



BPA Customer Led Workshop

May 18, 2023



THE SAVION STORY

Savion, a Shell Group portfolio company operating on a stand-alone basis, is an industry-leading solar and energy storage organization built on a foundation of specialized experience and mastery in the craft of development.

With a growing portfolio of more than 36.5 GW, Savion is currently one of the country's largest and most technologically advanced utility-scale solar and energy storage project development companies.

Savion's diverse team provides comprehensive services at each phase of renewable energy project development, from conception through construction. Savion is committed to helping decarbonize the energy grid by replacing electric power generation with renewable sources and delivering cost-competitive electricity to the marketplace.



Desired Queue Reform Outcomes



BPA's Generation Interconnection ("GI") study process must be designed to drive appropriate Interconnection Customer ("IC") behavior

- Must contain criteria discouraging speculative entry including:
 - Meaningful site control requirements
 - Sizable financial deposits that indicate "commitment"
 - Clear data requirements
- Must be structured to minimize late-stage withdrawals:
 - Financial parameters must increase at each study stage
 - The risk of financial deposit forfeiture must increase at each study stage
 - Financial structure must encourage ICs with no line-of-sight to affordable cost allocation to withdraw at the nearest decision point
 - Cost-causation principles must be followed
 - Harm assessments must be performed for ICs that withdraw after the first decision point, and restitution must be made to harmed ICs
 - Encourage ICs to financially cure site control deficiencies
 - Make all study models / assumptions available to ICs in a timely manner

Reform outcomes must promote level playing field across project size and developer profile

First Ready, First Served Process

BPA Proposed Alternatives



FERC NOPR

- Savion is hesitant to model reforms after FERC NOPR, as they have not been implemented and are subject to material changes

FERC NOPR – BPA Revisions

- Savion does not recommend this approach as concerns outlined above apply

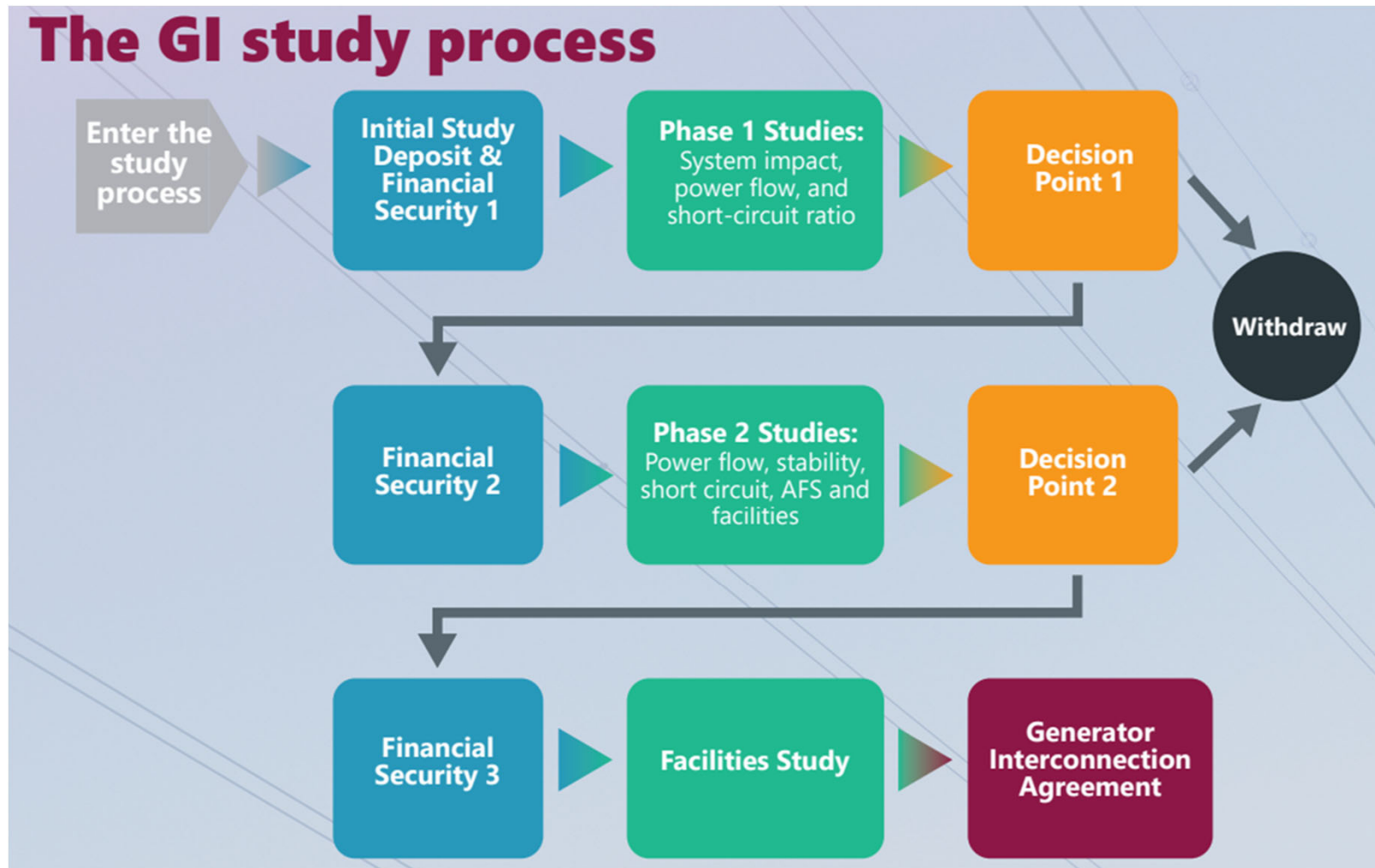
FERC approved approach in other markets

- Savion suggests BPA adopt a FERC approved First Ready First Served (FRFS) cluster study process akin to SPP's 3-stage DISIS process or MISO's 3-stage DPP process

Savion's Preferred FRFS Process: SPP's 3-Stage DISIS



Savion suggests BPA adopt a FERC approved First Ready First Served (FRFS) cluster study process akin to SPP's 3-stage DISIS process:

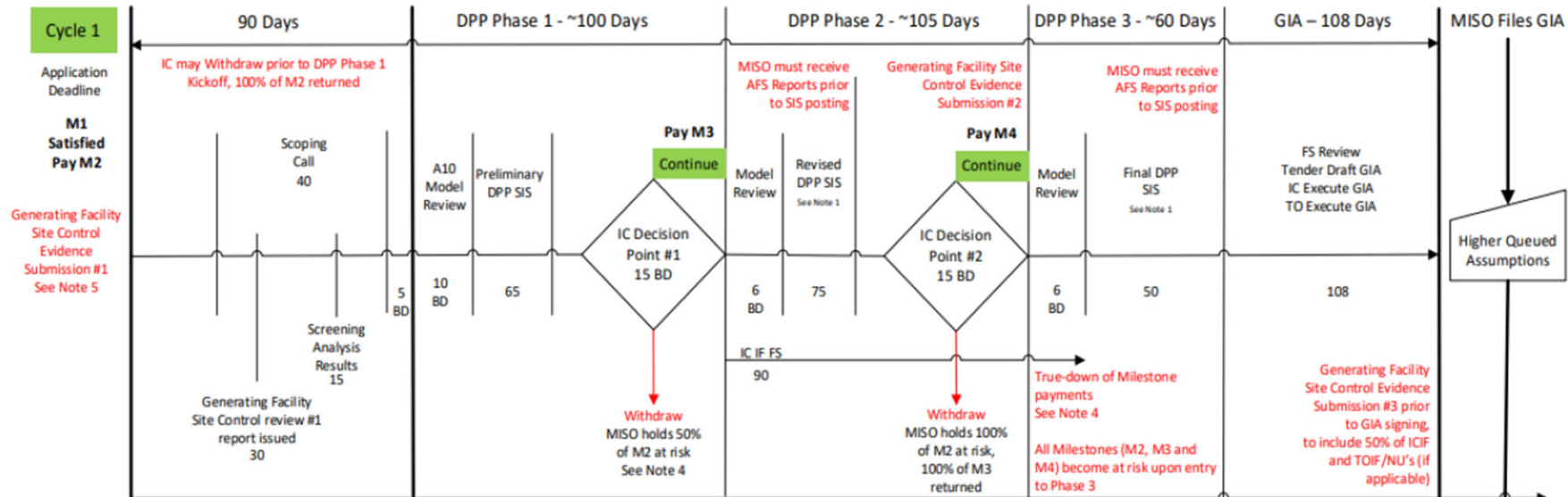


Alternative FRFS Processes: MISO's 3-stage DPP



Generator Interconnection Process

DPP Phase 1 + DPP Phase 2 + DPP Phase 3 + GIA = ~ 373 Days



M1 = Technical requirements, D1 + D2
M2 = \$4000/MW
M3 = (10% of NU) – M2 See Note 2
M4 = (20% of NU) – M3 – M2 See Note 2

Acronyms:
AFS: Affected Systems Study
BD : Business Days
DPP : Definitive Planning Phase
D1 : Application Fee
D2 : DPP Study Funding Deposit
FS : Facilities Study
GIA : Generator Interconnection Agreement
IC : Interconnection Customer
IF : Interconnection Facility
M1, M2, etc. : Milestones
NU : Network Upgrades
POI : Point of Interconnection
SIS : System Impact Study

Notes:
1) Effective September 19th 2018, for new cycles, Affected System, Stability, and Short Circuit Studies are required only for DPP Phase 2 and DPP Phase 3
2) M3 and M4 will be adjusted based on previously paid M3 and M4 for Provisional Requests
3) DPP Phase 1 and Phase 2 of each cycle will model higher queued assumptions from previous Phase 3 studies as available during the time of the study
4) True-down and Milestone M2 50% at risk should a project withdraw go into effect beginning with DPP-2020-Cycle
5) Site Control documentation for Review #1 is due at least 90 Calendar Days prior to the kick-off of DPP Phase 1 beginning with DPP-2020-Cycle
6) Days on this diagram are Calendar Days unless where noted as Business Days – “BD”

IC Path #1 (Default)
Final NU FS not required prior to start of GIA negotiation

IC Path #2 (Election)
Final NU FS must be complete prior to start of GIA period. Add an additional 90 days to Phase 3

Updated: 5/10/2022

SPP's 3-Stage FRFS Process



SPP's 3-Stage Study Process recognizes:

- Control of the gen-tie right-of-way is equally as important as the site control of the development site
- Security deposits are better at driving appropriate IC behavior than study deposits as they are easily correlated with allocated upgrade costs
- Educated ICs make better go / no-go decisions, thus GI study models and assumptions are made available to ICs early and often
- GI study results commonly drive project viability
- ICs' financial obligations:
 - Are structured to correlate directly with upgrade cost allocation
 - Become increasingly at-risk at each study phase
- Penalty Free Withdrawal opportunities incentivize ICs to withdraw from the study process at the appropriate time avoiding withdrawal penalties that wrongly delay ICs withdrawal
- ICs harmed by a fellow IC's late-stage withdrawal should be compensated by the "harmer" IC



Savion's Recommendations



3-Stage FRFS Recommendation



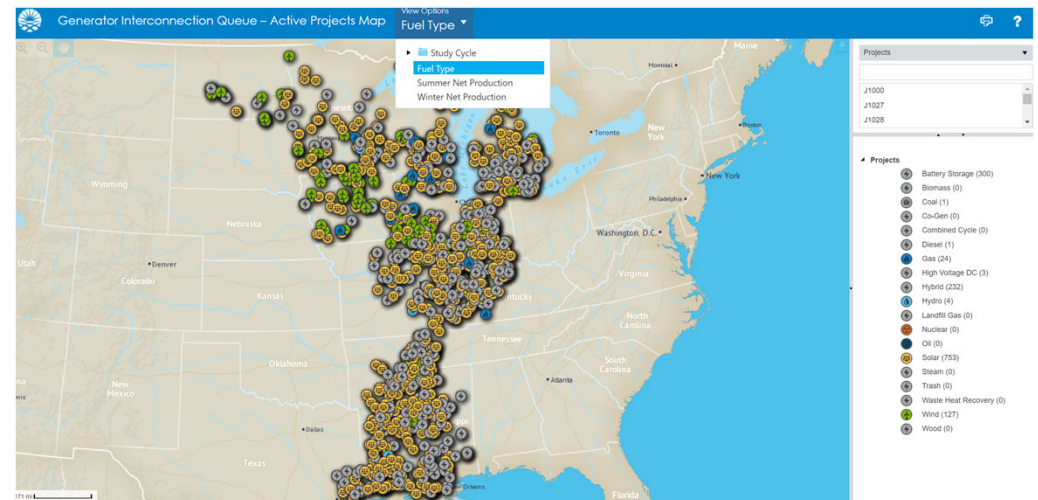
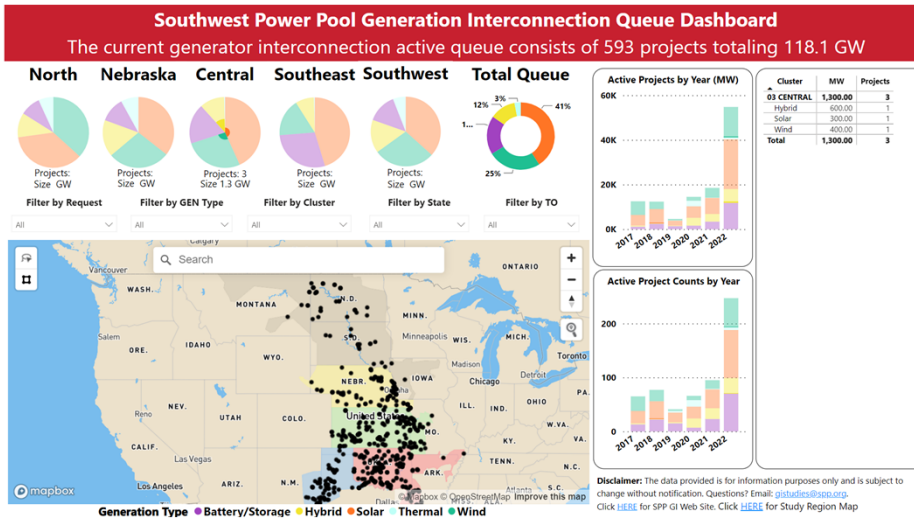
Data Exchange

- Robust information exchange is important for both TPs and ICs. It allows TPs to better perform studies in a timely manner and it allows ICs to make informed decisions.
 - At GI application, ICs should provide full detailed project model data including manufacturers' transient stability models, harmonics and short circuit data.
 - If BPA intends to pursue EMTP studies, BPA should perform a system strength screening analysis and notify ICs at the initial kick-off call if they are required to provide plant specific EMTP data. ICs should provide the required data prior to the kick-off of the Phase 2 study.
 - BPA should provide study model data to ICs early and often. This includes base case, study case and all input files (e.g., scripts, exclude files, topology changes, mon/con files).
 - BPA should consider developing a GI queue dashboard comparable to what SPP and MISO have developed.

3-Stage FRFS Recommendation



Implementation of GI Queue Dashboard (similar to that provided by SPP or MISO)



Readiness Requirements



Study Deposits: study cost correlated

- Should be sized to no more than 2X expected study cost (\$300k max)
- Should be a single up-front payment to avoid accounting "gymnastics"
- Amounts not spent should be refundable

Security Deposits: upgrade cost correlated

- Initial security (FS1) of \$4k per MW
- Subsequent security amounts, FS2 and FS3, should be tied to NU cost allocation (i.e., cost-causer construct)
 - Decision Point 1:
 - $FS2 = (10\% \times \text{Total GI Cost Allocation}) - FS1$
 - 100% of FS1 become "at-risk" at conclusion of DP1
 - Decision Point 2:
 - $FS3 = (20\% \times \text{Total GI Cost Allocation}) - (FS2 + FS1)$
 - 100% of FS1+FS2+FS3 become "at-risk" at conclusion of DP2

Readiness Requirements



Site Control

- Parameters:
 - Wind: 30 acres / MW
 - Solar: 6 acres / MW
 - Battery: 0.1 acre / MW
 - New POI: As specified by BPA
- At Application:
 - 100% of gen facility + 50% gen-tie ROW
 - In-Lieu-of-Payment: \$100k/mile for entire gen-tie length with 50% nonrefundable. Refundable portion only refunded if site control is attained prior to withdrawal.
- At DP1:
 - Continued evidence of site control
- At DP2:
 - 100% of gen facility + 75% gen-tie ROW
- At IA execution:
 - 100% of gen facility, gen-tie ROW and POI (if necessary)
- Exceptions should be incorporated where the IC is working in good faith with a government authority to secure site control.

Readiness Requirements



Commercial Readiness Milestones

- We believe CRMs do not meaningfully protect against 3rd parties who may seek to exercise leverage via their continued participation in the contracts employed to meet the CRM.
- Requiring ICs to post some amount of at-risk financial security is a better gauge of an IC's belief in their project's viability.
- If BPA chooses to incorporate CRMs in its queue reform:
 - Offtake agreements with C&I customers, Load Serving Entities, and Load Responsible Entities should all be eligible CRM venues.
 - CRMs should be an additional option for study advancement, not the only option.

Study Financials

Study Costs



Allocation of Study Costs

- Savion recommends Alternative 4 as the best approach - dividing study cost evenly across all GI requests.
- Savion's 2nd choice would be Alternative 2 - allocating study costs 50:50 according to 1) pro rata MWs, and 2) the number of requests.
- Savion opposes Alternative 3 - study costs should not be allocated purely on a pro rata MW basis, as this wrongly implies that larger GI requests always require more work hours to study than small GI requests.
 - Poorly sighted small projects can trigger massive upgrades, including stability upgrades, whereas a well sighted large project may have minimal impact to heavily loaded elements.
- In any case, BPA must define how it will apply study costs for hybrid and co-located "non-additive" GI requests (i.e., Will calculation be based on MW impact at POI or nameplate MW?).

Study Financials

Incentivizing Advancement or Withdrawal



Penalty Free Withdrawal

- At DP1 (FS1 posted previously, FS2 to be posted):
 - FS1 payment is fully refundable if IC withdraws prior to end of DP1
 - FS1 becomes at-risk upon DP1 conclusion
- At DP2 (FS1 & FS2 posted previously, FS3 to be posted):
 - FS2 payment is fully refundable if IC withdraws prior to end of DP2
 - FS2+FS3 become at-risk upon DP2 conclusion
 - FS1 is refundable upon IC withdrawal if Phase 2 upgrade cost increases 25% or more AND increases by at least \$10k/MW compared to Phase 1 upgrade cost
- At FacS Completion (FS1, FS2 & FS3 have all been posted):
 - FS1+FS2+FS3 are refundable if upgrade cost increases 35% or more AND increases by at least \$15k/MW compared to Phase 2
 - FS1+FS2+FS3 are refundable if upgrade cost increases 50% or more and increases by at least \$20k/MW compared to Phase 1

In all withdrawal situations, if such withdrawal results in no cost allocation increases to other equally queued ICs, the withdrawing IC is reimbursed 100% of all FS payments as no harm has occurred.

Study Financials

Network Cost Allocation



Cost Allocation of Shared Upgrades

- Cost allocation should follow FERC's cost-causation principles and should be closely correlated to the impact an IC's project has on the power system
 - Steady-State Thermal Upgrades: Assign cost allocation via MW-Impact method using TDF
 - Steady-State Voltage Upgrades: Assign cost allocation on per project voltage degradation
 - Transient Stability Upgrades: Assign cost allocation on a pro-rata MW basis across all ICs contributing to the violation
 - Communications Upgrades (e.g., fiber): Assign cost equally across all ICs benefitting from the upgrade

BPA Alternative 3 well aligns with Savion's recommendation

Transition Process



Transitional Study

- A Transitional Study program is necessary to address BPA's GI queue backlog currently far exceeding system capacity
- We believe this can be accomplished by allowing ICs that have executed Facility Study Agreements to have the opportunity to advance to a LGIA by participating in a cluster study that is exclusive to them. The remaining ICs in BPA's GI queue that have not completed a System Impact Study could also advance to a LGIA by participating in a subsequent cluster study
- What might this look like?

BPA's Transitional Study Alternatives

- Savion supports Alt 1: FERC NOPR – Transitional Cluster
- Savion rejects Alt 2: BPA Staff Proposal – FRFS Hybrid Transitional Process due to:
 - Commercial Readiness Requirements concerns
 - Drawbacks to serial study process (and the continued implication on both transitional projects and future projects)

Transition Process



ICs currently in Facility Study AND meet the below criteria would qualify for an exclusive cluster study:

- To enter the Cluster Study:
 - ICs must provide evidence demonstrating 100% of site control and gen-tie ROW for at least one year beyond the to-be-announced Transition Date
 - ICs may lower project size to align with site control
 - ICs must post Financial Security that is the greater of \$5M or 20% of interconnection costs allocated in the SIS
- To proceed to GIA execution following Cluster Study completion:
 - The same 100% site control should extend through the Project COD
 - A Decision Point should be employed at the end of the Cluster Study whereby the IC must withdraw or place their financial security fully at-risk to execute a GIA

Transition Process



ICs currently in System Impact Study or earlier and which meet the below criteria would qualify for another secondary cluster study.

- **Criteria for the Secondary Cluster Study:**
 - ICs must provide evidence showing 100% control of the development site and 50% control of gen-tie ROW for at least one year beyond the to-be-announced Transition Date.
 - ICs may lower project size to align with site control.
 - ICs must post \$4k/MW Financial Security.
 - The Secondary Cluster Study process would then follow the typical study process outlined on slide 10

Does the 3-stage FR/FS Process Work?



SPP DISIS-2017-001 Study Response (SPP's first 3-stage cluster study)

- At Decision Point 1: (96 initial GIRs totaling > 14.4 GW)
 - 55 ICs with ERIS cost allocation < \$300k/MW
 - 10 withdrew (18.2%)
 - 10 ICs with ERIS cost allocation $\$300\text{k/MW} < X < \500k/MW
 - 3 withdrew (30%)
 - 31 ICs with ERIS cost allocation > \$500k/MW
 - 17 withdrew (54.8%)
- At Decision Point 2: (64 GIRs)
 - 39 ICs with ERIS cost allocation < \$300k/MW
 - 5 withdrew (12.8%)
 - 4 ICs with ERIS cost allocation $\$300\text{k/MW} < X < \500k/MW
 - 2 withdrew (50%)
 - 21 ICs with ERIS cost allocation > \$500k/MW
 - 18 withdrew (85.7%)
- At Decision Point 2 Restudy: (37 GIRs)
 - 34 of 37 ICs possessed ERIS cost allocation < \$200k/MW
 - 3 of 37 ICs possessed ERIS cost allocation $\$200\text{k/MW} < X < \300k/MW

Does the 3-stage FR/FS Process Work?



SPP DISIS-2017-002 Study Response

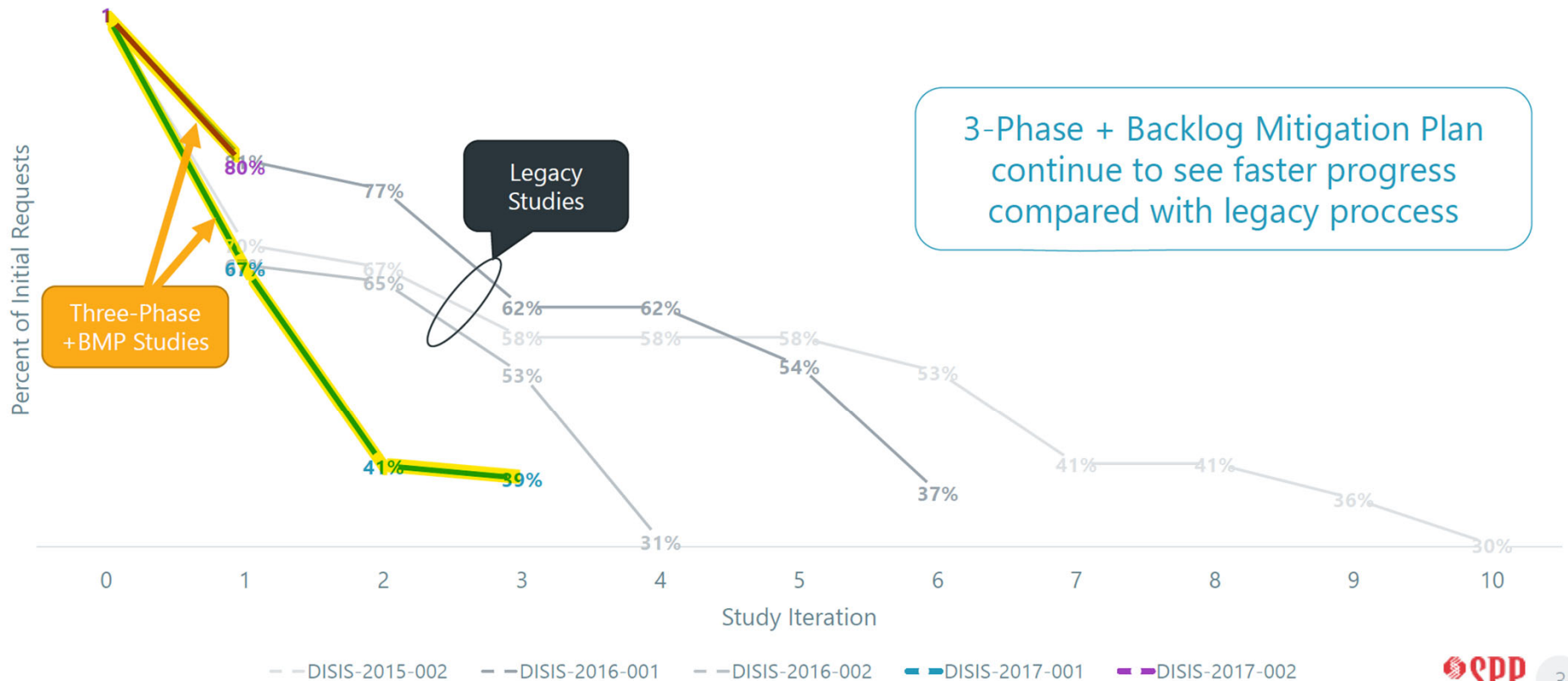
- At Decision Point 1: (113 GIRs totaling > 22.6 GW)
 - 62 ICs with ERIS cost allocation < \$300k/MW
 - 7 withdrew (11.3%)
 - 32 ICs with ERIS cost allocation \$300k/MW < X < \$500k/MW
 - 4 withdrew (12.5%)
 - 19 ICs with ERIS cost allocation > \$500k/MW
 - 3 withdrew (15.8%)
- At Decision Point 2: (98 GIRs totaling >19.5 GW)
 - 89 ICs with ERIS cost allocation < \$300k/MW
 - 13 withdrew (14.6%)
 - 7 ICs with ERIS cost allocation \$300k/MW < X < \$500k/MW
 - 4 withdrew (57.1%)
 - 2 ICs with ERIS cost allocation > \$500k/MW
 - 2 withdrew (100%)
- **Why was DP1 apparently ineffective at removing GI customers?**
 - *SPP announced prior to DP1 that the transition to fuel-based dispatch and the disabling of Area Interchange would be implemented in Phase 2.*
 - *GI customers got it right!*

Does the 3-stage FR/FS Process Work?



HOW ARE WE DOING? GI 3-PHASE DISIS PROCESS

Comparison of the 3-Phase + Backlog Mitigation with legacy process



3-Phase + Backlog Mitigation Plan continue to see faster progress compared with legacy process



Questions?

Thank You



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