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Strategic Transmission Investment using Modular Static Synchronous Series Compensators

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Topics

- Transmission Investment Strategies and Risks
 - Project Deferral
 - Outage Coordination
- Modular Static Synchronous Series Compensator (M-SSSC) for Risk Mitigation
- Project Deferral Use Case
- Outage Management Studies
- Q&A

Transmission Investment Strategies and Risks

Grid challenges are driving transmission owners to take a more strategic approach to managing their infrastructure investment portfolio.

Project Deferrals

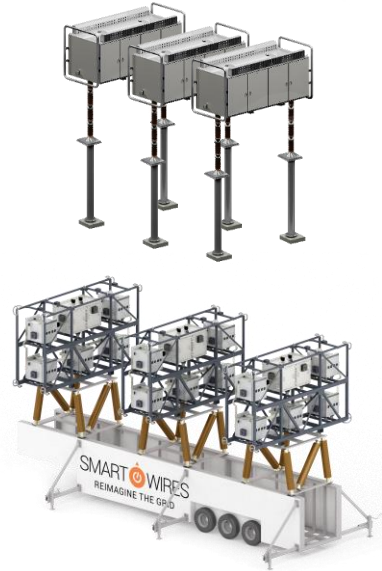
- Increasing transmission investment and limitations in available resources challenge project timelines
- Projects deemed not critical or strategic are often deferred
- Project deferrals can create reliability and congestion risk to the grid

Outage Coordination

- Growing load, increased investment, and greater grid uncertainty complicate outages
- Even high-priority projects can get delayed, adding new risk to the grid and postponing project revenues

Modular Static Synchronous Series Compensator (M-SSSC) for Risk Mitigation

- M-SSSC injects a leading/lagging voltage to decrease/increase the effective reactance of the line
- Modular design facilitates rapid and cost-effective deployment or re-deployment with significantly less customized design work
- Available to install on three-phase mobile trailer (mobile M-SSSC) for addressing operational challenges



Project Deferrals

For deferrals creating thermal overload risk, M-SSSC can alleviate the overload until the project is completed

Outage Coordination

For outages creating reliability risks or creating congestion, mobile M-SSSC can alleviate the temporary constraint during the outage

Project Deferral Use Case

- Oviedo – Winter Springs 69 kV line projected to have a minor N-1 reliability violation
- The line reconductor was a deferral candidate, allowing DEF to strategically engage resources on other projects
- DEF now plans to install M-SSSC devices on the Oviedo – Winter Springs 69 kV line
- These M-SSSC devices will inject an inductive voltage to redirect power onto lines with available capacity
- M-SSSC solution is better suited to mitigate project deferral risks than alternative power flow control (series reactors, PSTs, SSSCs) due to:
 - Lower cost
 - Deployment footprint within the existing station fence, eliminating need for new permits or significant site preparation
 - Ability to quickly and cost effectively redeploy elsewhere on the system when the Oviedo – Winter Spring reconductor is completed

DEF is evaluating how M-SSSC solutions can be applied to similar project deferrals to mitigate risk

Outage Management Studies

DEF has begun studying the use of mobile M-SSSC to support outage management

Use Case #1

- Outage of 230/69 kV transformer results in loss of main source for 69 kV load pocket
- Additional lines serving the area will overload during this outage
- Mobile M-SSSC solution provides capacitive injection to resolve the overloads

Use Case #2

- Maintenance outage of 230 kV line results in loss of source to a load pocket
- During the outage, the N-1 loss of a second 230 kV line in the area results in overloads on neighboring 69 kV lines
- Mobile M-SSSC solution provides inductive injection to resolve the overloads

DEF is studying other maintenance and capital projects to evaluate mobile M-SSSC use to ensure timely project completion and risk reduction

Q&A



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