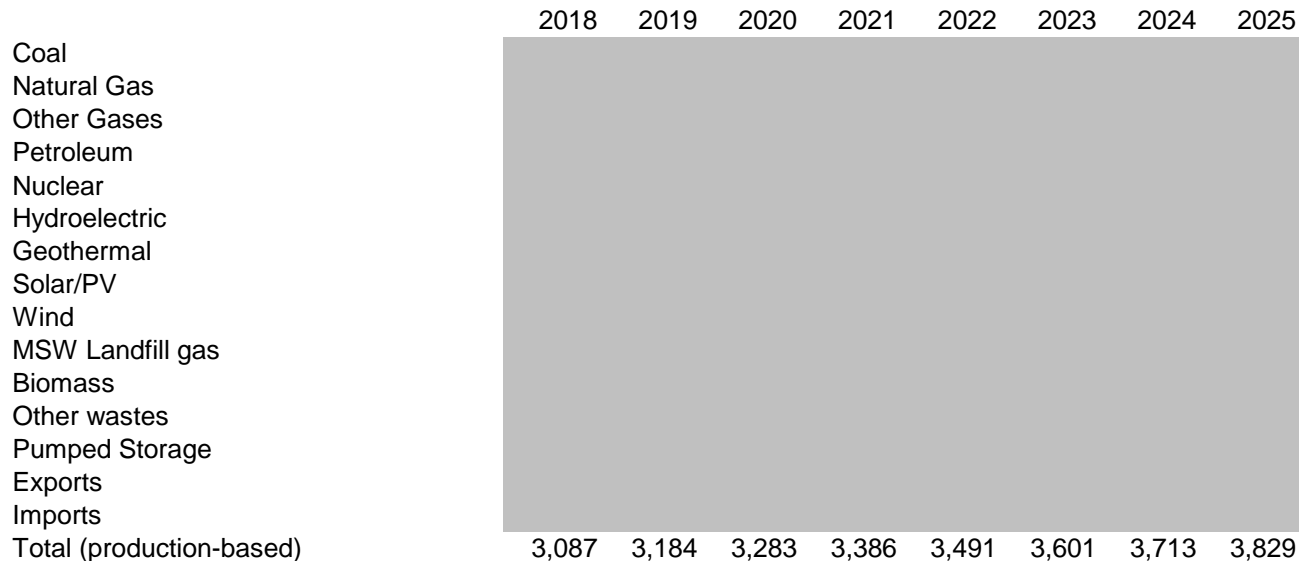
- Potential assumptions (Option #1 has been selected as a default):

Assumptions regarding "Total (production-based)" primary energy for gross generation

1

- 1 Average annual growth in total production for the 2018-2025 period is the same as in the 2007-2017 period (10-year trend of 2.8% per year)
- 2 Average annual growth in total production for the 2018-2025 period is the same as in the 2012-2017 period (5-year trend of 2.7% per year)
- 3 Average annual growth in total production for the 2018-2025 period is the same as in the 2015-2017 period (2-year trend of 3.1% per year)

- Leading to the following projection:



Fuel-specific, in-state primary energy (trillion btu) for the 2018-2025 period

- Potential assumptions (Option #1 has been selected as a default):

Assumptions regarding future energy shares of individual resource categories

1

- 1 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2007-2017 period (10-year trend)
- 2 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2012-2017 period (5-year trend)
- 3 Average annual growth in resource shares for the 2018-2025 period is the same as in the 2015-2017 period (2-year trend)
- 4 Resource shares for the 2018-2025 period are the same as in 2017 (1-year trend)

- Leading to the following projections of the generation mix:

Assumed shares (final iteration)							
2018	2019	2020	2021	2022	2023	2024	2025
25.8%	25.0%	24.3%	23.5%	22.8%	22.1%	21.4%	20.7%
49.8%	50.5%	51.2%	51.8%	52.4%	53.0%	53.6%	54.1%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.4%	2.1%	1.9%	1.6%	1.5%	1.3%	1.1%	1.0%
18.6%	19.0%	19.3%	19.6%	19.9%	20.3%	20.6%	20.8%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.8%	1.8%	1.7%	1.7%	1.6%	1.6%	1.5%	1.5%
1.1%	1.2%	1.2%	1.3%	1.3%	1.3%	1.4%	1.4%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
100%	100%	100%	100%	100%	100%	100%	100%

Fuel-specific, in-state primary energy (trillion btu) for the 2010-2025 period

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Coal	744	777	757	769	807	817	816	798	799	800	801	800	800	799	797	795
Natural Gas	1,131	1,211	1,240	1,297	1,356	1,400	1,461	1,475	1,544	1,614	1,687	1,762	1,838	1,917	1,998	2,082
Other Gases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum	124	90	89	87	83	90	83	81	74	68	62	56	51	46	42	38
Nuclear	334	334	374	394	404	394	458	550	578	607	637	667	699	732	766	802
Hydroelectric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geothermal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar/PV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MSW Landfill gas	58	56	57	57	57	56	55	56	56	56	57	57	57	57	57	57
Biomass	21	32	39	38	35	35	34	33	36	38	40	43	45	48	51	54
Other wastes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pumped Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	14	14	14	15	15	15	16	16	16
Imports	112	75	84	76	67	70	11	0	0	0	0	0	0	0	0	0
Total (production-based)	2,412	2,499	2,557	2,642	2,743	2,792	2,908	2,994	3,087	3,184	3,283	3,386	3,491	3,601	3,713	3,829
Total (consumption-based)	2,524	2,574	2,641	2,718	2,809	2,862	2,919	2,980	3,073	3,169	3,268	3,371	3,476	3,585	3,697	3,813

Difference between FRCC and existing forecast for primary energy

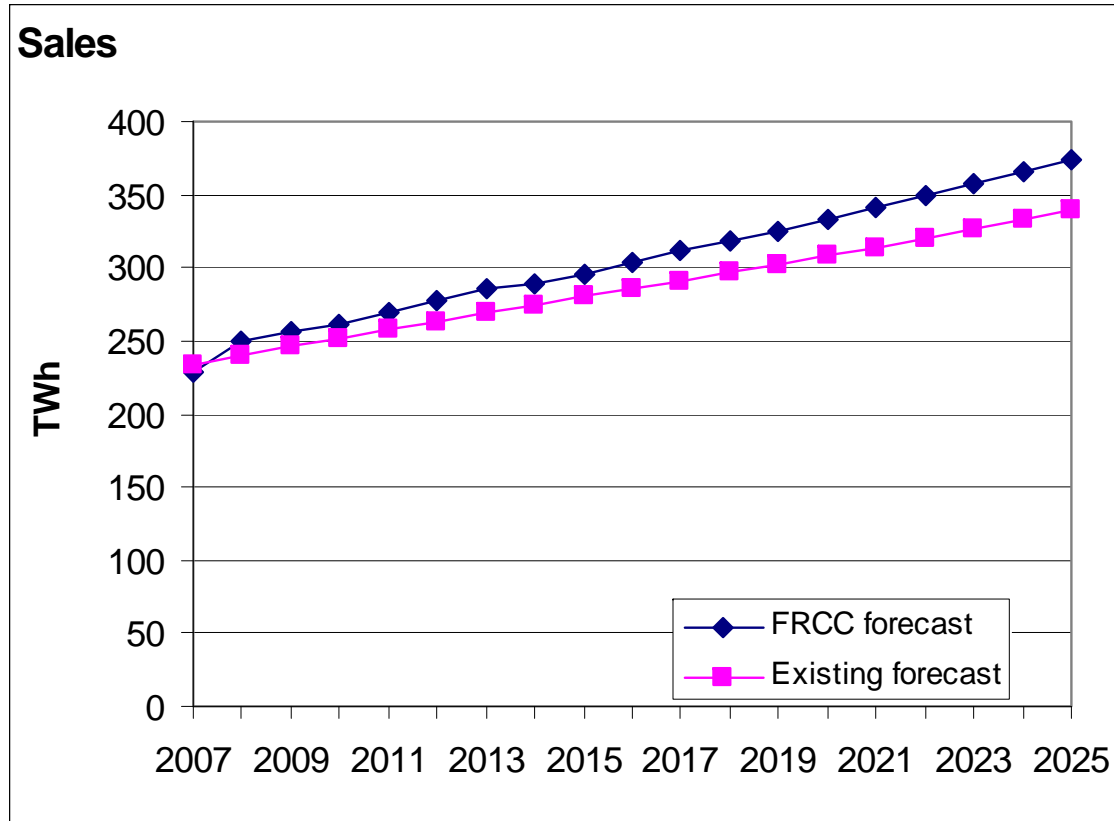
Difference between AEO2007 and FRCC outputs (%)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Exports	0%	0%	0%	0%	0%	0%	0%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%
Imports	153%	246%	293%	366%	444%	328%	3081%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total (production-based)	-7%	-7%	-9%	-11%	-13%	-11%	-15%	-15%	-16%	-17%	-18%	-18%	-20%	-22%	-23%	-24%
Total (consumption-based)	0%	0%	0%	-1%	-2%	-3%	-3%	-4%	-5%	-6%	-8%	-9%	-10%	-11%	-13%	-14%

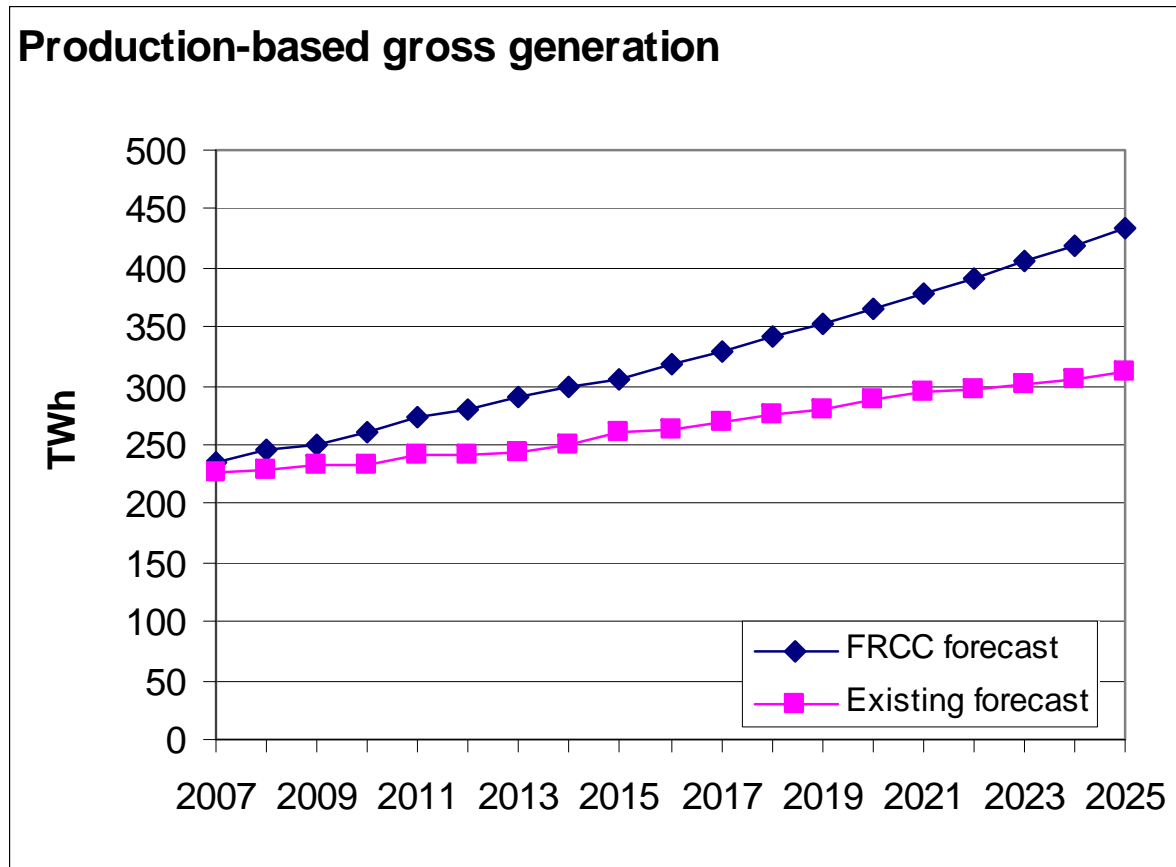
- **Observations (relative to FRCC):**
Biggest change for imports and exports
In-state production levels of existing forecast are between 7% (2010) and 24% (2025) less than FRCC
Total production levels for load of existing forecast are between 0% (2010) and 14% (2025) less than FRCC

Summary charts

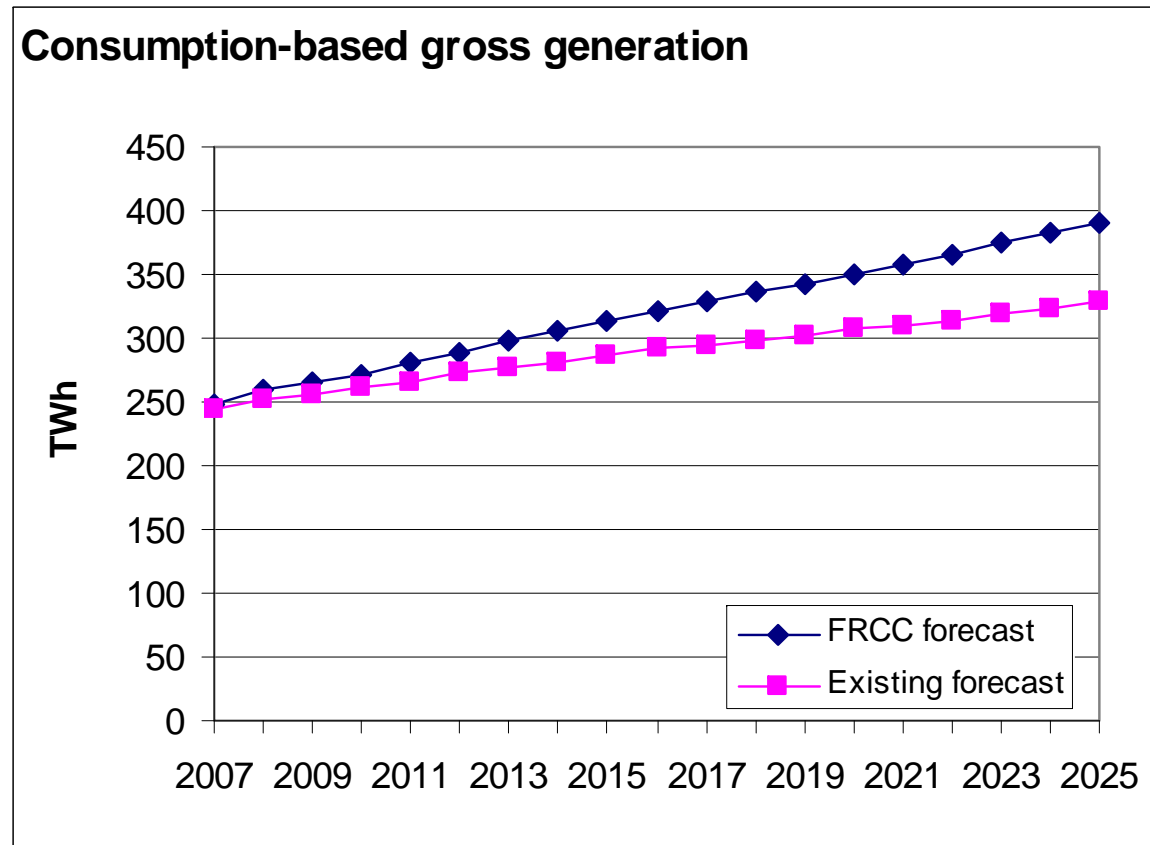
Sales (2007-2025)



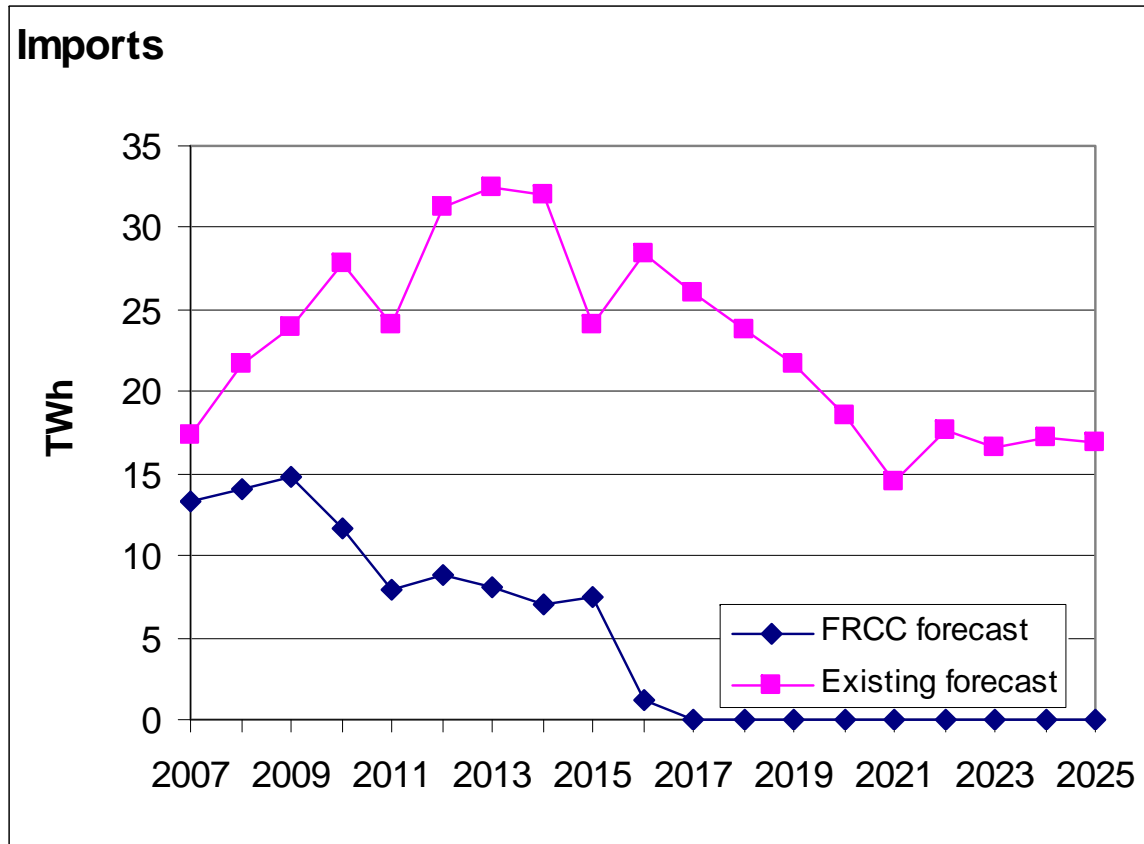
Gross Generation, production-based (2007-2025)



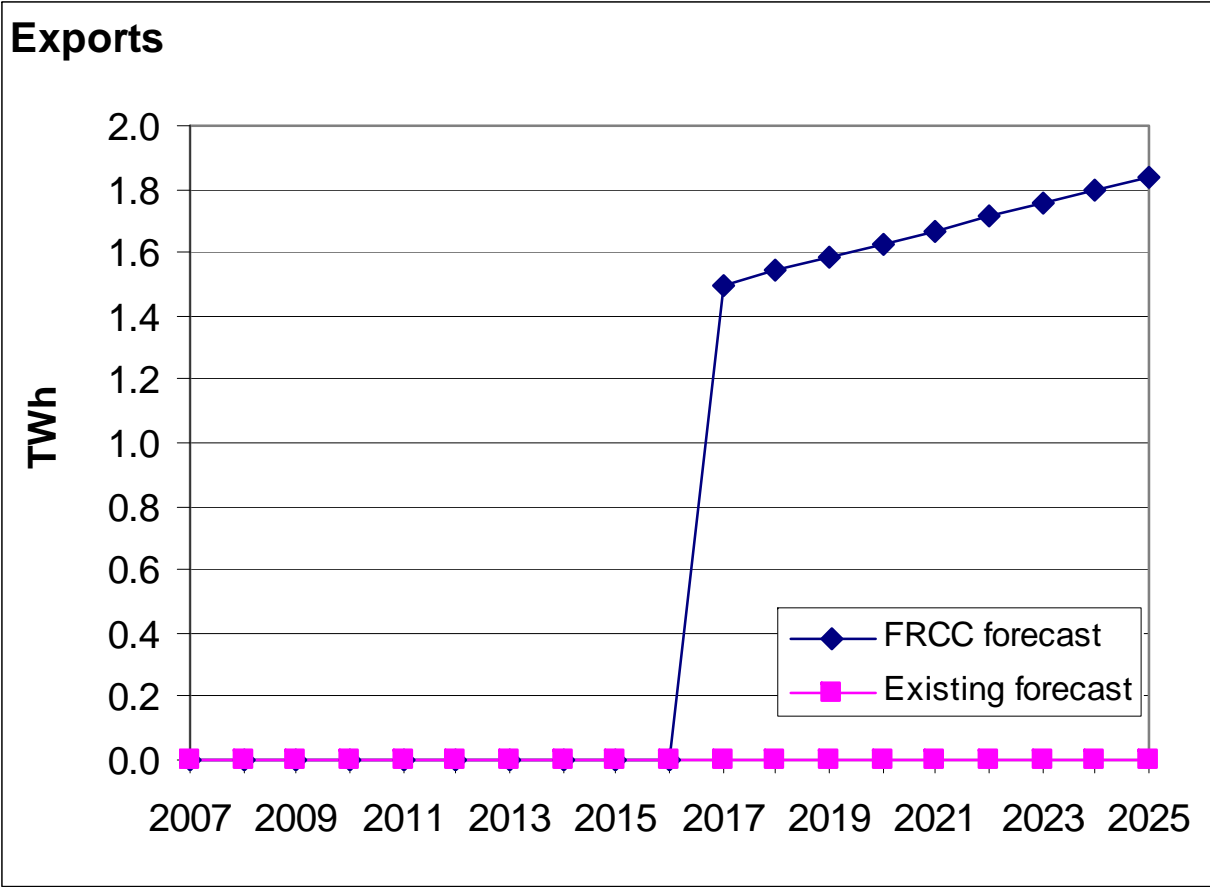
Gross Generation, consumption-based (2007-2025)



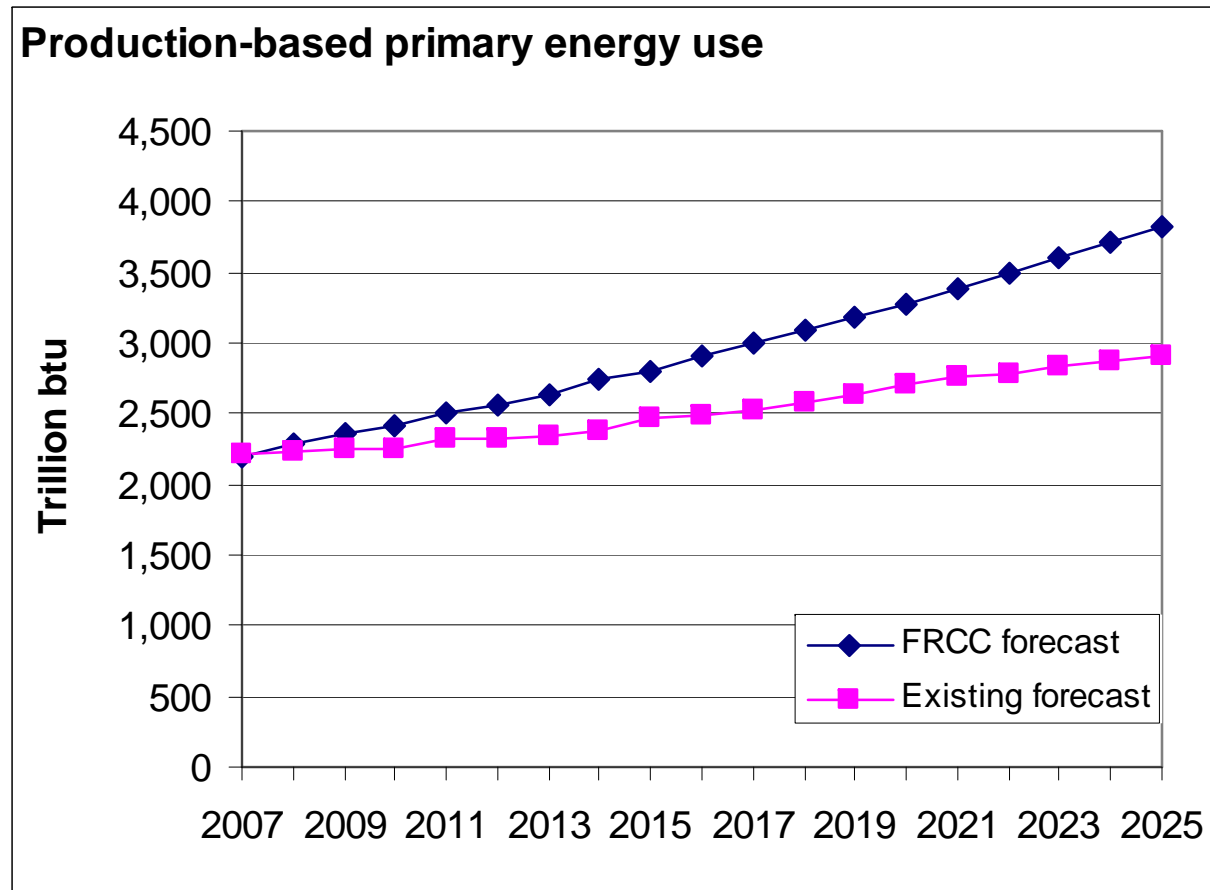
Imports (2007-2025)



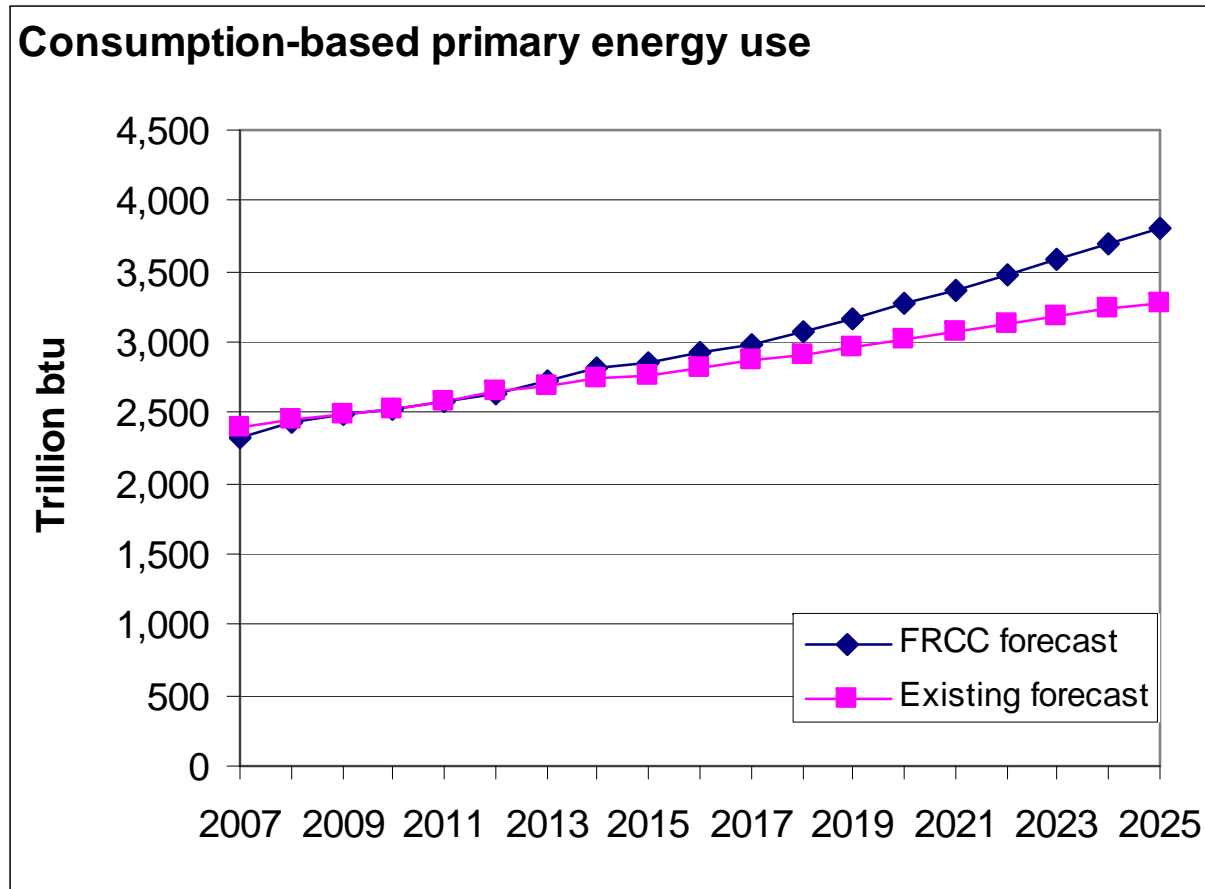
Exports



Primary energy, production-based (2007-2025)



Primary energy, consumption-based (2007-2025)



Conclusions

Very Important!

Confirm or provide alternative assumptions for the following:

1. *Retail electricity sales growth rate during the 2017-2025 period*
2. *Transmission and distribution losses during the 2017-2025 period*
3. *Breakdown of “NUG” net generation during the 2007-2017 period*
4. *Breakdown of “Renewable” net generation during the 2007-2017 period*
5. *Breakdown of “Other” net generation during the 2007-2017 period*
6. *Overall in-state net generation for the 2018-2025 period*
7. *Fuel-specific, in-state net generation for the 2018-2025 period*
8. *Breakdown of “NUG” primary energy use during the 2007-2017 period*
9. *Breakdown of “Renewable” primary energy use during the 2007-2017 period*
10. *Breakdown of “Other” primary energy use during the 2007-2017 period*
11. *“Other” primary energy use during the 2007-2017 period overreported by a factor of 10 in the FRCC forecast*
12. *Overall in-state primary energy (trillion btu) for the 2018-2025 period*
13. *Fuel-specific, in-state primary energy (trillion btu) for the 2018-2025 period*

Summary of results (based on default assumptions)

- Comparison between the existing forecast which relies on AEO2007 outputs and the FRCC 2008 10-year forecast, extrapolated to 2025 by the assumptions noted in this presentation shows by 2025 that the FRCC forecast for Florida is:
 - 10% higher for sales
 - 39% higher for gross generation (production-based)
 - 19% higher for gross generation (consumption-based)
 - 100% less for imports
 - Exports: 2 TWH for FRCC versus 0 TWH for the existing forecast
 - 32% higher for primary energy use (production-based)
 - 17% higher for primary energy use (consumption-based)
- Using the FRCC estimates and assumptions for FL as noted in this presentation will result in a considerably different GHG forecast than the existing forecast
- There are uncertainties in the FRCC forecast for FL in the 2007-2017 and 2018-2025 periods due to default assumptions made