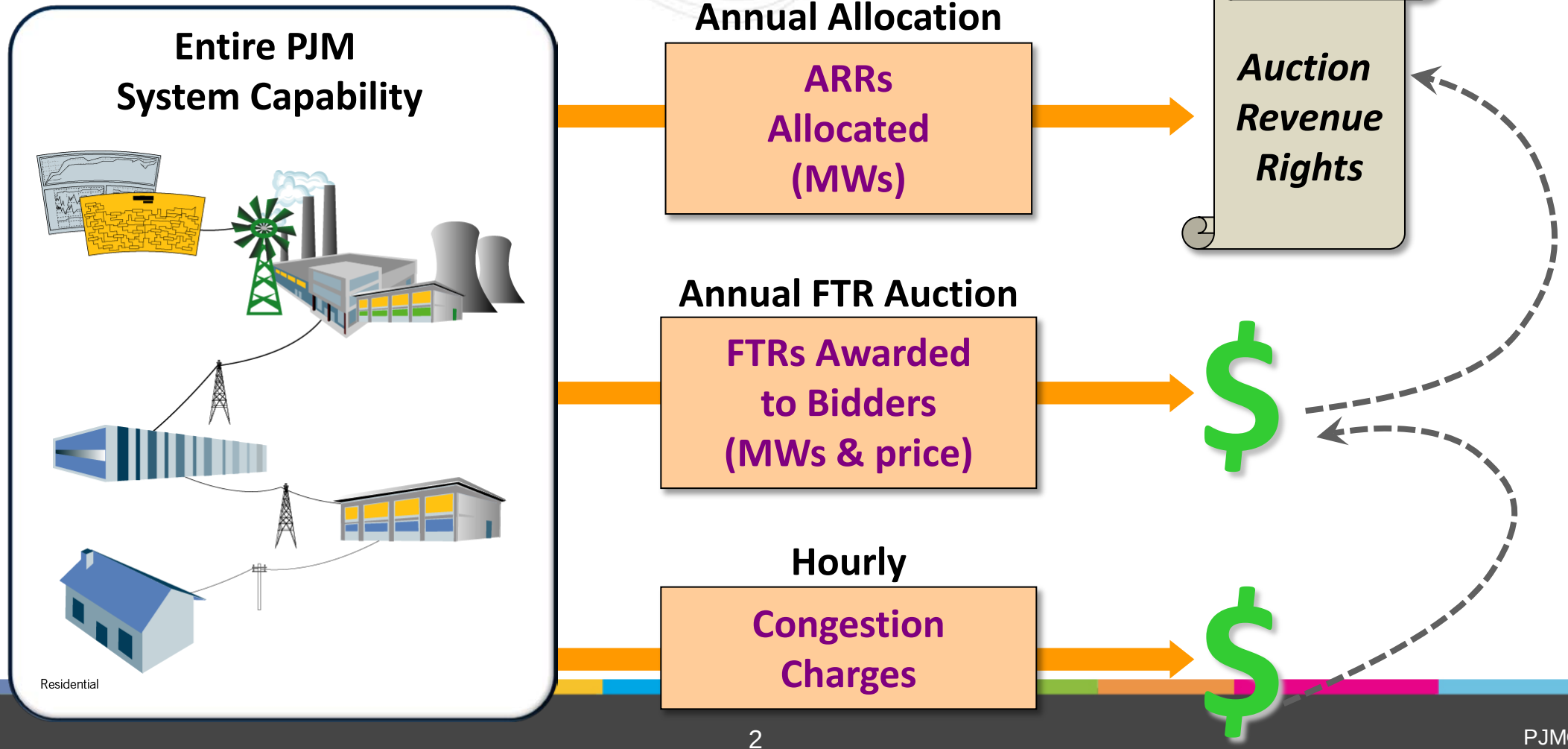
Congestion Surplus Allocation

Brian Chmielewski
Sr. Analyst, Market Simulation

Special MIC – FTRMPS

June 23, 2017

ARRs provide a revenue stream to the firm transmission customer to offset purchase price of FTRs



Economic Value of ARR

ARR Target Allocation = (ARR MW) * ($LMP_{ARR\ Sink} - LMP_{ARR\ Source}$)

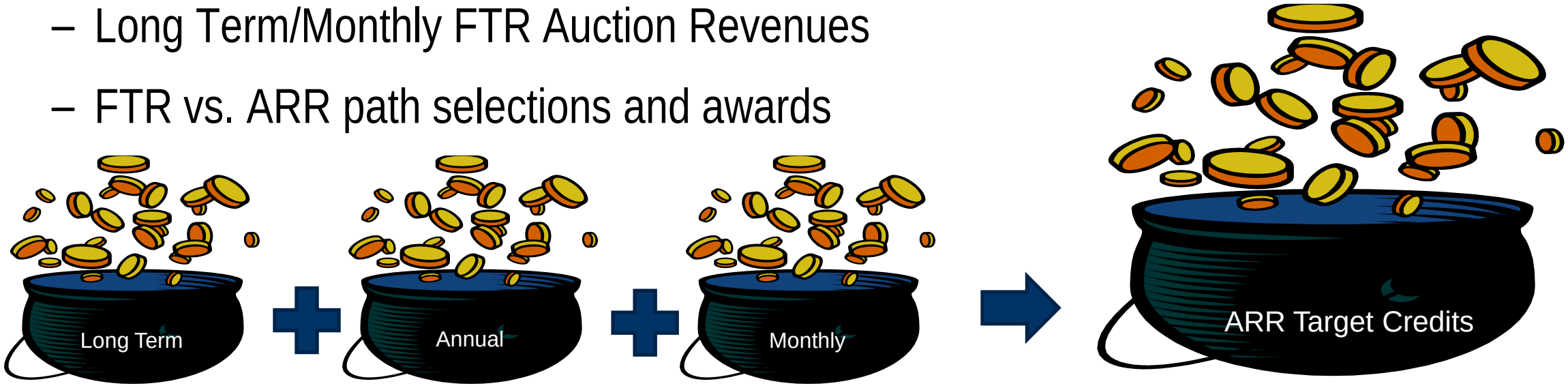
- ARR Target Allocation is equal to the ARR MW amount times the average price difference from the ARR sink point to the ARR source point over the 4 rounds
- LMPs based on the average nodal clearing prices over the 4 rounds of the Annual FTR Auction
- ARRs can be a benefit or a liability

Annual FTR/ARR Settlements

- The Annual FTR Auction and corresponding ARRs will be settled for on a weekly basis over the course of the planning period for which the Annual FTRs are in effect
- Since ARR ownership can change daily through ARR reassignment, PJM Settlements calculates:
  - daily Annual FTR Auction revenues by dividing annual auction revenues by the number of days in the planning period
  - daily ARR credits by dividing ARR Target Allocation by the number of days in the planning period

ARR Revenues

- ARRs are never overfunded – capped at daily target credit
- Excess FTR Auction revenue is distributed back to FTR holders
- Generally, Annual FTR Auction revenues are very close to Annual ARR Target credits but excess can be created by
  - Long Term/Monthly FTR Auction Revenues
  - FTR vs. ARR path selections and awards



FTR Settlements

$$\text{FTR Target Allocation} = (\text{FTR MW}) * (\text{Congestion Price}_{\text{FTR Sink}} - \text{Congestion Price}_{\text{FTR Source}})$$

- FTR Target Allocation is equal to the FTR MW amount times the congestion price difference from the FTR sink point to the FTR source point
- Congestion Price based on the clearing prices from Day Ahead Market
- If $\text{Congestion Price}_{\text{FTR Sink}} < \text{Congestion Price}_{\text{FTR Source}}$
  - the FTR is a liability if FTR defined as Obligation
  - the FTR has zero value if defined as Option

FTR Settlements *(cont.)*

- If sufficient congestion charges (and auction surplus) are collected from the Day Ahead Market to satisfy FTR Target Allocations then:
  - FTR Credits = FTR Target Allocation
- Excess (surplus) congestion charges are used to
  - cover any deficiencies in FTR Target Allocations within month
  - cover any deficiencies in FTR Target Allocations within planning period
  - any remaining year-end excess covers any deficiencies in ARR Target Allocation from previous months within planning period
  - any remaining year-end excess distributed to FTR participants pro-rata to total FTR Target Allocations

FTR Settlements *(cont.)*

- If insufficient revenues (and auction surplus) are collected from the Day Ahead Market to satisfy FTR Target Allocations then:
  - FTR Credits are prorated proportionately pro-rata to FTR Target Allocations
  - FTR Target Allocation deficiencies are funded from:
    1) Excess congestion charges from current month and subsequent months, then
    2) An uplift charge assessed to FTR holders on pro-rata basis according to total Target Allocations for all FTRs held at any time during the planning period

FTR Revenues

- Total congestion is paid out to FTR holders and does not change regardless of cleared FTRs.
- FTR Auctions are modeled to minimize over and under subscribing the system.
- Over subscribing will clear more FTRs then feasible and result in revenue inadequacy.
- Under subscribing will clear less FTRs then available and result in 100% adequacy with surplus.

FTR Revenue Surplus/Deficiency Causes

- In theory, the FTR Auction and DA Simultaneous Feasibility Test (SFT) ensures revenue adequacy.
  - Auction and DA software uses a model to simulate future conditions
  - FTR, Day-ahead, and Real-Time models never exactly the same
- Perfect revenue adequacy can never be guaranteed

FTR Revenue Surplus/Deficiency Causes *(cont.)*

- FTR revenue surplus and inadequacy generally is caused by modeling differences between FTR, DA, and RT.
- Modeling differences can occur due to the following:
  - Congestion along PJM borders
  - Reduced or increased capability
  - Infeasible Stage 1A ARRs
  - Conservative ARR/FTR modeling

Appendix

ARR & FTR Settlements