

# Paris Session 2022



## M-SSSC & Complementary Technologies for Power Systems Requirements

C2 Power System Operation and Control

PS2 – Operational Planning Strategies, Methodologies and Supporting Tools

*Q2.3 While the control systems of power electronic interfaced resources can be highly flexible they may not be able to be adjusted to meet all of the power system technical performance requirements. In what circumstances are supporting technologies, such as battery energy storage systems or synchronous condensers, needed to complement the capabilities of the power electronic interfaced resources? How are control interactions between these technologies being managed to improve power system technical performance?*

Group Discussion Meeting

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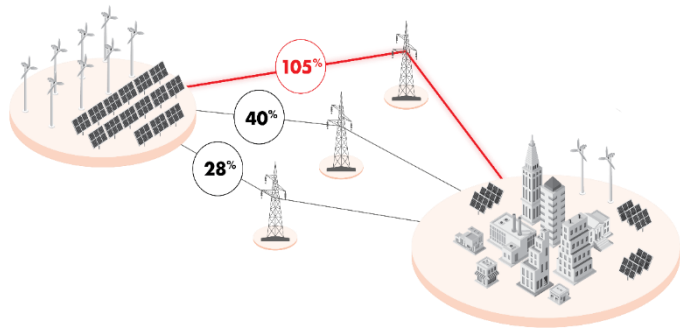
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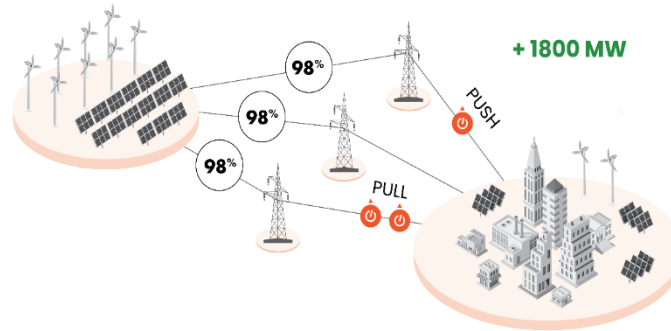
Mario Patino, Colombia

# M-SSSC & Complementary Technologies

Grid Restrictions

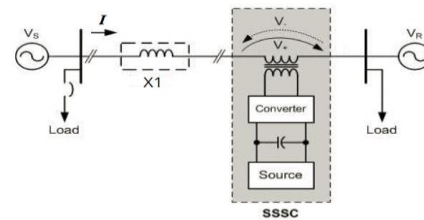
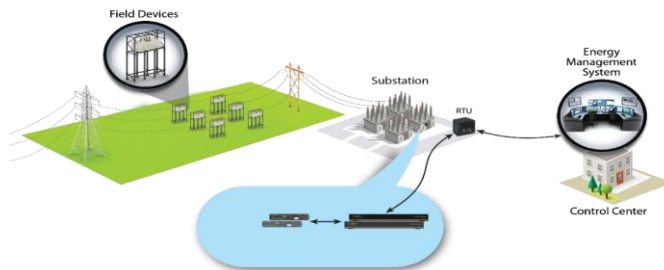


Power Flow Control with M-SSSC



## □ Synergistic operation with:

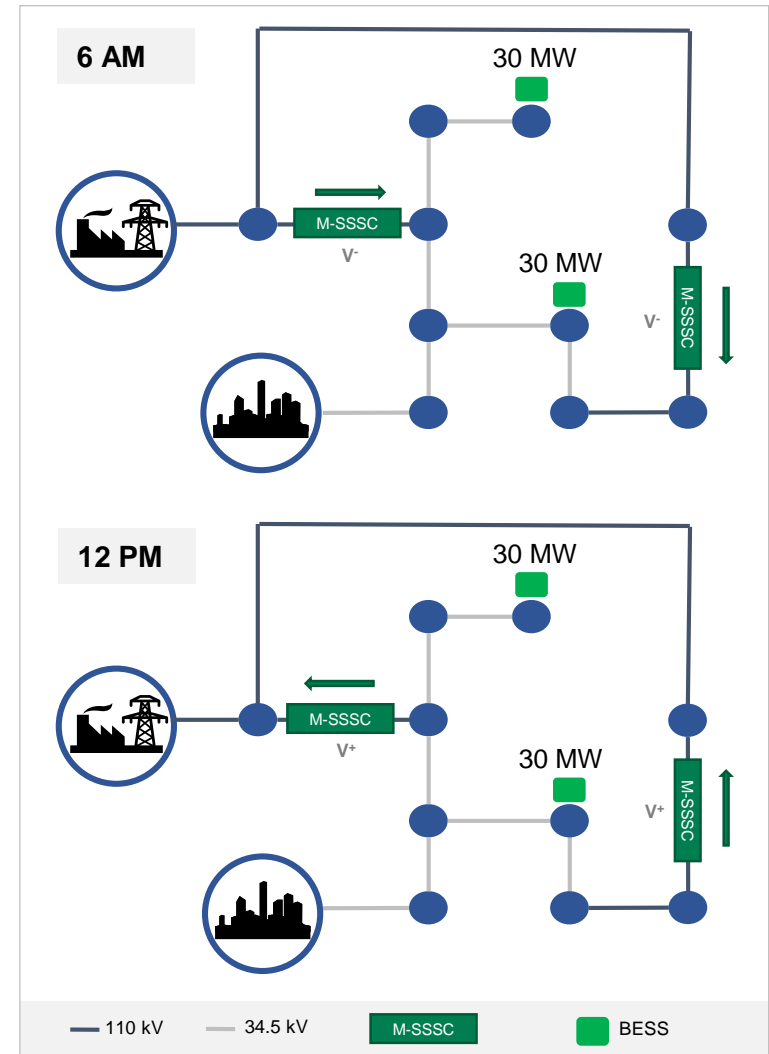
- Real-time EMS OPF Tools
- Dynamic Line Rating
- Topology Control Algorithms
- Synchronous Condensers
- BESS
- WAMPAC



# Supporting & Complementary Technologies 1-2

## □ Hybrid M-SSSC + BESS Solutions

- ✓ Greater technical & economic benefits
- ✓ Avoid re-dispatch costs and RMR payments
- ✓ Optimization of charge and discharge cycles
- ✓ Optimize storage size and overall solution footprint
- ✓ Inject and steer stored energy where most needed
- ✓ Increase safe operating scenarios
- ✓ Increase overall system reliability
- ✓ Black-start capabilities



# Supporting & Complementary Technologies 2-2

## □ M-SSSC + Synchronous Condensers

- Network strength improvement
- SCR increase
- Reduce instability in IBR generators electrically remote
- Allow integration of greater quantity of IBR RES
- Impact of SC extended to more parts of the networks
- VSC-based series compensation avoids SSR and SSCI

