# CRR 1B – Post Implementation issues

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Jeremy Malekos: Manager – Market Settlement Design & Configuration

# CRR Auction Efficiency 1B update cont. - Summary

- Update on post implementation issues
- Settlement calculation validation example of CRR 1B notional value
- Exceptions to Notional Value calculation
- Offset Calculations

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# CRR Auction Efficiency 1B update cont. – Issue #1

- Anode shift factor missing at SLAPs and CLAPs when the effective shift factor is below 2%.

- Resolution: Working as designed for trade dates 1/1/2019 through 02/28/2019.This issue was resolved as of 3/1/2019 indirectly by applying PIME methodology to SLAP, CLAP and for any aggregate location that we extend the PIME logic

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# CRR Auction Efficiency 1B update cont. – Issue #2

- POD shift factor vs. Resource shift factor. Anode vs. APNODE pricing.
- Resolution: CAISO will fix this issue for all the impacted trade dates from 1/1/2019.  We created a defect to fix the issue in the market going forward. CRRS workaround to be implemented no later than 4/30/2019 and this workaround will fix the issue for all prior trade dates starting 1/1/2019.
  - Workaround fix went into production on 4/8/2019, first trade date will be rerun with this fix would be T+3B recalc for 4/8/2019.
  - Based on the settlement rerun calendar approximate time-line:
    - Trade date 1/1/2019 – 2/01/2019 – will be corrected in T+9M recalc
    - Trade date 2/02/2019 – 2/28/2019 – will be corrected in T+55B recalc
    - Trade date 3/31/2019 – 4/7/2019 – will be corrected in T+12B recalc
    - Trade date 4/8/2019 forward will be corrected in T+3B initial calc

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# CRR Auction Efficiency 1B update cont. – Issue #3

- Missing shift factors for Nodes related to ITCs. The issue here is, there are two CNODES and both have Shift factors.  However, only one SF is being transferred to CRR engine. Based on our research, it seems that when the schedule is Zero, the respective SF is missing and not being transferred to CRR engine.

- Resolution:  CAISO will be making corrections to all the impacted trade dates.  Market fix going forward, CRRS work around implemented to fix impacted trade dates from 1/1/2019.
  - Workaround fix went into production on 3/21/2019. Additional issues identified for TD 1/1/2019 -3/29/2019 and fix went into production on 5/14/2019.
    - Based on the settlement rerun calendar approximate time-line:
    - Trade date 1/1/2019 – 3/9/2019 – will be corrected in T+9M recalc
    - Trade date 3/10/2019 – 5/5/2019 – will be corrected in T+55B recalc
    - Trade date 5/6/2019 – 5/12/2019 –corrected in T+12B recalc
    - Trade date 5/13/2019 forward corrected in T+3B initial calc

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- Shift factors at Generic Trading Hubs.
- Resolution: CAISO will be making corrections to all the impacted trade dates. As for Market fix going forward, CRRS work around implemented to fix all impacted trade dates from 1/1/2019.
  - Workaround fix went into production on 3/21/2019. Additional issues identified and fix went into production on 5/1/2019.
    - Based on the settlement rerun calendar approximate time-line:
    - Trade date 1/1/2019 – 2/24/2019 – will be corrected in T+9M recalc
    - Trade date 2/25/2019 – 4/22/2019 – will be corrected in T+55B recalc
    - Trade date 4/23/2019 – 4/29/2019 –corrected in T+12B recalc
    - Trade date 4/30/2019 forward corrected in T+3B initial calc

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# CRR Auction Efficiency 1B update cont. – Issue #5

- CAISO identified that some of the ANODEs at disconnected locations are not getting their Shift Factors corrected.
- Resolution: CAISO will be making corrections to all impacted trade dates. CRRS fix is in progress, and CRRS work around will be implemented to fix all impacted trade dates from 1/1/2019.
  - Software fix deployed to production on 4/5/2019.

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# CRR Auction Efficiency 1B update cont. – Issue #6

- Data transfer issues between two applications (PCA and MQS).  Due to this, we are not publishing the constraint data from CRRS to other systems.

- Resolution: Data clean up and work around is being performed.  CRRS fix deployed to production on 4/17/2019 and will apply to all trade dates forward and correct all prior trade dates from 1/1/2019.

  – This scenario happens whenever we have DA ahead price corrections, so far we had DA price corrections only for two trade dates 2/21/2019 and 2/22/2019 and these two trade dates will be corrected in T+55B recalc.

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# CRR Auction Efficiency 1B update cont. – Issue #7

- Parsing of Nomogram names affecting CRRS.

- Resolution: Data clean up and work around is being performed. The issue was that the settlements system was not able to parse some special characters, and a decision was made not to fix the settlement system.   This required a change in OE procedures going forward and cleanup of historical data back to 1/1/2019.

  - We did the data cleanup and all the corrected data will reflect in T+55B recalc from trade date 1/1/2019 onwards.

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# CRR Auction Efficiency 1B update cont. – Settlement calculation validation of CRR Notional Value

- How to validate CRR 1B Notional Value using Settlements, OASIS and CMRI
- Data needed:
  - LMP/MCC data from OASIS
    - ([MCC at sink] – [MCC at source]) * netted MW
  - CMRI CRR reports
  - CC 6700 Settlement Statement
  - See reference Documents for detailed example
    - http://www.caiso.com/Documents/ValidationofCRRNotionalValue_Apr17_2019.pdf
    - http://www.caiso.com/Documents/CRR1BNotionalValueValidationExampleData_Apr17_2019.xlsx

# CRR Auction Efficiency 1B update cont. – Settlement calculation of CRR Notional Value exceptions

- Exceptions
  - Rounding differences
  - MLAP's – PIME logic not applied, as a results the Shift Factors created may not be consistent with prices calculated in the market.

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# Offset Calculations

- Data needed to calculate Offset values:

  - IFM flow by constraint by contingency case by interval

  - Total CRR Flow by constraint by contingency case by interval

  - Shift Factors at Source and Sink

- Data will be available as follows:

  - IFM => CAISO will provide (Location **TBD**)

  - CRRs => Total inventory for all CRRs is available on OASIS

  - Shift Factors => CAISO will provide in Market Modeling Database (MMD)

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# CRR Auction Efficiency 1B update

- ISO plans to publish the following additional data sets (prospectively)

  1. Day Ahead Shift factors for each APNode
     - Similar file we produce today for Shift factors (NDA required to access)
     - ISO will publish a sample file for review

  2. Net IFM Flow - Positive or Negative to represent the direction of congestion

  3. Directional Flag
  4. Single Value for ClawBack & Circular scheduling  MWs

- Settlement calculation of Offset at constraint level for a portfolio
- How-to calculate offset at a constraint level for a portfolio

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# Offset Calculations – Data & Formula



$$CRR\ Flow_{qkmt} = \sum_q^Q [(SFqkmt^{src} - SF_{qkmt}^{snk}) * MW_q] - [Total\ Clawback_{kmt}] - [Total\ Circular\ Scheduling_{kmt}]$$

# Data Sources and Flows

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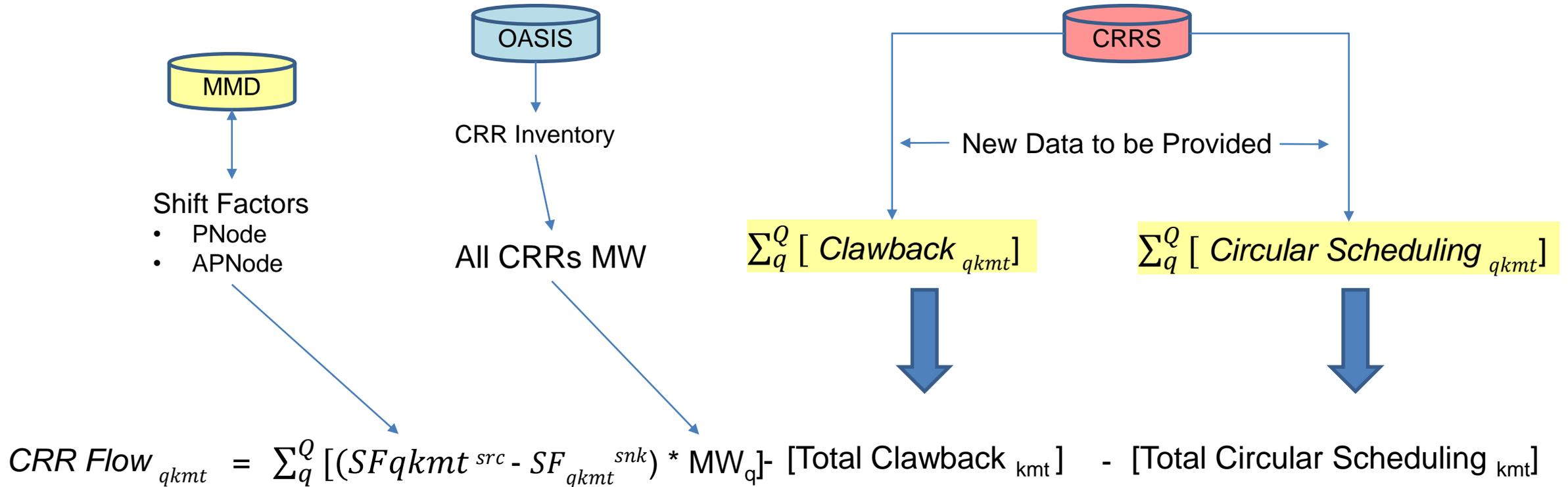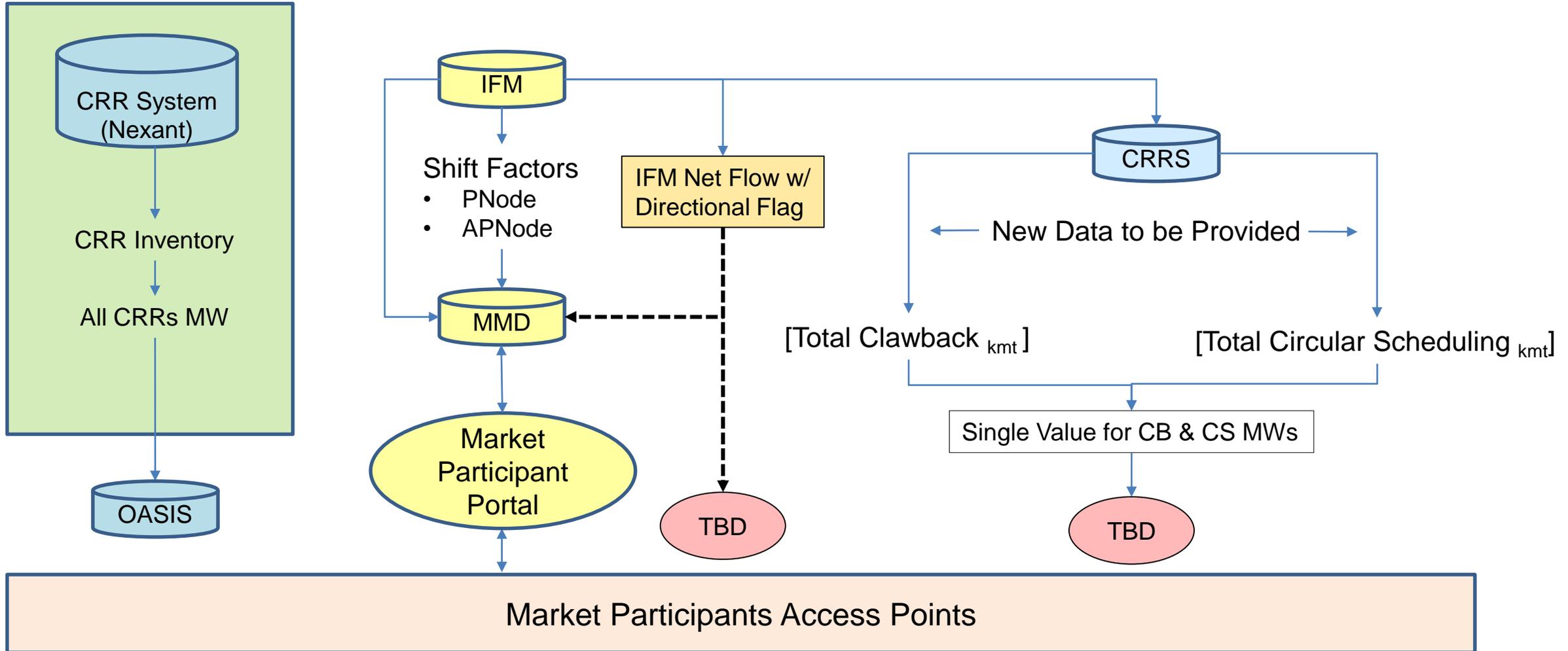
# Offset Calculations – Deficit & Surplus

Total Rated Capacity @ Constraint

Total CRR MW flow$_t$ @ Constraint > IFM Net flow$_t$

Total Offset$_{mw}$ Deficit

IFM Net flow$_t$ @ Constraint Relative to Prevailing

Prevailing Direction

Total Offset$_{mw}$ Surplus

Total CRR MW flow$_t$ @ Constraint < IFM Net flow$_t$

OASIS

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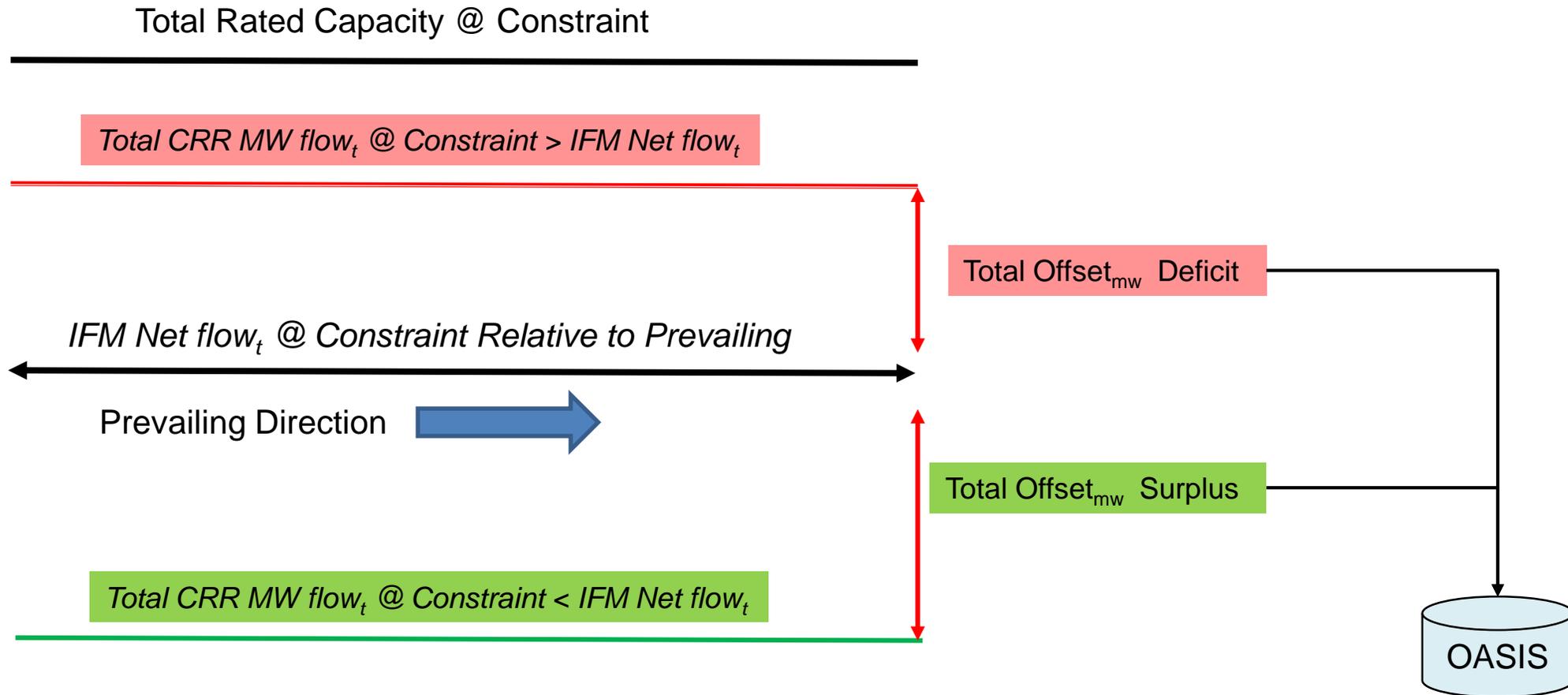
# Offsets at Portfolio (BA) Level

**Alpha Factor (%) =>**   $$\dfrac{\textit{Total CRR MW}_p \textit{ for BA1 Portfolio @ Constraint}}{\textit{Total CRR MW}_p \textit{ for all Portfolios @ Constraint}}$$   = % assigned to BA1

Total Offset$_{mw}$ Deficit

Total Offset$_{mw}$ Surplus

OASIS
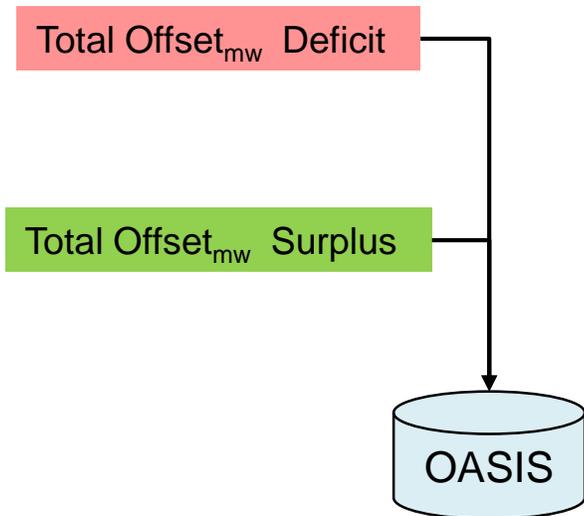
Total Offset$_{mw}$ Deficit   X   % assigned to BA1   =   Offset MW to BA1$_p$

Offset MW to BA1$_p$   X   Shadow Price $   =   Offset $$ to BA1$_p$

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