MMU Comments on NYISO's Dynamic Reserve Market Design Proposal

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Introduction

- Core elements of Dynamic Reserve design are excellent
  - ✓ Highly adaptable to changing system conditions
  - ✓ Essential for a system with high renewable penetration
- Several elements will lead to poor incentives or non-J&R settlements (see cites to NYISO Nov. 17 MIWG presentation):
  - ✓ An error in the calculation of DAM Congestion Rent (15-17)
  - ✓ Allocation of the Forecast Reserve Charge (39-40)
  - ✓ Local 30-min reserve constraints based on "Bid Load" (32-33)
  - ✓ Treatment of DAM imports (41)
  - ✓ Settlements with largest and second largest contingencies (46)
- This presentation proposes J&R/incentive compatible solutions for the first two issues. The remaining three issues will be addressed in a subsequent presentation.

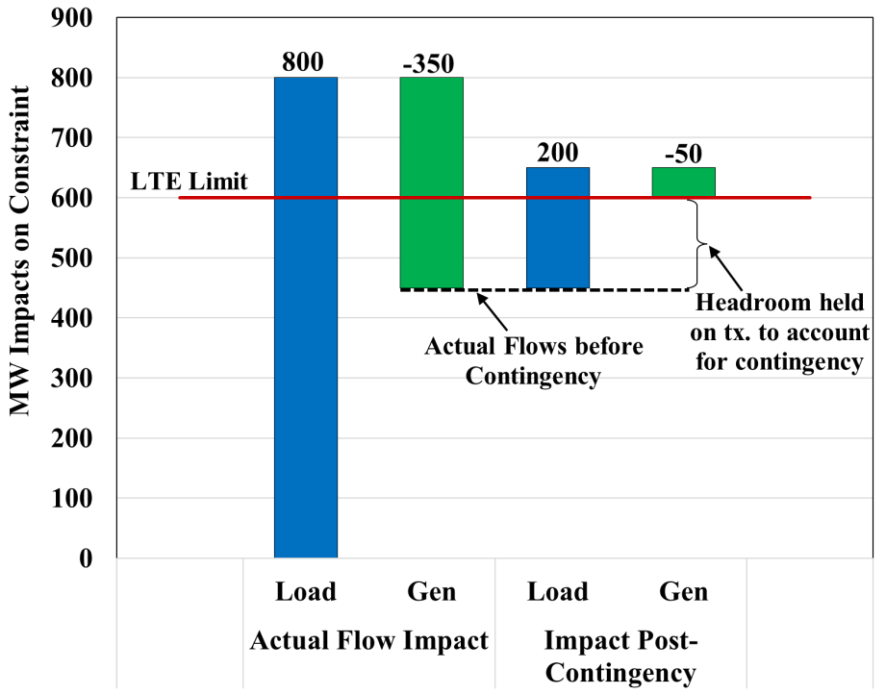
Dynamic Reserves Changes the Role of Local Reserves

- Dynamic Reserves were expected to result in:
  - ✓ Efficient scheduling
  - ✓ Better incentives
  - ✓ Lower overall costs to consumers
- Local reserves play a modest role the NYISO markets today.
  - ✓ Although they are held to support *local* reliability, their costs are allocated to NYCA loads -- $4.1 million/year from 2018 to 2022.
- Dynamic reserves fundamentally changes the role of local reserves:
  - ✓ It creates congestion payments to local reserves that can displace congestion payments made for local generation (energy).
  - ✓ This will lower costs of managing congestion and creates new payments to local reserves.
  - ✓ It is critical to recognize these as congestion payments in settlements to avoid inefficient cost-shifting that does not exist today.

DAM Congestion Rent: Current Rules for Actual Flow Constraints

- Nodal markets naturally assign congestion costs and revenues fairly.
- When all congestion revenues and costs are included, settlements will be revenue adequate. This is simple absent contingencies:
  - ✓ Normal Transfer Limit ≥ Load Impact – Gen Impact
    550 MW ≥ 750 MW – 200 MW w/$2 shadow price
  - ✓ Load payment = 750 MW × $2/MW = +$1500
  - ✓ Gen revenue = -200 MW × $2/MW = -$400
  - ✓ DAM Congestion Rent = -550 MW × $2/MW = -$1100
  - ✓ Total net congestion settlement = $0 → Beneficial features:
    - Revenue adequate
    - Incentive Compatible
    - Just & Reasonable

DAM Congestion Rent: Current Rules for N-1 Constraints



- Shadow price of constraint equals the marginal value of the transfer limit (LTE in this example) = $2/MWh of Flow
- Load payment: $2000 = (800 + 200) × $2
- Gen payment: -$800 = (350 + 50) × $2
- Congestion Rent = $1200

- Settlements are revenue adequate:
  - ✓ Post-contingency flows limited by LTE transfer limit of 600 MW
  - ✓ Constraint Value = 600 × $2 = Congestion Rent of $1200 (see above)
- Revenue adequacy should not change under dynamic reserves.

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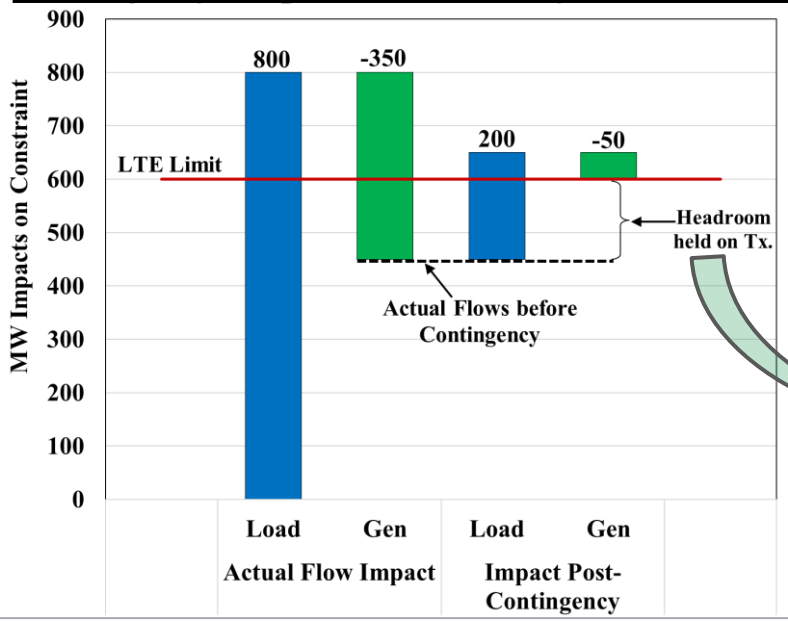
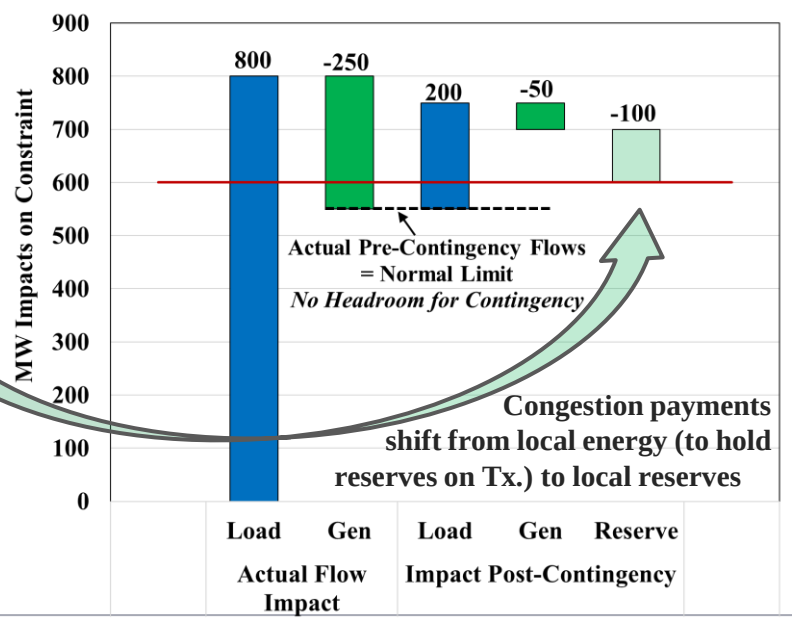
DAM Congestion Rent: MMU Proposal for Dynamic Reserves

Contingency Response Provided by Transmission



Contingency Response Provided by Reserves



- Dynamic Reserves will allow local reserves to be scheduled when it is less costly than local generation → reduces costs and local emissions
- Properly including the new congestion payments to local reserves in the congestion rent calculation will assign costs naturally through prices → revenue adequate, incentive compatible and J&R.
- Simply requires adding a term to DAM Congestion Rent formula.

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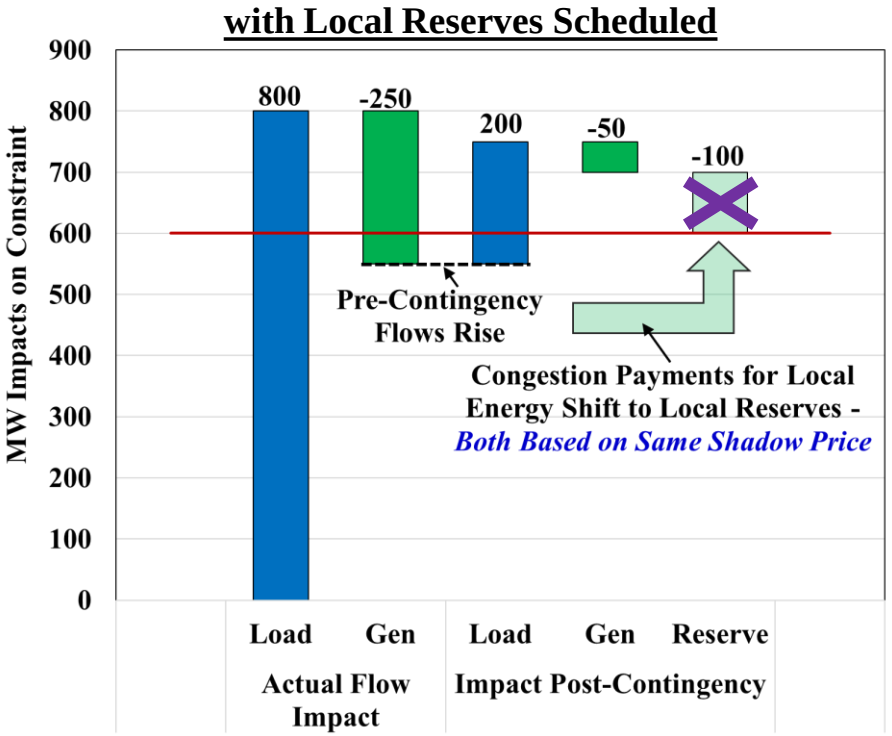
DAM Congestion Rent: NYISO Proposal for Dynamic Reserves



- As NYISO shifts congestion payments from energy to reserves, the payments will not be included in DA Cong. Rent
- This is an error because these payments are fungible.
- This is revenue inadequate:
  - ✓ $200 (= 100 MW × $2) rise in payments to tx. owners.
  - ✓ $200 charge to NYCA loads to balance payments.

- Local loads pay $2000 = (800 MW + 200 MW) × $2 through the LBMP.
- This covers *all* congestion payments of $800 = (250 + 50 + *100*) × $2 and the $1200 entitlement to transmission customers/owners (600 MW × $2).
- Excluding the reserve payment is arbitrary and revenue inadequate.

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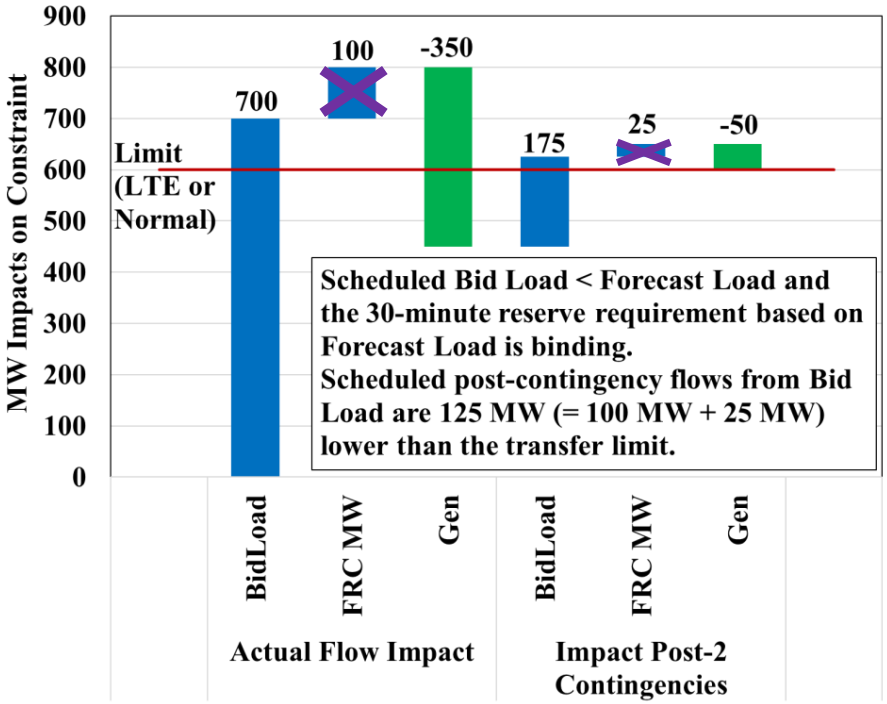
DAM Congestion Rent: NYISO Proposal for Dynamic Reserves

- To illustrate the arbitrariness of the NYISO proposal, consider how settlements would be affected by a 1 MW increase in load.
  - ✓ If met with +1 MW of local generation at $2/MWh congestion cost (relative to the cost of outside generation):
    - Local load pays congestion of $2
    - Local generation receives a congestion payment of $2
  - ✓ If met with +1 MW of local reserves at $2/MWh cost:
    - Local load pays congestion of $2
    - Local reserves receive a congestion payment of $2
    - Day-Ahead Congestion Rent increases $2 (because the cost of the incremental congestion payment is ignored in this case)
    - NYCA load pays the $2 shortfall
- The congestion settlements should be identical in these cases because both solutions are managing post-contingent flows to the same limit – the choice between them is solely made to minimize costs.

Allocation of Forecast Reserve Charge

- The previous slides assume all load is "Bid Load" scheduled in the DAM. However, some DAM constraints will be based on forecast load rather than scheduled load.
  - ✓ NYISO has identified the need to charge virtual supply and under-scheduled load for their share of the cost of reserves.
    - For example, if forecast load = 1000 MW and scheduled load = 900 MW, then 100 MW of forecast load will not be charged (through the LBMP) for its impact on reserve costs.
    - Hence the 100 MW of forecasted load is assigned the Forecast Reserve Charge ("FRC") = 100 MW × shadow price.
- NYISO proposes to not include the FRC in the DAM Congestion Rent, which will generally cause it to be understated.
  - ✓ This will create revenue inadequacy issues that NYISO proposes to resolve by allocating the FRC to NYCA load.
  - ✓ NYISO also proposes not to credit over-scheduled loads properly for their contribution to the local reserve procurement.

Allocation of Forecast Reserve Charge: NYISO Proposal



- NYISO proposes to exclude the Forecast Reserve Charge proceeds from DAM Congestion Rent, leading to:
  - ✓ $250 = (100MW+25MW) × $2 *decrease* in DAM Congestion Rent
  - ✓ $250 *credit* to NYCA loads to balance payments

- Transmission owners receive only 475 MW × $2 of revenue but provide 600 MW of support to the load pocket.
- When the 30-minute reserve requirement for Forecast Load is binding, transmission owners will tend to under-collect revenue.

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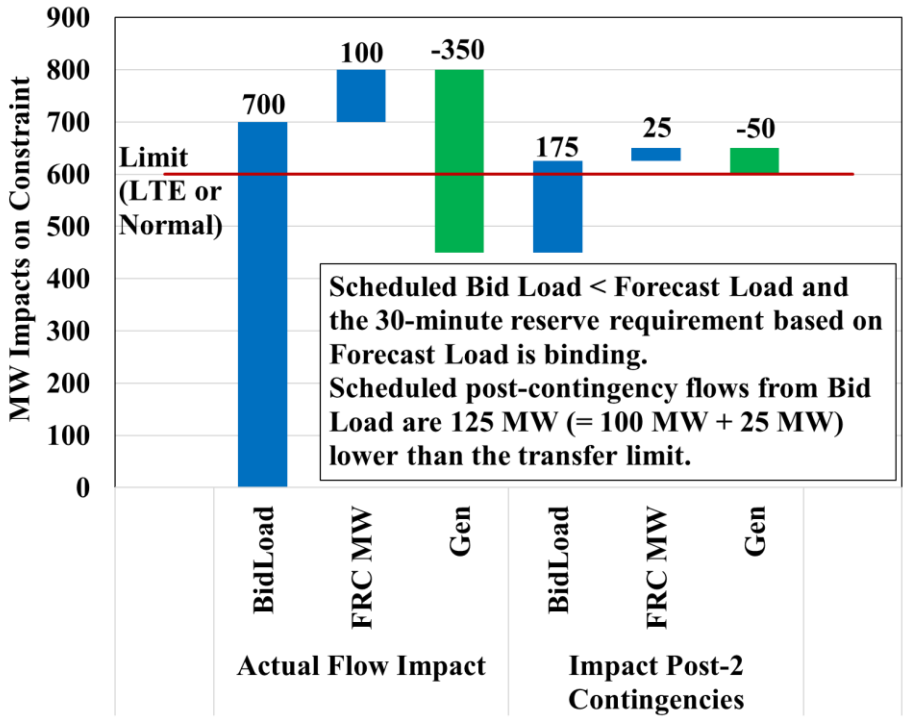
Allocation of Forecast Reserve Charge: MMU Proposal



- The Forecast Reserve Charge proceeds should be included in the DAM Congestion Rent:
  - ✓ DAM Congestion Rent = 600 MW × $2.
  - ✓ This is consistent with the applicable limit (600 MW).
  - ✓ This simply requires adding an FRC term to the DAM Congestion Rent formula.

- This would allow transmission owners to receive an amount of revenue consistent with the support they provide to the load pocket.
- MMU also proposes to allow the FRC to be negative (i.e., a credit) for LSEs that over-schedule load relative to Forecast Load.

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