

Subj: **Mark Lively's confusion of "Inadvertent" Interchange with "Discretionary" or "Scheduled" Bilateral Interchange**
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To: WEQ Inadvertent Interchange Payback Task Force

"Inadvertent" Interchange is precisely that, Inadvertent, uncontrolled by any single Balancing Authority because it is determined by the actions of ALL interconnected Balancing Authorities at once across the Interconnection. Take a two-Balancing-Authority Interconnection. If one Balancing Authority attempts to deliberately send 100 MWh of Inadvertent Interchange to the other by carrying a net internal Imbalance of 100 MWh consisting of a 100 MWh shortfall of actual generation from scheduled and actual load equal to scheduled load, how much Inadvertent Interchange actually flows between the two Balancing Authorities depends ALSO on the action taken by the other Balancing Authority freely and independently. If the other Balancing Authority is the same size and "schedules" an identical net internal imbalance of 100 MWh consisting of a 100 MWh shortfall of actual generation from scheduled and actual load equal to scheduled load, NO INADVERTENT flows between the two balancing authorities because they internally deploy an equal amount of instantaneous frequency (governor) response to offset their respective scheduling errors. In general a Balancing Authority's Inadvertent Interchange with the Interconnection depends on how big that Balancing Authority's scheduling error is compared to that Balancing Authority's offsetting instantaneous governor response to the frequency error caused by the Interconnection's net scheduling error.

Instantaneous "Frequency" (Governor) Response, unlike slower-acting and programmable AGC/Regulation, is an involuntary deployment of generation by each Balancing Authority that adjusts generation not at all to any one particular Balancing Authority's scheduling error, but to ALL Balancing Authorities' scheduling errors captured in the "system characteristic" called frequency. [Frequency Response is voluntary/discretionary only "before" the fact when a Balancing Authority chooses the governor "set point" (and steam valve settings in the case of thermal generation). Governor action itself is "involuntary".] AGC/Regulation is "involuntary" only to the extent that deliberate and programmed actions are chosen to keep performance within the NERC Control Performance Standard. The automatic "response" settings that Mark Lively has the regulator program once and for all into the WOLF mechanism [he hasn't stated whether governor response or slower-acting AGC/Regulation] are likewise "involuntary".

Accordingly, the very fact of an electrical "interconnection" is "socialistic" in the sense of both this unavoidable "involuntary" response and the unavoidable "joint" impact of actions by all the others on one's own Inadvertent. This is a subset of what economists call "network" effects. However, network effects like loop flow in the world of scheduled, discretionary transactions are not necessarily socialistic. NERC's Interchange Distribution Calculator was a software breakthrough that tracked physical flow and desocialized it.

That a Balancing Authority's Inadvertent Interchange is jointly determined "involuntarily" by the actions of all Balancing Authorities together is a fact of the electrical interconnection and not decreed by NERC. That does not absolve Balancing Authorities of responsibility and accountability for their individual contribution to frequency "weighted", in NERC's Control Performance Measure or in the the JIIF Frequency Control Contribution, by the actions of all the other Balancing Authorities at the time.

A Balancing Authority's Inadvertent with the Interconnection is the Balancing Authority's own generation/load imbalance energy. It is equal to the Balancing Authority's own scheduling error plus the Balancing Authority's own immediate instantaneous governor-responses to frequency error over that time. Nate Cohn referred to the Interconnection's own scheduling error, its

triggering inadvertent that contributes to frequency error, as "primary" inadvertent. The frequency response is the Balancing Authority's "secondary" inadvertent.

I provided a simple mathematical example/illustration/proof in my previous comment that bilateral decompositions of a Balancing Authority's Inadvertent with the Interconnection are meaningless for not properly indicating the sources and sinks of Inadvertent flow. Each Balancing Authority's Inadvertent with the Interconnection properly reflects the sourcing and sinking of Inadvertent flow!

To modify my mathematical example for equal instantaneous governor response from each of the three Balancing Authorities A, B, and C all of equal size, their Inadvertent Interchange with the Interconnection was -50, -100, and 150 MWh respectively, their scheduling errors are -100, -150 and +100 MWh respectively, their instantaneous (shared) governor responses to the Interconnection's net scheduling error of 150 MWh are each 50 MWh, accounting for the difference between the scheduling errors and the Inadvertent Interchanges with the Interconnection.

Scheduled, next-hour bilateral payback in kind by a Balancing Authority of its Inadvertent with the Interconnection is no more socialistic than this Inadvertent. Provided it is "next-hour" its energy "market value" is very near the energy market-value of the Inadvertent, and the closest we can get in the absence of actual market pricing of the energy. For the concept of "timely" payback-in-kind as a reasonable in-kind equivalent to market pricing of the energy we are indebted to the Western Interconnection's chief technologist, Warren McReynolds, member of NERC's Resources Subcommittee.