Congestion Modeling

AC vs DC vs Transport

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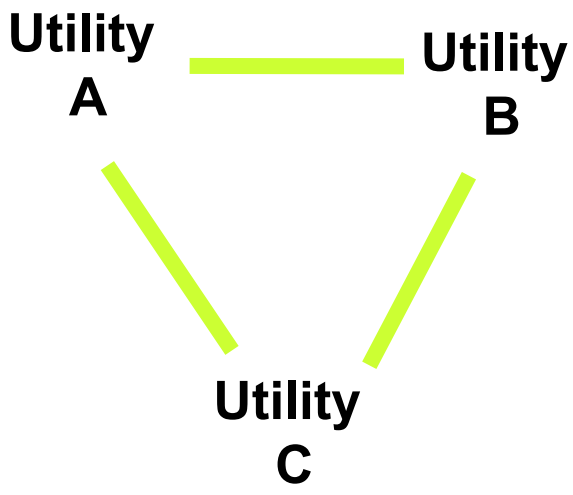
System Operations uses a Security Constrained Economic Commitment and Dispatch considering Line, Interface and Voltage constraints.

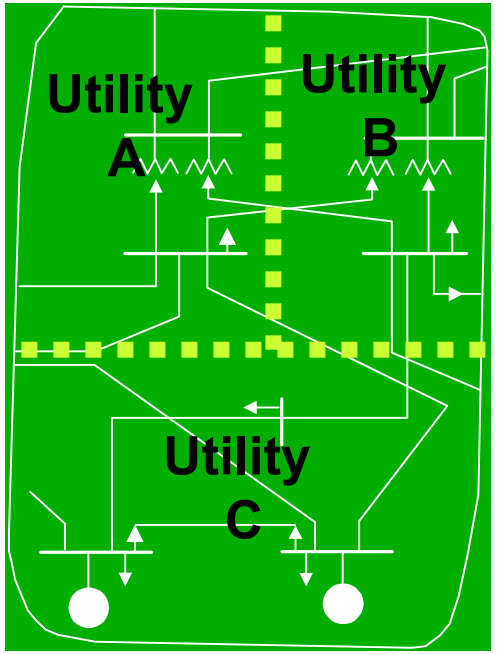
Simulation Models **should capture as much detail as is computationally feasible within the accuracy required.**

Two Methods for Modeling the Bulk Power System

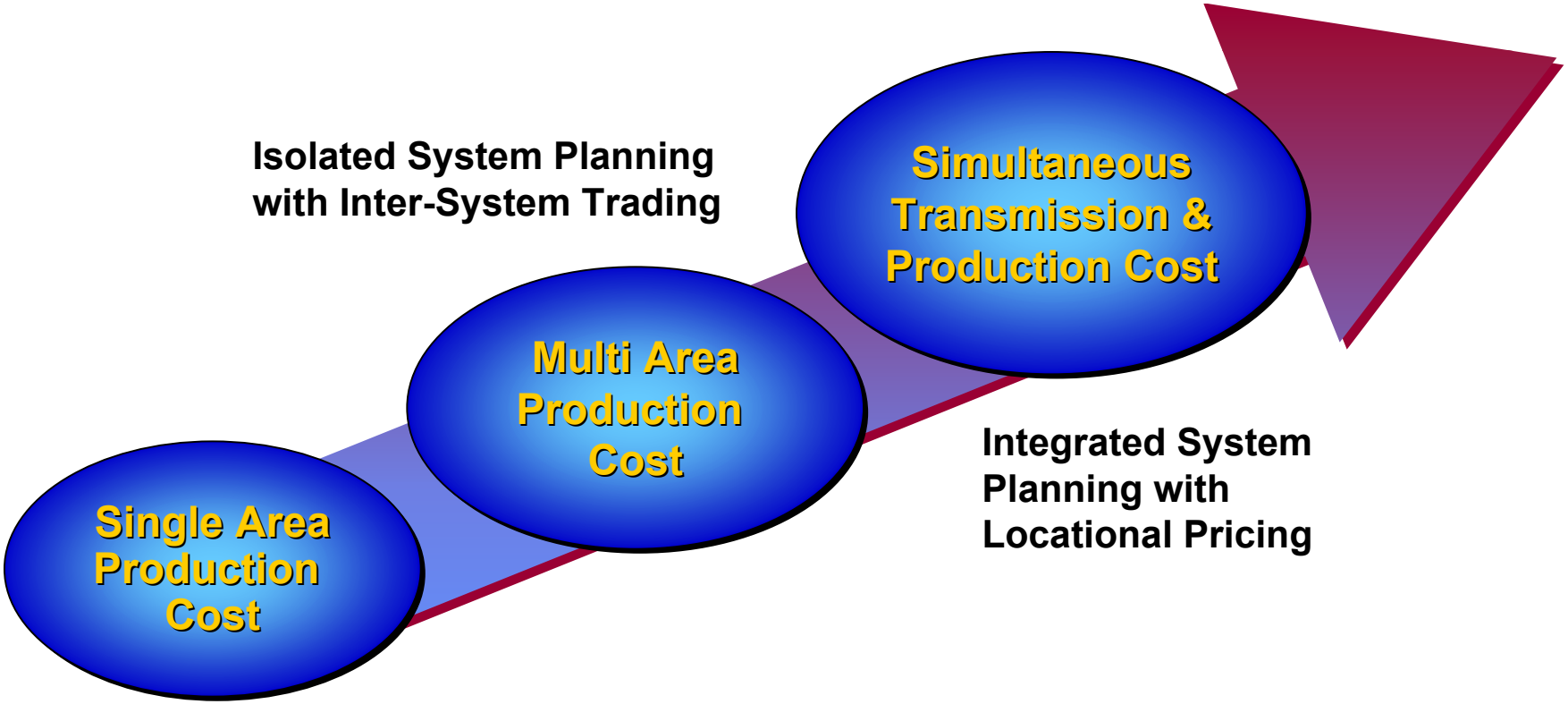
Transportation Model Simulates Transfer Interfaces



Electric Model Represents Each Transmission Line



Evaluation of Chronological Simulation Models



Only a transmission model recognizing the interaction of line impedance and flows can accurately calculate the spot prices at individual buses and the value of transmission lines.

A better question is not AC vs DC, but Secure vs Normal conditions.

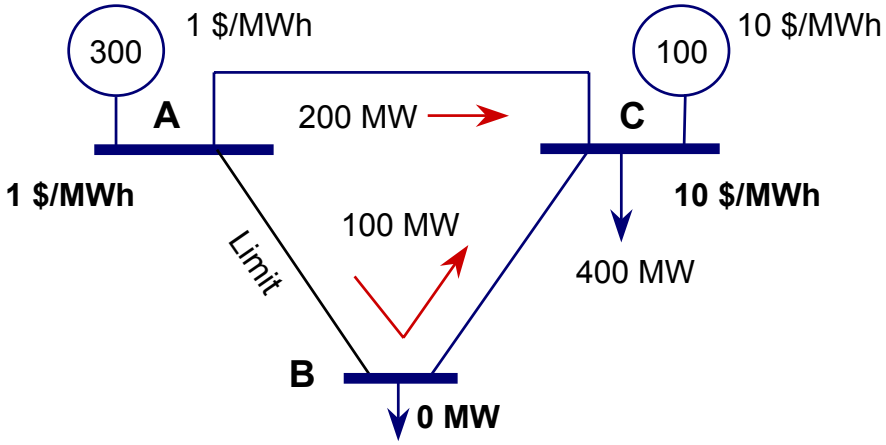
Load Flows don't *fix* overloads, they just tell you about them.

A DC load flow is a linear approximation which ignores losses, but which, unlike AC load flows, ***always*** converges to a solution.

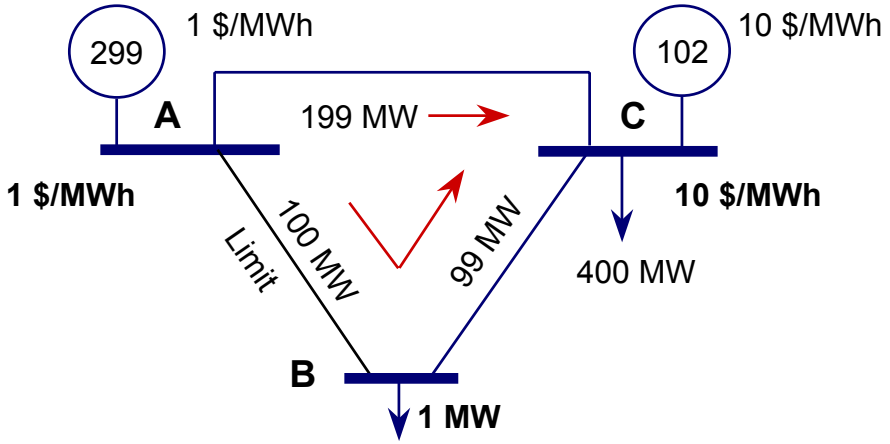
The Generation Shift Factor (GSF) methodology is also a linear approach but it starts at a solved AC solution rather than zero. The GSF method can also recognize incremental losses.

Calculation of Spot Prices

Line A-B at Limit



Total Cost = $1,300



Total Cost = $1,319

The Locational Marginal Price at Bus B is 19 $/MWh.