

POWER SYSTEMS OPERATIONS

PLANNING & INVESTMENT

Power system stability and security

Power system reliability

Energy security

PHENOMENA

Wave
E, B, I, V

Electromagnetic
& inverter-based controls

E, B, I, V, δ

Electromechanical

H, τ , ω

Thermodynamic

P, W, η

TIMEFRAMES

ms

s

min

hour

day

week

month

quarter

year

decade

PROCESSES, SERVICES & MARKETS

UFLS & OFGS
Regulation
Contingency

Inertia

**Frequency
control services**

Rotor angle
stability

(Inverter-driven)
control stability

Reactive power support
Fault current
Grid forming capabilities
Voltage control stability

Voltage stability
& system strength

Real time dispatch & markets

Intra-day
& day-ahead
markets

**Operating
& ramping
reserves**

**Resource
scheduling
(including unit
commitment)**

**Energy reserve
management**

Electricity
derivatives
& contracts