



# Corpus North Shore Project

*ERCOT Regional Planning Group*  
*November 12<sup>th</sup>, 2019*

# STUDY REGION



- 1: Voestalpine (Hot Iron)
- 2: TPCO (Steel Manufacturing)
- 3: Cheniere CCL Stage 1&2 (LNG)
- 4: GCGV (Chemical Processing)
- 5: Cheniere Stage 3 (LNG)
- 6: SDI-Sinton (Steel Manufacturing)

Study Region Generation (Updated June, 2019)			
	Gas (MW)	Renewable (MW)	Total (MW)
Operational	838 <sup>1</sup>	538	1,376
PG 6.9 Compliant	0	402	402
<b>Total</b>	<b>838</b>	<b>940</b>	<b>1,778</b>

Study Region Load Recent Load Additions <sup>2</sup> (2012 - Present)	
	Forecast (MW)
Steel Manufacturing	730
Chemical Processing	200
LNG	698
<b>Total</b>	<b>1,628</b>

<sup>1</sup> Includes Seasonally Mothballed Gen (378 MW)

<sup>2</sup> Operational or Committed Load

# INTRODUCTION

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## □ Study Drivers:

- Executed Letter Agreements for New Industrial Load
  - Steel Mill (400 MW Load)
    - Operational 2<sup>nd</sup> Half of 2021
  - Additional LNG (528 MW Load)
    - Staged LNG Train Expansion: Years 2022 - 2024
  - Financial Commitment for Direct Interconnect Facilities
- Mothballed Generation
  - Seasonal Loss of Local Conventional Generation
  - 378 MWs (2 CTs + 1 ST)

# Study Cases & Assumptions

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## ❑ Study Case:

- SSWG 2024 Summer Peak (Posted February 2019)

## ❑ Pertinent Case Assumptions:

- Study Area Wind: 15% Dispatch
- Conventional Generation: ERCOT SCED Dispatch
- GPP Plant Offline
- Study Area Load Increases Offset by Increases in Panhandle & Oncor Interconnected Renewables

# Existing System: Committed Load

		Steel Mill (400 MW) + Stage 3 LNG (Trains 1&2, 3 - 7)					
Combined N-1, G1N1, and A1N1 Overloads:	Line Miles	148 MW (Trains 1 & 2)	221 MW (Train 3)	295 MW (Train 4)	380 MW (Train 5)	454 MW (Train 6)	528 MW (Train 7)
Nueces Bay to Whitepoint 138 kV	10.48	G1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Pelican to Whitepoint 138 kV	4.7	G1N1	G1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Dupont Victoria to Big Three 138 kV <sup>1</sup>	4.46	G1N1	G1N1	G1N1, A1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Whitepoint to Portland 138 kV Ckt #3	5.2		G1N1	G1N1	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Lon Hill to Pelican 138 kV	14.44		G1N1	G1N1	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Hecker to McCampbell 138 kV Ckt #1	2.51			G1N1	G1N1	G1N1	G1N1, A1N1, N-1
Hecker to Resnik 138 kV Ckt #2	2.81			G1N1	G1N1	G1N1	G1N1, A1N1, N-1
Portland to McCampbell 138 kV Ckt #3	6.11			G1N1	G1N1	G1N1	G1N1, A1N1, N-1
Gila to Mayo 138 kV	6.26				G1N1	G1N1	G1N1
McCampbell to Resnik 138 kV Ckt #3	1.03					G1N1	G1N1
Mayo to Whitepoint 138 kV	6.12					G1N1	G1N1
Whitepoint to Hecker 138 kV Ckt 1	5.72						G1N1
Whitepoint to Hecker 138 kV Ckt 2	5.72						G1N1
Lon Hill to Whitepoint 345 kV	20.5						G1N1
<b>Total Miles:</b>	<b>96.06</b>						



# Existing System: Committed + Margin Load

		SDI Steel Mill (400 MW) + Stage 3 LNG (Trains 1&2, 3 - 7)			Steel Mill + Stage 3 LNG + Margin Load (2 x 125 MW)	
Combined N-1, G1N1, and A1N1 Overloads:	Line Miles	0 - 148 MW	...	528 MW	653 MW	778 MW
Nueces Bay to Whitepoint 138 kV	10.48	G1N1, N-1		G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Pelican to Whitepoint 138 kV	4.7	G1N1		G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Dupont Victoria to Big Three 138 kV	4.46	G1N1		G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Whitepoint to Portland 138 kV Ckt #3	5.2			G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Lon Hill to Pelican 138 kV	14.44			G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Hecker to McCampbell 138 kV Ckt #1	2.51			G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Hecker to Resnik 138 kV Ckt #2	2.81			G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Portland to McCampbell 138 kV Ckt #3	6.11			G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Gila to Mayo 138 kV	6.26			G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
McCampbell to Resnik 138 kV Ckt #3	1.03			G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Mayo to Whitepoint 138 kV	6.12			G1N1	G1N1, N-1	G1N1, A1N1, N-1
Whitepoint to Hecker 138 kV Ckt 1	5.72			G1N1	G1N1	G1N1, A1N1, N-1
Whitepoint to Hecker 138 kV Ckt 2	5.72			G1N1	G1N1	G1N1, A1N1, N-1
Lon Hill to Whitepoint 345 kV	20.5			G1N1	G1N1	G1N1
Rincon - Dupont Ingleside 138 kV Ckt #1	10.69				G1N1	G1N1
Whitepoint Series Reactors (Nueces Bay Line)	0				G1N1	G1N1, N-1
Dupont Ingleside to Resnik 138 kV Ckt #2	0.72				A1N1, N-1	A1N1, N-1, G1N1
Rincon - Dupont Ingleside 138 kV Ckt #2	10.56					G1N1
Whitepoint to Rincon 138 kV	7.7					G1N1
Dupont Ingleside to McCampbell 138 kV Ckt #1	1.82					G1N1
Whitepoint Series Reactors (Gila Line)	0					G1N1
Rincon 138 kV Bus Tie (Breaker)	0					G1N1
Lon Hill to Water Works Tap 69 kV	1.76					G1N1
Water Works Tap to Calallen Water Works 69 kV	1.31					G1N1
Calallen Water Works to Odem 69 kV	5.77					G1N1
Dupont Ingleside to Resnik 138 kV Ckt #3	0.74					A1N1, N-1
Whitepoint 345/138 kV Auto #2	0					A1N1
<b>Total Cumulative Miles:</b>	<b>137.13</b>					

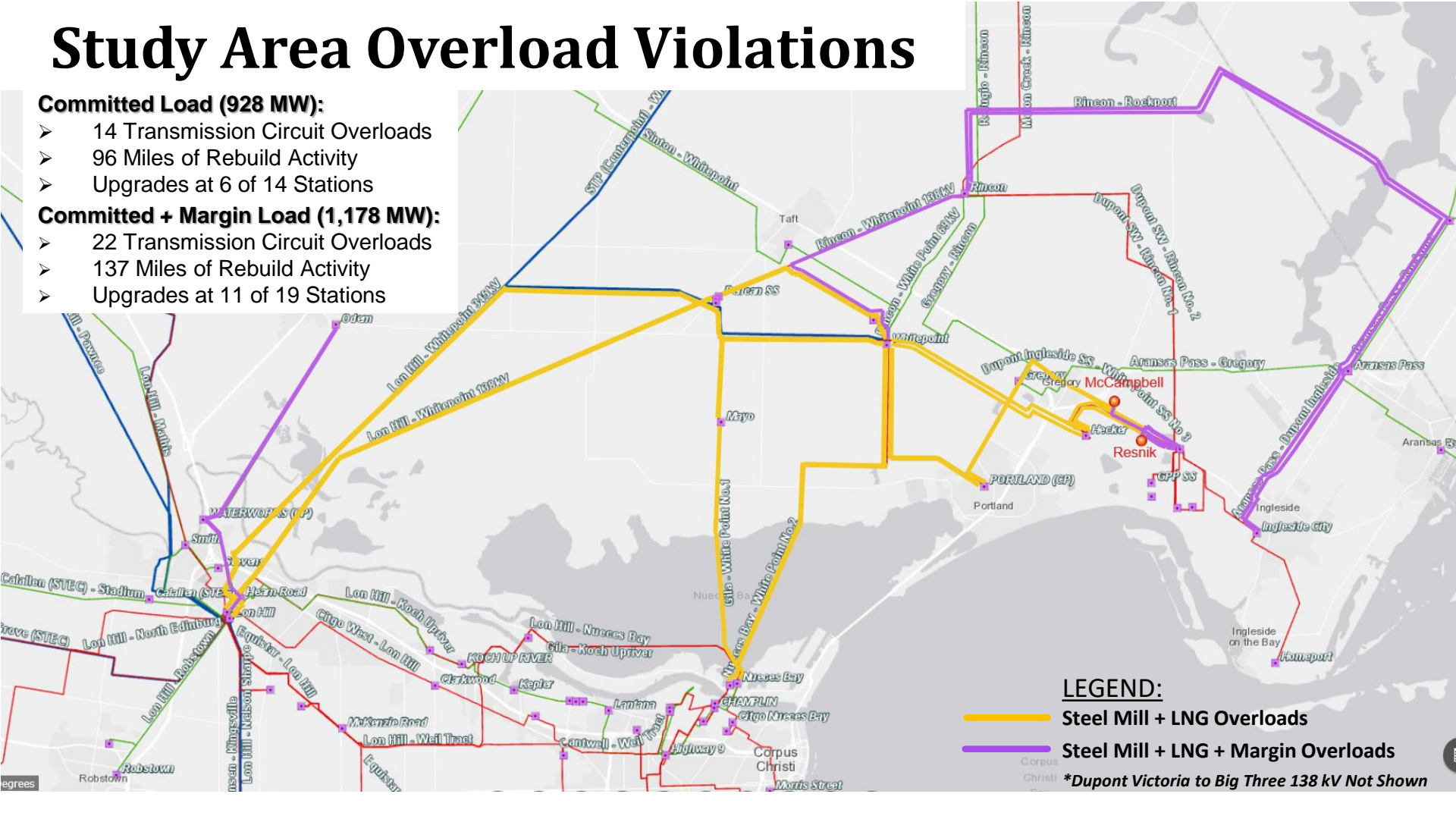
# Study Area Overload Violations

## Committed Load (928 MW):

- 14 Transmission Circuit Overloads
- 96 Miles of Rebuild Activity
- Upgrades at 6 of 14 Stations

## Committed + Margin Load (1,178 MW):

- 22 Transmission Circuit Overloads
- 137 Miles of Rebuild Activity
- Upgrades at 11 of 19 Stations



### LEGEND:

- Steel Mill + LNG Overloads
- Steel Mill + LNG + Margin Overloads

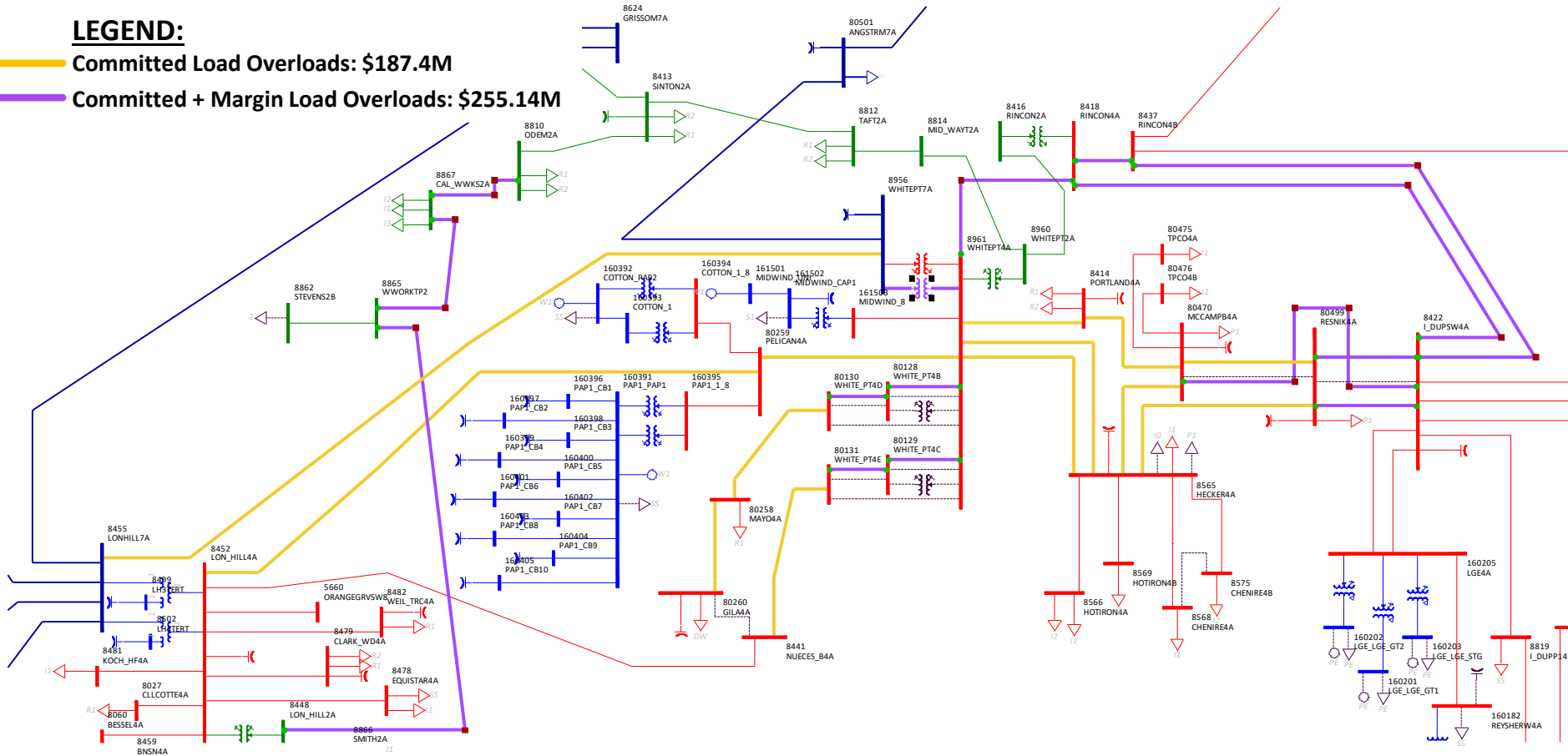
\*Dupont Victoria to Big Three 138 kV Not Shown

# Upgrade Option 1: Rebuild Overloaded Facilities

## LEGEND:

**Committed Load Overloads: \$187.4M**

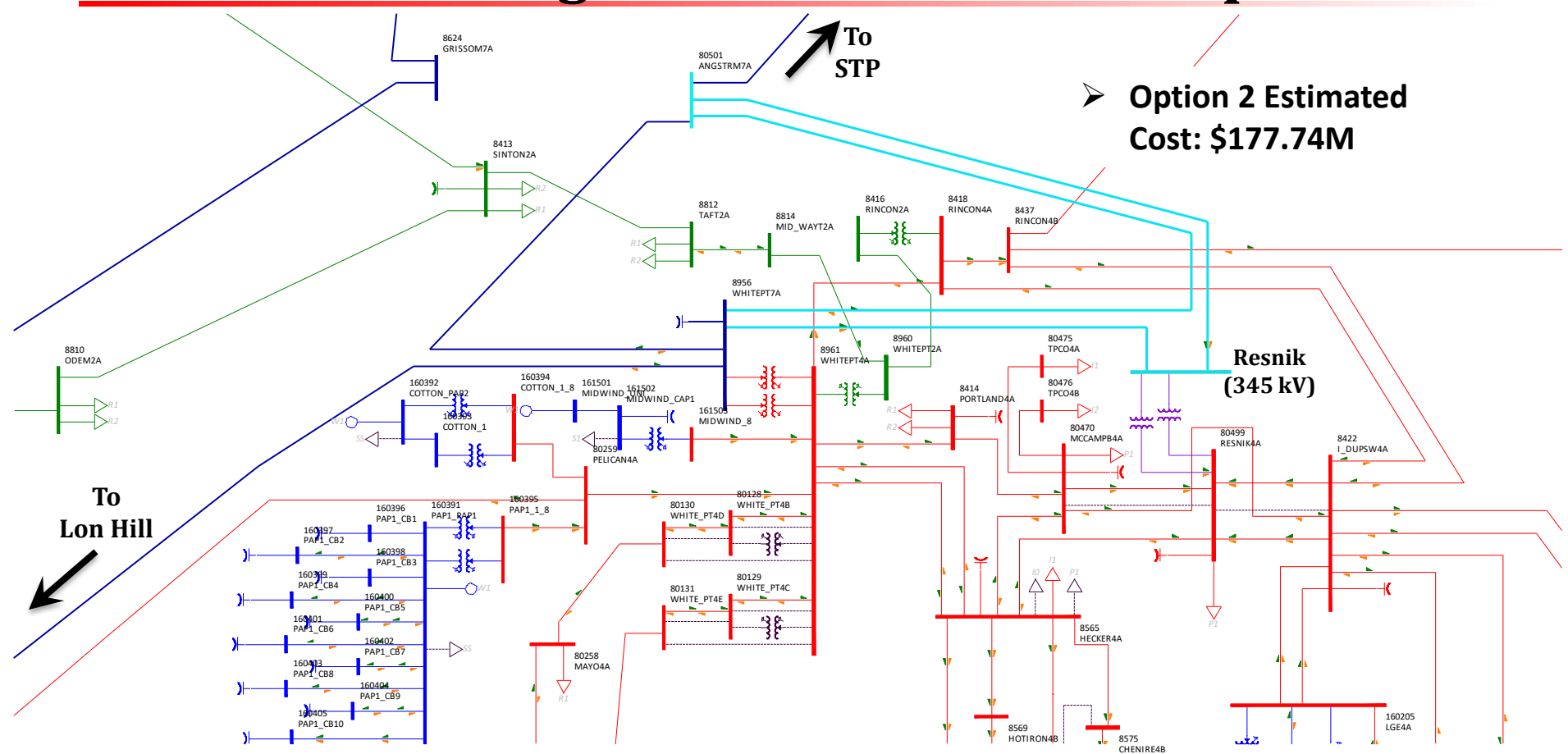
**Committed + Margin Load Overloads: \$255.14M**





# Upgrade Option 2: Angstrom - Resnik - Whitepoint

➤ **Option 2 Estimated  
Cost: \$177.74M**





# Option 2 and 3 Results

Option 2 Results		SDI Steel Mill (400 MW) + Stage 3 LNG (Trains 1&2, 3 - 7)						Steel Mill + Stage 3 LNG + Margin Load (2 x 125 MW)	
Combined N-1, G1N1, and A1N1 Overloads:	Line Miles	0 - 148 MW	221 MW	295 MW	380 MW	454 MW	528 MW	653 MW	778 MW
Nueces Bay to Whitepoint 138 kV	10.48	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Pelican to Whitepoint 138 kV	4.7	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Lon Hill to Pelican 138 kV	14.44	G1N1	G1N1	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Lon Hill to Whitepoint 345 kV	20.5			G1N1	G1N1	G1N1	G1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Dupont Victoria to Big Three 138 kV <sup>1</sup>	4.46				G1N1	G1N1, A1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Gila to Mayo 138 kV	6.26				G1N1	G1N1	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
Mayo to Whitepoint 138 kV	6.12					G1N1	G1N1	G1N1, A1N1, N-1	G1N1, A1N1, N-1
<b>Total Miles:</b>	<b>66.96</b>								
Nueces Bay to Whitepoint Series Reactors	0							G1N1	G1N1
Gila to Whitepoint Series Reactors	0								G1N1
<b>Total Cumulative Miles:</b>	<b>66.96</b>								

Option 3 Results		SDI Steel Mill (400 MW) + Stage 3 LNG (Trains 1&2, 3 - 7)						Steel Mill + Stage 3 LNG + Margin Load (2 x 125 MW)	
Combined N-1, G1N1, and A1N1 Overloads:	Line Miles	0 - 148 MW	221 MW	295 MW	380 MW	454 MW	528 MW	653 MW	778 MW
Dupont Victoria to Big Three 138 kV <sup>1</sup>	4.46						G1N1	G1N1, A1N1	G1N1, A1N1, N-1
<b>Total Miles:</b>	<b>4.46</b>								
Lon Hill to Whitepoint 345 kV	20.5								G1N1
<b>Total Cumulative Miles:</b>	<b>24.96</b>								

<sup>1</sup> Dupont Victoria – Big Three overloading persists despite the addition of the upgrades considered. The line loading is minimally correlated to increasing study area load. AEPSC intends to address this line outside of the Corpus North Shore RPG. To maintain consistency, estimated cost of the line upgrade has been extracted from all upgrade cost comparisons.

# Key Results

## ❑ Upgrade Option 1:

- Estimated Cost: \$187.40M [Committed Load]
- Estimated Cost: \$255.14M [Committed + Margin Load]
- Presents Rehab Opportunities
- Also Presents Significant Outage/Coordination Challenges
- Live-Line Reconductor or Rebuilds Increases Costs

## ❑ Upgrade Option 2:

- Estimated Cost: \$177.74M
- Fails to Address Overloading on Study Area Interface Lines
- Incremental Rebuild Cost: \$149.43M
- Total Option 2 Cost: \$327.17M

## ❑ Upgrade Option 3:

- Estimated Cost: \$255.82M
- Highest Initial Cost; Most Effective at Resolving Loading Violations
- Need for Lengthy Outages is Minimized
- Presents Timing Challenges (RPG/EIR, CCN, ROW Acquisition, EPC)
- Total Cost On-Par with Option 1 [Committed + Margin Load]

# AEPSC Recommendation

## ➤ Upgrade Option 3

- Two 345 kV terminals at the planned Grissom station.
- Four 345 kV terminals at the Angstrom station.
- Two 345 kV terminals at the Whitepoint station.
- A new “Resnik” 345 kV station to be located near the planned Resnik 138 kV with two 345/138 kV autotransformers connecting the Resnik 345 kV and 138 kV stations.
- New 345 kV double-circuit line from Grissom to Angstrom (~17 miles).
- New 345 kV double-circuit line from Angstrom to Resnik (~19 miles).
- New 345 kV double-circuit line from Resnik to Whitepoint (~9 miles).
- <2 Miles of Reconductor Work (GPP Online Sensitivity): \$3.75M
- Total Estimated Cost: \$259.57M

## ➤ AEPSC is Requesting Critical Status

- Estimated Need Date: Year 2022 - 2024



# Questions?

