

State of Florida



## Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD  
TALLAHASSEE, FLORIDA 32399-0850

**-M-E-M-O-R-A-N-D-U-M-**

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**DATE:** November 10, 2014

**TO:** Carlotta S. Stauffer, Commission Clerk, Office of Commission Clerk

**FROM:** Kelley F. Corbari, Senior Attorney, Office of the General Counsel *KFC*  
Charles W. Murphy, Senior Attorney, Office of the General Counsel

**RE:** **140180-EG** – Petition for approval of amendment to extend term of negotiated renewable energy power purchase contract with Rayonier Performance Fibers, LLC, by Florida Public Utilities Company.

**140185-EG** – Petition for approval of negotiated power purchase contract with Eight Flags Energy, LLC, by Florida Public Utilities Company.

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Attached is a copy of the slides from the PowerPoint presentation given by FPUC at the informal meeting held on November 10, 2014, in Docket Nos. 140180-EG and 140185-EG. Please file the document in both of the above-referenced docket files.

Thank you for your assistance in this matter. Should you have any questions, please do not hesitate to contact me.

KFC

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COMMISSION  
CLERK



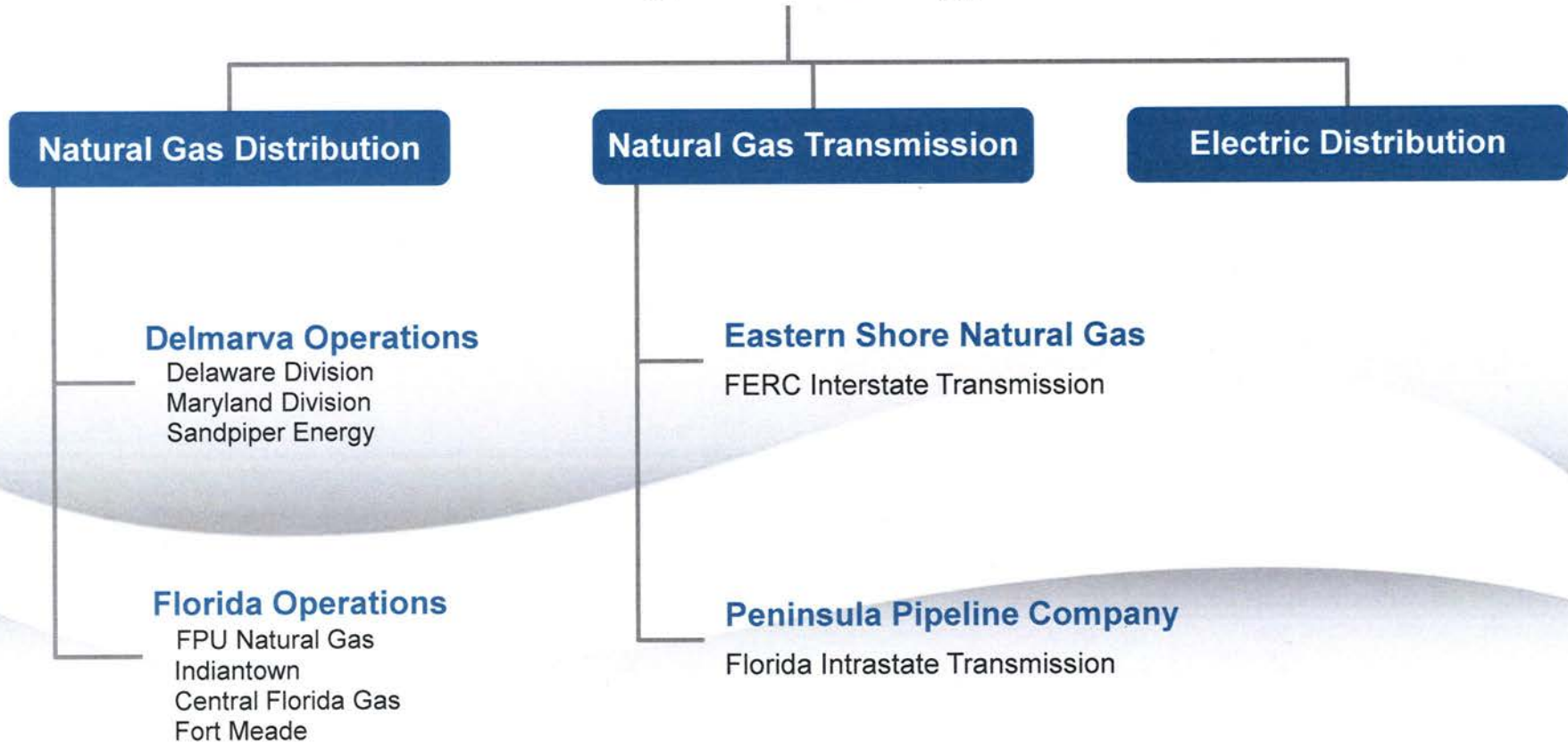
**Chesapeake Utilities Corporation**

**Eight Flags Energy, LLC  
Amelia Island CHP Project**

*November 10, 2014*

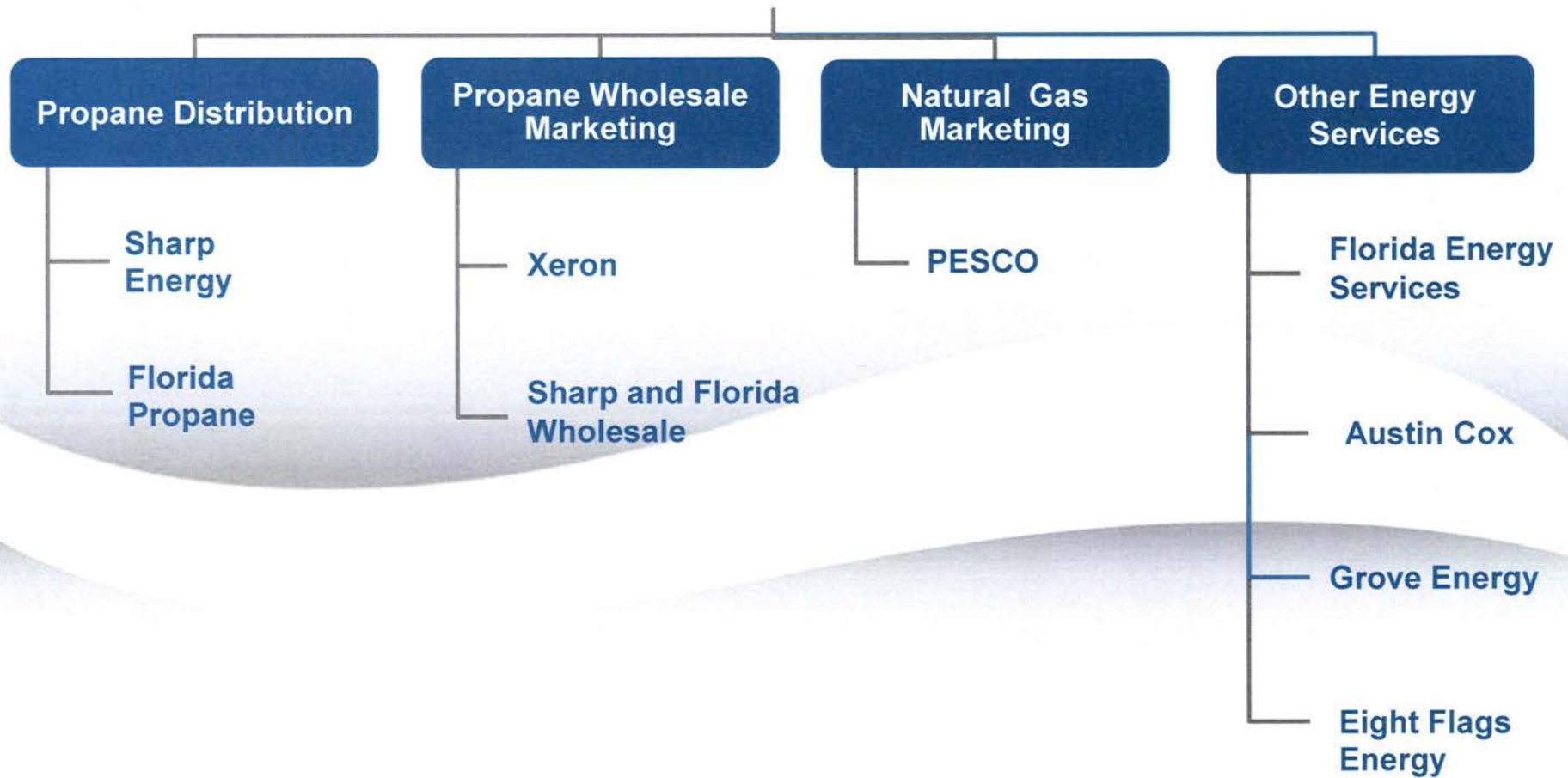
# Chesapeake Utilities – Organizational Structure

## Regulated Energy



# Chesapeake Utilities – Organizational Structure

## Un-regulated Energy



# FPU Electric Operations

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- **Two Electric Service Operating Areas**
  - NW Division – Jackson, Calhoun and Liberty Counties
    - Approximately 15,000 customers
    - Wholesale supplier: Southern Company/Gulf Power
  - NE Division – Amelia Island in Nassau County
    - Approximately 16,000 customers
    - Wholesale suppliers:
      - JEA
      - Rock Tenn Paper QF (REN-1 as-available)
      - Rayonier Advanced Materials QF (REN-2 firm)
    - Winter Demand: 75 MW peak – 20 MW off-peak minimum
    - Summer Demand: 65 MW peak – 25 MW off-peak minimum

# Project Background



- **1996-2007 FPU rates among lowest in Florida**
- **2008 new wholesale PPA's (JEA/Gulf Power)**
  - Base rate remain low – fuel rates increase dramatically.
  - By 2010 total rates are 50+% higher than in 2007.
  - Customer and local political issues.
- **Started looking for a solution.**
  - Renegotiate existing wholesale contracts.
  - Operations cost containment.
  - Optimize local QF purchases
  - Longer term: transmission expansion; new wholesale providers; equity interest in generation.

# Project Background

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## ▪ Concurrent Events

- Natural gas pipeline to Nassau County.
- Rock Tenn begins re-powering study (coal to gas)
- Interest from CHP/IPP developers
  - Rock Tenn CHP and various LNG projects.
- Rayonier announces purchase of a new steam turbine.
  - Significant FPU margin loss from discontinued sales.
- Rayonier requests modified stand-by tariff.
- Rayonier requests increased excess power purchase price.
- Marianna franchise dispute.

# Project Background

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- **Initially approached Rayonier about a gas conversion.**
  - Discovered their new steam turbine had approx. 5 MW of generating capacity in excess of RYN's requirements.
  - RYN steam capacity was insufficient to optimize their power production capabilities.
- **FPU proposed a gas boiler addition**
  - Gas sales replace lost electric revenue.
  - High pressure steam from boiler spins the steam turbine.
  - FPU would purchase excess energy from RYN.
- **FPU as available REN-1 tariff rate less than RYN's generating cost – began firm capacity discussions.**



# Project Background



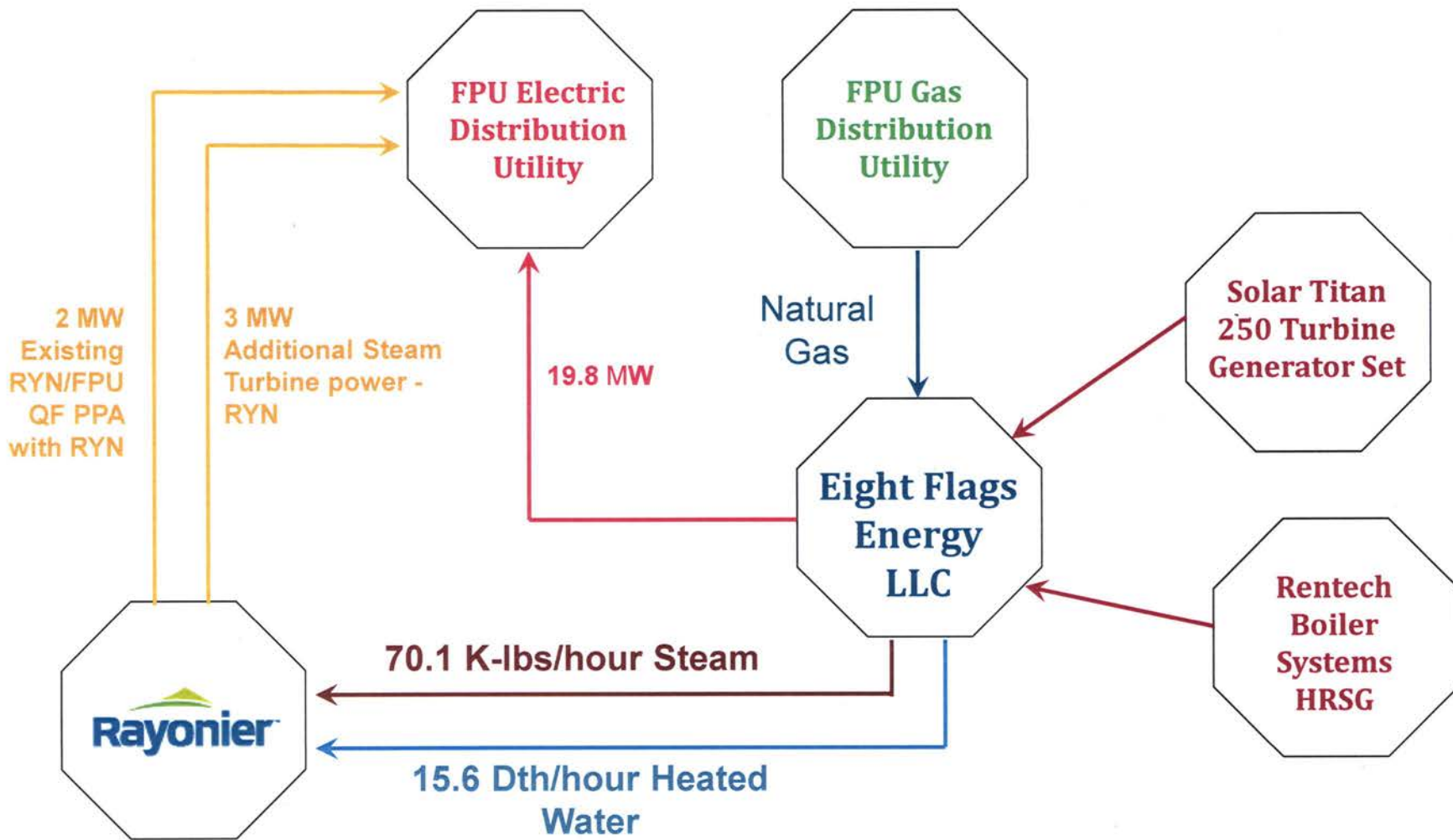
- **FPU and RYN jointly retain Sterling Energy to assess boiler steam and electric interconnection issues.**
- **CHP option emerges.**
  - RYN uses low pressure steam in its paper process.
  - Gas turbine with HRSG produces low pressure steam.
  - Existing RYN high pressure steam diverted to steam turbine.
  - FPU takes CHP power; RYN takes the steam.
- **Retained Sterling and Christenson Assoc. to determine if a CHP was technically and economically feasible.**
- **Many CHP ownership options reviewed.**
- **CPK Board approves Eight Flags in March 2014.**

# Project Overview

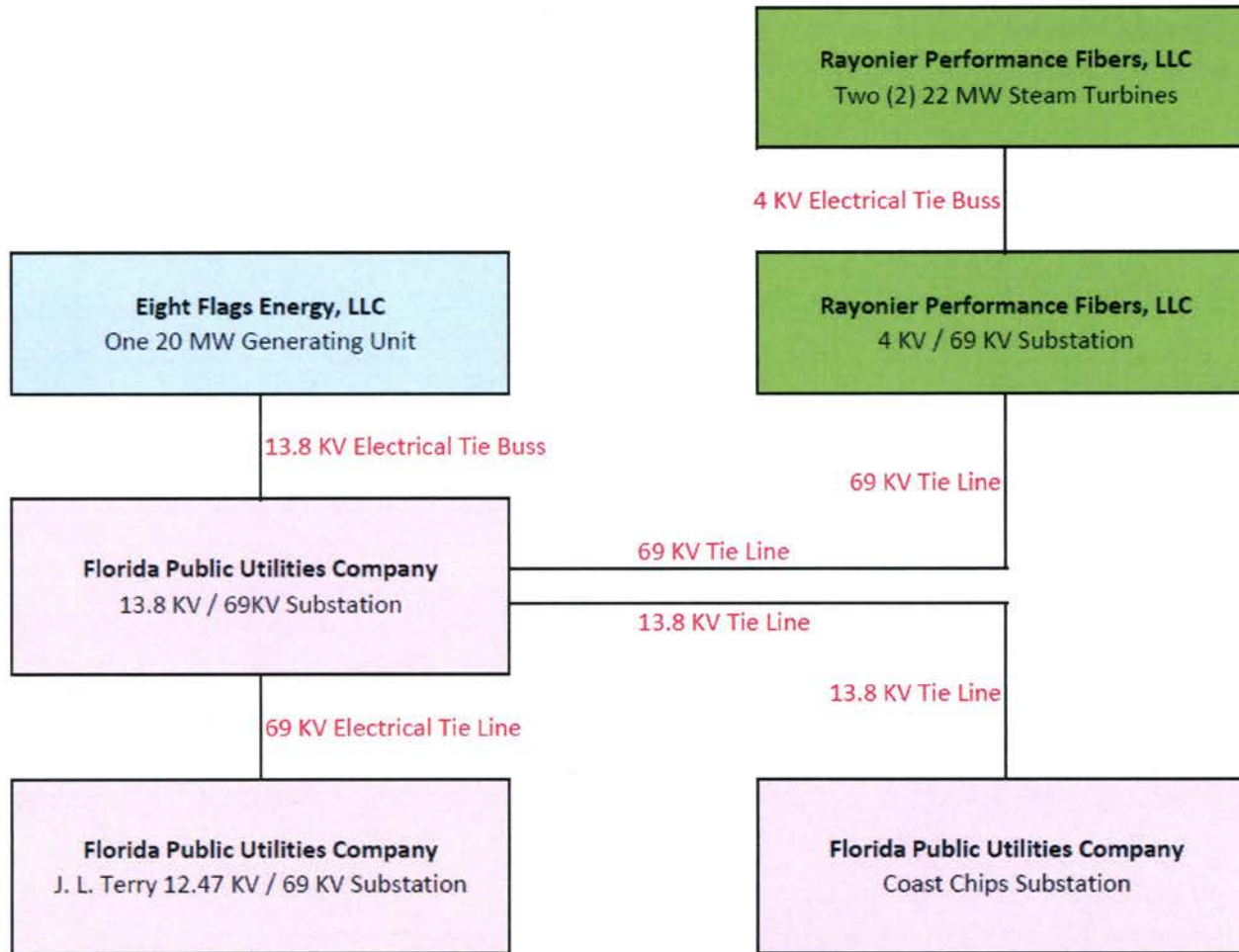


- A new CPK subsidiary, Eight Flags Energy, LLC, will construct, own and operate a Combined Heat and Power (CHP) unit at the Rayonier Amelia Island paper mill.
  - Natural gas combustion turbine.
  - Heat Recovery Steam Generator (HRSG)
- The CHP is designed to produce 19.8 MW of power, plus 650,000 kp of low pressure steam for RYNs paper process
- FPU will purchase all the power from Eight Flags.
- RYN will purchase steam and hot water from Eight Flags.
- FPU Gas Distribution will deliver gas to Eight Flags.
- FPU will purchase excess electricity from the RYN steam turbine generators.

# Project Structure



# Interconnection of Eight Flags and RYN Generating Facilities

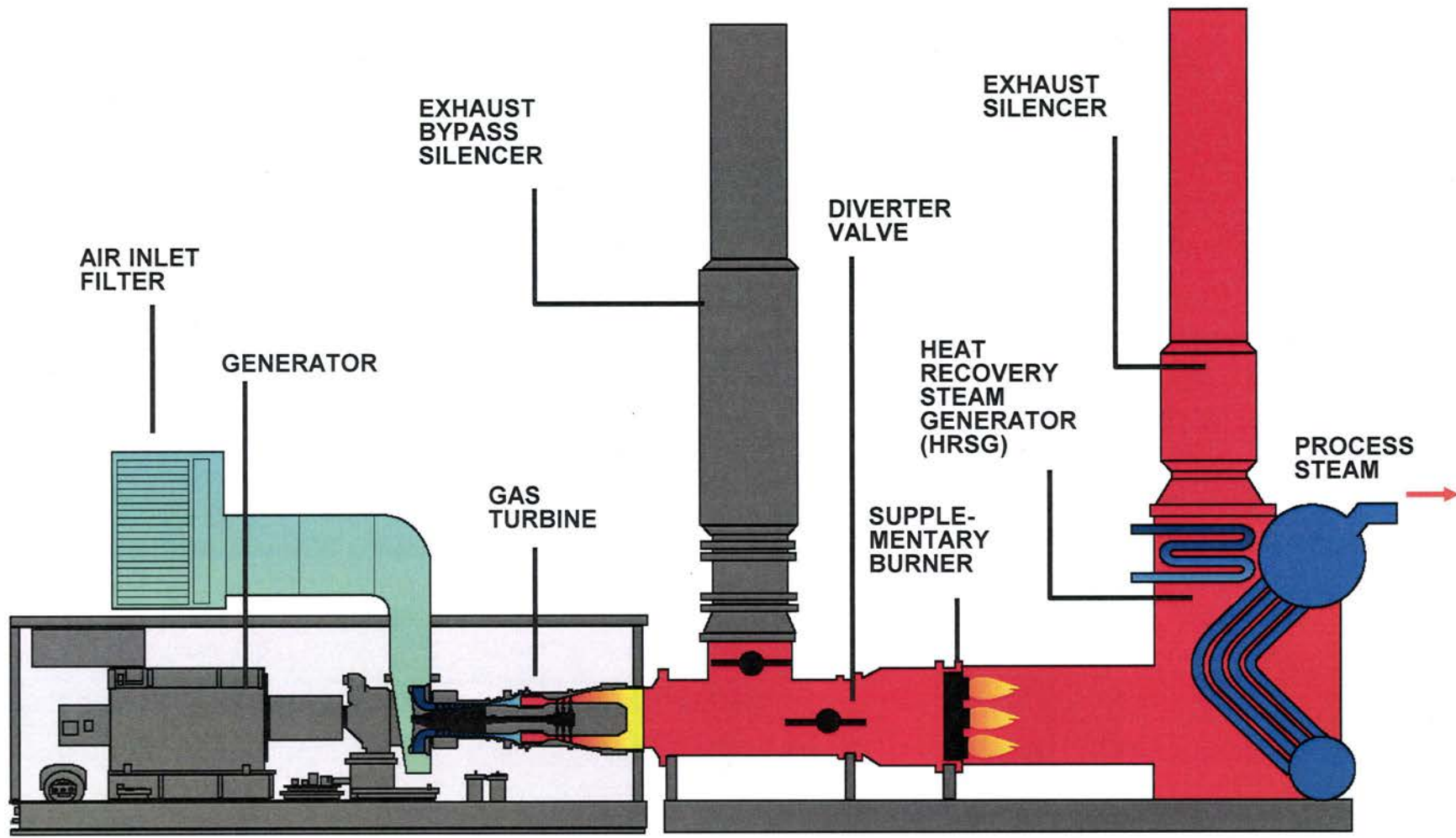


# Eight Flags CHP at Rayonier Mill Site

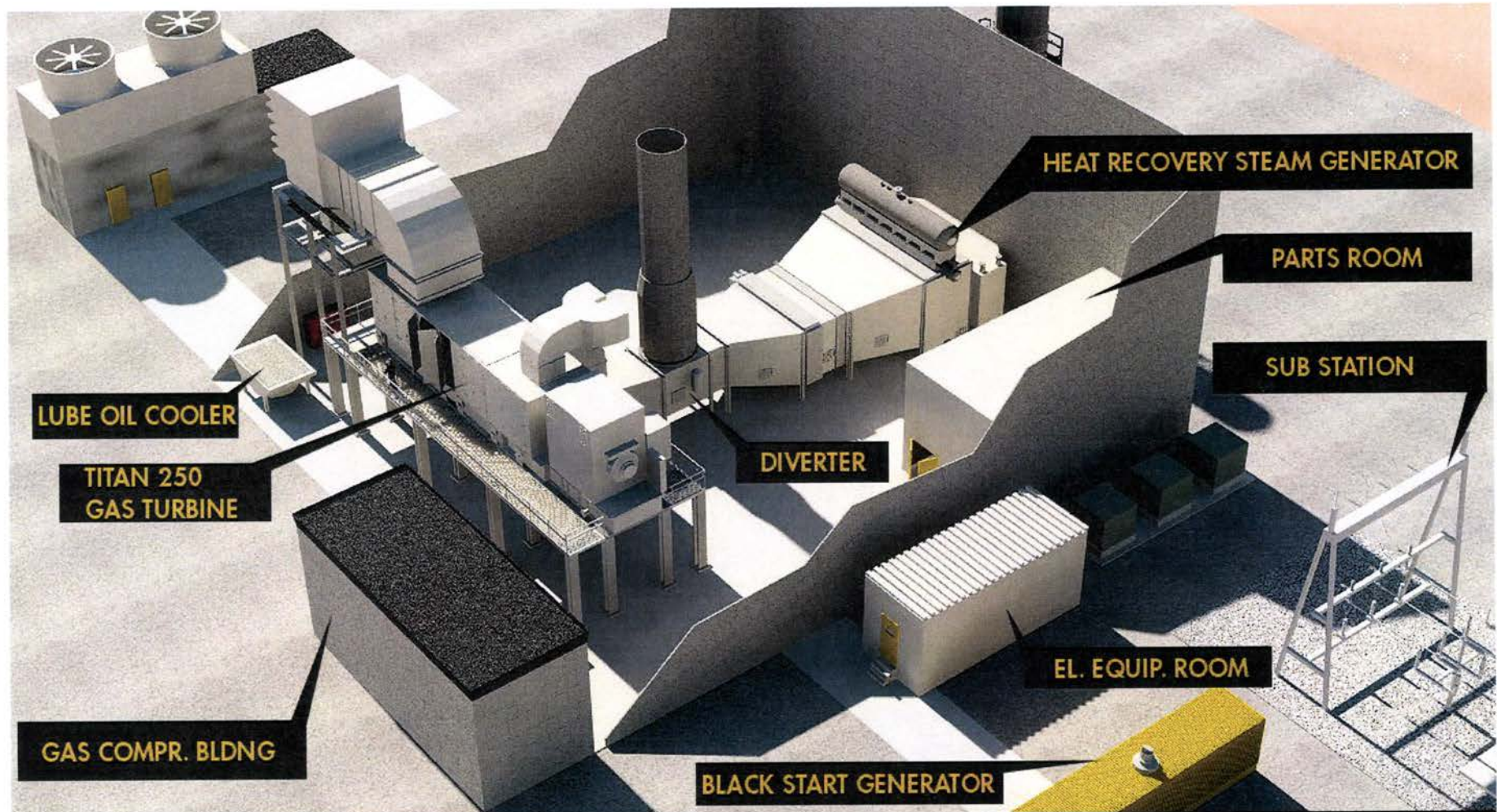




# Natural Gas Turbine/HRSG CHP



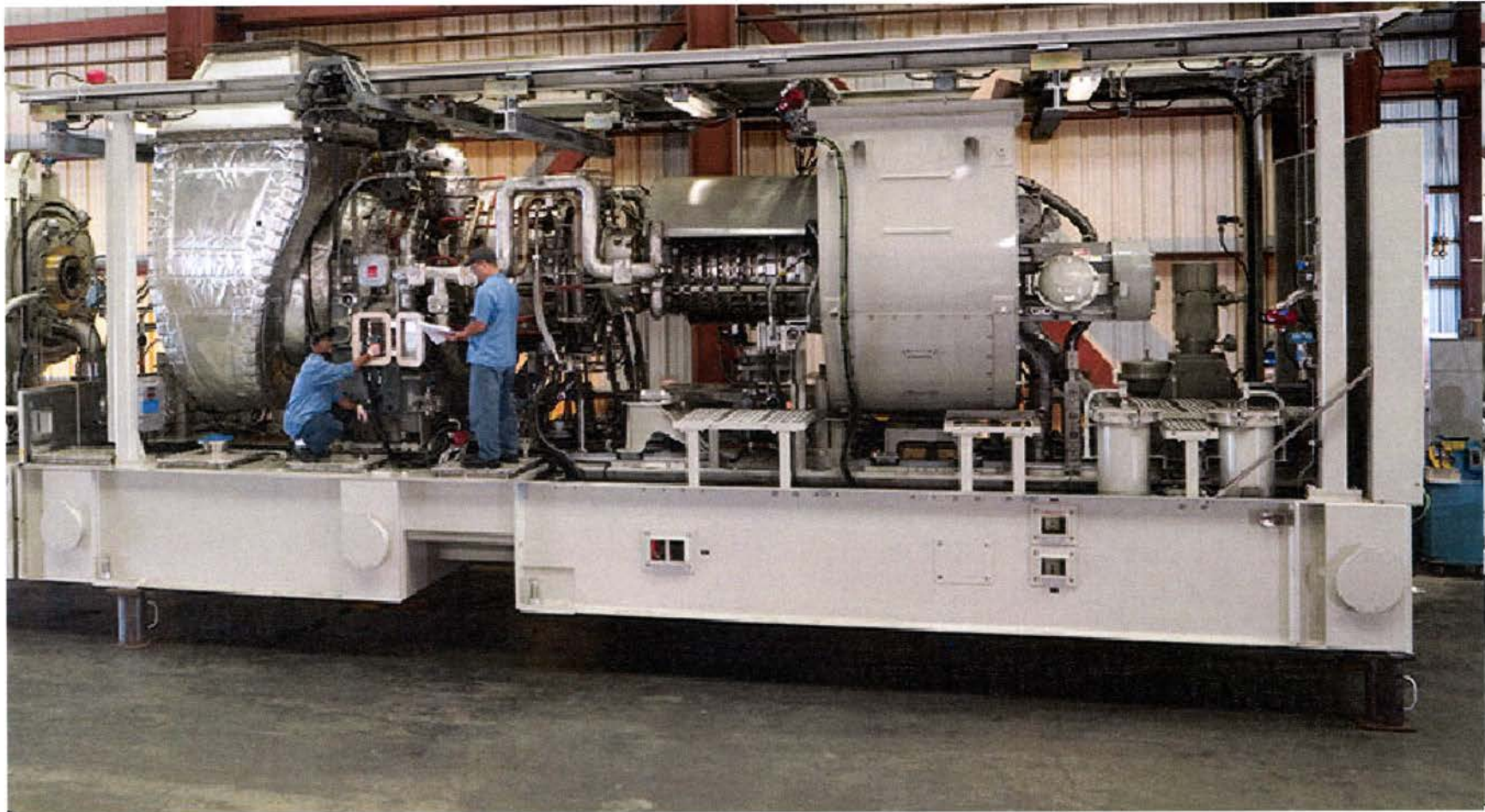
# Rendering of CHP Installation



Solar Turbines Titan 250  
A Caterpillar Company

TITAN 250 PLUS HEAT RECOVERY STEAM GENERATOR FOR FLORIDA PUBLIC UTILITIES

# Solar Titan 250 Gas Turbine



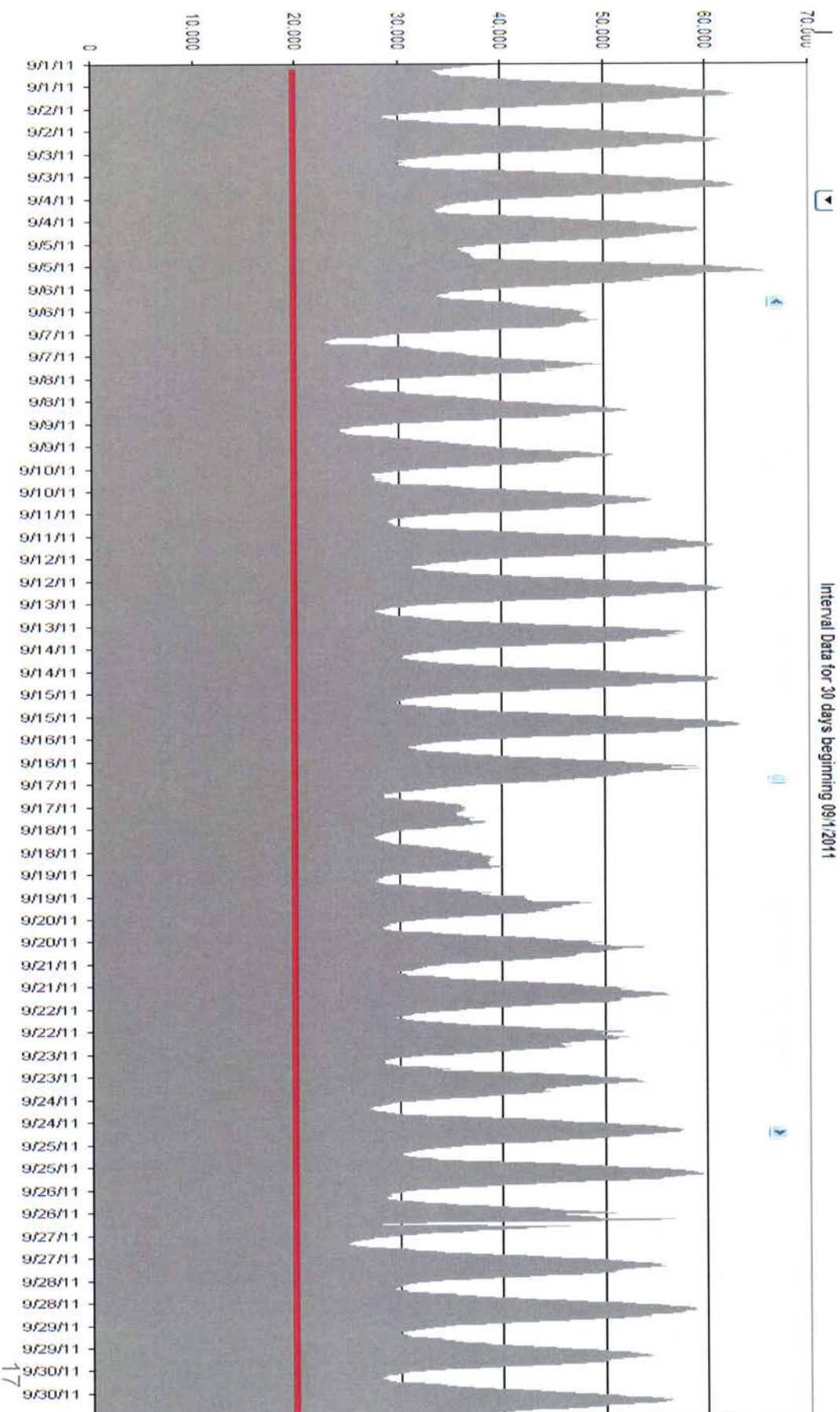


# CHP Turbine/HRSG Selection

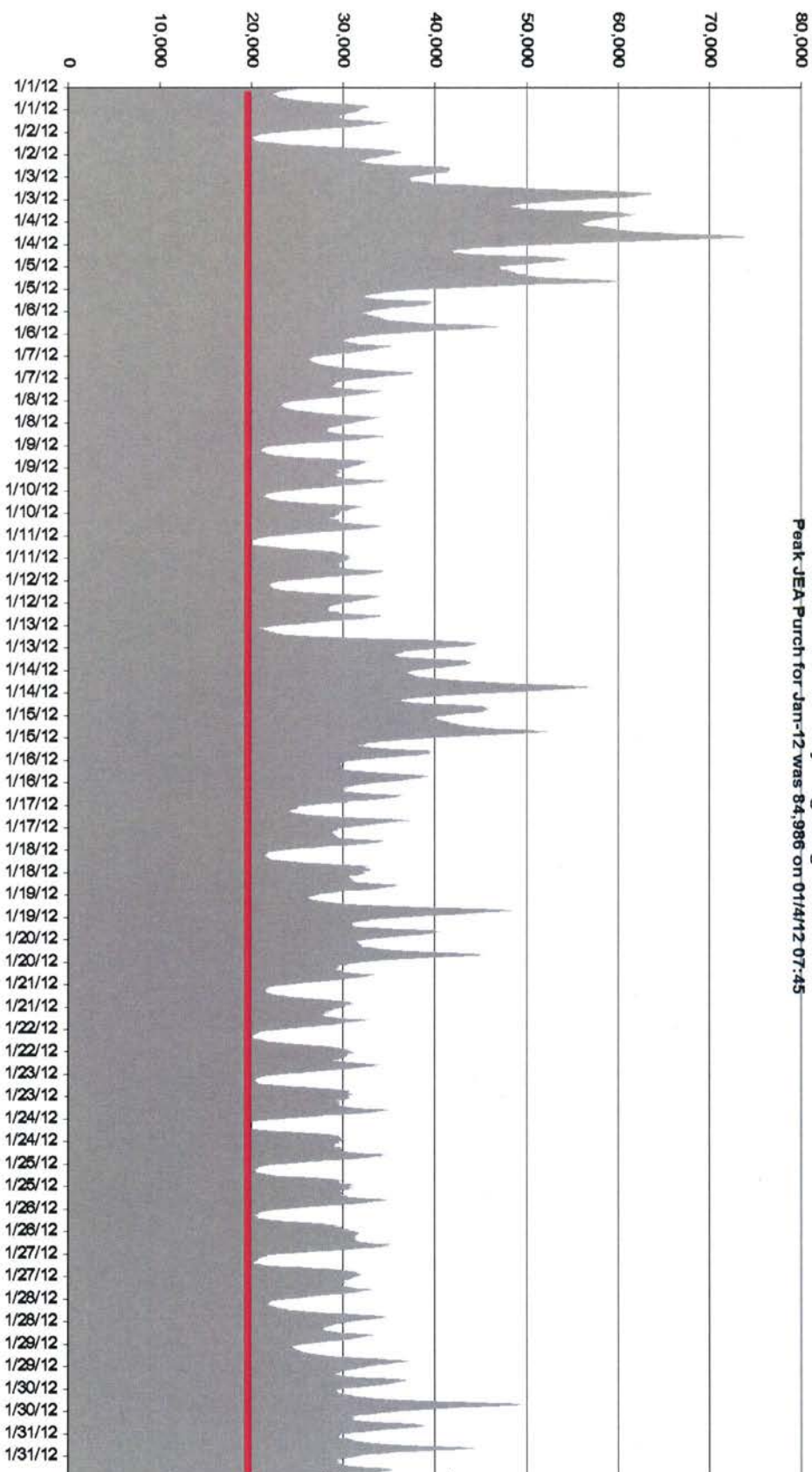


- Developed hourly load model of FPU island and mills' profiles
  - Adjusted for known changes (addition of Rayonier new steam T/G)
  - Integrated analysis with mills' hourly thermal (steam) load balances and internal turbine generator outputs from RT and RYN
  - Layered various gas turbine performance curves & costs for: 70 MW, 46 MW, 21 MW, 15 MW & 8 MW GT's into hourly island load model and mills' thermal load profile and ran multiple regressions/optimizations to determine best fit/economics compared to JEA base case
  - Determined highest value for all parties for HRSG to make 150 # steam permitting Rayonier to condense up to 5 MW more power by displacing 150 # extraction flow with unfired steam from 21 MW GT/HRSG
  - Targeted and ran optimization analyses on both 15 and 22 MW cases at Rayonier with hard costs/economics
    - Ran multiple cases over 15 year horizons with multiple contingencies
      - with / without exports, unit performance variations, with/without RYN Steam Turbine output.

# Typical NE Division Summer Month Load



# NE Division Peak Winter Month Load



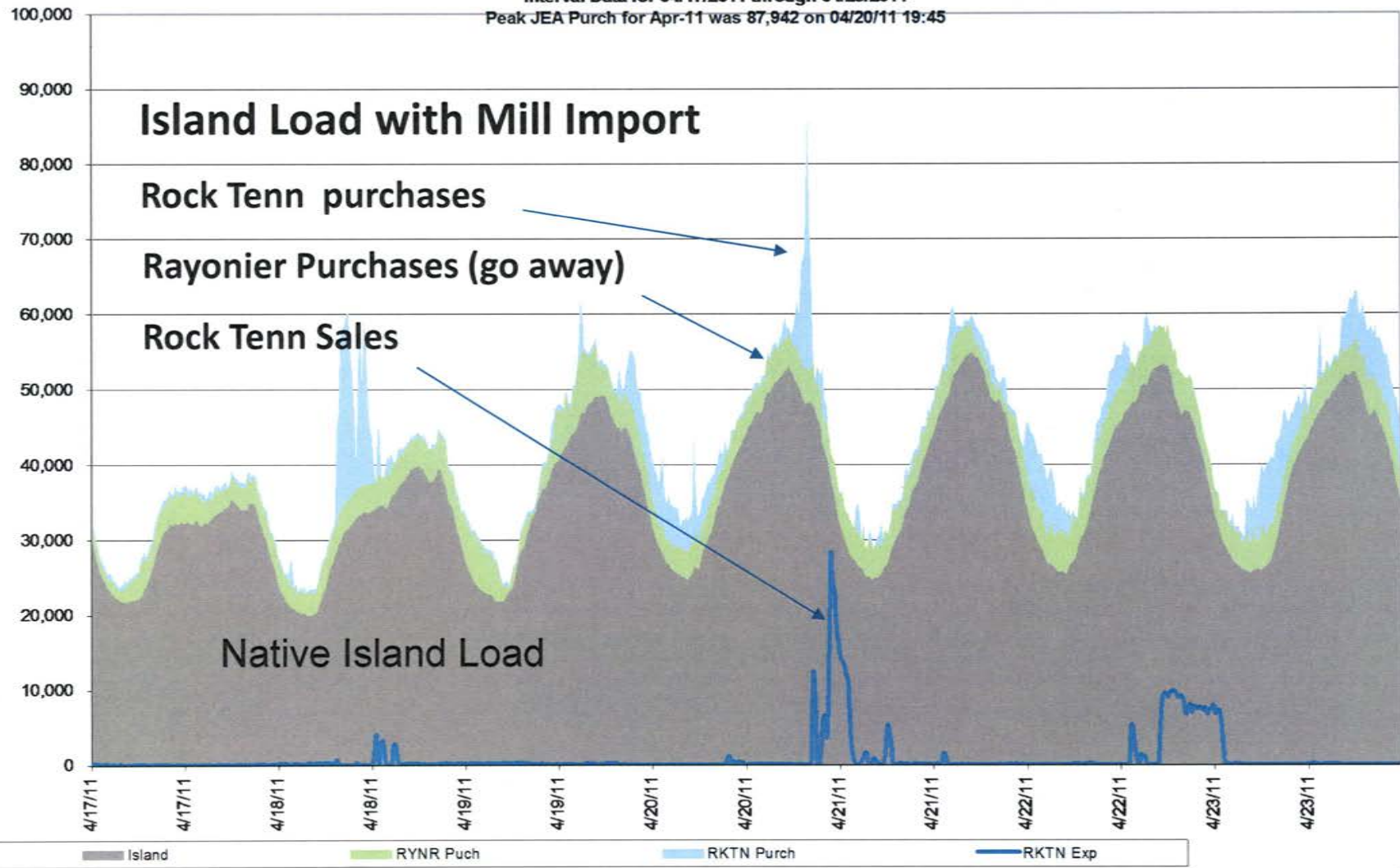
FPU - Rockkenn - Rayonier  
Interval Data for 31 days beginning 01/1/2012  
Peak - JEA Purch for Jan-12 was 84,986 on 01/4/12 07:45



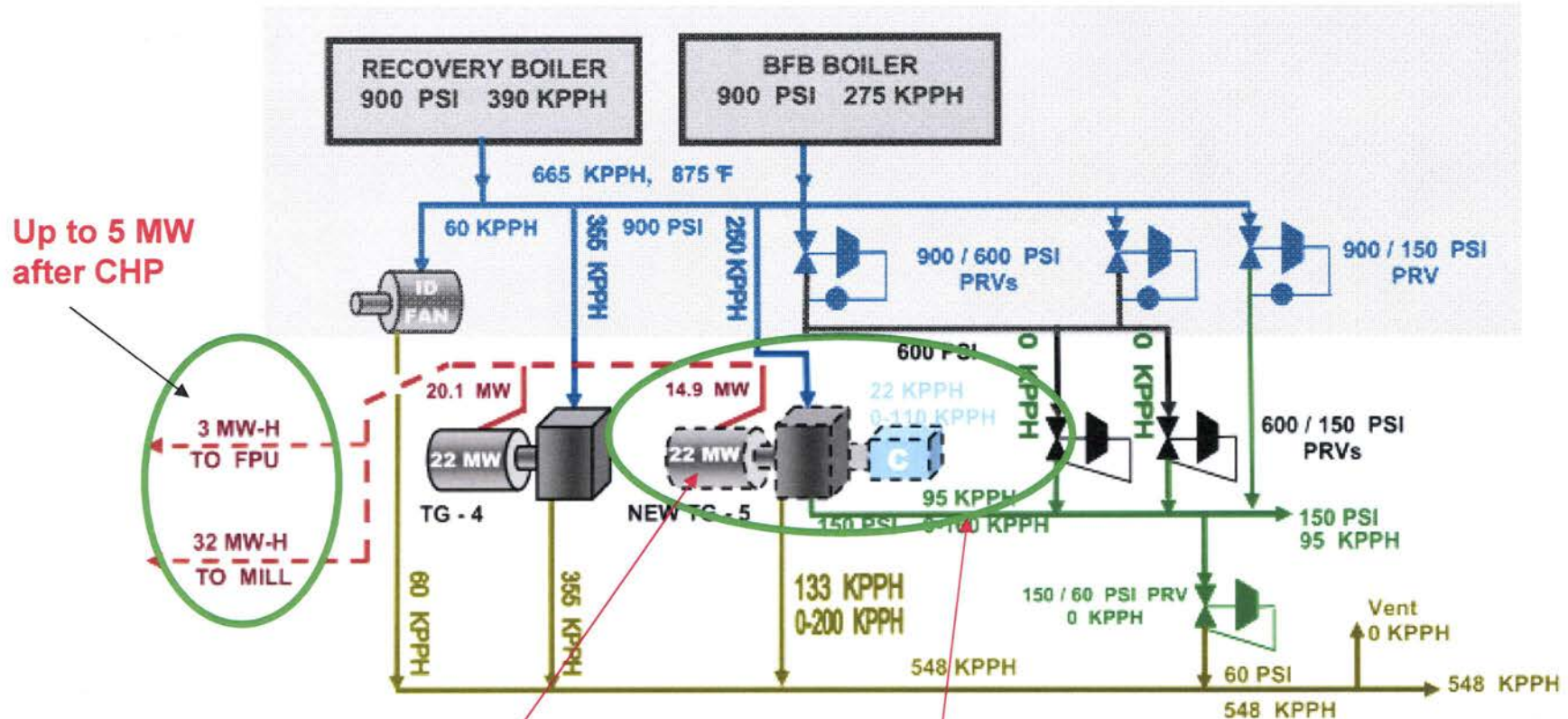
Island

# FPU NE Division

FPU - Rocktenn - Rayonier  
 Interval Data for 04/17/2011 through 04/23/2011  
 Peak JEA Purch for Apr-11 was 87,942 on 04/20/11 19:45



# Rayonier Steam / Power Balance



Up to 5 MW after CHP

Key Design Factors Driving GT/CHP size and heat balance

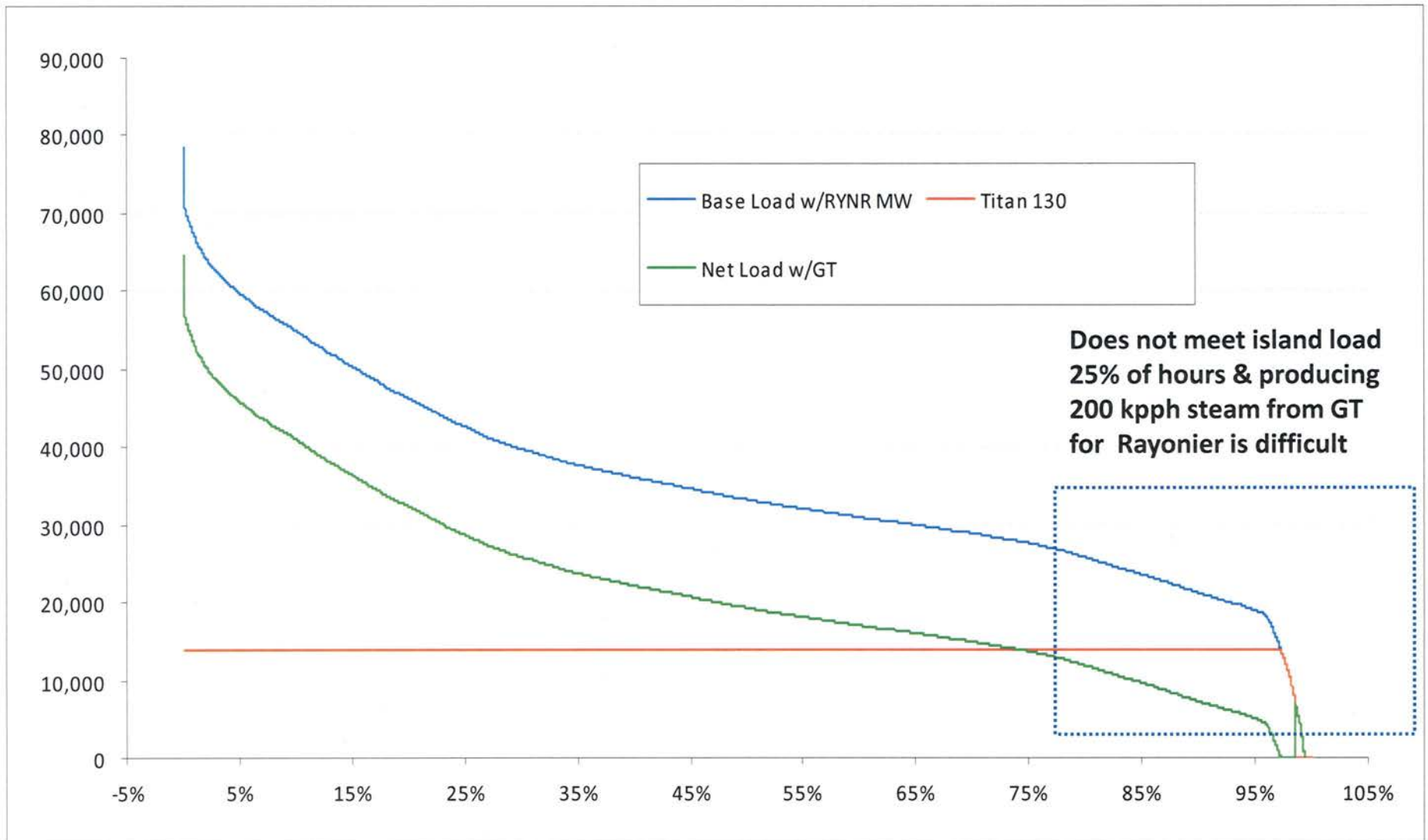
T/G capacity 22 MW with 15 avg and 95 kpph avg of 150 # steam use #5

# Turbine Performance Evaluation

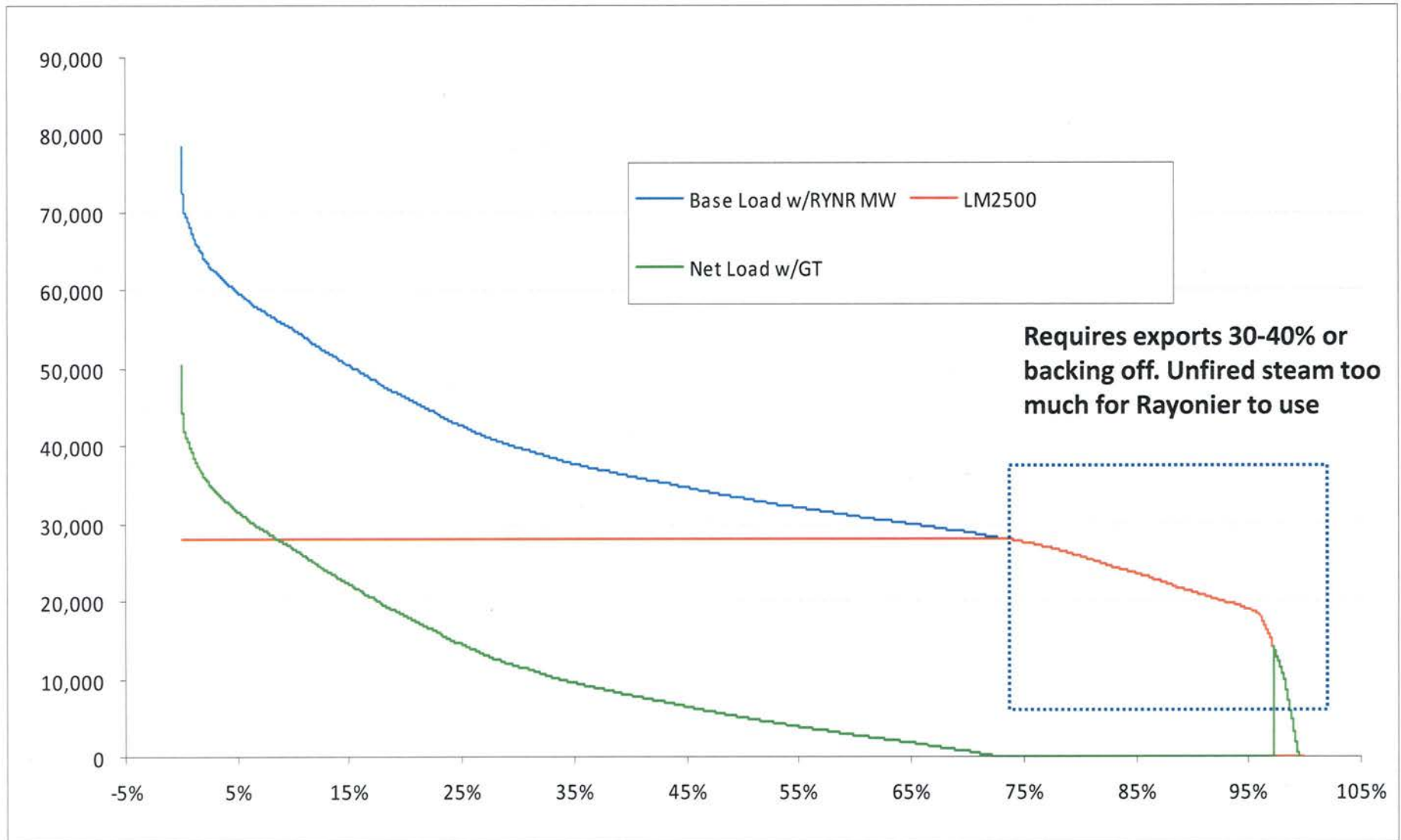


- Determined electric & thermal balance optimized for Island/Mill conditions – narrow ‘range’ exists for optimum performance
  - Limits: Rayonier 150 # steam avg of 95 kpph (impacts GT specs)
  - FPU island minimum load of 20 MW. More GT MW would make project economics depend on export or backing off GT output
- Selected 4 gas turbines that ‘fit’ site energy balance and secured quotes
  - Solar: Titan 130 -15MW and Titan 250 - 21.7 MW net ISO
  - GE Aero: LM 2000 – 18 MW and LM 2500 – 25 MW net ISO
    - GE Frame 1, Siemens SGT, Mitsubishi and Kawasaki: too much unfired thermal
  - Ran multiple performance/economic comparison for Solar & GE units
  - Evaluated emissions impacts with Golder: all GE units require SCR
  - Secured cost and performance data on final 4 units
  - Selected Solar Titan 250, 21.7 nominal MW unit – others ‘not even in same ball park on performance and costs’ for site conditions

# Solar Turbines Titan 130 – 15 MW

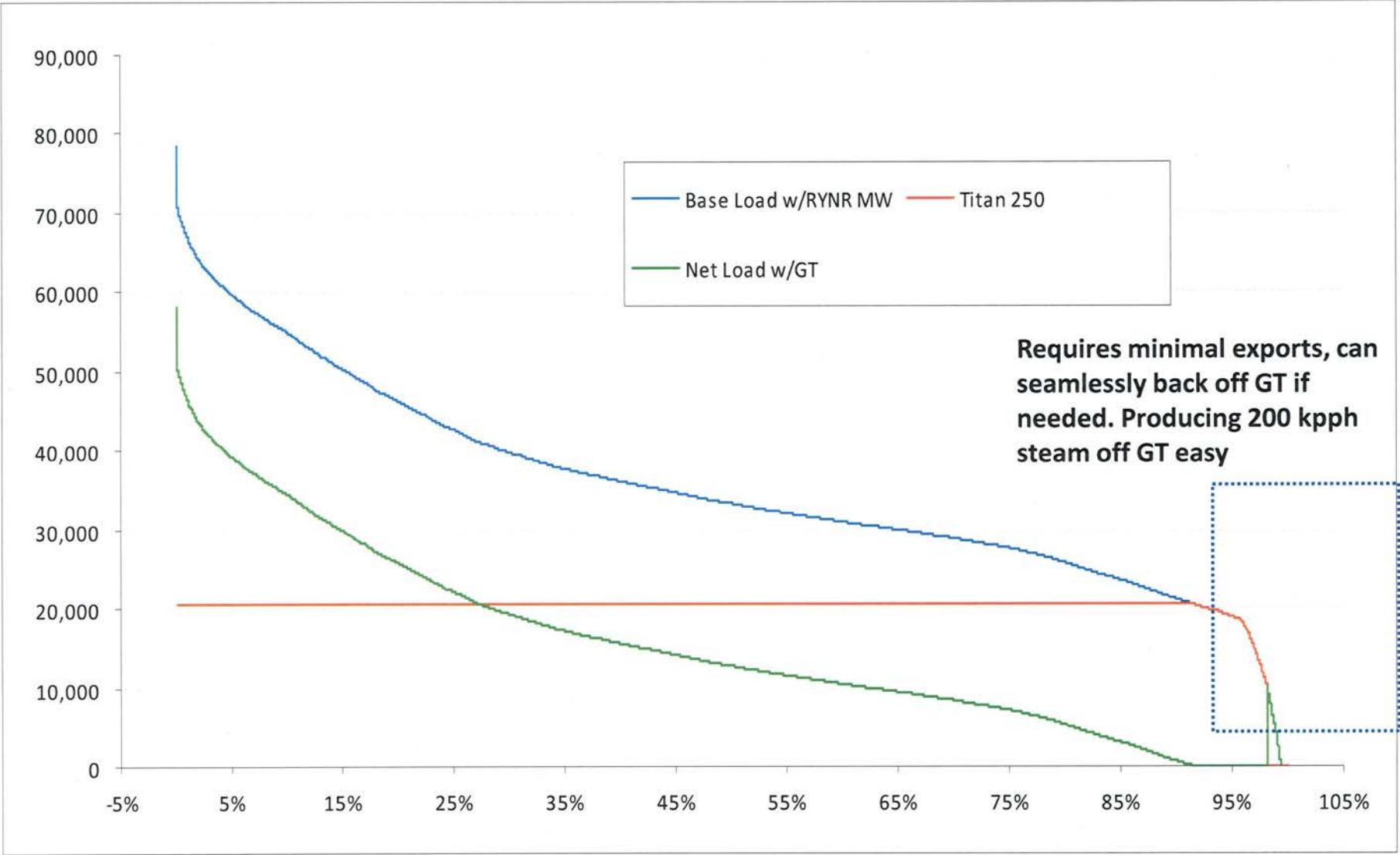


# GE LM2500 – 29 MW





# Solar Turbine Titan 250 – 22 MW



# Primary Suppliers



- Solar Turbines, Inc. – a Caterpillar subsidiary - San Diego, CA.
  - Titan 250 gas turbine. (14,500 total turbines installed; 2 billion operating hours; low emissions; thermal efficiency approaching 90%)
  - Service and Maintenance Agreement (includes turbine replacements).
- Rentech Boiler Systems, Inc. - Abilene, TX
  - HRSG. (Industry leader in HRSG's for gas turbines up to 40 MW)
- CR Myer – Oshkosh, WI
  - General Contractor. Heavy industry specialists (125 years in business)
- Sterling Energy Services, LLC. – Atlanta, Ga.
  - Project design, engineering, oversight. (Significant work in paper industry energy projects.)
- Golder and Associates – Tampa, Fl office.
  - Environmental permitting (global engineering firm)

# Project Benefits



- CHP provides approx 50% of Amelia Island electric requirements – approx. 25% of total FPU requirements.
- CHP electric price is significantly lower than current wholesale pricing; even lower than 2017 forecast price. (confidential specifics provided in original filing and data responses)
- Power savings help offset 2014 base rate increase.
- Improved overall island reliability and emergency power.
- Opportunity to increase green power purchases from RYN.
- Improves RYN mill reliability and efficiency.
- Allows RYN to expand production.
- Significant community, political and economic develop support.
- Improves air emissions – eliminates RYN oil and reduces coal power purchases from JEA.
- Increased local jobs and tax base.

# Project Timeline

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- October 2014 - Steam agreement executed with RYN.
- October 2014 – LOI with Solar. Final agreement subject to PPA approval.
- November 2014 – Land Lease to be executed with RYN.
- November 2014 – Geotech survey for platform.
- November 2014 – Gas transport agreement with TECO.
- December 2014 – PSC consideration of PPA agreements.
- January 2015 – all agreements executed; construction begins.
- December 2015 – Turbine and HRSG delivered to site.
- July 2016 – in-service.

Questions?

[www.chpk.com/eight-flags-energy/](http://www.chpk.com/eight-flags-energy/)

