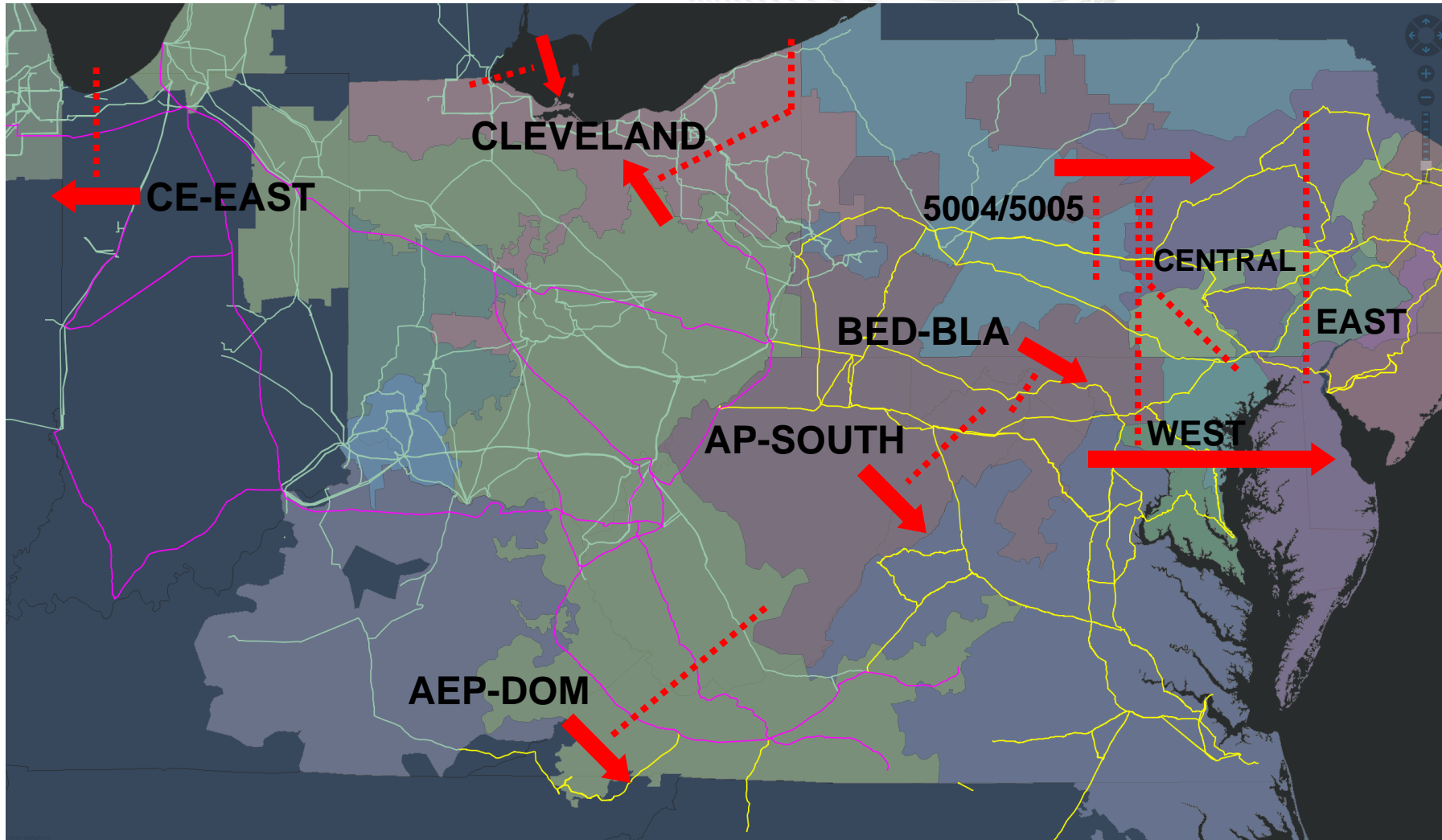




IROL Monitoring - PMU Application

Jordan Shenk
Reliability Engineer
PJM Interconnection



Reactive Transfer Interface:
Interface where transfer cause voltage violations to occur prior to thermal limitations.

Pre-Defined

- Facility
- Source
- Sink

Historically more limiting than experienced recently.

Interconnection Reliability Operating Limit (IROL)

“a System Operating limit that, if violated, could lead to instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Bulk Electric System (BES).”

NERC Glossary of Terms

“facilities that if exceeded have the potential to result in wide-area voltage collapse.”

PJM Manual 37

IRO-002 R7

Back-up monitoring of IROL facilities

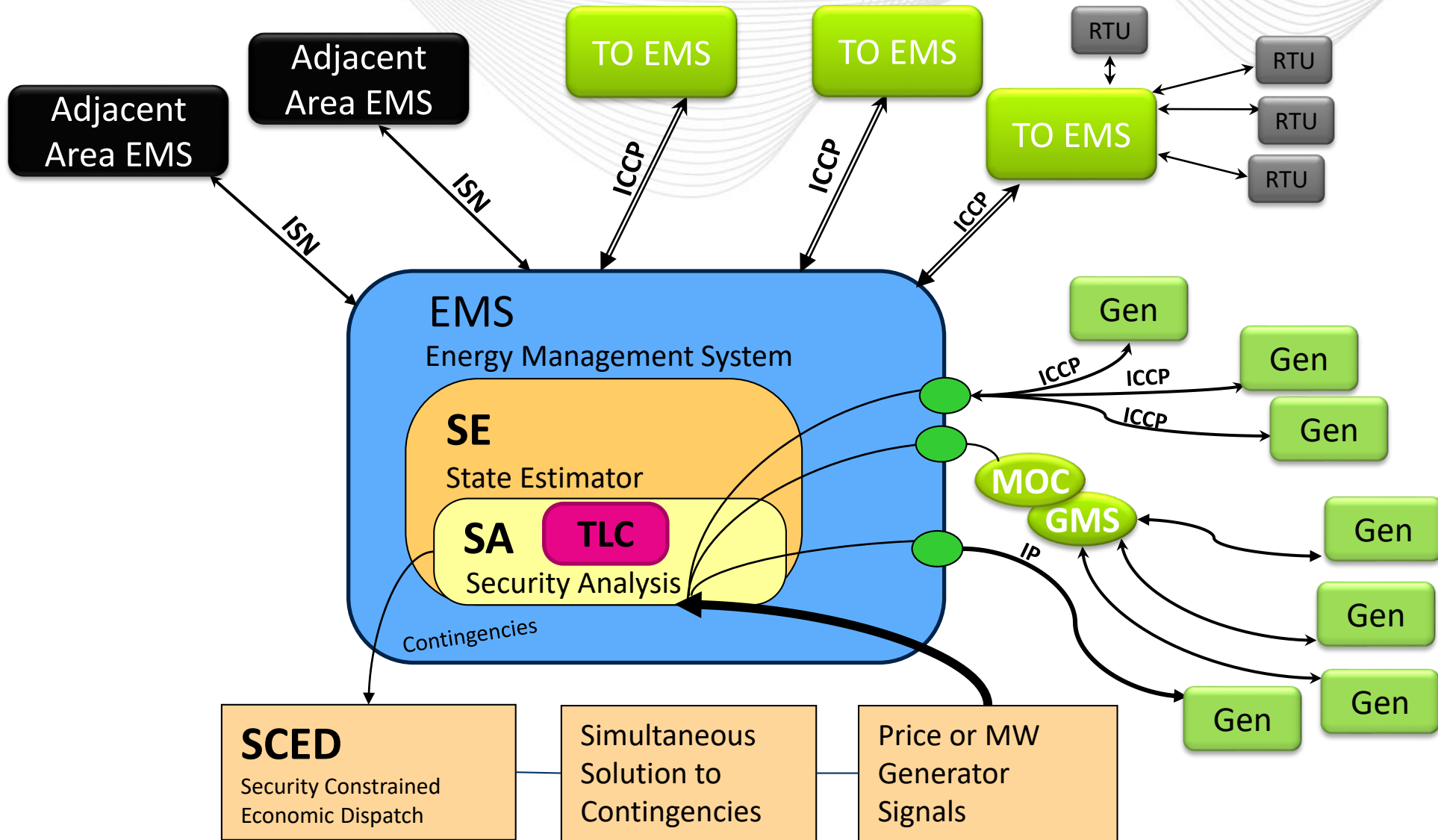
TOP-001 R13

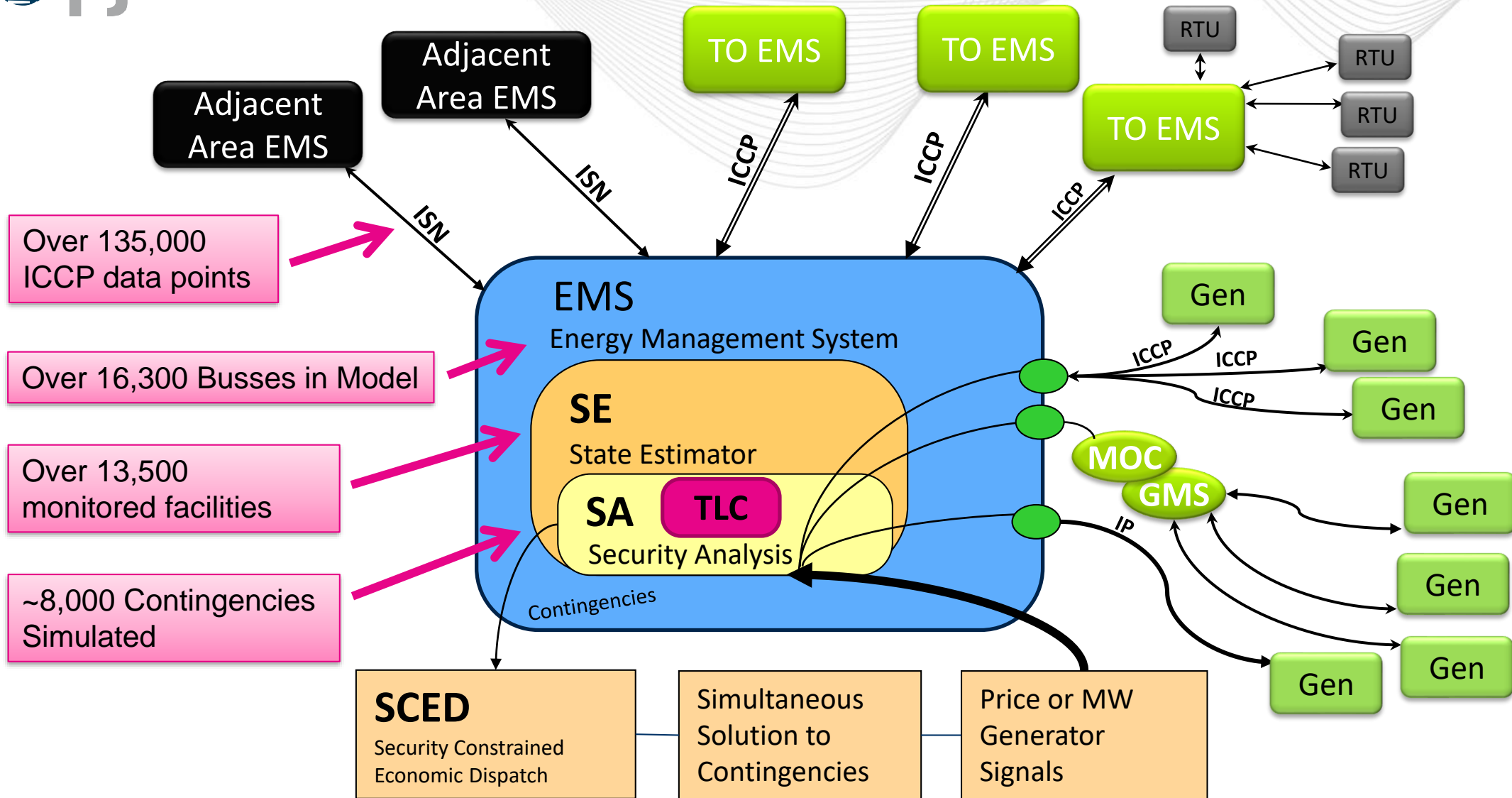
Real-Time assessment every 30 minutes

TOP-004 R4

Recovery from unknown operating state within 30 minutes

E.g. Transfer limits have not been determined





IROL flows and limits manually tracked if EMS TLC functionality degraded

Must be performed every 30 minutes at minimum (TOP-004)

If telemetry unavailable, flows manually inputted (phone verification with TO)

If TLC unavailable, limits manually entered from Day Ahead report

East	PI Flow*	Manual			
Alburtis-Juniata		500			
Limerick-PeachBottom		500			
Keeney-RockSprings		500			
Hosensack-TMI		500			
Alburtis-Breinigsville		500	Pre-Limit	IROL Limit	
Lackawanna-Hopatcong		500			Current**
Total	✓ 3000		4000	5000	Manual

Opportunity for PMU data to provide backup source of data – input from Linear State Estimator

Reduce risk of IROLs in an unknown operating state.

Low cost, high benefit use of PMU data.