

Large Generation Interconnection Study

Sponsor: Avista Corporation
Mentor: Richard Maguire

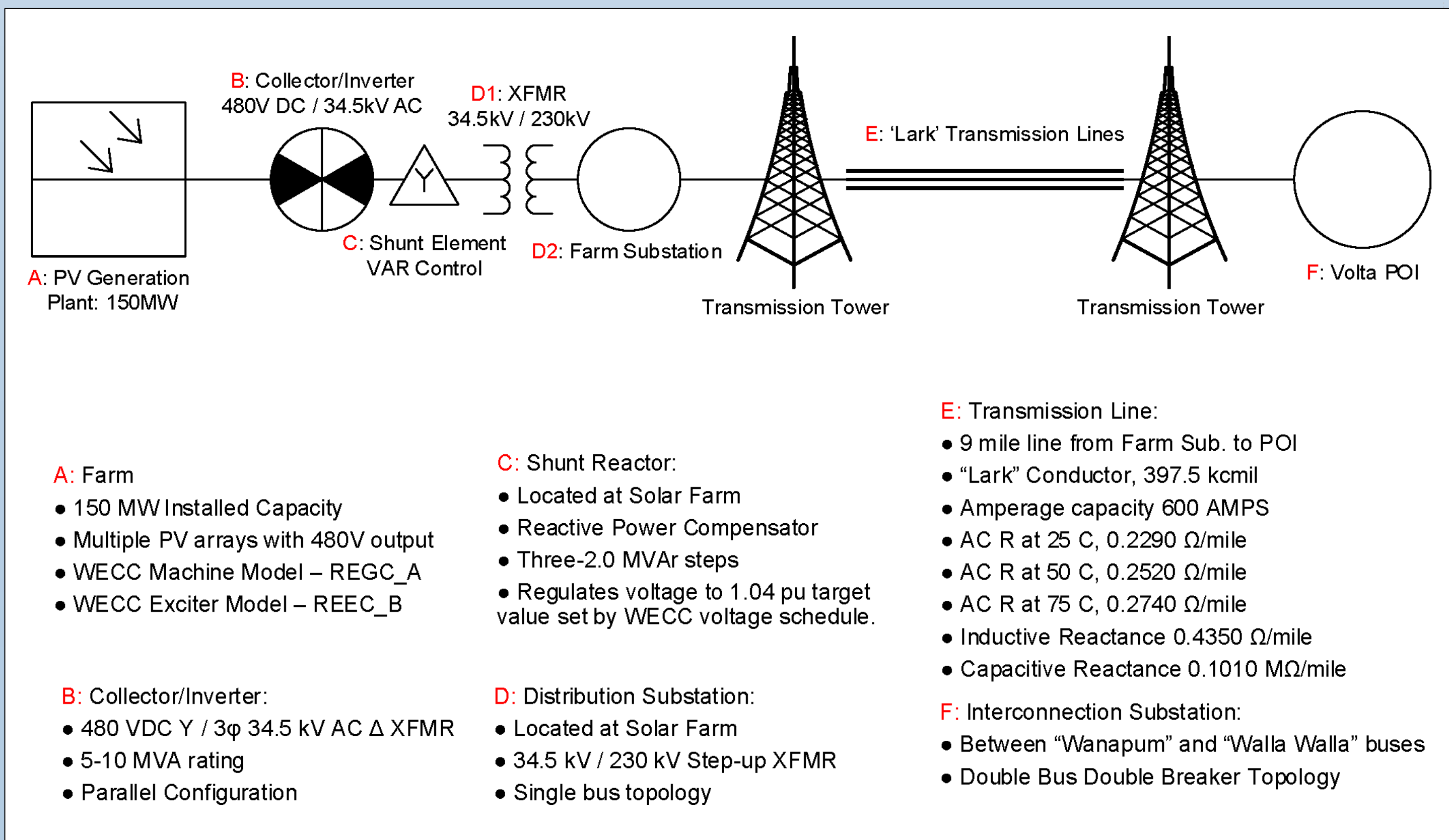


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Purpose

Use our knowledge of power systems, industry standards, organizations, and regulations to perform an Interconnection System Impact Study for the Palouse Sun project. The study involves a 150 MW Solar Farm approximately 30 miles east of Mesa, WA. Avista is required by FERC to perform system impact studies in response to transmission service requests. Our study used the software *PowerWorld Simulator* to analyze power system behavior with the proposed solar farm.

Design Summary



Methodology

One-Line – A one-line diagram is developed to represent the 3-phase system in its simplest terms. This is especially helpful for modeling a large system.

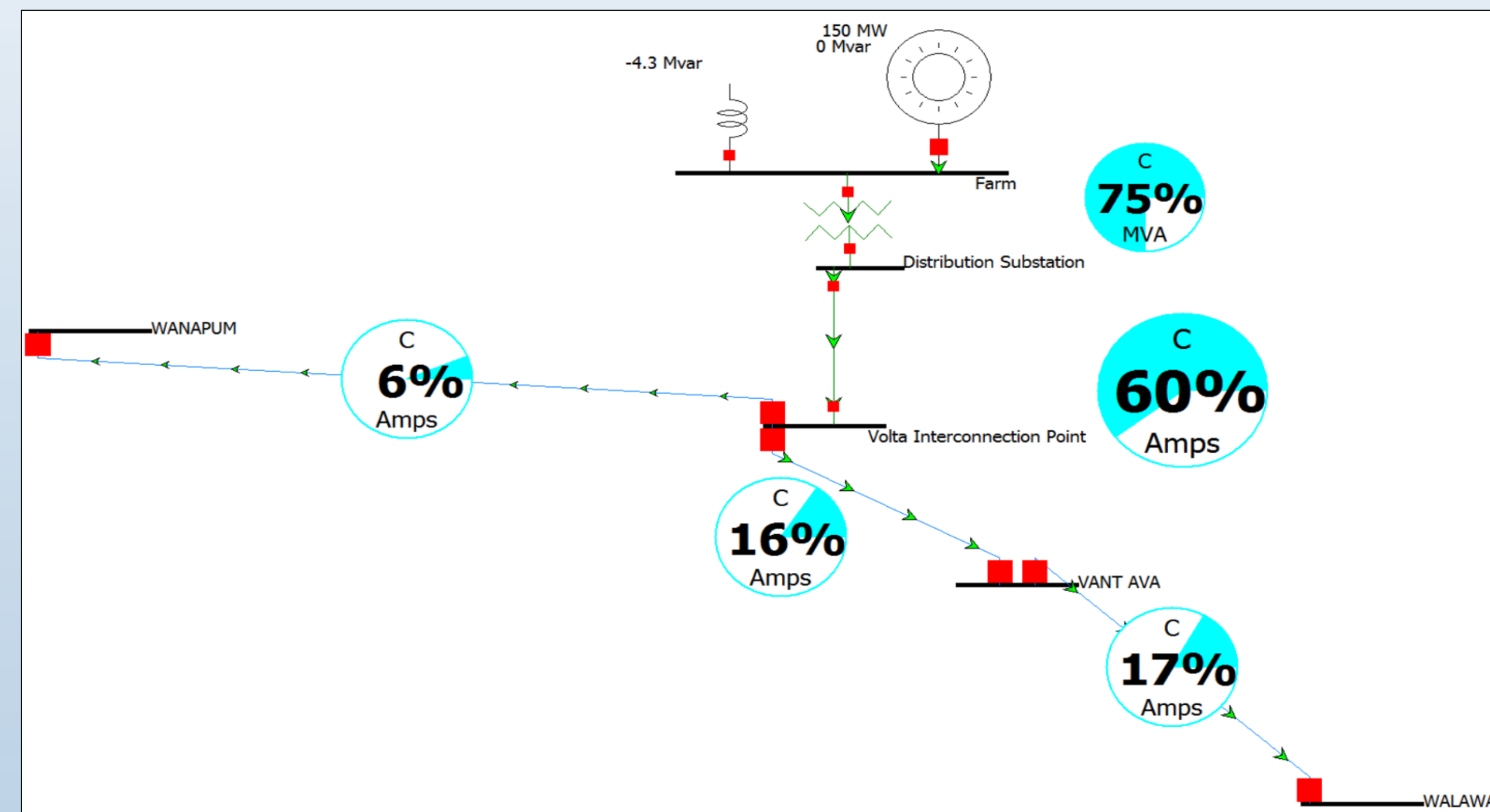
Interconnection Design – The point of interconnection is determined. The physical location as well as where the buses are referenced in PowerWorld.

System Contingency Analysis – Pre-existing contingencies are defined for the power system. Old contingencies must be removed and new ones added for changes to a line.

Transient Stability – This analysis is performed to determine how fast the system reaches steady-state after a fault occurs.

Cost Analysis – A detailed cost analysis is crucial to determining the expected building costs, and generation profit for both generator owner and the utility.

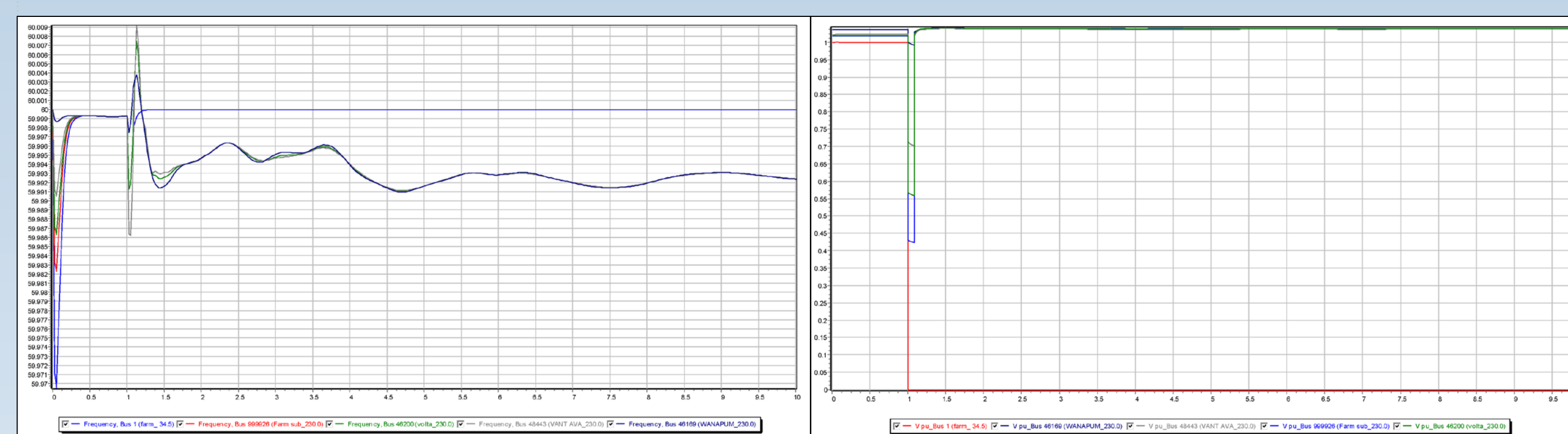
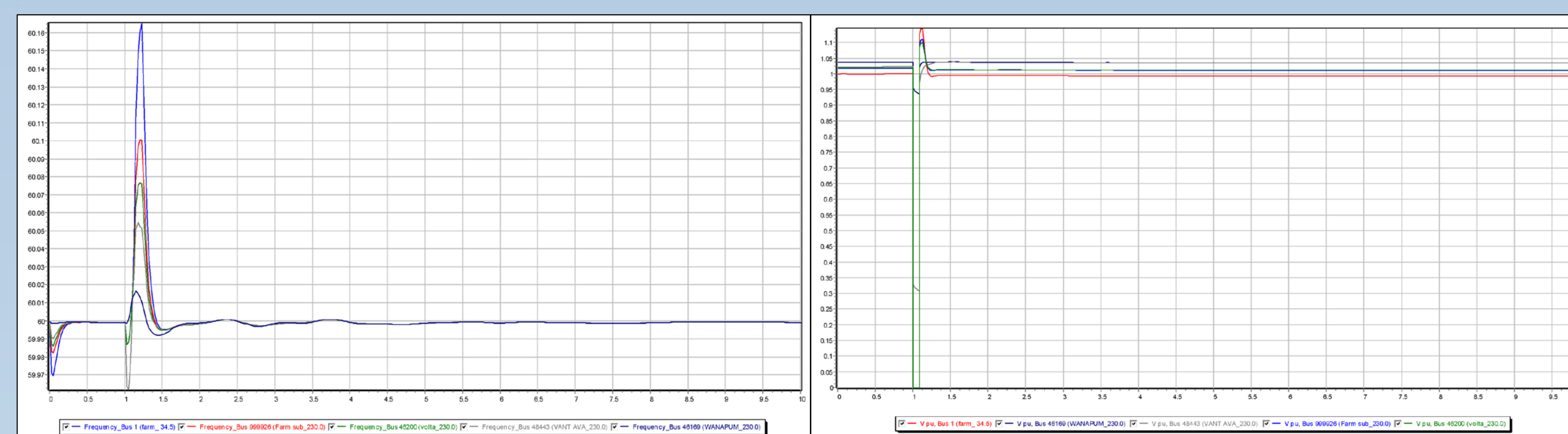
Simulation Model



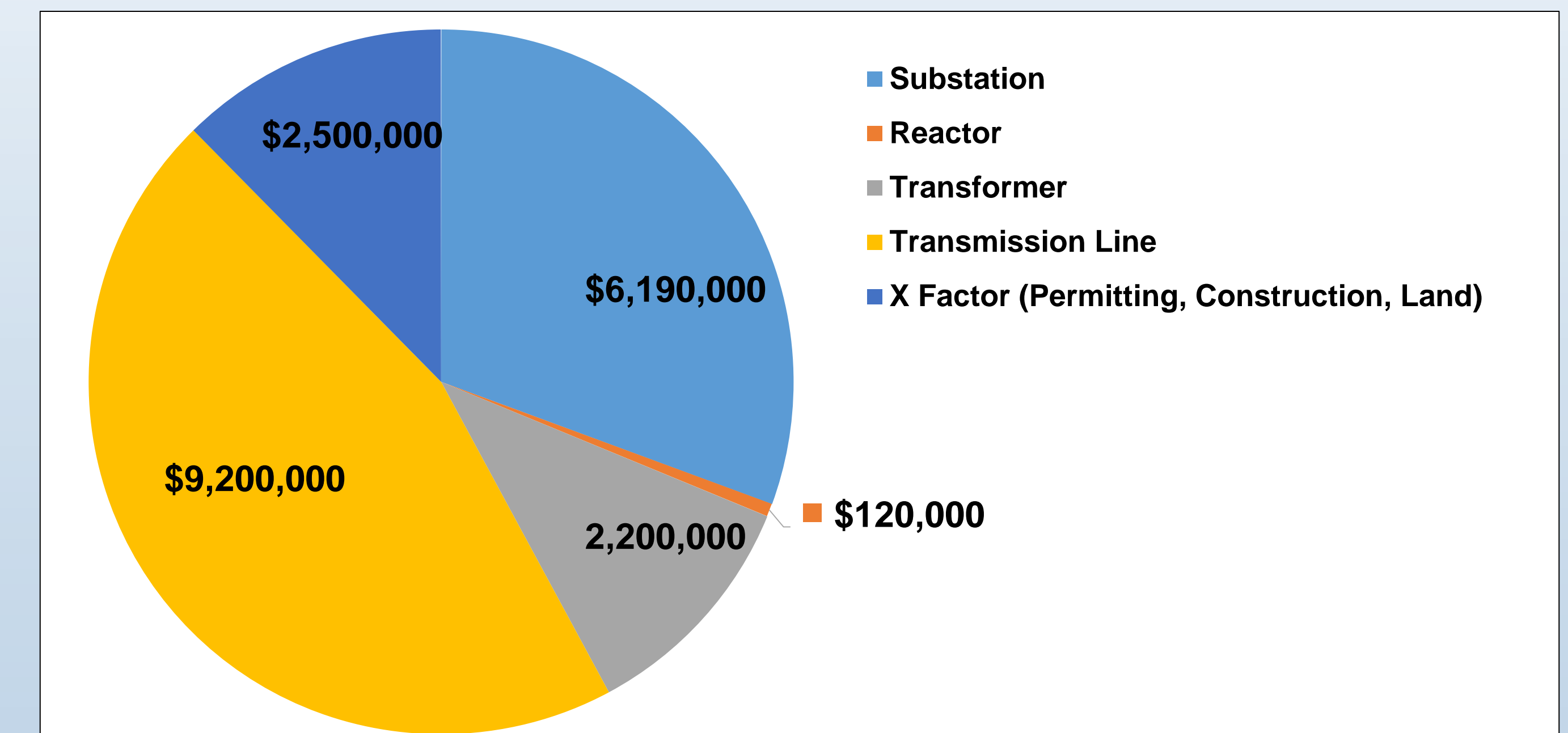
Contingency Analysis

Winter - Original		Winter - Fixed	
Contingencies:	913	Contingencies:	920
Unsolveable:	1	Unsolveable:	1
Violations:	61	Violations:	68
Summer - Original		Summer - Fixed	
Contingencies:	913	Contingencies:	920
Unsolveable:	1	Unsolveable:	1
Violations:	250	Violations:	240

Transient Stability Analysis



Financial Analysis



Results

Team Volta performed the interconnection system impact study in accordance with the methodology shown. This included the creation of an interconnection design and one-line diagram modelled in PowerWorld Simulator. Using the software, a system contingency and transient stability analysis was performed. The analyses were held up to NERC and WECC transmission planning standards. A cost estimation was performed based on the team's interconnection design.

Considerations

- Facilities Study
- Analysis of system upgrades to fix contingency violations
- Regulatory filings
- Large generation interconnection agreement

Key

AVA – Avista Corporation
NERC – North American Electric Reliability Corporation
FERC – Federal Energy Regulatory Commission
WECC – Western Electricity Coordinating Council
POI – Point of Interconnection

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Team Volta