CIR Transfer Education

Mark Sims
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Interconnection Analysis

CIR Transfer Manual Language

- PJM Manual 14G: Generation Interconnection Requests

- Section 4.4 – Transfer of Capacity Interconnection Rights
  - Transfer of Capacity Interconnection Rights (CIRs)
    - Prior to commercial operation
    - From an operating unit
    - From a deactivated unit

CIR Transfer Process Overview

- 4.4.2 CIR Transfer Process
  - Load Flow
    - Test looks at the case with the existing rights and at the case with the proposed transfer of rights (i.e. what is the delta?)
    - Iterative and labor intensive
  - Short Circuit
    - Similar to load flow
    - Increase in fault current
    - Identify system needs
  - Stability
    - Monitor system performance

CIR Transfer Challenges and Discussion

- Queue priority
- Electrical characteristics of new facility vs. existing facility
  - POI
  - Machine parameters
  - Direct connection facilities
- Incorporation of CIR transfer procedure in future interconnection process following IPRTF reform

Incremental Rights Education

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Incremental Rights

- Incremental rights may be awarded by funding transmission system upgrades which may provide specific additional transmission capability on the system
- Requested through the PJM New Services Queue
  - Usually via Merchant Transmission Request (Attachment S) or Upgrade Request (Attachment EE)

Incremental Available Transfer Capability Revenue Rights (IATCRRs)

- Available Transfer Capability (ATC) – is the additional capability on the system that can be scheduled for further energy transfer across a particular path (source/sink).
- IATCRRs - rights generated from the incremental increase in Available Transfer Capability (ATC) created by the addition of new merchant transmission facilities or customer-funded transmission system upgrades.
- References: Tariff Section 233; Manual 14 E, Attachment C
- Customer must specify source/sink pair(s) being requested for IATCRRs.
- IATCRRs Requested to date: None

Incremental Deliverability Rights (IDRs)

- IDRs are rights resulting from the incremental increase in transmission capability created by the addition of new merchant transmission facilities to inject energy and capacity at a point on the system that satisfies the deliverability requirement of a Capacity Resource.
- IDRs are converted to capacity interconnection rights (CIRs) via an IDR Transfer Agreement to a generation resource. The IDR holder has one year after commencement of interconnection service to transfer the IDRs.
- References: PJM Tariff section 235; Manual 14 E, Attachment E
- Customer must provide the electrical bus/substation where the IDRs are being requested.
- PJM Planning evaluates and determines the IDRs
- IDRs Requested & Granted to date: Since 2011, less than 5 IDR requests, none granted.

Incremental Auction Revenue Rights (IARRs)

- Auction Revenue Rights (ARRs) – entitlements to receive an allocation of the revenues from FTR auctions
  - Financial Transmission Right (FTR) – financial instrument which allows compensation for congestion charges
  - Economic value of ARRs depends on MW amount and price difference between source and sink nodes
- Incremental Auction Revenue Rights (IARRs) are additional Auction Revenue Rights (ARRs) generated by the addition of new merchant transmission facilities or customer-funded transmission system upgrades.
- References: Tariff Section 231; Manual 14 E, Attachment D; Manual 6
- Customer must provide the source/sink pair(s) being requested for the IARRs
- Evaluated by PJM Markets
- Since 2016, ~6 IARR requests through Queue and zero IARRS were awarded.

Incremental Capacity Transfer Rights (ICTRs)

- Capacity Transfer Rights (CTRs) – financial instrument to allocate the economic value of transmission import capability that exists into a Locational Deliverability Area (LDA).
- ICTRs - rights generated by the addition of new merchant transmission facilities or customer-funded transmission system upgrades which increase the import capability into a Locational Deliverability Area (LDA) (i.e. an increase to the Capacity Emergency Transfer Limit (CETL) of a given LDA)
- References: PJM Tariff Sections 234; Manual 14 E – Attachment F; Manual 18
- Customer must provide the LDA(s) for which the ICTRs are being requested.
- PJM Planning evaluates and determines the ICTRs
- ICTRs Requested from generator funded network upgrades: Less than 5

Incremental Financial Rights – Transition to Proposed Interconnection Process

- There has been a small number of requests for these incremental rights. In addition, most of the requests are by merchant transmission interconnection customers (Att. S) and Upgrade Request (Att. EE) customers
- PJM present proposal:
  - Remove the eligibility of generators, controllable merchant transmission customers, and LTF customers funding network upgrades to support their requested service to receive these incremental rights.
    - With no queue priority among a group of service requests in a given cycle, issue arises between merchant transmission interconnection/Upgrade Request customers and generators needing the same upgrade on who receives the incremental rights to the upgrade.
    - Also introduces cost uncertainty onto the generators as it would be unclear if the merchant transmission interconnection/Upgrade Request project is moving forward and will build the upgrade while all projects are still under study.
  - IARRs, ICTRs, IDRs can still be requested by merchant transmission interconnection customers (Att. S) and Upgrade Request (Att. EE) customers as currently applicable
  - Remove IATCRRs as they are not utilized

Site Control Proposal

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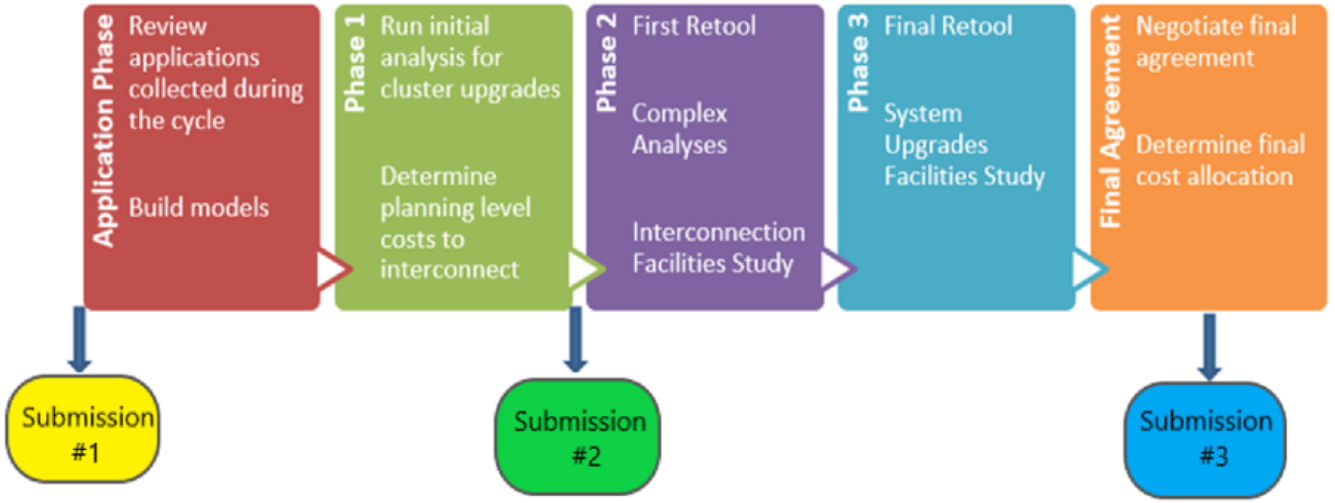
Site Control: Submission Timing

Site Control Submissions

SUBMISSION #1 – APPLICATION PHASE
• Initial Application, 90 days prior to Phase 1
SUBMISSION #2 – DECISION POINT 1
• At Decision Point 1. (Prior to Phase 2)
SUBMISSION #3 – DECISION POINT 3
• Prior to execution of final ISA in Final Agreement Phase.



Site Control: Form of Evidence

Form of Evidence

SUBMISSION #1 – APPLICATION PHASE	
Full Site Control for:	**Site Plan Showing:**
• Generating Facility: deed/lease/option[1]	• Generating site • Interconnection Facilities • Interconnection Switchyard (if required)
SUBMISSION #2 – DECISION POINT 1	
Full Site Control for:	**Site Plan Showing:**
• Generating facility: deed/lease/option • Interconnection Facilities: deed/lease/option/ROW • Interconnection Switchyard: deed/lease/option	• Generating site • Interconnection Facilities • Interconnection Switchyard (if required)
SUBMISSION #3 – DECISION POINT 3	
Full Site Control for:	**Site Plan Showing:**
• Generating facility: deed/lease/option • Interconnection Facilities: deed/lease/option/ROW • Interconnection Switchyard: deed/lease/option[2]	• Generating site • Interconnection Facilities • Interconnection Switchyard (if required)

[1] For Merchant Transmission, need site control for Transmission Facility (PAR, VFT, transmission line, etc.) up front at the Application Phase.

[2] Project Developer will need to be in compliance with Interconnection Transmission Owner's ultimate ownership requirements for the Interconnection Switchyard.

Site Control: Term

Site Control Term

SUBMISSION #1 – APPLICATION PHASE	
Full Site Control: • Generating facility: deed/lease/option	**Term Requirement:** • 1 Year from Application Deadline
SUBMISSION #2 – DECISION POINT 1	
Full Site Control: • Generating facility: deed/lease/option • Interconnection Facilities: deed/lease/option/ROW • Interconnection Switchyard: deed/lease/option	**Term Requirement:** • Additional 1 Year from last day of Phase 1 • 1 Year from last day of Phase 1 • 1 Year from last day of Phase 1
SUBMISSION #3 – DECISION POINT 3	
Full Site Control: • Generating facility: deed/lease/option • Interconnection Facilities: deed/lease/option/ROW • Interconnection Switchyard: deed/lease/option	**Term Requirement:** • Additional 5 Years from last day of Phase 3 • Additional 5 Years from last day of Phase 3 • Additional 5 Years from last day of Phase 3

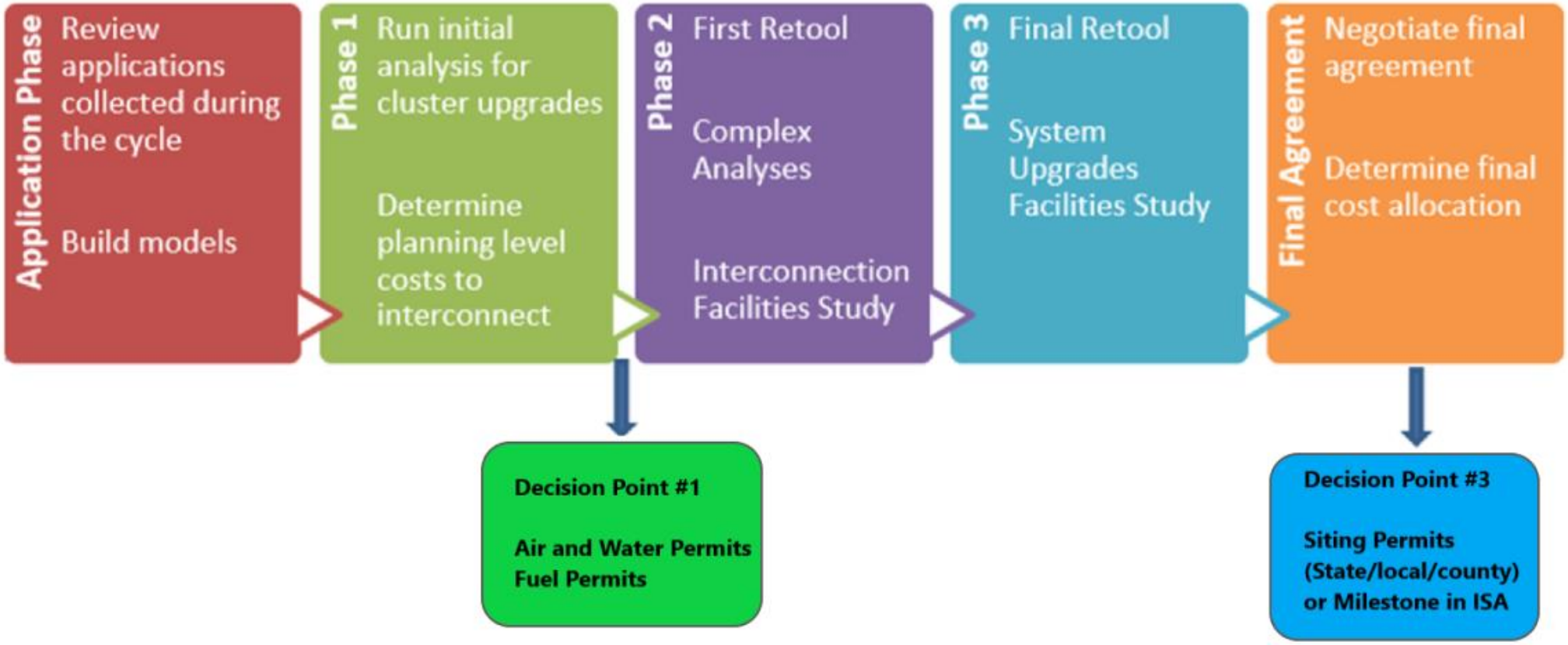
Officer Certifications and Landowner Attestations

Officer Certifications and Landowner Attestations

SUBMISSION #1 – APPLICATION PHASE			
Facility	**Officer Certification**	**Landowner Attestation**	**Duration of Control**
Generating Facility	Yes	Yes (or county recording)	Extends for at least a one year period past the first day of PJM Cycle X relative to Interconnection Request.
SUBMISSION #2 – DECISION POINT 1			
Facility	**Officer Certification**	**Landowner Attestation**	**Duration of Control**
Generating facility, Interconnection Facilities & Interconnection Switchyard	Yes	Yes (or county recording)	Extends at least one year past the last day of PJM Cycle X, Phase 1 relative to Interconnection Request.
SUBMISSION #3 – DECISION POINT 3			
Facility	**Officer Certification**	**Landowner Attestation**	**Duration of Control**
Generating facility, Interconnection Facilities & Interconnection Switchyard	Yes	Yes (or county recording)	Extends at least 5 years past the last day of PJM Cycle X, Phase 3 relative to Interconnection Request.

Note: Officer Certifications and Landowner Attestations are **in addition to** site control!

Permit Points



More on Site Control

Site Control	PJM Proposed Reform
Exclusivity	Exclusivity evidence required in deed/lease/option
Acreage requirements	Solar: 5 Acres per MW Wind: 50 acres per MW Battery Storage 0.1 acres per MW Synchronous Generator: 10 acres per facility *PE Stamped Site Plan will be accepted
Site Sharing	• Identification of other projects sharing site (same owner) • Proposed space utilization by all projects (same owner)
Officer Certifications and Attestations	Site control + Officer Certification + Landowner Attestation (or County Record)
Changes to site	No significant changes permitted (By DP1 need to solidify POI)

Site Control: FAQs

- **Submit by Deadline:**
  Site control (lease/option/deed) must be submitted by the application deadline to be considered a complete application.

- **Use of Officer Certification/Landowner Attestation:**
  Must be submitted along with site control, not in lieu of.

- **Not same name:**
  If site control is not in name of the Project Developer but is in the name of affiliate, the applicant must provide documentation demonstrating the affiliate relationship.

- **Site Control Extensions:**
  Site control must cover the required periods at each submission point. Extensions must already have been exercised to meet the requirement.

Study and Readiness Deposit Proposal

Jason Shoemaker
Manager
Interconnection Projects

- Propose to increase the amount of financial commitment commensurate with study results
- One mechanism used for projects to demonstrate their readiness
- Adverse study results test provides off ramp where there are significant cost increases between phases

Deposit Definitions

- Study Deposit
  - Covers the study costs
  - Fully refundable minus actual study costs
  - Due one time at the beginning of the study process

- Readiness Deposit (RD)
  - Funds committed based upon study results
  - Not used to fund studies
  - Refunds subject to study phase and adverse study results test
  - RDs determined at the time they are due; not to be refunded or reduced based upon later project reductions or cost allocation changes
  - Maximum of three RDs due at the project decision points

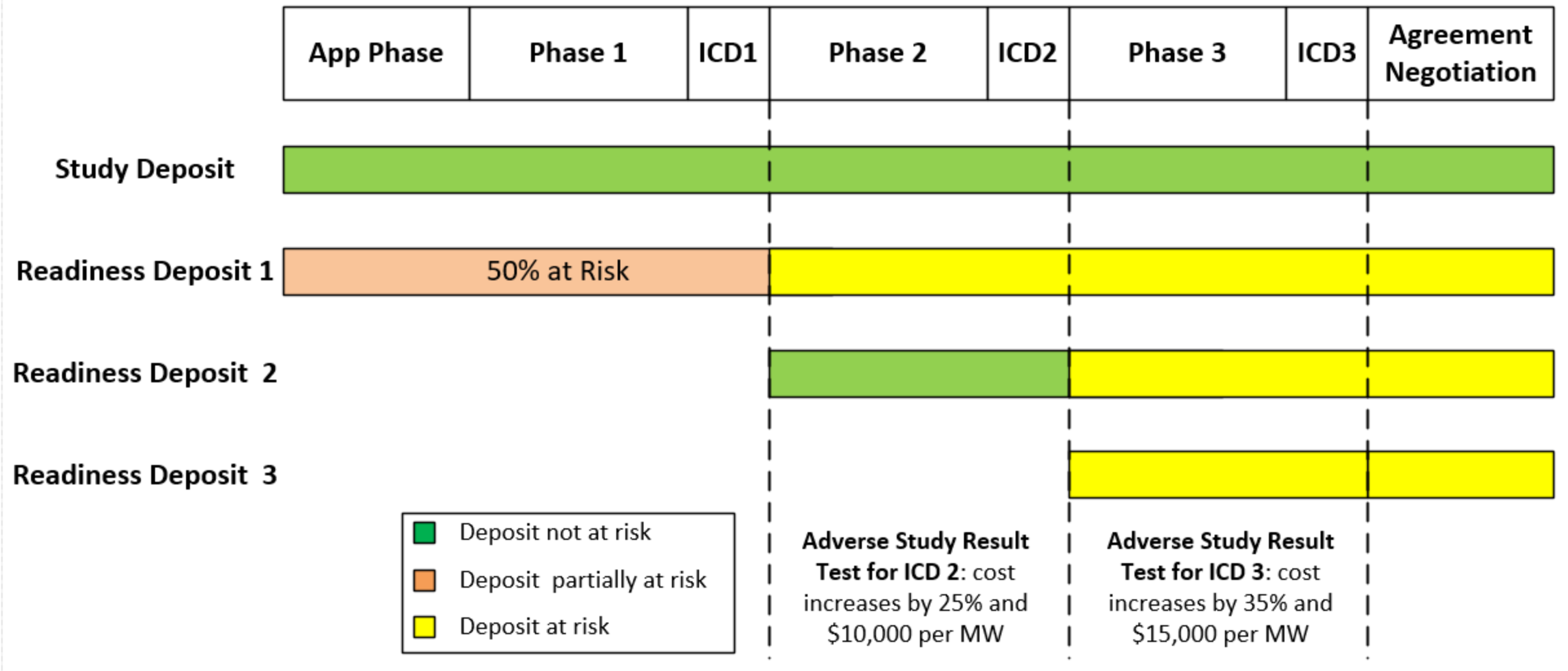
Deposit Calculations

- Study Deposit

Project Size	Study Deposit
0 - 20MW	$75,000
> 20 – 50MW	$200,000
> 50 – 100MW	$250,000
> 100 – 250MW	$300,000
> 250 – 750MW	$350,000
> 750MW	$400,000

- Readiness Deposits
  - RD1 = $4,000 per MW
  - RD2 = (10% of cost allocation towards required Network Upgrades) – RD1
  - RD3 = (20% of cost allocation towards required Network Upgrades) – RD1 – RD2

Study and Readiness Deposit Timeline



Treatment of Readiness Payments due to Adverse Study Results

- At IC Decision 2
  - Increase in Network Upgrade costs allocated to the project of 25% or greater **and** more than $10,000 per MW from phase 1 study results

- At IC Decision 3
  - Increase in Network Upgrade costs allocated to the project of 35% or greater **and** more than $25,000 per MW from phase 2 study results

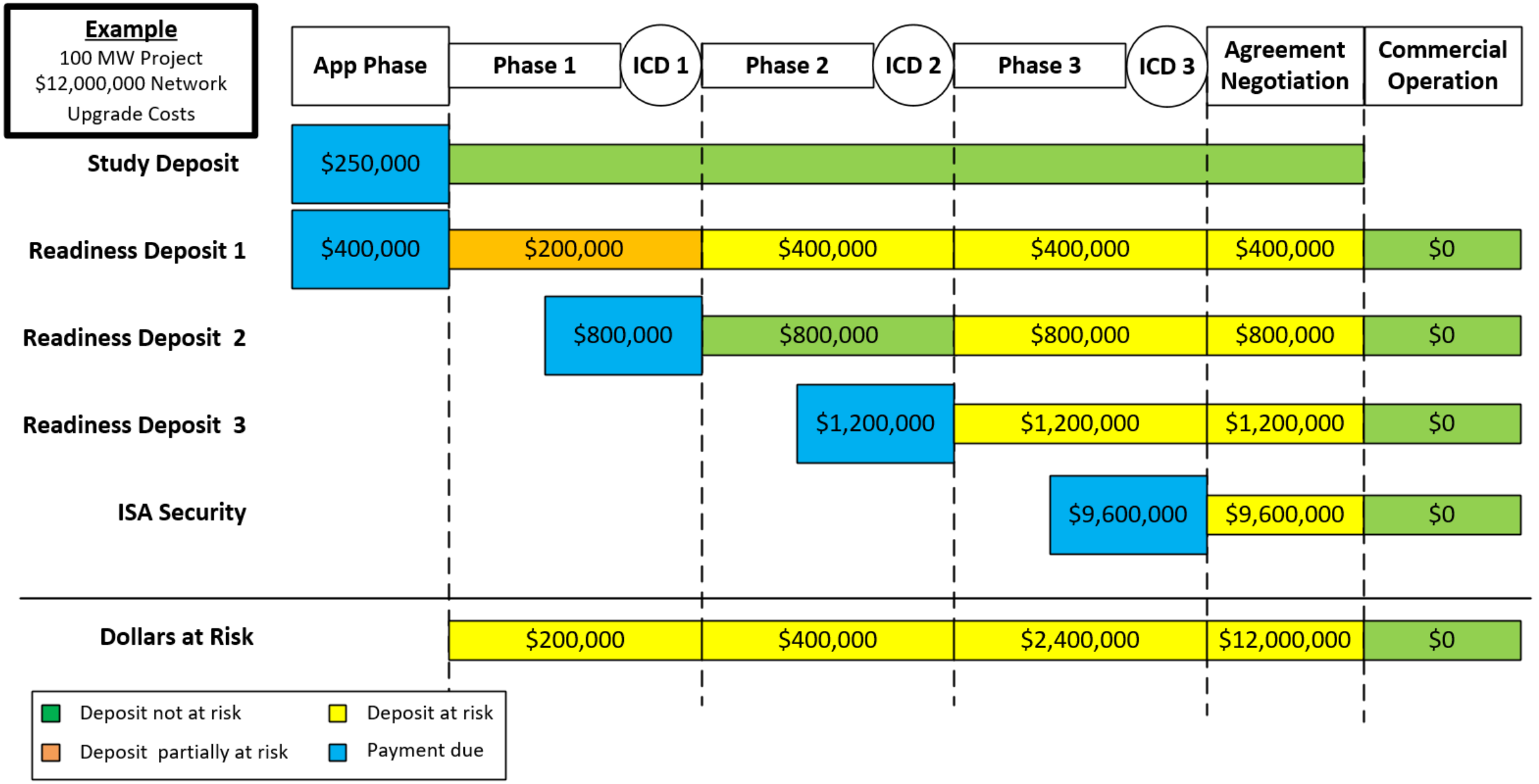
Deposit Example

100 MW Project

- Proposed 100 MW facility
- Network Upgrades
  - Physical interconnection: $5,000,000
  - Cost allocation for system Network Upgrades: $7,000,000
- For this example, costs remain constant

Deposit Example

100 MW Project



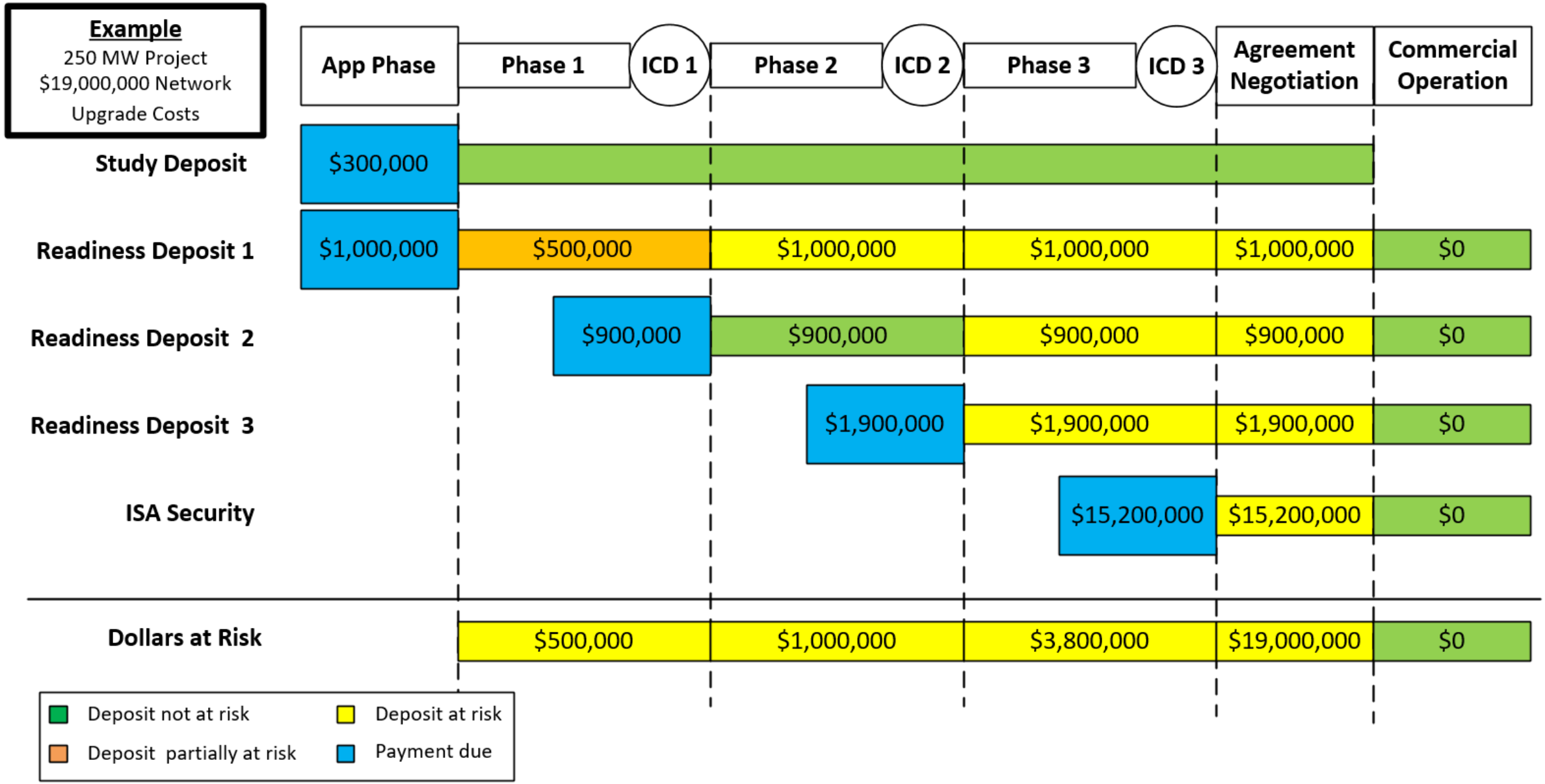
Deposit Example

250 MW Project

- Proposed 250 MW facility
- Network Upgrades
  - Physical interconnection: $9,000,000
  - Cost allocation for system Network Upgrades: $10,000,000
- For this example, costs remain constant

Deposit Example

250 MW Project



Deposit Example
1000 MW Project

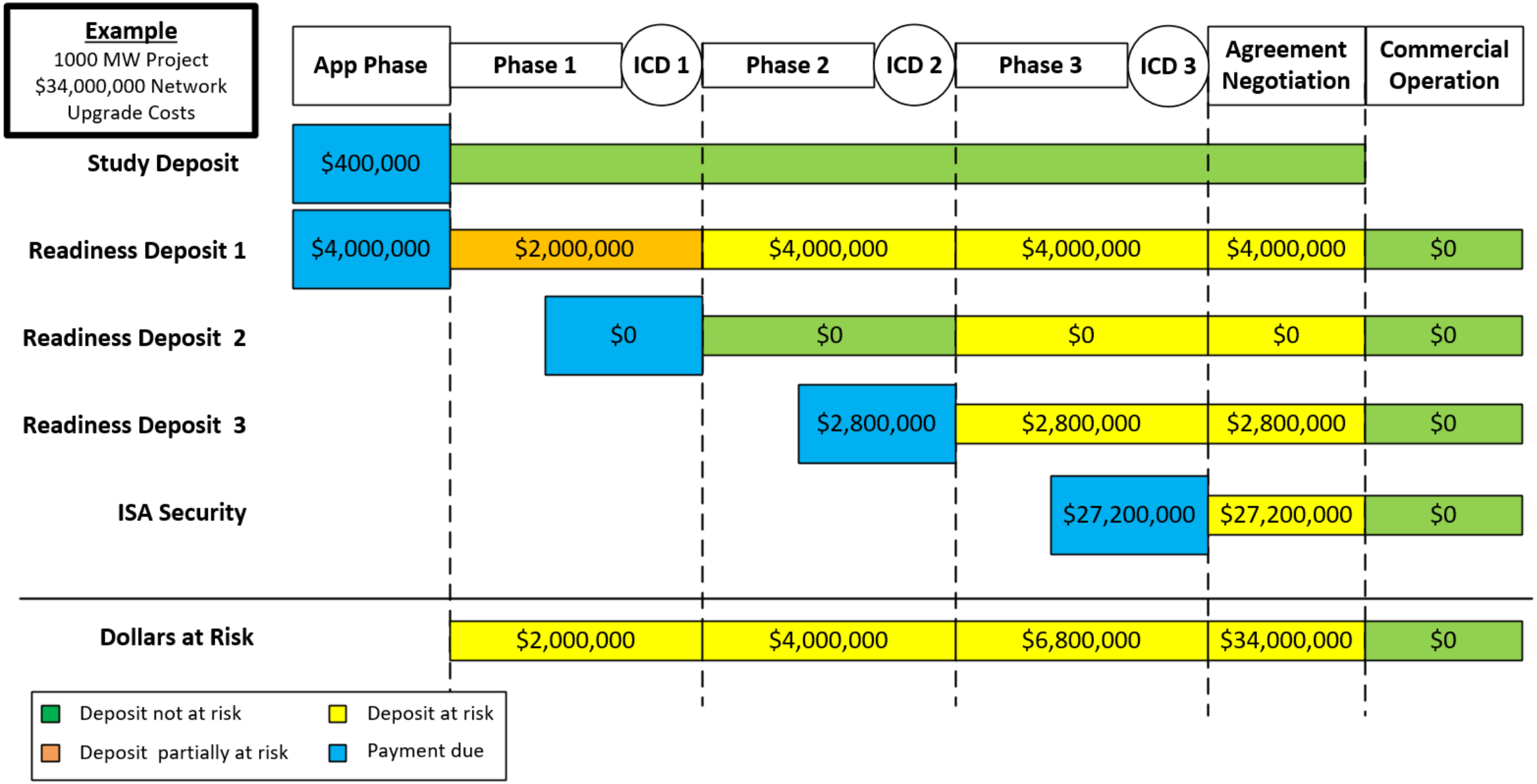
- Proposed 1000 MW facility

- Network Upgrades
  - Physical interconnection: $14,000,000
  - Cost allocation for system Network Upgrades: $20,000,000

- For this example, costs remain constant

Deposit Example

1000 MW Project



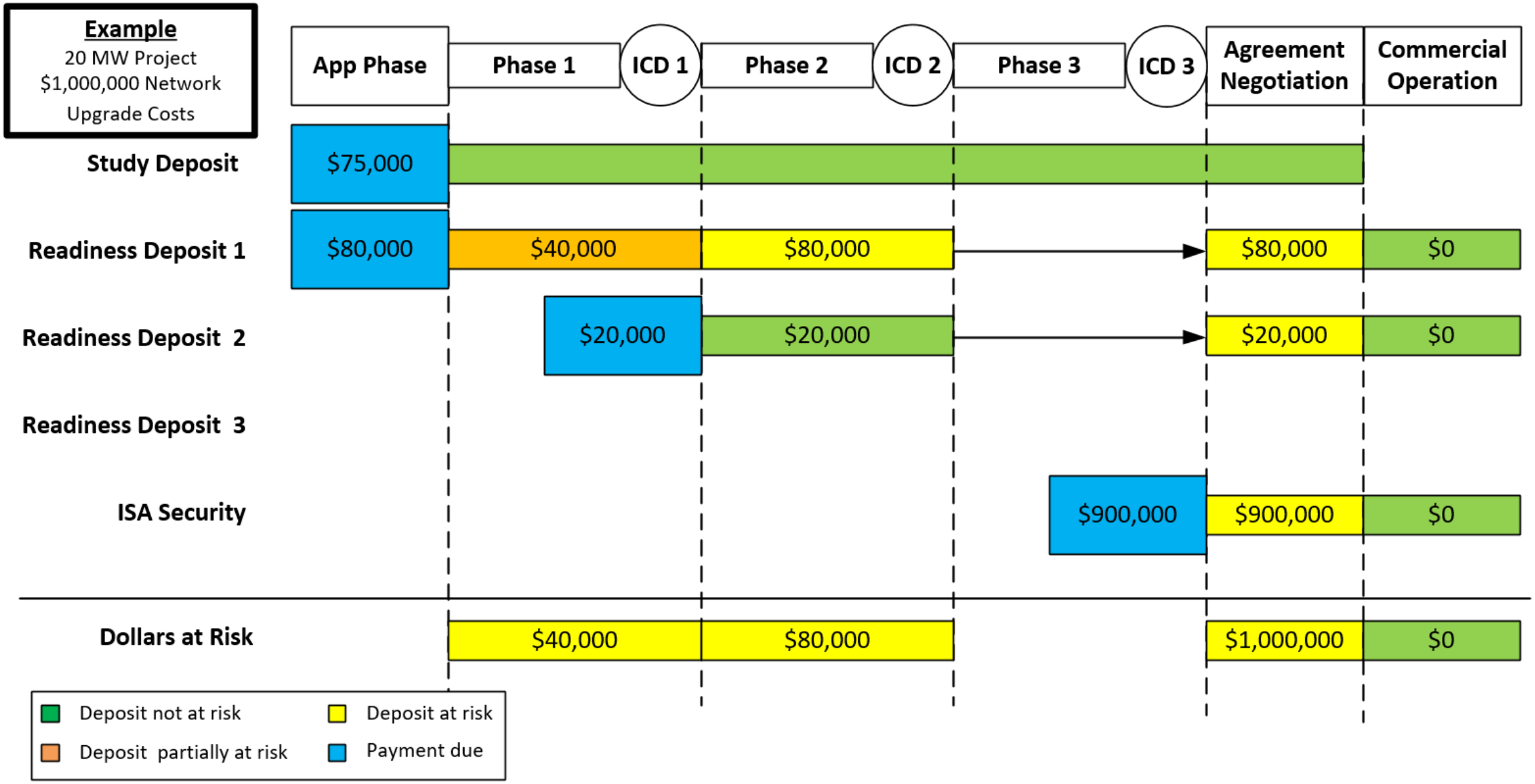
Deposit Example

1000 MW Project

- Proposed 20 MW facility
- Network Upgrades
  - Physical interconnection: $1,000,000
- For this example, costs remain constant

Deposit Example

20 MW Project



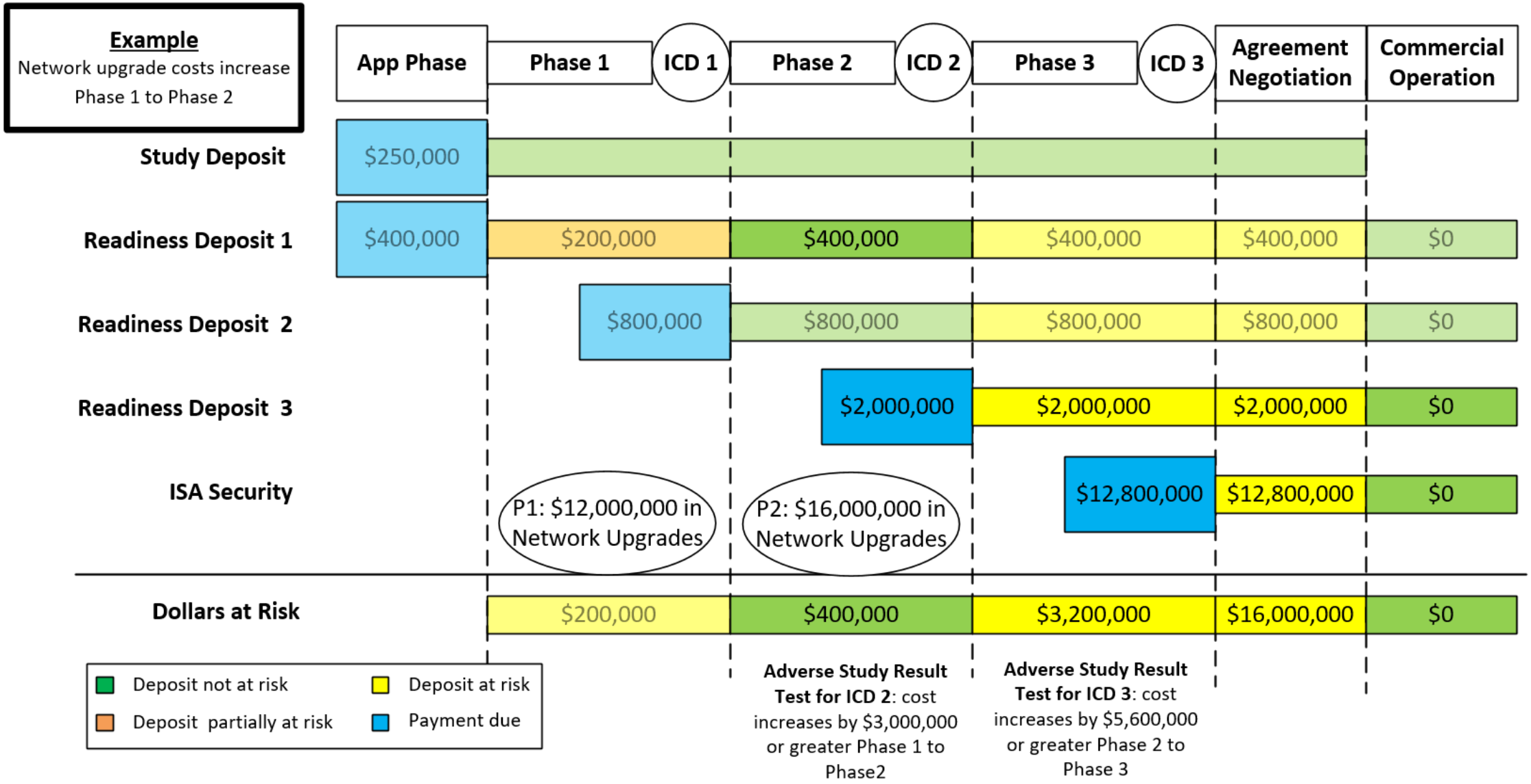
Adverse Study Results Test Example

100 MW Project

- Proposed 100 MW facility
- Network Upgrade findings by Phase
  - Phase 1: $12,000,000
  - Phase 2: $16,000,000
- Adverse Study Results Test parameters for IC Decision Point 1
  - 25% of costs: $3,000,000
  - $10k/MW: $1,000,000

Adverse Study Results Test Example

100 MW Project



Adverse Study Results Test Example

1000 MW Project

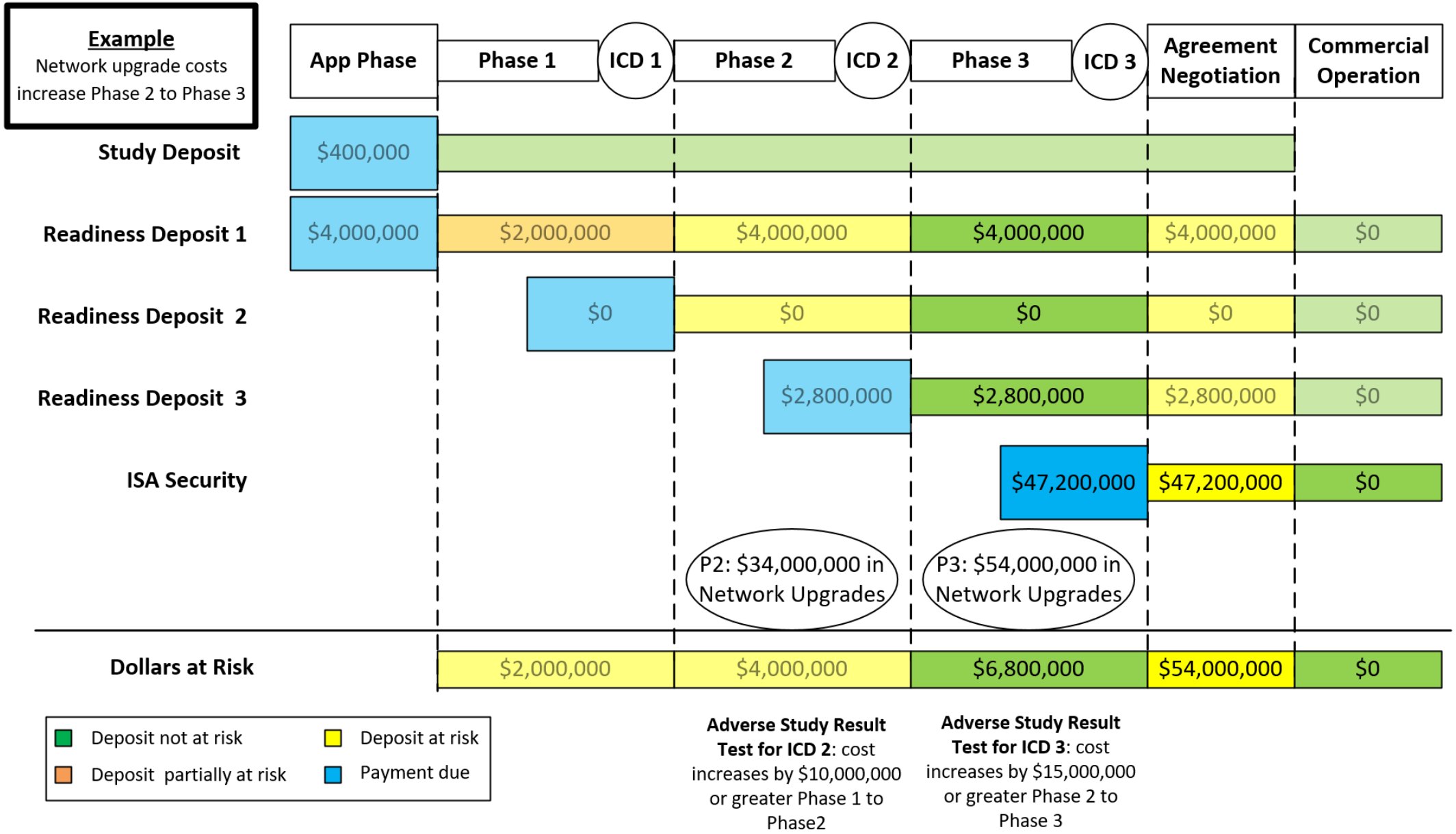
- Proposed 1000 MW facility

- Network Upgrade findings by Phase
  - Phase 1: $34,000,000
  - Phase 2: $54,000,000

- Adverse Study Results Test parameters
  - 35% of costs: $11,900,000
  - $15k/MW: $15,000,000

Adverse Study Results Test Example

1000 MW Project



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Appendix

Interconnection Reform Task Force
PJM Solution Proposal Framework

Overview

- Framework was created by PJM staff and management over several sessions
- The framework borrows heavily from interconnection processes in other RTOs
- Proposed solution is still a work in progress as details still need to be further developed

Guiding Principles for PJM's Proposed Solution

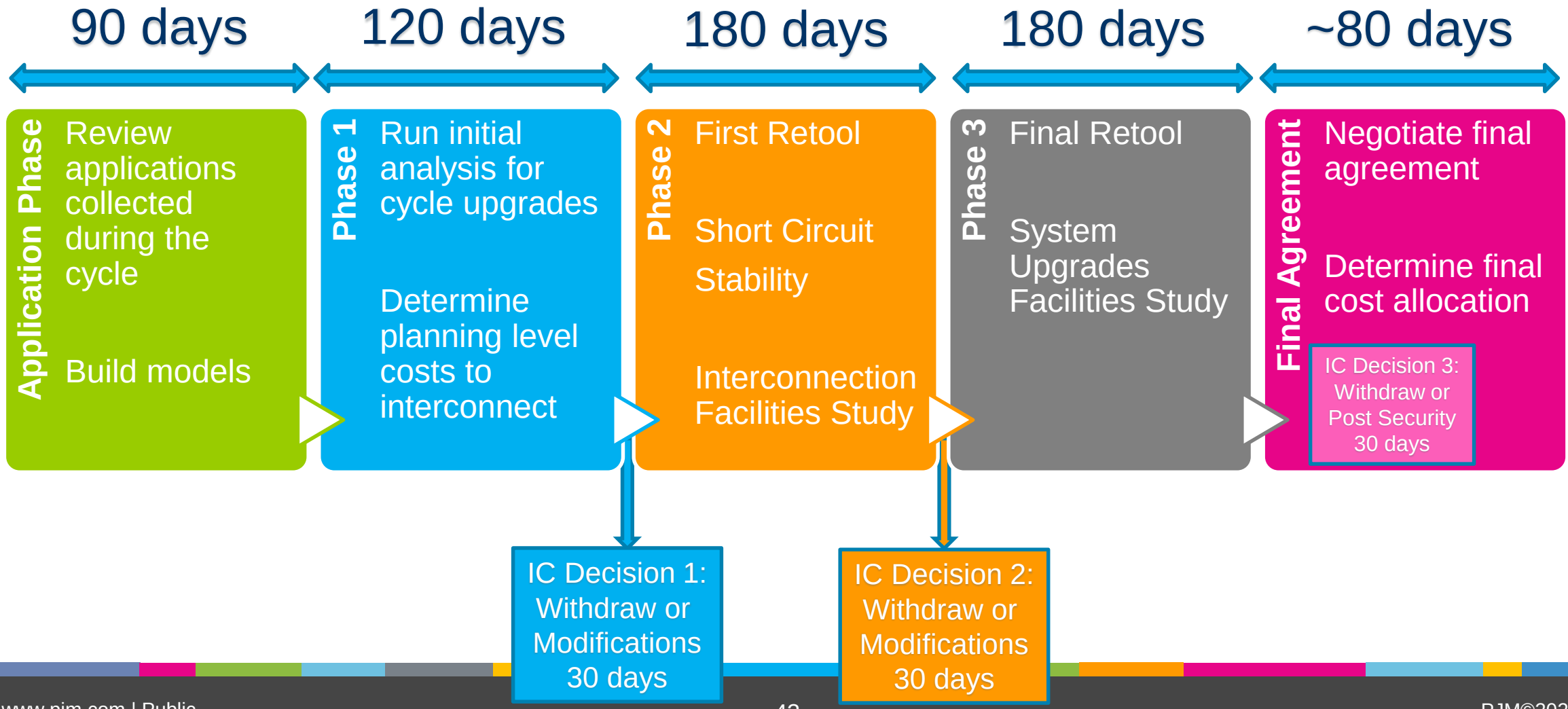
- Ideal timing not to exceed 2 years
- Cost and study construct should be cluster/cycle based and convert from first in/first out processing to first ready/first out processing
  - Readiness demonstrated by site control and financial milestones
- Subsequent cycle management should be assessed based on completion of a certain point in the prior cycle to minimize backlog
- Provide customers with more actionable information, earlier in the process
- Attempt to merge all other application types into new process
- State jurisdictional projects should first receive their interconnection agreement from the Transmission Owner / Distribution Provider prior to coming to PJM

Guiding Principles for PJM's Proposed Solution

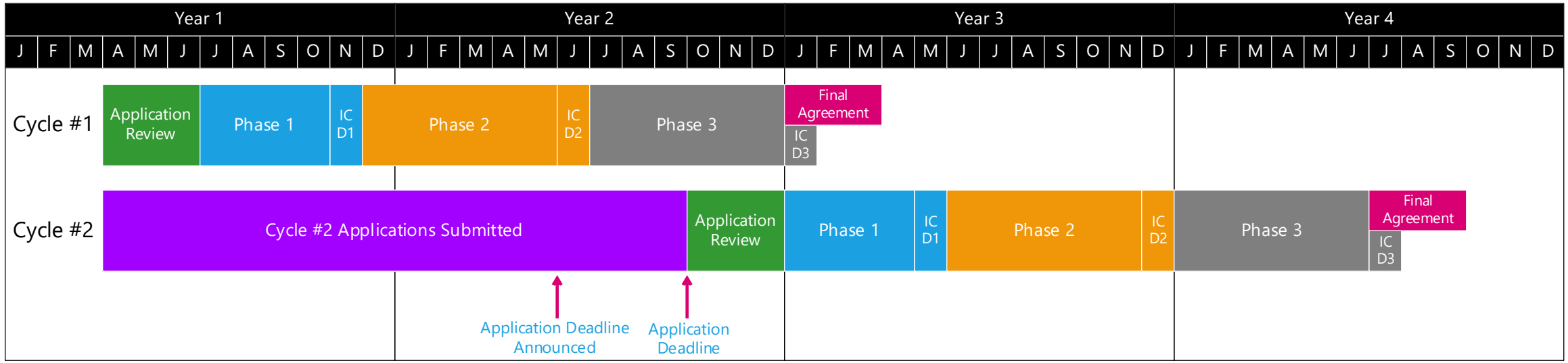
- Remove incremental financial rights for generators for simplification and due to removal of first-to-cause construct
- Remove other generation interconnection request forms (Attachments Y & BB) for simplification
- Remove or reduce scope of pre-application process
- Make project changes predictable from a process viewpoint and automatic to provide certainty to customers
- Allow off-ramps for generators proceeding through the process at various decision points
- Remove Optional Interconnection Study process

New Framework Overview

Total time per cycle – 710 days



New Framework Timeline Example



Subsequent Cycle Start

- Application deadline will be announced 120 days in advance.
- Only completed applications received by the Application Deadline will be considered for the upcoming Cycle.
- Applications will only be reviewed during the Application Review period.
- Phase 1 of Cycle #2 will only start after Phase 3 of the previous cycle has concluded AND all Application Review period activities have concluded.

Application Review Phase

- Single closing period for kicking off a cycle
- Allow a defined window to review all active applications from the open cycle
  - Do not review applications “mid-stream”
- Single application agreement with a unified study deposit and milestone payments
  - Typical data required + dynamic data up front
  - Shared facilities agreement required if connecting behind another POI
- Site control for generating site required and will be revisited throughout the process
- Single Point of Interconnection only
- Study Deposit (see table) + Readiness payment ($4,000 / MW)

Phase 1 Details

- Analysis Provided
  - Summer Peak load flow
  - Light load season load flow
  - This analysis will be the equivalent of an Impact study analysis at full commercial probability and DC & AC
- Interconnection Facilities
  - Scope, cost, schedule – planning desk-side estimate
- System Upgrades
  - Scope, cost, schedule – planning desk-side estimate
  - Cost allocation
- Results provided as a single cycle format (e.g. spreadsheet)

IC Decision 1

- Changes permitted:
  - Reduce the output of the request (both MFO & CIR)
    - Up to 100% of requested MFO and/or CIR value
  - Point of Interconnection finalized
    - Location along transmission line or
    - Substation breaker position
  - Equipment changes
  - Withdraw project
- Customer Requirements:
  - Decide whether direct connection network upgrades will be subject to Option to Build
  - Provide site control for customer interconnection facilities (gen-tie) to the Point of Interconnection & new interconnection switchyard (if applicable)
  - Provide evidence of air & water permits if applicable
  - Readiness Payment #2 (10% of network upgrade costs)
- Off ramp for projects that do not require a Facilities Study and do not contribute to the need for network upgrades

Phase 2 Details

- Analysis Provided
  - Retool load flow results
  - Short circuit study
  - Initial affected system study results (if needed)
  - Stability analysis

- Interconnection Facilities
  - Transmission Owner to perform Facilities study

- System Upgrades
  - Scope, cost, schedule, & cost allocation

IC Decision 2

- Changes Permitted:
  - Reduce the output of the request (both MFO & CIR)
    - 10% of the amount studied for Phase 2
  - Equipment changes under permissible technology changes
  - Withdraw project

- Customer Requirements:
  - Readiness Payment #3 (20% of network upgrade costs)

- Off-ramp for projects that only have interconnection facilities and do not contribute to the need for network upgrades. They can proceed directly to a final agreement

Phase 3 Details

- Analysis Provided
  - Final retool of all Phase 2 analyses
  - Final affected system study (if needed)
- Interconnection Facilities
  - Target back-feed dates
- System Upgrades
  - Final cost allocation
  - Transmission Owner Facilities study
- Agreement Related
  - Draft ISA/CSA
  - Security calculation

IC Decision 3

- Changes Permitted:
  - Withdraw project

- Customer Requirements:
  - Post security for upgrade cost allocation and indicate the project will proceed to a final agreement.

  - Developer to provide site control for review again
    - generation site
    - interconnection switchyard
    - customer interconnection facilities to the POI

  - Provide evidence of necessary state, county, & local permits or a milestone will be created for the final agreement

Final Agreement Phase Details

- Negotiate final agreement details including milestones, construction schedule, site control review, and Transmission Owner input
- True-up final security as required for projects that may have withdrawn during IC Decision 3
- Perform any remaining retool necessary to ensure system upgrades are still needed
- No ability to suspend a project - construction delays will be handled with milestone extensions for issues outside of the developer's control
- 15 business days to execute once tendered

Application Type Comparison

- Generation Interconnection
  - Attachment N, Y, BB
- Transmission Interconnection
  - Attachment S
- Long Term Firm Transmission Service
  - Attachment PP

→ Merge into new cycle process

- Upgrade Request
  - Attachment EE

→ Parallel Process?

- Surplus Service Request
  - Attachment RR

→ Status Quo