



NM Subgroup

NM Collector/HPX Integration Analysis

Some Preliminary Findings

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PNM Transmission Planning and Contracts



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August 19-20, 2008
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- HPX/Collector Integration Analysis (Some preliminary results)
- RTTF Work Overlap
- PNM Work on 10-Year Plan complete– some areas identified for coordination with EPE or Tri-State



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Purpose

- Assess ability of integrating HPX with probable initial expansion at 345 kV



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HPX Review

- Two 500 kV
- 3000-4000 MW
- Feasibility Study Completed 6/08
- Analysis based on HPX Study Configuration
 - Likely a different location than Ft Craig



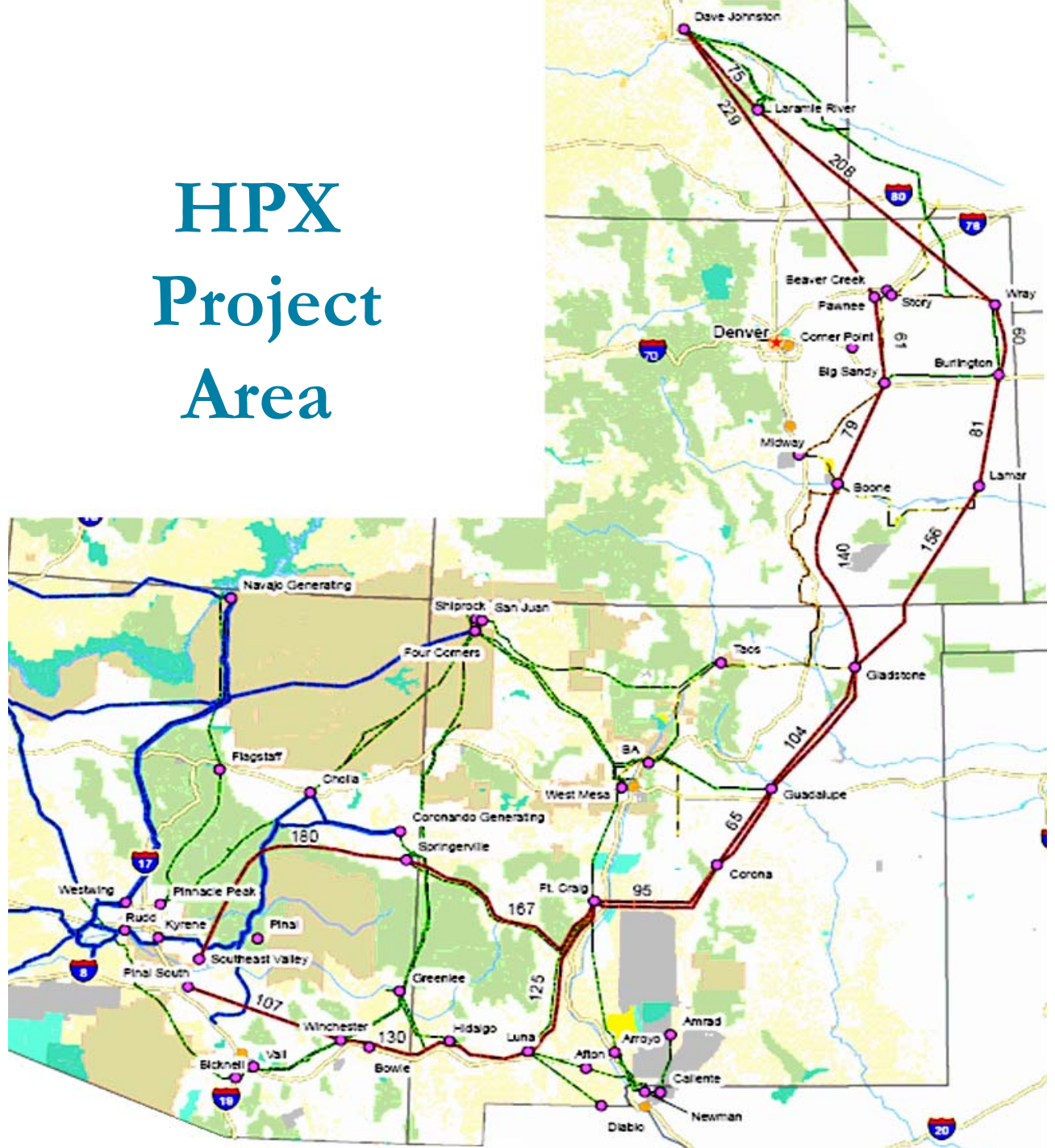
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HPX Project Area

From HPX
Transmission
Project
Feasibility
Study Report
June, 2008



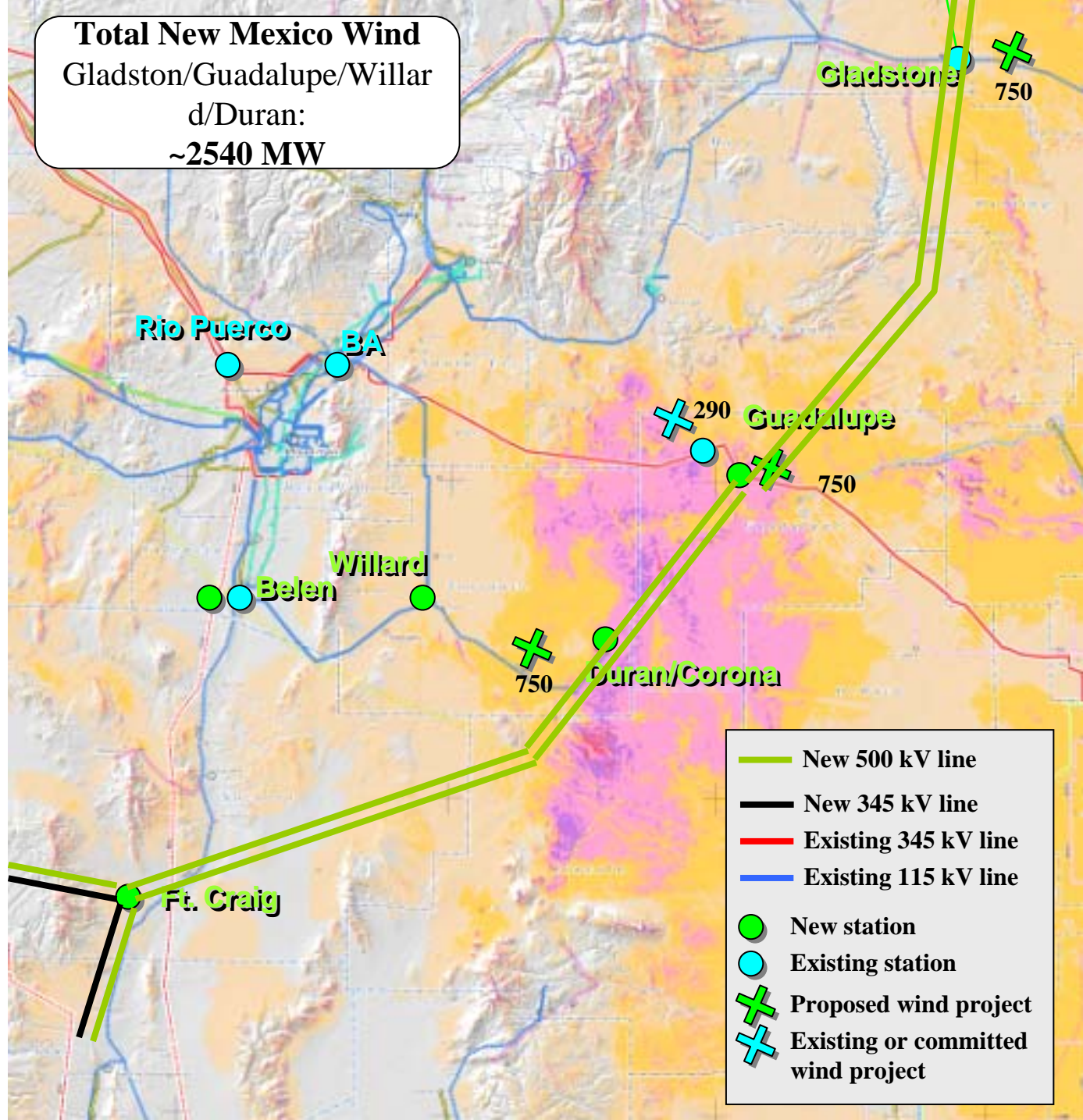
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HPX in Collector Area

Total New Mexico Wind
 Gladston/Guadalupe/Willard/Duran:
 ~2540 MW



- New 500 kV line
- New 345 kV line
- Existing 345 kV line
- Existing 115 kV line
- New station
- Existing station
- + Proposed wind project
- + Existing or committed wind project



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HPX Injections

- 1000 MW WY
- 3400 MW CO with 2500 MW drop-off to CO
- 2150 MW NM with 1000 MW drop-off to NM
- 1900 MW Scheduled Flow into NM
- 3050 MW Scheduled Flow to AZ



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HPX Case for Analysis

- **Highest NM Pick-up Scenario in HPX Study**
 - **Flows into and out of NM**
 - **In from CO: 2267 MW**
 - **On to AZ: 2449 on 500 kV**
 - **Case limitations**
 - **Generally overloads on HPX for HPX outage**
 - **Some 115 kV Overloads in NM**



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NM Collector System

- 2051 MW accommodated (queue emphasis).
- System beyond or NM not modified to accept injections.
- Baseload resources not fully accommodated.
- Westerly tie near Belen rather than Ft Craig.
- Other studies likely to include routing variations (Sunzia).



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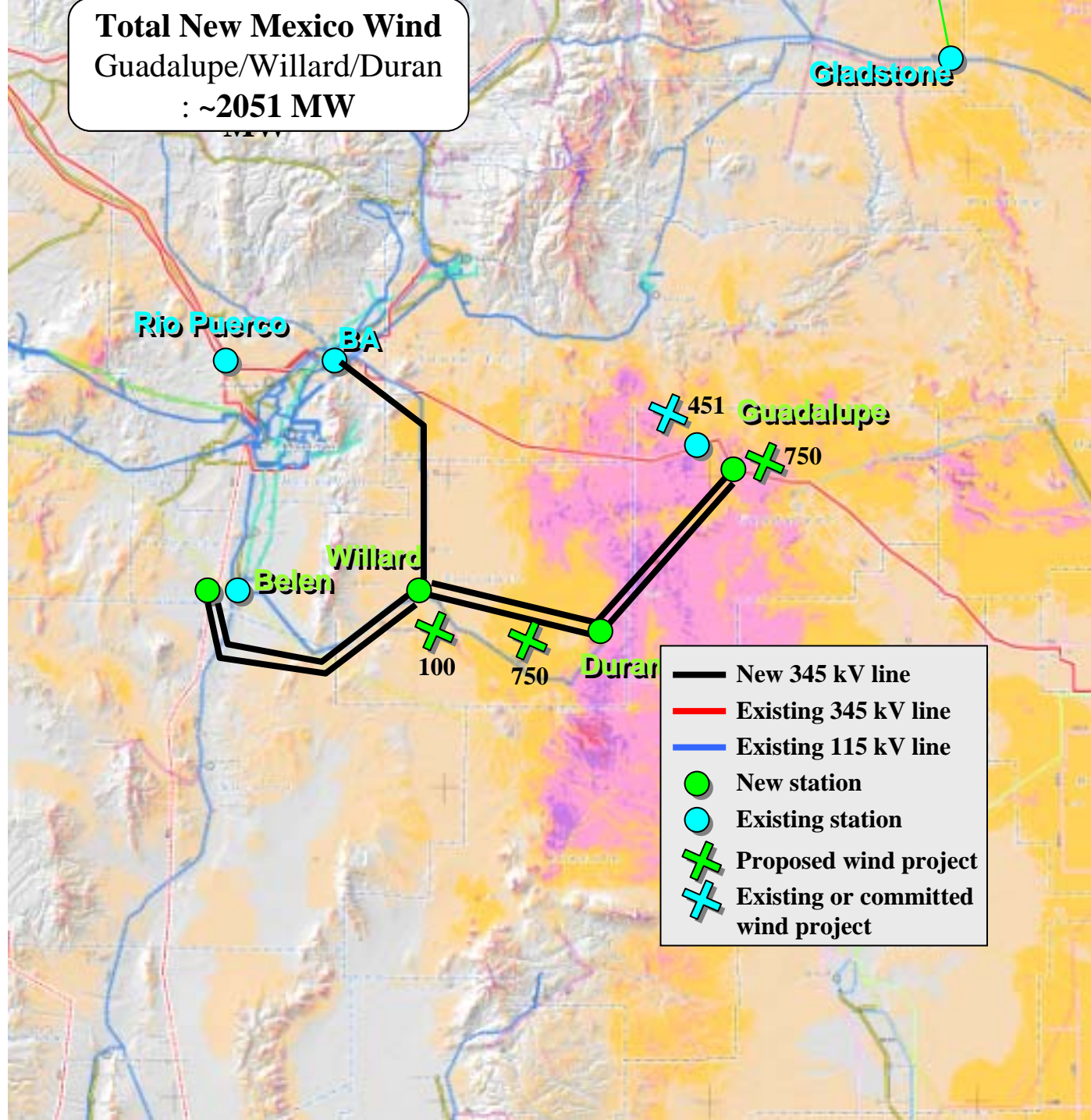
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NM Collector Map Pre HPX



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Total New Mexico Wind
Guadalupe/Willard/Duran
: ~2051 MW





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NM Collector Powerflow

- About $\frac{1}{2}$ Guadalupe-BA and $\frac{1}{2}$ Willard – Belen.
- Belen flow approximately $\frac{1}{3}$ north and $\frac{2}{3}$ south.
- More flow north out of New Mexico with collector system.
- Likely need additional line south to accommodate current baseload imports.



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Integration Alternatives

- **Replace one Guadalupe-Fort Craig 500 kV.**
 - **Collector System Alternative 1:**
 - Two Guadalupe-Fort Craig 345 kV lines with 35 – 50 % compensation
 - Willard-BA 345 kV line
 - Belen-Fort Craig 345 kV & Belen Rio Puerco
 - **Collector System Alternative 2:**
 - Alt 1 with BA-Guadalupe 345 kV in place of Willard-BA 345 kV
 - Maybe w/o Guadalupe-Fort Craig 500 kV series compensation

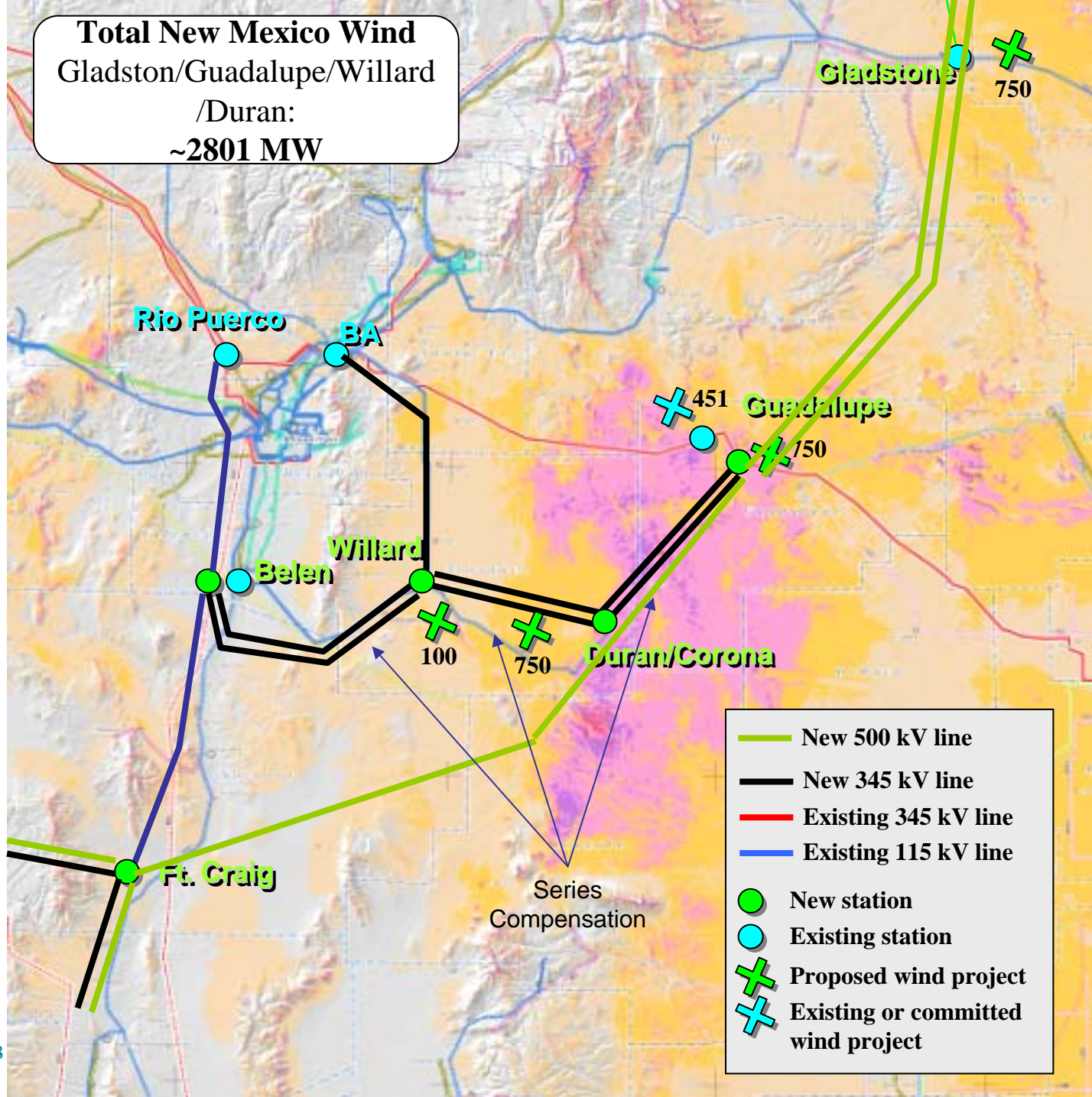




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Total New Mexico Wind
Gladston/Guadalupe/Willard
/Duran:
~2801 MW

Alternative 1



- New 500 kV line
- New 345 kV line
- Existing 345 kV line
- Existing 115 kV line
- New station
- Existing station
- Proposed wind project
- Existing or committed wind project



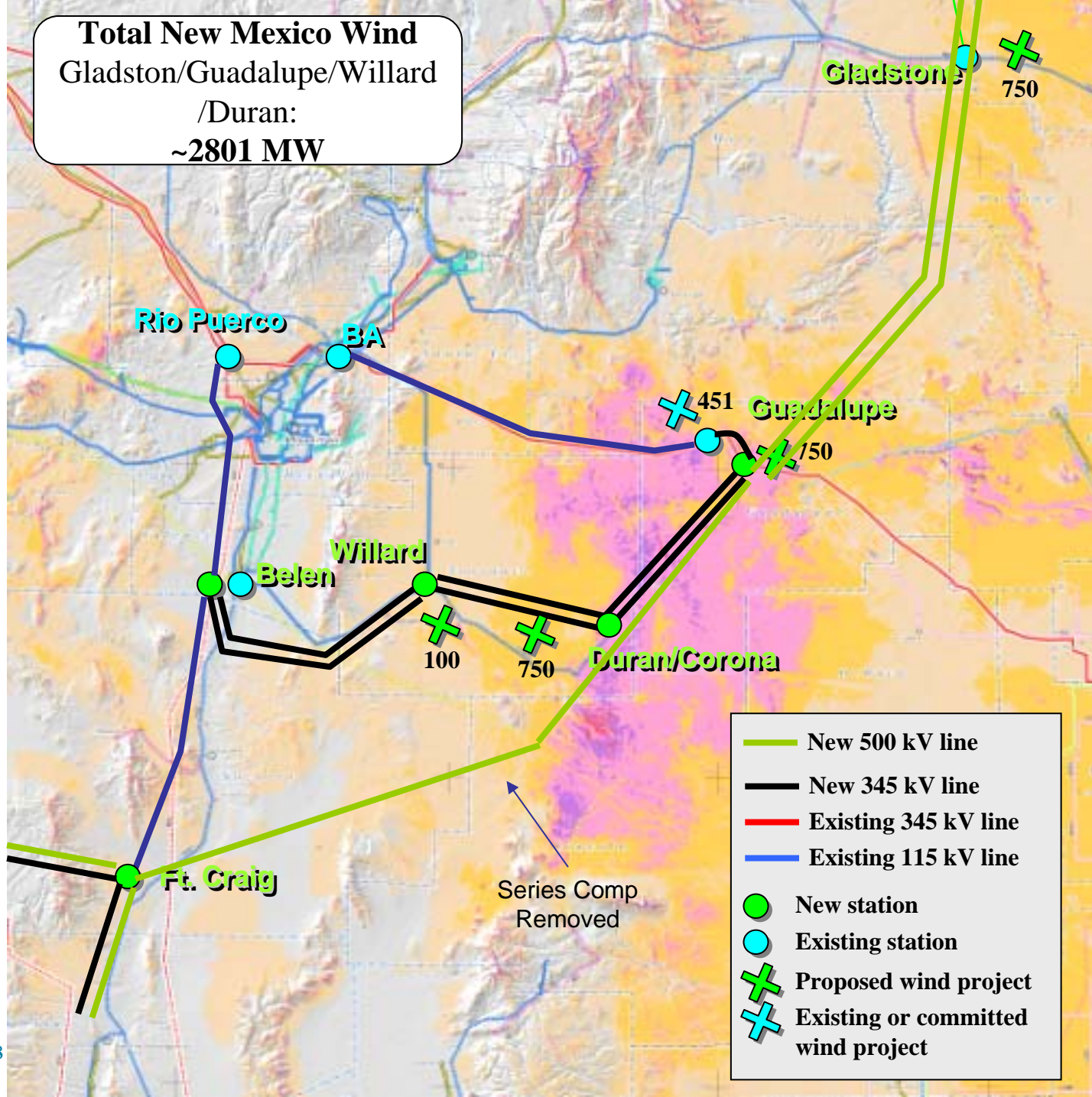
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Total New Mexico Wind
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 /Duran:
 ~2801 MW

Alternative 2



	New 500 kV line
	New 345 kV line
	Existing 345 kV line
	Existing 115 kV line
	New station
	Existing station
	Proposed wind project
	Existing or committed wind project



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Alternative 1 Powerflow

- **Flows into and out of NM**
 - In from CO: 2205 MW
 - On to AZ: 2087 on 500 kV
- **Case limitations**
 - Generally outage of HPX (Gaudalupe-Fort Craig)
 - Some 115 kV Overloads in NM

Alternative 2 Powerflow

- **Flows into and out of NM**
 - In from CO: 2211 MW
 - On to AZ: 2074 on 500 kV
- **Case limitations**
 - Generally outage of HPX (Gaudalupe-Fort Craig)
 - Some 115 kV Overloads in NM

Performance Comparison

- **Critical Contingency: Guadalupe – Ft Craig 500 kV.**
- **Need for 2nd Guadalupe 500 kV XFMR but Corona 500 kV is eliminated.**
- **Some 115 kV lines experience higher contingency overloads – especially Gladstone-Springer.**



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Findings

- **Generally supportive of integration concept.**
- **Not without some tradeoffs.**
 - **More collector lines needed to accommodate 500 kV outages. Higher underlying system contingency flows.**



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Cost Comparison

- **HPX Reduction – 160 Miles of 500 kV Line, Series Comp, Switching Station: \$314M**
- **Collector: 169 Miles of Double Ckt, 70 Miles of Single Ckt, 4 Stations: \$375M**
- **Additions for flow-through: \$177**
- **Total Collector: \$552**
- **Would expect lower integration costs for developers depending on location.**
- **Somewhat of an apples to oranges comparison at this point.**



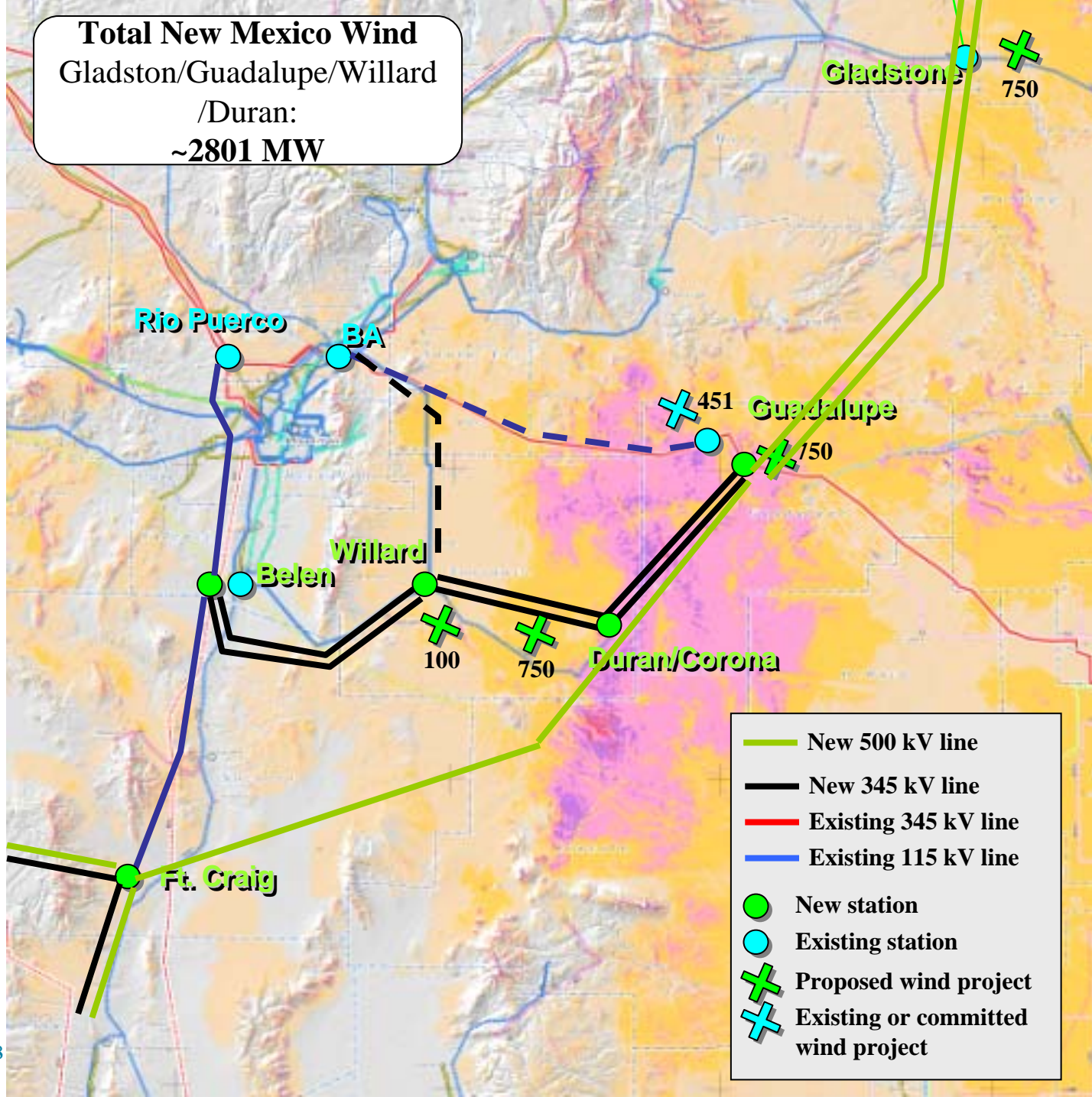
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Total New Mexico Wind
 Gladston/Guadalupe/Willard
 /Duran:
 ~2801 MW

Additions



- New 500 kV line
- New 345 kV line
- Existing 345 kV line
- Existing 115 kV line
- New station
- Existing station
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- + Existing or committed wind project



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Potential 345 kV Advantages

- Staging will likely result in lower initial cost.
- Shorter lead times for developers.
- Lower developer costs
- Better integration with existing system.
- Can allow for later parallel of 500 kV if sized properly without sacrificing HPX capacity goals.

500 kV Operated At 345 kV

- Collector system built as 500 kV but operated at 345 kV.
- Pros and Cons: For later discussion.



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Questions/Suggestions



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