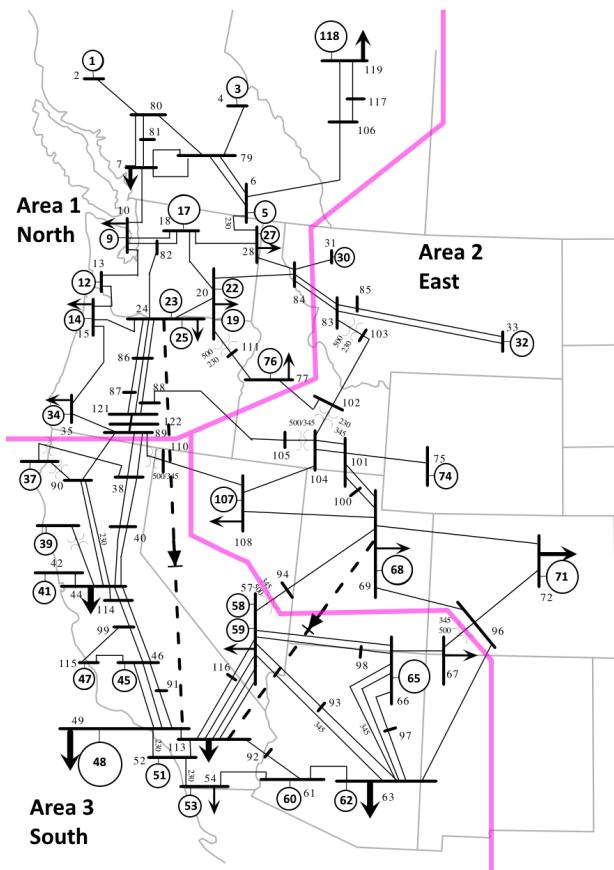


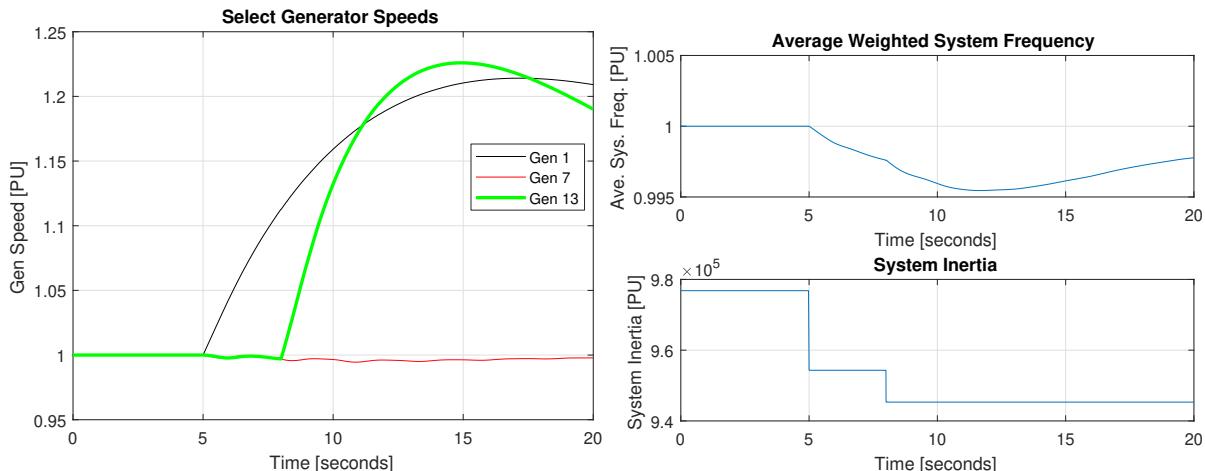
## 10 Minute AGC Recovery of Mini WECC after 2 Generator Trips

- Mini WECC system:
  - Buses: 122
  - Lines: 171
  - Loads: 88
  - Machines: 34
  - States: 623
- Events: Trip of Bus 1 Gen at t = 5  
Trip of Bus 30 Gen at t = 8
- Each area has identical conditional AGC that acts at t=40 and again when t=160, 280, 400, 520 (i.e. 2 minute action time).
- ODE solver tolerances:
  - Relative: 1e-5
  - Absolute: 1e-7



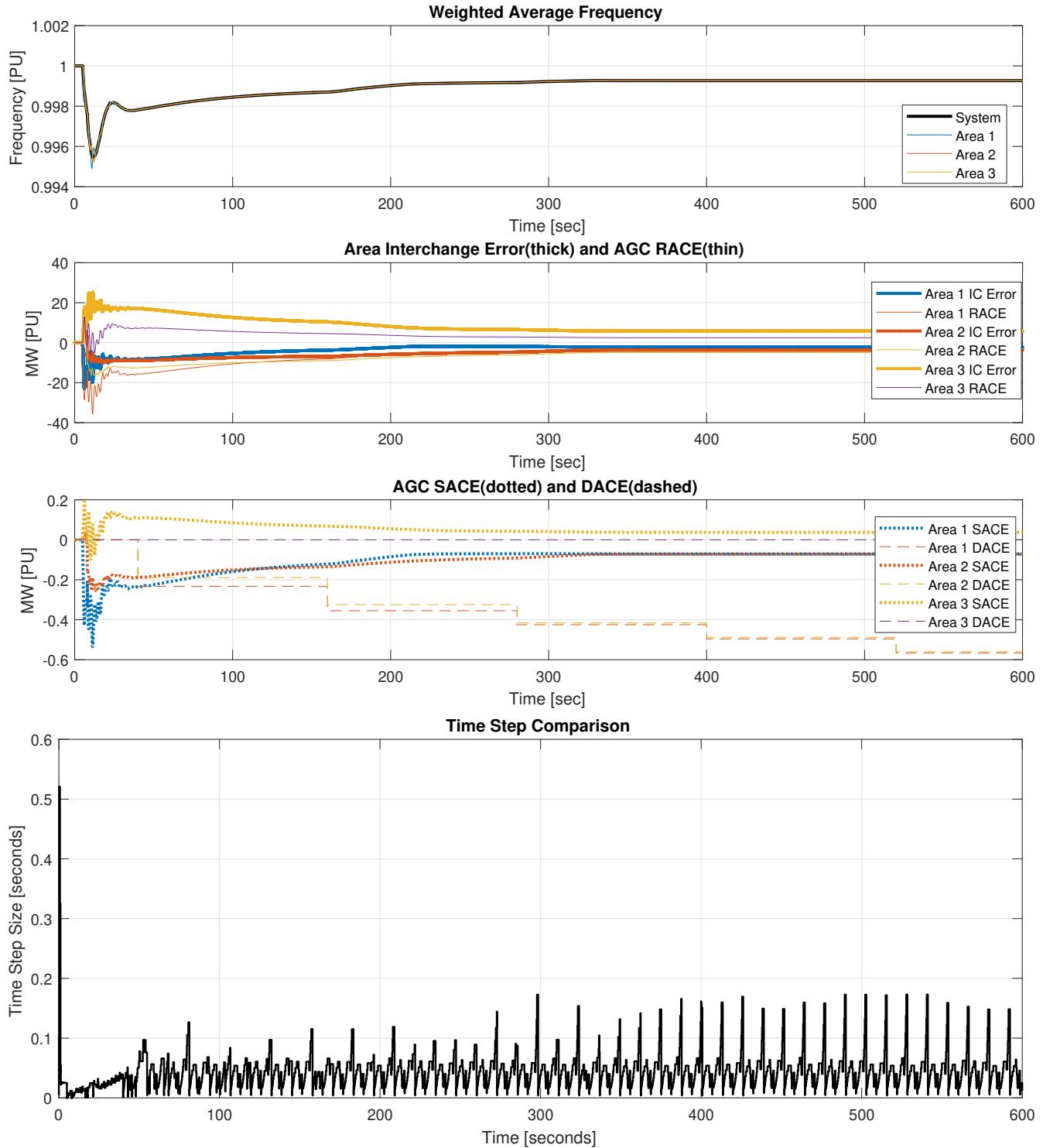
### Result Summary:

- Generators trip successfully, average system frequency and system inertia calculated correctly.
- AGC controlled machines hit generation limits - Case needs minor adjustment.
- Tripped generator calculated states and derivatives effect size of time step.



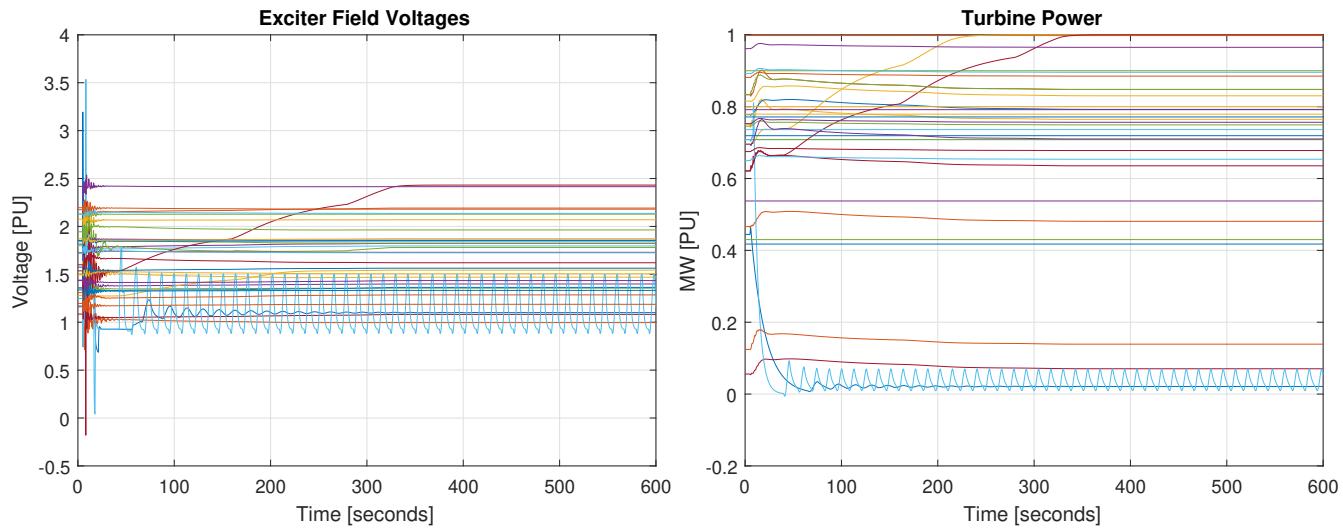
**Select Comparisons:  $t = 0:600$  (full simulation)**

System frequency does not return to 1 as controlled machine generation limits are hit. AGC distributed ACE (DACE) continues to accumulate. Time step does not increase past 0.2 seconds.



## EFD and Mechanical Power

The oscillations of tripped generators affect the size of variable time steps as dynamic calculations still account for disconnected machines. This is noticeable in exciter EFD and pmech oscillations of tripped generators.



A possible solution may be to zero out the associated derivatives of tripped machines.  
Something along the lines of:

```
if ~all(~g.mac.mac_trip_flags)
    g.mac.dXXX1 = g.mac.dXXX1 .* ~g.mac.mac_trip_flags
    g.mac.dXXX2 = g.mac.dXXX2 .* ~g.mac.mac_trip_flags
    ...
end
```

Placed in the `handleStDx` function and called if the field is `mac`.

This would prevent any associated states from changing, which may be confusing during data analysis and may have other network solution related effects, but should allow time step to increase.