Services of Different Plants

Module 2
Objectives

• Consider the different ‘services’ created by a plant
• What characteristics of a plant have value?
  • Flexibility and ancillary services
• How is that value compensated?
New plants have different flexibility

- **Ramp rate**: How quickly the plant can increase or decrease power output
- **Ramp time**: The amount of time it takes from the moment a generator is turned on to the moment it can start providing energy to the grid at its lower operating limit
- **Capacity**: The maximum output of a plant
- **Lower Operating Limit**: The minimum amount of power a plant can generate once it is turned on
- **Minimum Run Time**: The shortest amount of time a plant can operate once it is turned on
- **No-Load Cost**: The cost of turning the plant on, but keeping it "spinning," ready to increase power output
- **Start-up and Shut-down Costs**: the costs of turning the plant on and off
Why is generator flexibility important

• Uncertainty in supply and demand
• Proper compensation to encourage investment
• Increased availability of wind and solar
• Immediate response and incremental supply adjustment
• Unresponsive demand in the short run
  • Can demand response act as flexible supply?
• These things made worse by transmission constraints
Ancillary Services

• Voltage/frequency regulation
  • Primary, secondary and tertiary
• Spinning and non-spinning reserves
  • Quick response supply
• Reactive power
• Black start capability

• Which plants provide these?
• How will batteries, wind and solar fit in?
Things that are valuable need compensation

• In thinking about capital investments, think about whether these generation attributes have value

• And whether generators have incentive to provide them