



FPL & Gulf Integrated Resource Plan

**Florida Public Service Commission
2020 Ten Year Site Plan Workshop**

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The 2020 Ten-Year Site Plan (TYSP) presents a resource plan for an integrated FPL/Gulf system

Integration Into a Single System

- Integration of the FPL and Gulf systems is on-going with the objective of having a single operating electrical system in 2022
- Resource planning for both current systems, and for the single integrated system, is now being performed by FPL's IRP group
- Operation of the Gulf generating units is currently being performed by Southern Company (SoCo); this will continue through 2021
- A new 161 kV transmission line (the North Florida Resiliency Connection, or NFRC, line) will enhance the existing electrical connection between these two systems starting in 2022

This presentation provides an overview of the approach used to develop the resource plan for the integrated system



The analyses that led to the 2020 TYSP resource plan consisted of 3 steps

The 3 Analysis Steps

- **Step 1: Optimize Gulf as a stand-alone utility**
 - To determine how much system improvement can be made to Gulf as a separate system; and,
 - To provide a starting point for evaluation of the NFRC line
- **Step 2: Re-optimize Gulf as a separate utility system, but with a new electrical connection to FPL (*i.e.*, the NFRC line)**
 - To determine if projected benefits exceed projected costs of the NFRC line; and,
 - To provide a starting point for evaluating the integration of FPL and Gulf from a resource planning perspective
- **Step 3: Re-optimize FPL & Gulf as a single, integrated utility system**
 - The result was the resource plan presented in the 2020 TYSP



Gulf's generating units worked well as part of SoCo, but pose reliability challenges as a stand-alone system

Gulf's Generating Units

Gulf Power Generation

| Resource | Unit No. | Primary Fuel | Firm MW Summer | Unit or PPA | % of Total MW |
|-----------------------|--------------|--------------|----------------|-------------|---------------|
| Crist | 4 | Coal | 75 | Unit | 2% |
| Crist | 5 | Coal | 75 | Unit | 2% |
| Crist | 6 | Coal | 299 | Unit | 9% |
| Crist | 7 | Coal | 475 | Unit | 14% |
| Daniel | 1 | Coal | 251 | Unit | 7% |
| Daniel | 2 | Coal | 251 | Unit | 7% |
| Lansing Smith | 3 | CC | 664 | Unit | 20% |
| Lansing Smith | A | CT | 32 | Unit | 1% |
| Pea Ridge | 1 | CT | 4 | Unit | 0% |
| Pea Ridge | 2 | CT | 4 | Unit | 0% |
| Pea Ridge | 3 | CT | 4 | Unit | 0% |
| Perdido | 1 | LFG | 1.5 | Unit | 0% |
| Perdido | 2 | LFG | 1.5 | Unit | 0% |
| Scherer | 3 | Coal | 215 | Unit | 6% |
| Kingfisher PPAs | I & II | Wind | 89 | PPA | 3% |
| Gulf Coast Solar PPAs | I, II, & III | Solar | 34 | PPA | 1% |
| SENA (Shell) PPA | | CC | 885 | PPA | 26% |

Total = 3,360 100%

- 1 resource, SENA (Shell) PPA, is 26% of total MW (for comparison, FPL's largest unit, Fort Myers 2, represents < 7% of the total)
- 3 resources (Crist 7, Lansing Smith 3, & SENA (Shell) PPA) sum to 60% of total MW

Due to the large size of several resources relative to total firm capacity, a reserve margin of 30% would be needed for a stand-alone Gulf system



In Step 1, six types of resource options were evaluated as potential improvements for Gulf

Resources Options Analyzed in the Step 1 Analyses

- The 6 types of resource options analyzed for Gulf in Step 1 are:
 - New CTs and CCs (*similar to what appeared in Gulf's 2019 TYSP*)
 - Early retirement of Gulf's ownership portion of the Daniel coal units
 - 74.5 MW solar (PV) facilities
 - Conversion of the Crist Units 6 & 7 from coal-fueled to gas-fueled
 - Capacity upgrades to the Lansing Smith Unit 3 CC
 - Battery storage (20 MW facilities of 2-, 3-, and 4-hour durations)
- These options were analyzed sequentially in order to determine the economic impact of each option; the result was that each of these options was selected in an optimized resource plan for Gulf as a stand-alone utility system

This resource plan was used as the starting point for the Step 2 analyses



In the Step 2 analysis, the economics of the new NFRC line were analyzed

North Florida Resiliency Connection Line

- 176 miles of 161 kV line
- Allows bi-directional transfer capability of 850 MW
- 2022 in-service date
- Allows connection of Gulf (fossil fleet avg. HR of ~ 9,600) with FPL (fossil fleet avg. HR of ~ 6,900)



The economics of the NFRC line focused on answering two questions

The Step 2 Analysis

- **Question # 1: Is the projected cost saving to Gulf's customers resulting from having access to FPL's more efficient generation system via the NFRC line greater than the projected cost of the NFRC line?**
 - The answer is "Yes"
- **Question # 2: Is the projected cost of the NFRC line less than the projected cost of wheeling through neighboring utility systems?**
 - The answer to this question is also "Yes"

Based on these results, the NFRC line is projected to be a cost-effective addition and the re-optimized resource plan for Gulf based on the NFRC line became the starting point for Step 3 analyses

In the Step 3 analysis, several considerations emerged

Considerations in the Step 3 Analysis

- **Load Coincidence:**

- The electrical peaks in Gulf's and FPL's areas both occur at 4-to-5 pm, but in different time zones
- Consequently, the two areas do not experience peak loads simultaneously
- The coincident Summer peak load for the integrated system (which occurs at 4-to-5 pm EDT) is ~ 100 MW less than the sum of the Gulf & FPL areas' individual peaks

- **Reliability planning:**

- With an integrated system, there is no longer a need to meet a 20% reserve margin (RM) in both areas; instead resources from both areas can meet an overall 20% RM

Both of these considerations lower the amount of new resources needed for the single, integrated system



In addition to affecting coincident peak load, geographic distance affects solar planning

Considerations in the Step 3 Analysis (Cont.)

- **Siting of Solar:**
 - Because Gulf's area is west of FPL's area, the sun is higher in the sky over Gulf's area than it is over FPL's area at the integrated system's coincident peak
 - Thus, all else equal, solar placed in Gulf's area will have greater output at the coincident peak hour than solar placed in FPL's area
 - As a result, solar located in Gulf's area has a higher firm capacity value (*the % of the solar nameplate rating that is accounted for as firm capacity in RM analysis*) than solar located in FPL's area
- **Based on these (and other) considerations, an optimized resource plan for the integrated FPL/Gulf system was developed in Step 3**
 - The projected costs of this resource plan were then compared to the sum of the projected costs for optimized plans for the separate, electrically connected Gulf & FPL systems

Integrating the two systems is projected to be cost-effective

Results of the Step 3 Analyses

- The resource plan for the integrated system is projected to have a lower cost than the sum of the costs for optimized stand-alone Gulf & FPL resource plans
- Key features of the integrated resource plan:
 - ~ 10,000 MW of solar by 2029 (*the next slide presents a projection of solar to be added in both Gulf's & FPL's areas*)
 - ~ 1,200 MW of batteries by 2029
 - A 4x0 CT facility (938 MW) is scheduled for Gulf by the start of 2022 (*to provide fast start capability lacking in Gulf's area*)
 - Two CCs, one in Gulf's area (2024) & one in FPL's area (2026), previously shown in the respective 2019 TYSPs, have been avoided or deferred past 2029

The resource plan from the Step 3 analysis is presented in detail in FPL's 2020 TYSP



The 2020 TYSP shows a cumulative total of 10,000 MW of solar by 2029

2020 TYSP Solar Projection

| | Year | FPL-Owned Solar MW | Gulf-Owned Solar MW | Combined Total MW | Cumulative Total MW |
|-------------------------|--|--------------------|---------------------|-------------------|---------------------|
| | Cumulative Thru 2019 | 1,153 | 0 | 1,153 | 1,153 |
| Annual Additions | 2020 | 745 | 75 | 820 | 1,973 |
| | 2021 | 1,043 | 149 | 1,192 | 3,165 |
| | 2022 | 0 | 447 | 447 | 3,612 |
| | 2023 | 0 | 447 | 447 | 4,059 |
| | 2024 | 0 | 447 | 447 | 4,506 |
| | 2025 | 745 | 0 | 745 | 5,251 |
| | 2026 | 1,192 | 0 | 1,192 | 6,443 |
| | 2027 | 1,192 | 0 | 1,192 | 7,635 |
| | 2028 | 1,192 | 0 | 1,192 | 8,827 |
| | 2029 | 1,192 | 0 | 1,192 | 10,019 |
| | Total Additions: 2020 thru 2029 = | 7,301 | 1,565 | 8,866 | |

The “30 million solar panels by 2030” objective will be met with this solar projection



The analyses concluded that significant cost savings are obtainable through a number of actions (*many of which are now underway*)

In Conclusion

- **The 3-step analyses performed to-date have resulted in projected net cost savings for:**
 - Various improvements/additions to the current Gulf system (Step 1 analyses)
 - Enhancing the electrical connection between Gulf and FPL by adding the NFRC line (Step 2 analyses)
 - Integrating the two systems into a single, integrated system based on the NFRC line being in place (Step 3 analyses)
- **Analyses of the two areas will continue throughout 2020:**
 - Updated forecasts & assumptions will be used (and, as always, IRP analysis results may change as a result)
 - The outcome of these new analyses will be presented in the 2021 TYSP

