UK PACT

RMI
ENERGY. TRANSFORMED.

Renewable Embedded Generation

Project Implementation Guide for Electricity Distribution Companies (DisCos)

April 2026

Table of Contents

Abbreviations

AMI	advanced metering infrastructure
BESS	battery energy storage system
C&I	commercial and industrial
CAPEX	capital expenditure
CBN	Central Bank of Nigeria
COD	commercial operation date
CSA	customer service agreement
DER	distributed energy resource
DisCo	electricity distribution company
EIA	environmental impact assessment
EPC	engineering, procurement and construction
GEDSI	gender, equality, disability and social inclusion
ICA	independent collections account
LoI	letter of intent
MCE	minimum chargeable energy
MD	maximum demand
NEMSA	Nigerian Electricity Management Services Agency
NERC	Nigerian Electricity Regulatory Commission
PPA	power purchase agreement
PV	photovoltaic
RACI	responsible–accountable–consulted–informed
REG	renewable embedded generation
RFP	request for proposals
RFQ	request for qualifications
RMI	Rocky Mountain Institute
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SERC	State Electricity Regulatory Commission
UK PACT	United Kingdom Partnering for Accelerated Climate Transitions

1 Overview

This ***REG Project Implementation Guide*** provides detailed guidance to Nigerian electricity distribution companies (DisCos) on implementing renewable embedded generation (REG) projects following completion of the site selection and prefeasibility assessment process described in the ***REG Project Selection Guide***. It supports DisCos in advancing validated REG clusters through project preparation, procurement, contracting, construction, commissioning, and stable commercial operations.

This *Implementation Guide* complements the *Project Selection Guide*, which focuses on identifying and prioritizing technically and commercially viable REG sites. Implementation begins once a cluster has been validated and approved for development. This guide addresses the institutional, technical, commercial, and regulatory processes required to deliver a bankable REG transaction and sustain performance once commercial operations begin.

Who Can Benefit from this Guide

This guide is intended for all Disco teams involved in the delivery of a REG project — including technical, commercial, finance, legal, and regulatory teams — as well as the project lead(s) responsible for coordinating REG implementation. While the guide presents a structured framework for implementing REG projects, DisCos may adapt the processes, approval thresholds, and governance arrangements described to align with their internal organisational structures and state-level regulatory contexts.

1.1 Purpose and Scope

The objectives of this guide are to support DisCos in:

- Achieving transaction-ready REG projects that are attractive to credible developers and financiers
- Establishing clear internal governance, decision-making, and accountability mechanisms
- Delivering reliable and differentiated service to premium and non-premium customers
- Protecting collections and ensuring transparent revenue allocation through robust payment structures
- Managing technical, commercial, and regulatory risks across the project life cycle

The Implementation Guide is structured as follows:

- **Section 1** provides an overview of the REG business model and its operational implications for DisCos.
- **Section 2** discusses the organizational structures, readiness requirements, and stakeholder coordination mechanisms required for DisCos to effectively implement renewable embedded generation.
- **Section 3** sets out the detailed implementation phases and step-by-step activities required to deliver a REG project from initiation through operations.
- **Section 4** presents guidance on project work planning and timelines.
- **Section 5** outlines key risks and recommended mitigation measures across the REG project life cycle.

- **Section 6** recommends a monitoring and evaluation framework to track project technical, commercial, and customer performance.
- **Annexes** provide supporting tools, templates, and checklists to facilitate the practical application of the guide.

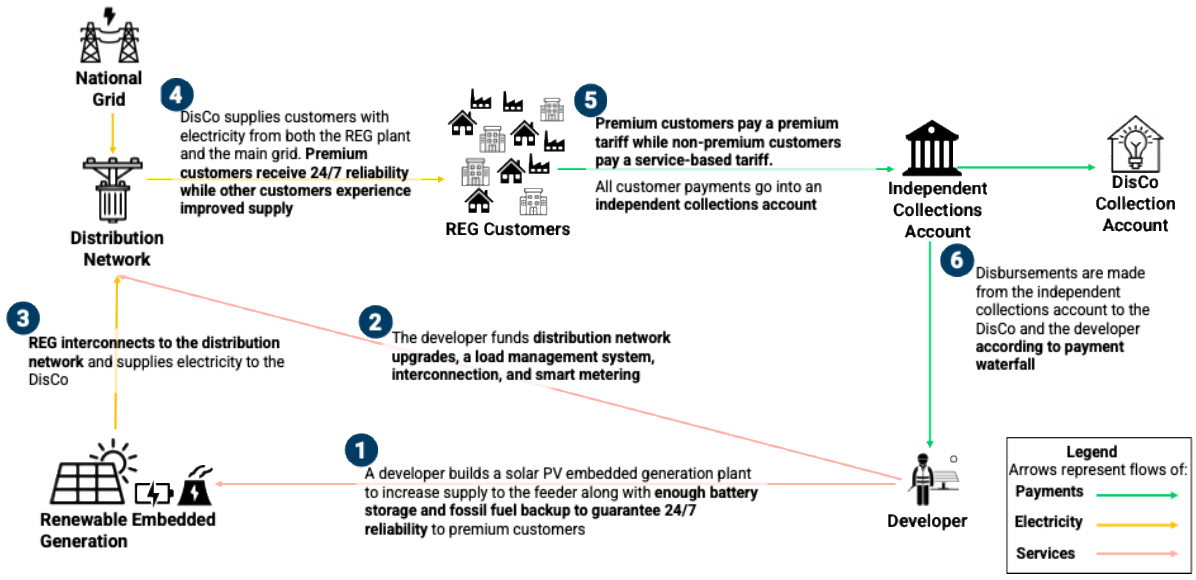
1.2 The REG Business Model

The renewable embedded generation (REG) model enables DisCos to partner with private developers to improve the reliability of energy supply within defined network clusters through the integration of distributed energy resource (DER) generation assets — typically solar PV combined with battery energy storage systems (BESS) — while remaining connected to the main grid. The REG business model is illustrated in **Error! Reference source not found.**. This section outlines the technical, commercial, and operational implications of implementing REG projects for DisCos.

Under the REG model:

- A private developer finances, builds, and operates the embedded generation plant.
- The developer also funds distribution network upgrades, the interconnection of the REG system, and the smart metering of customers in the cluster.
- The DisCo retains responsibility for distribution network operations and customer relationships.
- Premium customers within the cluster receive enhanced reliability through differentiated service arrangements.
- Non-premium customers benefit from improved supply stability and network upgrades within the cluster.

Exhibit 1: The renewable embedded generation business model



Unlike isolated minigrid models, REG operates within the DisCo's network and is integrated into the broader Nigerian Electricity Market framework. The model also calls for an independent collection account (or a secondary escrow account) in addition to the DisCo's standard payment collection and escrow with the Central Bank of Nigeria (CBN). As such, successful implementation requires careful coordination of energy flows, payment structures, regulatory compliance, and operational responsibilities.

Technical and commercial implications of REG

REG projects improve supply reliability within defined feeder clusters that experience constrained or inconsistent grid supply. Embedded generation supplements grid energy and provides power during grid outages or periods of load shedding.

From a technical perspective:

- The REG plant connects to the DisCo's network at an agreed point of interconnection, typically at 11 kV or 33 kV.
- During periods of grid availability, both grid and embedded generation may supply the cluster, subject to dispatch logic and contractual arrangements.
- During grid outages, the REG plant can continue supplying designated loads within the cluster, subject to protection settings and islanding capability.
- Network upgrades may be required to enable safe interconnection, load segregation, and improved voltage stability.

From a commercial perspective:

- A subset of customers, typically large commercial and industrial (C&I) customers with higher willingness to pay, enter into premium supply arrangements. These premium customers anchor project revenues and support the bankability of the REG project.
- Non-premium customers remain on standard DisCo service-based tariffs but may benefit from improved supply as a result of network upgrades and REG integration.
- Revenues from premium customers are channeled through a structured payment mechanism, typically an independent collections account, which allocates payments according to a defined waterfall.

Operational implications for DisCos

Successful REG implementation requires DisCos to separate premium and non-premium customers both technically and commercially. This is necessary to ensure that premium customers receive enhanced reliability while maintaining transparent revenue allocation and settlement processes. This differentiation can only be achieved through energy flow and payment flow separation.

Energy flow separation

DisCos must establish technical arrangements that enable premium customer loads to be reliably served by the REG plant during grid outages. This may involve:

- Load segregation at the transformer or feeder level
- Dedicated metering and load monitoring for premium customers
- Clear definition of the "dedicated network" serving premium customers
- Protection coordination and islanding logic to enable safe operation during grid outages
- Hosting capacity analysis to validate the network's ability to integrate the REG plant

Where full physical segregation is not feasible, metering-based segregation and contractual mechanisms must clearly define energy allocation and performance obligations.

Payment flow separation

Commercial separation is typically implemented through an independent collections account (ICA), which:

- Receives payments from premium customers. The ICA receives payments directly, in the case of maximum-demand (MD) customers, or through reconciled remittance in the case of non-MD customers.
- Allocates funds according to a predefined payment waterfall.
- Protects developer revenues while maintaining DisCo settlement obligations within the Nigerian Electricity Market.

The ICA must be carefully integrated into the DisCo's existing billing and collections systems. Payment routing based on meter numbers, reconciliation processes, and daily remittance procedures must be clearly defined before project commercial operations begin. DisCos must ensure that:

- Premium customer billing is transparent and contractually aligned with the customer service agreement (CSA) terms
- Non-premium customer payments are not inadvertently routed through the ICA
- Settlement timelines and reconciliation processes are operationally feasible

Failure to operationalize this separation clearly will result in implementation delays and disputes.

Design considerations in REG implementation

While the REG model provides a structured framework for improving supply reliability within distribution networks, it is not a rigid or one-size-fits-all approach. DisCos have the flexibility to adapt elements of the transaction structure — particularly in areas such as tariff design, customer segmentation, and contractual arrangements — to reflect local conditions, customer profiles, and strategic priorities.

This flexibility creates an opportunity to design projects that are both commercially viable and attractive to developers. However, experience from early REG transactions shows that certain areas require early alignment to avoid delays during procurement and contracting. These include:

- Clarity on the interconnection scope and responsibility for network upgrades
- Early validation of premium customer demand and willingness to pay
- Alignment on key contractual parameters, including minimum chargeable energy and service levels
- Integration of ICA processes into existing billing and collections systems
- Coordination across technical, commercial, and regulatory teams within the DisCo

Where these elements are not addressed early, they can lead to renegotiation or delays during later stages of implementation. DisCos are therefore encouraged to use this guide as a reference framework while tailoring project structures to their specific context, ensuring that key commercial and operational assumptions are validated before proceeding to procurement.

1.3 The REG Project Implementation Cycle

REG implementation involves a multi-phase process that begins after site identification and selection. This guide organizes implementation into four phases:

1. **Project Initiation**: Confirming project scope and cluster boundaries and establishing baseline metrics.
2. **Project Preparation**: Conducting detailed network assessments, customer engagement, REG system design, and commercial structuring.
3. **Project Execution**: Procuring developers, finalizing contracts, securing approvals, constructing infrastructure, and commissioning the plant.
4. **Project Operations**: Managing commercial settlement, monitoring performance, and sustaining service delivery after commercial operations begin.

While the implementation process follows a defined sequence, several workstreams — particularly procurement, regulatory approvals, and operational readiness — can affect overall project timelines if they are not managed proactively. **Section 4** highlights the critical path activities and timeline management considerations during this cycle that DisCos should monitor closely during implementation.

2 Implementation Readiness and Governance

In addition to a technically and commercially viable site, successful REG implementation requires institutional readiness within the DisCo, clear governance arrangements, early regulatory engagement, and effective coordination across business units. Projects that stall during implementation often do so not because of technical infeasibility, but because of weak internal alignment, unclear decision-making authority, or delayed regulatory and legal preparation.

This section outlines the organizational structures, readiness conditions, and stakeholder coordination mechanisms that should be established before a DisCo begins implementing a REG project.

2.1 DisCo Implementation Team and Governance Model

REG projects cut across multiple functional areas within a DisCo, including technical, operations, commercial, finance, and legal or regulatory affairs. Clear internal coordination is therefore essential.

Core implementation team

Each DisCo should establish a dedicated REG implementation team with clearly defined roles and responsibilities. At a minimum, the team should include:

- **Project Lead/Coordinator:** Responsible for overall coordination, timeline management, and primary interface with the developer and external advisors.
- **Technical Lead (Network Planning/Engineering):** Responsible for network assessments, interconnection requirements, hosting capacity analysis, upgrade planning, and commissioning oversight.
- **Commercial Lead:** Responsible for customer engagement, power purchase agreement (PPA) and CSA negotiations, tariff structuring, and coordination of billing and

collections processes. This role also oversees metering architecture, payment routing, and integration of ICA processes into existing systems.
- **Finance Representative:** Responsible for reviewing financial assumptions, validating revenue flows, and supporting ICA structuring.
- **Legal/Regulatory Representative:** Responsible for contract review, regulatory compliance, licensing coordination, and engagement with regulators.

Although organizational structures differ between DisCos, staff performing these functions should be formally designated to the REG project team.

Governance and decision-making

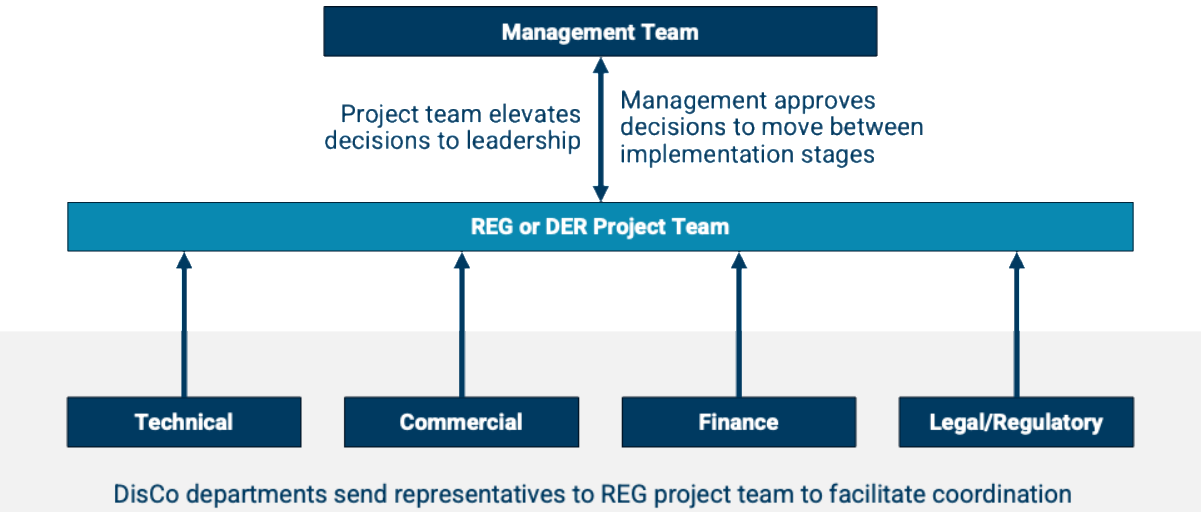
REG implementation involves several key decision points, including:

- Approval of cluster selection and project scope
- Authorization to launch developer procurement
- Approval of the preferred bidder
- Approval of final contract terms prior to financial close
- Authorization to energize and declare commercial operation date (COD)

To ensure that project implementation is not delayed, DisCos should define the following early:

- The internal body (e.g., executive committee, board, or management committee) responsible for approving each decision
- Documentation requirements at each stage
- Escalation pathways in the event of delays or disputes

Exhibit 2: Suggested internal coordination structure for DisCos implementing reg projects



Error! Reference source not found. illustrates a suggested internal coordination structure for DisCos implementing REG projects. **Annex A** also provides a RACI (responsible – accountable – consulted – informed) framework for the REG project team. Both should be tailored by DisCos to reflect its internal organization and operational structure.

Interface with developers

REG implementation requires coordination between the DisCo and the developer. Clear delineation of responsibilities helps avoid implementation delays or operational misalignment. In general:

- The DisCo defines interconnection requirements, provides network data, and approves protection settings.
- The developer finances, constructs, and operates the REG asset.
- Contractual arrangements allocate responsibilities and risks relating to delays, performance, and compliance.

Regular joint technical and commercial working sessions should be scheduled during the preparation and execution phases to maintain alignment.

2.2 Implementation Readiness Checklist

Before proceeding to developer procurement and detailed project execution, the DisCo should confirm that minimum readiness conditions have been met. These conditions span technical, commercial, legal/regulatory, and institutional dimensions. **Exhibit** summarizes the key readiness checks that should be completed before advancing to the next phase of implementation.

Exhibit 3: Conditions that must be met to proceed with REG project execution

Dimension	Key Readiness Conditions
Technical readiness	• Final cluster boundaries and feeder configuration validated • Preliminary network assessment completed and upgrade scope identified • Interconnection options identified at a high level • Hosting capacity considerations assessed • Required technical data organized for developer procurement
Commercial readiness	• Premium customer identification validated • Preliminary customer engagement completed • Customer willingness-to-pay assessed • Approach to premium versus non-premium service differentiation defined • Billing and payment routing implications assessed
Legal and regulatory readiness	• Confirmation of the applicable regulatory authority and approval pathway for the project state, including whether the project remains under NERC or falls within a state electricity market • Assessment of whether additional state-level approvals, interim ministry approvals, or premium tariff approvals may be required in the relevant jurisdiction • Embedded generation licensing requirements reviewed • Preliminary engagement with Nigerian Electricity Management Services Agency (NEMSA) to understand certification timelines • Draft PPA and CSA templates reviewed • Land ownership and permitting requirements identified
Institutional readiness	• REG project lead formally assigned • Internal governance and reporting cadence established • Cross-functional coordination mechanisms defined • Resources allocated for sustained project engagement

Where DisCos operate in states with active or emerging state-level electricity markets, both federal and state regulatory requirements must be considered. A high-level overview of the

Nigerian regulatory landscape is provided in **Annex I**, and DisCos should supplement this with state-specific guidance where applicable.

2.3 Stakeholder Engagement and Coordination

Stakeholder coordination must be managed deliberately throughout implementation. Effective coordination is required both within the DisCo and between the DisCo and external stakeholders, including regulators, developers, customers, and host communities. Error! Reference source not found. summarizes the key stakeholder groups involved in REG implementation and the primary coordination priorities associated with each.

Exhibit 4: Key stakeholders and coordination priorities for REG implementation

Stakeholder	Coordination Focus	Key Activities
Internal DisCo Teams	Cross-functional alignment across technical, commercial, finance, and legal teams	• Technical teams define interconnection requirements, protection settings, and network upgrades • Commercial teams manage premium customer engagement and PPA and CSA negotiations • Finance teams validate revenue flows and ICA structures • Legal teams review contracts and regulatory compliance • Regular cross-functional coordination meetings during preparation and execution phases
Regulators and Government Authorities	Regulatory compliance and approval coordination	• Confirm embedded generation licensing pathways • Clarify interconnection and safety requirements • Align on reporting obligations • Coordinate NEMSA inspection and certification timelines • Where applicable, engage both federal and state regulators early to prevent conflicting requirements
Customers and Host Communities	Managing expectations and maintaining stakeholder support	• Maintain ongoing communication with premium customers beyond initial letters of intent (LoIs) • Clarify commissioning timelines, tariff structures, and service arrangements • Address operational questions regarding premium supply arrangements • Engage host communities early where land is required for REG infrastructure to prevent disputes that could delay construction

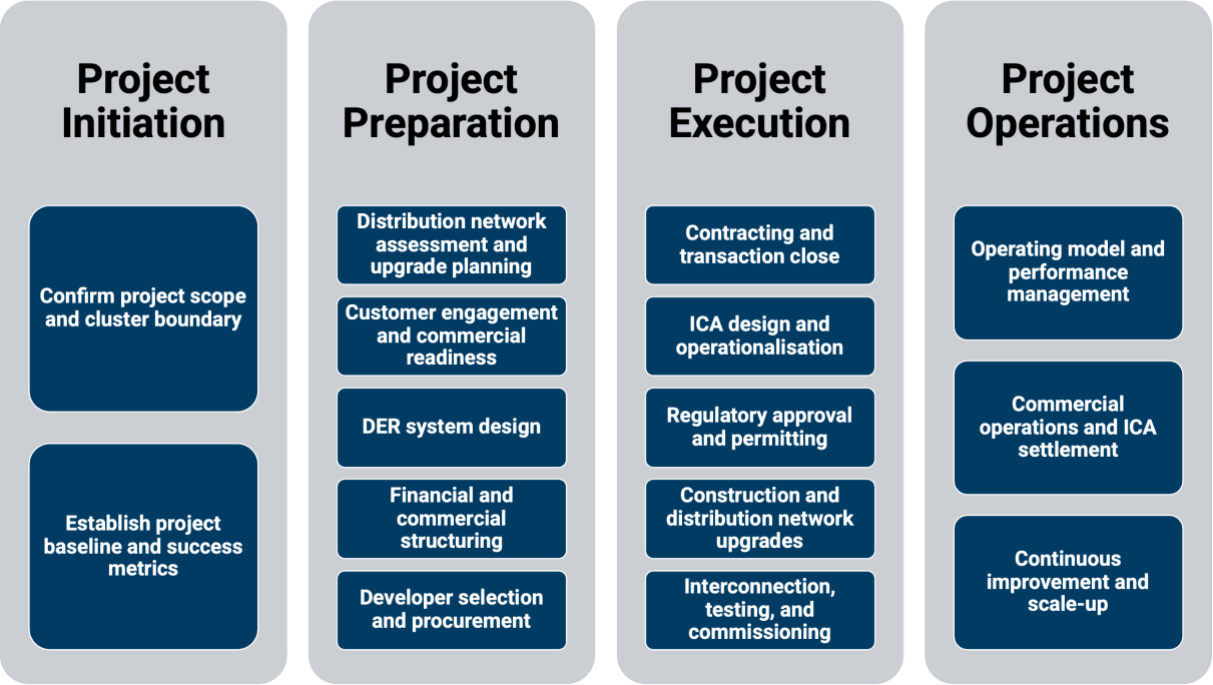
Once governance and coordination mechanisms are established and readiness conditions are met, the DisCo can proceed to detailed REG project preparation and implementation. **Section 3** provides step-by-step guidance on the phases and activities required to move a REG project from initiation through construction, commissioning, and commercial operations.

3 Implementation Phases

REG implementation proceeds through four structured phases: **project initiation**, **project preparation**, **project execution**, and **project operations** (Error! Reference source not found.). While certain activities may occur in parallel, each phase has a distinct objective and defined outputs. **Progression between phases should only occur after key outputs are satisfied.**

Successful implementation requires disciplined sequencing. Technical validation, customer commitment, system optimization, and commercial structuring must converge into a transaction-ready project before developer procurement begins.

Exhibit 5: The REG project life cycle



3.1 Phase I: Project Initiation

The project initiation phase begins immediately after completion of site selection and prefeasibility studies. Its objective is to convert a promising REG cluster into a clearly defined project with an agreed scope, documented assumptions, and measurable technical and commercial performance baselines and objectives. Ambiguities left unresolved at this stage often resurface later as procurement delays, contractual disputes, or system redesign during project execution. The steps involved are described below.

Step 1 — Confirm project scope and cluster boundary

The first step of project implementation is to ensure that technical and commercial stakeholders are aligned on the configuration of the REG cluster and the overall project scope. This involves:

- Confirming the final feeder and transformer boundaries of the cluster
- Validating the proposed points of interconnection
- Confirming transformer capacities and load allocation across feeders
- Validating the list of MD and large C&I customers within the cluster
- Confirming historical grid supply patterns, including hours of supply and load-shedding frequency

Where the cluster includes multiple feeders, the DisCo should assess whether all feeders should be included or whether segmentation would improve economics by concentrating MD customers and strengthening revenue stability.

In practice, this step often reveals discrepancies between data collected during prefeasibility assessments and operational realities. For example, feeder loading may have changed, new

customers may have connected to the network, or premium customer load assumptions may require adjustment. These issues must be resolved before progressing to the next step.

Outputs of this step should be formally documented and approved internally before moving forward. They include:

- Finalized cluster GIS map
- Updated single-line diagram
- Summary of contracted and projected premium customer loads
- Documented grid supply baseline
- Internal project scope approval memo

After the project scope has been confirmed, project preparation can begin.

Step 2 — Establish project baseline and success metrics

Before advancing into detailed preparation activities, the DisCo should establish baseline metrics against which the performance of the REG project will be assessed. Baseline metrics may include:

- Average hours of supply within the cluster
- Outage frequency and duration (SAIFI and SAIDI or proxy reliability measures[i])
- Billing and collection efficiency within the cluster
- Energy consumed by MD customers as a proportion of total feeder consumption
- Estimated diesel or self-generation levels (where data is available)
- Customer satisfaction indicators

Establishing these baselines serves three purposes:

1. Anchors performance expectations in contractual and service agreements
2. Supports monitoring and evaluation after commissioning
3. Provides evidence to support replication and scaling decisions

Without a baseline, it is difficult to demonstrate improved reliability or commercial performance attributable to REG.

Outputs of this step include:

- A documented baseline for technical and commercial performance within the REG cluster
- Agreed success metrics for tracking post-implementation performance
- Baseline data to support monitoring, evaluation, and future replication decisions

3.2 Phase II: Project Preparation

Project preparation is the most critical phase of REG implementation. During this phase, the DisCo converts a defined cluster into a transaction-ready project through detailed technical, commercial, and financial assessments. Most REG projects fail or stall due to weaknesses in

[i] SAIFI = System Average Interruption Frequency Index' SAIDI = System Average Interruption Duration Index

this phase, particularly unclear interconnection scope, insufficient validation of premium customer demand, or misaligned economic assumptions. Preparation should therefore culminate in a structured procurement package supported by validated technical data and credible commercial commitments.

The steps involved are described below.

Step 3 — Distribution network assessment and upgrade planning

Once the REG cluster is confirmed, the DisCo must undertake a distribution network assessment to determine whether existing infrastructure can safely accommodate embedded generation and differentiated service arrangements. The interconnection and network upgrade plan forms the technical backbone of the project.

The network assessment must:

- Validate feeder topology and asset condition
- Catalogue transformers, switchgear, conductors, and protection equipment
- Identify bottlenecks affecting reliability
- Confirm feeder loading and voltage profiles
- Conduct hosting capacity analysis, where applicable
- Identify voltage regulation and reverse power flow/backfeed risks
- Confirm feasible interconnection points, preferably at the injection substation level, where synchronization is most robust; where injection substation interconnection is not feasible, transformer-level interconnection options should be assessed

The assessment should also determine:

- The network upgrades required to support reliable supply to the cluster
- Associated network upgrade costs
- Approved vendors capable of implementing upgrades
- The number of hours of bulk grid supply that can realistically be committed post-upgrade

Grid availability assumptions are particularly important because REG sizing and tariff modeling depend on them. Overstating bulk supply hours can undermine financial modeling and investor confidence.

Outputs of this step include:

- Updated network diagram
- Costed list of network upgrades
- Defined interconnection framework
- Responsibility allocation between DisCo and the developer
- Implementation schedule for network upgrades

Note: If a preferred developer is already identified, the DisCo may allow the developer to conduct or support this assessment. However, the DisCo remains responsible for validating outputs and defining binding interconnection parameters. The DisCo and developer must agree on which upgrades are prerequisites to interconnection, who bears the cost of specific networks, and the sequencing of network upgrade activities.

Step 4 — Customer engagement and commercial readiness

Premium customers are the commercial anchors of a REG project. The objective of this step is to assess their interest in participating in the REG arrangement and validate demand assumptions that will underpin system sizing and tariff modeling.

The DisCo should identify and engage selected MD and large C&I customers within the cluster, particularly those who have partially or fully defected from the grid. Engagement may be led by the REG project team or the DisCo's business unit responsible for managing those customers. Early discussions should clearly articulate the REG value proposition — improved reliability, predictable service, and structured supply arrangements — while also clarifying the obligations that accompany premium participation.

Where customers express interest, that interest should be formalized through a non-binding **letter of intent (LoI).** An LoI template and supporting briefing materials are provided in **Annexes B** and **C** and should be adapted to the DisCo's context. At the same time, the DisCo must validate premium customer load profiles. This may require analyzing historical billing data, reviewing MD consumption records, or deploying temporary loggers where metering data is insufficient. Reliable load data is essential, as it directly informs REG system sizing and economic modeling.

In parallel with engaging potential premium customers, the DisCo should develop a broader understanding of the cluster's customer base by engaging selected non-MD customers to understand their energy expenditure and reliability concerns.

Finally, the DisCo should conduct a detailed customer enumeration exercise to confirm the number of unique customers within the cluster and collect key information on energy consumption, metering status, and payment behavior. Although these non-MD customers are not anchor customers, their aggregate demand and billing discipline influence cluster economics and network performance. **Annex D** provides a data collection framework to guide this process.

Outputs of this step include:

- Signed LoIs from prospective premium customers
- Validated load profiles through metering or logging (where necessary)
- Preliminary understanding of customer willingness to pay
- Cluster-level customer enumeration dataset

Weak validation at this stage often leads to renegotiation after developer selection, undermining transaction credibility. Only once it is complete can the DisCo proceed to system design and optimization.

Step 5 — REG system design

The objective of this step is to translate validated cluster demand and premium customer commitments into a technically feasible and commercially viable REG solution. By the end of this step, the DisCo should have a proposed system design and an indicative premium tariff for the project that can support financial structuring and developer procurement.

The activities required in this step are described below.

Load assessment

System design begins with developing a robust load profile for the cluster. The DisCo should consolidate historical feeder-level load data with customer-specific consumption data from identified premium customers. Where detailed consumption data is unavailable, the project team may extract historical records from advanced metering infrastructure (AMI) or deploy temporary data loggers to capture representative demand patterns. The resulting dataset should reflect daily, weekly, and seasonal variability and will form the basis for system sizing and dispatch simulation. This load profile should also be included in the procurement data room to ensure transparency with prospective developers.

REG system design

Using the validated load assumptions, the DisCo should determine an optimal generation configuration that balances reliability, cost, and service delivery obligations. In most cases, a hybrid configuration combining solar PV, BESS, and backup diesel or gas generation will provide the most cost-effective solution. Optimization tools such as HOMER Pro or System Advisor Model (SAM) may be used to simulate dispatch behavior under different grid availability scenarios, including:

- Grid-available periods,
- Partial load shedding, and
- Extended grid outages requiring island operation

Interconnection study

In parallel, the DisCo should conduct a detailed interconnection study to define how the REG plant will integrate into the existing network. This study should confirm feeder hosting capacity, identify suitable interconnection points, and define the REG system interconnection requirements, including protection and control architecture required for safe operation. It should also determine appropriate measures to reduce collection losses, and how premium and non-premium customers will be differentiated in practice — whether through physical load segregation, metering configuration, or operational logic. The interconnection package should document:

- Protection settings and coordination
- Switching procedures
- Delivery point definition
- Compliance with DisCo interconnection standards

Financial modeling

The proposed technical design must be stress-tested through financial modeling. Using projected capital and operating costs, the DisCo should assess whether the system can deliver a viable premium tariff while strengthening DisCo revenues and meeting developer return expectations. The model should incorporate sensitivity analysis for exchange rate movements, inflation, grid supply variability, and minimum chargeable energy (MCE) assumptions. These are discussed further in **Section 0, Step 8**. **Annex E** provides a financial model template to guide this assessment.

Outputs of this step include:

- Technically validated and optimized REG system design
- Defined interconnection and network upgrade requirements
- Indicative premium tariff range

These outputs form the technical and economic foundation for financial structuring and developer procurement in the subsequent steps.

Note: The project team can choose to skip this step, proceed to the developer selection step (Step 7), and have the selected developer complete the REG system design, while the DisCo validates the design with a focus on the system's interconnection to the distribution network.

Step 6 — Financial and commercial structuring

Once the REG system design has been finalized, the DisCo must establish the financial and commercial framework that will underpin the transaction. The objective of this step is to translate the technical design into a bankable commercial structure that can be presented to developers and potential investors during procurement.

Financial inputs and key assumptions

Financial structuring begins by consolidating technical and operational assumptions into a consistent financial framework. The DisCo should confirm the core inputs determining project economics, including:

- Expected capital costs of the embedded generation system
- Distribution network upgrade costs
- Projected operating and maintenance costs
- Grid supply availability assumptions
- Expected premium customer demand and minimum chargeable energy levels
- Exchange rate and inflation assumptions, where relevant

These assumptions should be documented clearly and shared with prospective developers during procurement to minimize the risk of redesign or renegotiation in the transaction process.

Revenue flows and cost recovery

The financial model must clearly demonstrate how project costs will be recovered and how revenues will be allocated between the developer, the DisCo, and market settlement obligations. In the REG model, premium customers typically pay a negotiated tariff reflecting improved reliability and service levels. This tariff must be sufficient to recover:

- The developer's capital investment and operating costs
- Distribution network upgrade costs
- DisCo distribution service revenues
- Market settlement obligations within the Nigerian Electricity Market

Independent Collections Account (ICA) Framework

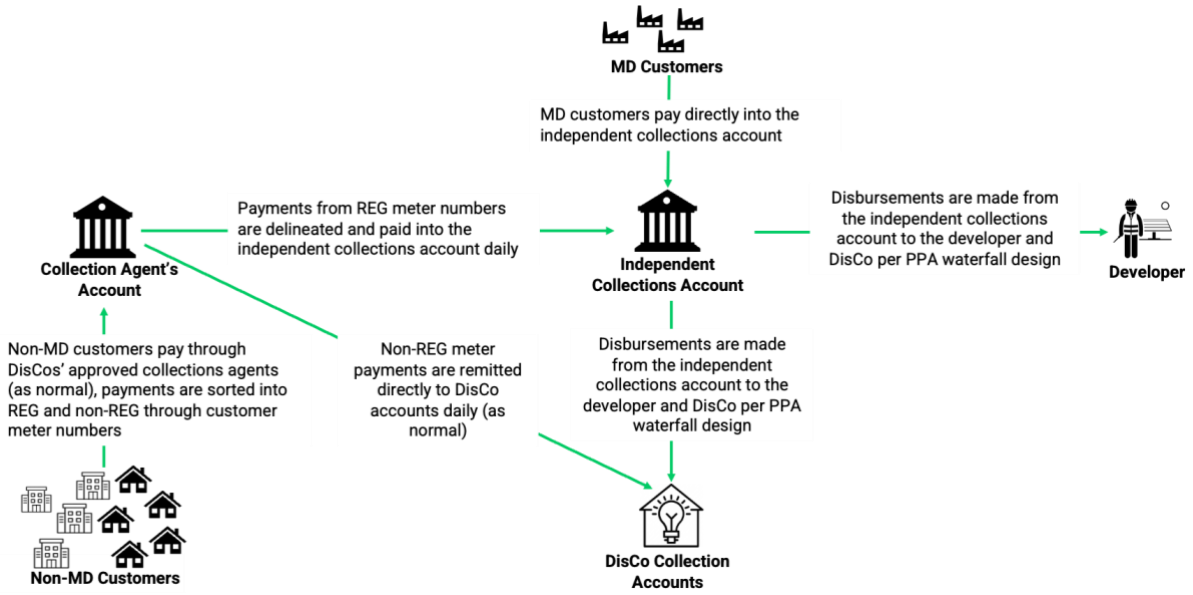
To ensure transparent revenue allocation, REG projects typically use an Independent Collections Account. The ICA is a ring-fenced payment mechanism through which premium

customer payments are received and distributed according to a predefined payment waterfall. At a conceptual level, the ICA framework ensures that:

- Premium customer payments are clearly separated from standard DisCo collections
- Revenues are allocated transparently between the developer and the DisCo
- Market settlement obligations are maintained
- Payment flows can be audited and reconciled efficiently

The detailed operational design of the ICA is addressed later in this guide (**Step 9**).

Exhibit 6: Proposed Independent Collections Account (ICA) framework.



Preparing the transaction for developer and investor review

Before launching developer procurement, the DisCo should ensure that the project structure is sufficiently clear for developers and investors to assess the opportunity. At a minimum, the procurement package should include:

- Documented financial assumptions used in tariff modeling
- Preliminary premium tariff estimates
- Defined revenue allocation principles
- A high-level explanation of the ICA framework and payment waterfall logic

These elements should be incorporated into the procurement documentation so that developers evaluate the project based on consistent assumptions.

Outputs of this step include:

- Documented financial assumptions for tariff and revenue modeling
- Defined cost recovery and revenue allocation principles
- Preliminary premium tariff estimates
- A high-level ICA framework and payment waterfall logic
- A bankable commercial structure to support developer procurement

Step 7 — Developer selection and procurement

Once the financial and commercial framework for the project has been defined, the DisCo can proceed to select a private developer to finance, construct, and operate the REG system. The objective of this step is to identify a technically capable and financially credible developer to deliver the project within the agreed commercial structure. Developer procurement should be conducted in a transparent and structured manner to ensure that the selected developer has the technical capability, financial capacity, and operational credibility required for implementation.

Procurement approach and market engagement

DisCos may adopt different procurement approaches depending on project scale, market conditions, and internal timelines. In most cases, competitive procurement will deliver the best outcome by allowing multiple developers to submit proposals and compete. Under a competitive approach, the DisCo invites qualified developers to participate in a structured bidding process and evaluates proposals against defined technical and commercial criteria.

Regardless of the approach adopted, the DisCo should ensure that procurement remains structured, that evaluation criteria are clearly defined, and that developer selection is based on demonstrated technical capability, financial capacity, and ability to deliver the project within the agreed timeline. Developers should be provided with consistent technical and commercial information to enable credible bids.

Before launching procurement, DisCos are encouraged to conduct informal market sounding with potential developers. This helps gauge developer interest, test assumptions about project scale and tariff levels, and identify concerns that could affect financing or implementation.

Site bundling considerations

Where multiple REG clusters are under development, DisCos may consider bundling sites into a single procurement package. Bundling can improve project attractiveness to developers and financiers by increasing scale and reducing transaction costs. However, bundling should be approached carefully. Clusters grouped within a bundle should have broadly similar technical characteristics, grid supply conditions, and customer demand profiles. Combining sites with significantly different risk profiles may discourage developer participation or lead to uneven pricing across locations.

For early-stage REG programs, DisCos may choose to procure developers for individual pilot clusters before scaling up through bundled procurements.

Procurement process and bid sequencing

The procurement process typically involves two stages: a request for qualification (RFQ) followed by a request for proposals (RFP).

1. **Request for qualification (RFQ).** The RFQ stage identifies developers with the technical, financial, and operational capacity to implement the project. It establishes a shortlist of qualified bidders who will be invited to submit detailed proposals during the subsequent RFP stage. The RFQ should assess developers based on:

    a. Track record in developing and operating DER or hybrid power systems
    b. Experience in similar markets or regulatory environments
    c. Financial strength and access to capital

d. Reputation and compliance history

2. **Site visits with prequalified developers.** Following the RFQ stage, the DisCo should organize site visits with pre-qualified bidders. These visits allow developers to better understand the technical and operational context of the REG cluster and verify key assumptions in the procurement package. During site visits, the DisCo should present key project information, including feeder configuration, proposed interconnection points, and network upgrade requirements. Developers should also have the opportunity to assess logistical constraints and confirm site conditions. Site visits reduce the risk of misunderstandings or unrealistic proposals during the RFP stage.

3. **Request for proposals (RFP).** The RFP stage invites shortlisted developers to submit detailed technical and commercial proposals for the project. The RFP documentation should include all relevant information about the REG cluster, including:

    a. Technical data and load profiles
    b. Interconnection requirements and network upgrade plans
    c. Premium customer demand assumptions
    d. Proposed commercial structure and tariff framework
    e. Draft contractual documents

Alternative Procurement Approaches
In some cases, a DisCo may choose to use a more targeted procurement approach rather than an open competitive process. This may be appropriate where implementation speed is a priority, where the project is being developed as a pilot, or where the DisCo or program partners have already identified one or more developers with relevant experience and credible implementation capacity. Two commonly used approaches are:

1. **Direct selection (single developer engagement):** A DisCo may proceed directly to negotiations with an identified developer where that developer has relevant technical experience, financing capability, and familiarity with the network context. This approach may be appropriate for pilot transactions or where time constraints require accelerated implementation. In such cases, the DisCo should still carry out due diligence to confirm the developer's technical and financial credibility and benchmark proposed commercial terms against market expectations.
2. **Closed competitive process (invited bidding):** Instead of launching an open RFQ, the DisCo may invite a pre-selected group of qualified developers to participate in a competitive process. This approach is useful where credible developers have already been identified, and the objective is to improve bid quality while reducing procurement timelines. Even in a closed process, the DisCo should apply clear evaluation criteria and provide all invited developers with consistent project information.

Providing clear and comprehensive information at this stage improves bid quality and reduces the likelihood of renegotiation after developer selection.

Bid evaluation and selection

Bids should be evaluated through a structured process that considers both technical and commercial criteria. Evaluation should typically involve multiple DisCo teams, including technical, commercial, finance, and legal representatives.

- **Technical evaluation** should assess whether the proposed system configuration meets reliability and operational requirements. Key considerations include system design robustness, equipment specifications, and the developer's approach to construction and operations.
- **Commercial and financial evaluation** should assess the competitiveness and credibility of the proposed tariff and financial structure. In addition to headline tariff levels, the DisCo should review the financial assumptions underlying each proposal.

Equally important is the developer's ability to secure financing and deliver the project within the proposed timeline. The DisCo should verify claims regarding financial backing and request evidence of financing capability where necessary. This may include assessing:

- Proof of funds or evidence of financing arrangements
- Developer's balance sheet strength or access to lenders
- Implementation timelines and project delivery plans
- Demonstrated experience delivering similar projects

Developers with strong technical proposals but weak financial credibility often struggle to reach financial close. Rigorous evaluation at this stage helps prevent delays later in the transaction process. Following evaluation, the DisCo should identify a preferred bidder and begin negotiations to finalize contractual arrangements and reach transaction close.

Outputs of this step include:

- Agreed technical, commercial, and financial criteria for evaluating developers
- Standardized procurement documentation for the RFQ and RFP processes
- A completed developer procurement process, whether competitive or targeted
- Evaluation of bidders against the defined criteria
- Selection of a preferred developer for the REG project
- Bid evaluation records to support contract negotiations

During the project preparation phase, responsibilities between the DisCo and the developer may vary depending on whether a developer has already been identified and how far the project has progressed. In practice, this is often the phase where role ambiguity creates delays, particularly around network assessment, system design, and preparation for procurement.

Exhibit 7 summarizes the typical roles of the DisCo and the developer across the key activities in the project preparation phase. It is intended as a practical reference only and should be adapted to reflect the specific project structure and contractual arrangements adopted by each DisCo.

Exhibit 7: Roles of the DisCo and developer(s) during the project preparation phase.

Step	Activities by DisCo	Activities by Developer
Step 3 – Distribution network assessment and upgrade planning	• Conduct assessment of distribution network • Identify network upgrade and costs • Determine hours of grid supply	If developer has been selected, developer conducts or supports DisCo activities
Step 4 – Customer engagement and commercial readiness	• Engage potential premium customers • Sign LoIs with premium customers • Engage non-premium customers • Conduct customer enumeration	

Step 5 – REG system design	• Develop load profiles for anchor customers and cluster • Prepare technical system design • Conduct interconnection study • Conduct financial modeling	If developer has been selected, developer completes the REG system design
Step 6 – Financial and commercial structuring	• Prepare financial assumptions to guide procurement process • Develop ICA framework	
Step 7 – Developer selection and procurement	• Issue RFQ • Assess RFQ submissions • Conduct site visits with pre-qualified developers • Issue RFP • Assess submitted proposals and bids	• Submit response to RFQ • Visit customer site • Submit response to RFP

3.3 Phase III: Project Execution

The project execution phase begins once a developer has been selected and focuses on delivering the REG system. During this phase, the DisCo and the developer finalize contractual arrangements, secure regulatory approvals, construct the required infrastructure, and commission the REG plant. Delays at this stage most often arise from prolonged contract negotiations, incomplete regulatory preparation, or misalignment on construction responsibilities. Where possible, contracting, regulatory approvals, and preparatory construction activities should therefore be sequenced carefully and undertaken in parallel.

The steps described below guide DisCos through the process of reaching transaction close and delivering the REG system into commercial operation.

Step 8 – Contracting and transaction close

Once a preferred developer has been selected, the DisCo and the developer must negotiate and finalize the contractual framework governing project implementation and operations. The objective of this step is to convert the agreed commercial structure and technical design into binding agreements that allow the project to reach transaction and financial close and proceed to construction. Two core contracts underpin REG projects:

- **Power purchase agreements (PPAs)** between the DisCo and the developer
- **Customer service agreements (CSAs)** between the DisCo and premium customers

These agreements define energy supply arrangements, revenue allocations, and risk sharing between the parties. Because they are interdependent, negotiations should be coordinated to ensure that commercial terms remain consistent across all contracts.

Power purchase agreement (PPA)

The PPA establishes the contractual relationship between the DisCo and the developer and governs the financing, construction, and operation of the REG plant. Key issues addressed in the PPA include:

- Final system design
- Responsibilities for distribution network upgrades and interconnection works

- Tariff framework governing energy sales from the developer to the DisCo, and conditions for tariff review
- System reliability and availability requirements, and underperformance clauses
- Payment mechanisms linked to the ICA
- Risk allocation in cases of system underperformance or supply shortfalls
- Customer service processes
- Dispute resolution mechanisms

Annex F provides an PPA template that DisCos can adapt.

A critical element of the agreement is the **Minimum Chargeable Energy (MCE)** framework. Because the developer must recover capital investment in the REG asset, the contract typically defines a minimum volume of energy that the DisCo commits to pay for, regardless of actual consumption levels. This mechanism protects the developer from revenue volatility while maintaining incentives for the DisCo to maximize premium customer participation. The MCE level should therefore be aligned with validated premium customer demand and the load assumptions used during financial modeling. Setting the MCE too high may expose the DisCo to unnecessary payment obligations, while setting it too low may undermine project bankability.

Note: The DisCo and the developer may revisit the initial system design and financial model at this stage to make any needed modifications.

Customer service agreement (CSA) with premium customers

In parallel with negotiations with the developer, the DisCo must also negotiate and sign CSAs with premium customers. These agreements establish the contractual terms under which those customers receive enhanced reliability through the REG system. CSAs typically define:

- Service levels and reliability expectations
- Tariff structure and payment obligations
- Metering arrangements and billing processes

The DisCo must ensure that the commercial terms of the CSAs remain consistent with the structure agreed in the PPA. In some cases, the DisCo may elect the developer to lead CSA negotiations. **Annex G** provides a CSA template that DisCos can adapt.

Clauses That Commonly Delay Transaction Close

Experience from early REG transactions indicates that certain contractual provisions frequently delay negotiations or financial close. These include:

- MCE definitions, particularly where premium customer demand has not been fully validated
- Tariff indexation mechanisms, including exchange rate or inflation adjustments
- Unclear allocation of network upgrade costs between the DisCo and the developer
- System performance and availability guarantees
- Payment security mechanisms linked to the ICA

Where these issues are not addressed early, negotiations can extend significantly and delay project implementation. DisCos should therefore align internally on acceptable positions for these clauses before entering detailed negotiations.

Outputs of this step include:

- Finalized PPA between the DisCo and the developer
- Executed CSAs with participating premium customers
- Agreed final system design and key interconnection parameters
- Satisfied conditions precedent required for transaction close
- A project that is contractually and commercially ready to proceed to construction

Reaching Transaction Close
Transaction close occurs once all contractual agreements have been finalized and the conditions required for project implementation have been satisfied. For projects requiring third-party financing, this may also include satisfaction of lender conditions precedent and financial close requirements. These typically include:

- Execution of the PPA between the DisCo and the developer
- Execution of CSAs with participating premium customers
- Confirmation of the final system design and interconnection parameters
- Establishment of the ICA framework
- Completion of initial regulatory and permitting steps required for construction

Once these conditions are satisfied, the project can proceed to construction and infrastructure delivery. **Transaction close represents a major milestone in the REG implementation process, signaling that the project has achieved contractual alignment and financial viability.**

Step 9 – ICA design and operationalization

The Independent Collections Account (ICA) framework introduced during project preparation must now be operationalized within the DisCo's billing and collections systems. This step focuses on establishing the account, integrating payment routing mechanisms, and defining the governance and reconciliation processes required for commercial operations.

The ICA framework aligns with the *Guidelines for Secondary Escrow Account Management for Bilateral Transactions by Electricity Distribution Licensees (2023)* and is a critical component of the REG project's bankability. Without a clearly operational ICA structure, developers and financiers may view the project as exposed to collections risk.

ICA objectives and payment waterfall

The ICA ensures that payments from premium customers are collected and allocated transparently according to the contractual arrangements agreed between the DisCo and the developer. By separating these payments from DisCo's broader collections, the ICA reduces payment risk and enables clear monitoring of project financial performance.

Funds deposited into the ICA are distributed according to a predefined payment waterfall agreed within the PPA. While the structure may vary across projects, a typical waterfall allocates revenues in the following sequence:

1. Transaction administration and account management costs
2. DisCo account payment: Nigeria Electricity Market settlement obligations
3. Developer account payment: Developer's energy supply charges

4. DisCo account payment: Balance DisCo service revenues
5. Contributions to the Maintenance Reserve Account
6. Retention of any remaining balance for settlements in the next billing period

A billing cycle is not regarded as concluded until the developer is paid in full. Any outstanding balance carried forward from a previous billing period should therefore be settled at the beginning of the next settlement cycle.

Integration with DisCo billing and collections systems

For the ICA to function effectively, it must be integrated with the DisCo's existing billing and collections processes. This requires adjustments to the DisCo's payment routing, reconciliation, and remittance procedures. Payment flows typically differ by customer category:

- **Metered non-MD customers** generally pay through the DisCo's existing payment agents or vendor platforms. The billing system must therefore identify REG customers through their meter numbers and route those payments into the ICA rather than the DisCo's standard collections accounts.
- **MD customers** typically pay directly into the ICA in accordance with the payment terms specified in their CSAs.

Regardless of payment channel, reconciliation processes must ensure that payments received are accurately matched to individual customer meters. The DisCo should therefore establish daily reconciliation procedures linking vendor collections with the expected billing records for the REG cluster. Clear remittance procedures should also define how payments collected through vendor platforms are transferred to the ICA. Well-defined operational processes reduce the risk of payment delays, reconciliation errors, or disputes between the DisCo and the developer.

ICA governance and oversight

The ICA should be supported by a governance framework defining responsibilities for account administration, financial oversight, and dispute resolution. The account is typically administered by a designated commercial bank, which receives payments, executes the agreed payment waterfall, and maintains all transaction records. Both the DisCo and the developer should have visibility into ICA transactions. This typically includes access to account statements, reconciliation reports, and audit rights over payment allocations. Transparent reporting helps ensure that the settlement process functions as intended.

The ICA agreement should also define procedures for resolving disputes, including discrepancies in payment reconciliation, delayed remittances, or disagreements regarding the application of the payment waterfall.

ICA operational readiness checklist

Before commercial operations begin, the DisCo should confirm that the ICA structure is fully operational. At a minimum:

- The ICA has been established with the designated financial institution
- The payment waterfall is agreed and documented within the contractual framework
- The DisCo billing system can identify REG cluster customers through meter numbers
- Vendor payment platforms route REG collections to the ICA

- Reconciliation procedures match payments to customer meters
- Roles and responsibilities for ICA administration and oversight are defined
- Reporting templates for periodic settlement statements are agreed upon

Completing these steps before commissioning ensures that payment flows operate smoothly from the first day of commercial operation.

Note: Because the ICA sits at the center of the REG business model, delays or operational gaps in its implementation can undermine project performance even after the REG system has been constructed. DisCos should therefore prioritize ICA readiness in parallel with construction and commissioning activities.

Step 10 – Regulatory approvals and permits

REG projects must obtain several regulatory approvals and permits before construction, interconnection, and commissioning can proceed. These requirements typically include generation licensing, technical certification, and environmental or local government approvals. Responsibility for securing these approvals is generally shared between the developer and the DisCo. The developer typically leads the generation licensing process, while the DisCo provides network information, interconnection documentation, and other supporting materials required for regulatory submissions. Early coordination between both parties is essential to avoid delays. Error! Reference source not found. summarizes the main regulatory approvals typically required for REG implementation.

Exhibit 8: Key regulatory approvals needed for a REG project

Approval/ Permit	Responsible Party	Description	Key Requirements
Embedded Generation License	Developer (with DisCo support)	Regulatory authorization to construct and operate the REG plant. Licensing authority may be **Nigerian Electricity Regulatory Commission (NERC)** or a **State Electricity Regulatory Commission (SERC)** depending on whether the project falls within a federal or state electricity market post-Electricity Act (2023).	• Technical description of the proposed generation facility • Interconnection arrangements and point of interconnection • Evidence of land rights or site control • Environmental compliance documentation • Project financial and ownership information
NEMSA Certification	Developer and DisCo	Certification confirming that the generation facility, interconnection infrastructure, and associated distribution upgrades comply with Nigerian electrical safety and technical standards.	• Inspection of generation plant • Verification of interconnection infrastructure • Compliance with electrical safety standards • Approval of protection and control systems
Environmental Impact Assessment (EIA) *(where required)*	Developer	Environmental approval required for projects exceeding regulatory thresholds or located in sensitive areas.	• Environmental impact assessment documentation • Approval from the relevant environmental authority

Local Land-Use and Construction Permits	Developer (with community engagement support)	Local government or community approvals required for construction of the generation facility.	• Land-use approval from local authorities • Construction permits • Community consent agreements where applicable

Sequencing considerations to minimize delays

Regulatory approvals can take several months and are often outside the direct control of the DisCo or developer. To minimize delays, the following actions are recommended:

- Initiate the embedded generation license application soon after developer selection
- Confirm regulatory jurisdiction early (NERC or relevant SERC)
- Engage NEMSA during system design and construction planning
- Begin environmental and land permitting processes before construction begins

Early initiation of these workstreams allows regulatory reviews to proceed in parallel with contracting and construction preparation.

Outputs of this step include:

- Confirmed regulatory pathway for the project, including the responsible licensing authority
- Submission or receipt of required generation licensing, certification, and permitting documentation
- Regulatory and permitting workstreams sequenced to avoid delays to construction and commissioning
- A project that is regulatory-ready for execution

Step 11 – Construction and distribution network upgrades

Once transaction close has been achieved and the required regulatory approvals secured, the project can proceed to construction. The objective of this step is to deliver the REG plant and associated distribution network upgrades safely and in accordance with the technical specifications agreed during project preparation.

Construction is typically led by the developer, who is responsible for engineering, procurement, and construction (EPC) of the REG facility. Because REG systems are integrated into the DisCo's distribution network, close coordination between the developer and the DisCo is required throughout the construction phase.

Construction sequencing and responsibilities

Construction generally proceeds through two parallel workstreams: development of the REG generation plant and implementation of the distribution network upgrades required for system integration.

The developer is typically responsible for:

- Procurement and installation of generation equipment, including solar PV modules, BESS, inverters, and auxiliary generation, where applicable
- Construction of the generation facility and associated electrical infrastructure
- Installation of plant monitoring and control systems

In parallel, the developer and DisCo must coordinate on distribution network upgrades required for reliable system operation. These may include:

- Installation or upgrading of transformers and switchgear
- Reinforcement of feeder lines and conductors
- Installation of protection and control systems for safe interconnection
- Segregation of premium customer loads where required
- Installation or upgrade of customer metering infrastructure

The allocation of responsibilities for these works should follow the provisions defined in the PPA. Because generation construction and network upgrades are interdependent, both workstreams should be coordinated through a joint implementation schedule.

Joint execution workplan and progress monitoring

Before construction begins, the DisCo and developer should establish a joint execution workplan defining implementation milestones, responsibilities, and reporting procedures. The workplan should include:

- A detailed construction schedule covering engineering, procurement, and installation activities
- Identification of critical path milestones and expected completion dates
- Defined roles and responsibilities for the developer and the DisCo
- A progress reporting cadence for monitoring implementation

Regular coordination meetings should be held to review construction progress, track equipment delivery, and address emerging risks to the project schedule.

Annex H includes a workplan template that can be adapted by the DisCo to monitor developer activities and DisCo responsibilities during project execution.

DisCo oversight and quality assurance

Although the developer leads construction, the DisCo retains responsibility for ensuring that infrastructure connected to its network meets required technical and safety standards. DisCo oversight should include:

- Verification that installed equipment complies with agreed technical specifications
- Confirmation that network upgrades meet DisCo engineering standards
- Monitoring installation of protection and control systems in line with approved interconnection designs
- Oversight of safety procedures for works within the distribution network

All works must comply with relevant electrical safety standards enforced by NEMSA.

Logistics and long-lead equipment

Construction timelines may be affected by the procurement and delivery of critical equipment. Components such as inverters, battery systems, transformers, switchgear, and protection equipment may have significant manufacturing and delivery lead times. Developers should therefore identify long-lead items early in the construction planning process and secure

procurement orders accordingly. Delivery schedules should be aligned with the overall construction timeline to avoid installation delays.

Where the DisCo is responsible for procuring network equipment required for upgrades, those timelines should also be incorporated into the joint execution workplan.

Change management and issue resolution

During construction, unforeseen technical or logistical challenges may require modifications to the project design or construction approach. These may arise from site conditions, equipment availability, or technical integration constraints. The DisCo and developer should therefore establish a structured change management process to review and approve any modifications to the project scope or technical design. Changes should:

- Remain consistent with the contractual framework established at transaction close
- Not compromise system reliability or safety
- Be documented and approved by both parties

Clear change management procedures help prevent delays, cost overruns, or disputes during project execution.

Outputs of this step include:

- A physically completed REG plant and associated electrical infrastructure
- Completed distribution network upgrades required for interconnection and service differentiation
- A joint execution record tracking progress, responsibilities, and key implementation issues
- A system that is ready for testing, commissioning, and final technical acceptance

Step 12 – Interconnection, testing, and commissioning

Once construction of the REG facility and associated distribution network upgrades is complete, the project enters the commissioning stage. The objective of this step is to verify that the REG system operates safely and reliably under all expected operating conditions before commercial operation begins.

Commissioning involves coordinated technical testing between the developer and the DisCo to confirm that the generation plant, protection systems, control systems, and network interconnection function as designed. Successful completion of these activities culminates in regulatory certification and formal acceptance of the system for commercial operation.

Commissioning procedures and acceptance criteria

Commissioning begins once the developer confirms that all installation and construction activities have been completed. A structured commissioning plan should be prepared jointly by the developer and the DisCo to guide testing activities. The plan should define:

- The sequence of technical tests to be conducted
- Personnel responsible for conducting and supervising each test
- Safety procedures for energizing and operating the system
- Acceptance criteria for each stage of testing

Particular attention should be given to protection coordination and switching procedures. Protection settings must be verified to ensure that the embedded generation plant operates safely within the distribution network and that appropriate isolation occurs in the event of faults. Switching procedures should also be tested to confirm that the system can transition safely between operating states without compromising network stability.

Testing of operating modes and protection systems

Commissioning tests should confirm that the REG system performs correctly under the operating conditions expected during normal operation. These typically include:

- **Grid-connected operation**, where both the main grid and the REG plant supply power to the cluster
- **Island mode operation**, where the REG plant supplies designated loads during grid outages
- **Transitions between grid-connected and island modes**, including synchronization and reconnection procedures

Protection systems should also be tested to confirm proper response to abnormal conditions such as faults, voltage deviations, or frequency disturbances. These tests verify that protection relays, breakers, and control systems operate according to the approved interconnection design.

The DisCo's technical team should participate actively in these tests to confirm that system behavior aligns with network operational requirements.

NEMSA inspection and certification

Following successful internal commissioning tests, the project must undergo inspection and certification by NEMSA. **Step 10** describes what is needed to obtain certification. The developer and DisCo should coordinate the preparation of documentation and technical records required for inspection. Delays in documentation submission or inspection scheduling can postpone commissioning even after construction and internal testing have been completed. Once NEMSA certification is obtained, the system can be energized for commercial operation.

Handover and transition to operations

The final stage of commissioning involves the formal handover of the system from the engineering and construction teams to the operational teams responsible for running the facility. This process typically includes:

- Training of the developer's operations personnel
- Transfer of system documentation and operating procedures
- Final acceptance and sign-off by the DisCo confirming compliance with agreed technical and operational standards

Completion of this process marks the transition to commercial operation of the REG system.

Outputs of this step include:

- A completed commissioning plan and record of technical tests performed
- Verified operation of the REG system under expected operating modes

- Final technical acceptance and handover to operations teams
- A system that is ready for energization and commercial operation

3.4 Phase IV: Operations

Once commissioning is completed and the system reaches commercial operation date, the REG project enters the operations phase. The objective of this phase is to sustain reliable electricity supply within the cluster while maintaining the commercial arrangements established during project development. During operations, the DisCo and the developer transition from project implementation to long-term system management. This includes operating the REG facility and distribution network, administering billing and collections through the ICA framework, and ensuring that contractual obligations between the developer, the DisCo, and participating customers are fulfilled.

Step 13 – Operating model and performance management

Following commissioning, responsibility for operating the generation facility typically transfers to the developer's operations team, while the DisCo remains responsible for managing the distribution network and customer interface within the REG cluster. Under the typical REG operating model:

- The **developer** operates and maintains the generation facility
- The **DisCo** operates and maintains the distribution network serving the cluster
- Both parties coordinate on system dispatch, outage management, and operational scheduling

Service delivery within the REG cluster should be monitored against the performance standards defined in the PPA and customer CSAs. These standards typically relate to reliability, system availability, and power quality. Operational monitoring may include indicators such as:

- System availability and generation uptime
- Reliability of supply to premium customers
- Voltage and frequency stability within the cluster
- Response times to outages or service disruptions

Where performance standards are not met, the contractual framework typically defines procedures for remediation, which may include corrective operational actions or financial penalties.

Step 14 – Commercial operations and ICA settlement

Alongside technical operations, REG projects require structured commercial processes to manage billing, collections, and revenue allocation between the developer and the DisCo. Premium customer payments are managed through the ICA framework introduced in **Step 9**. Under this arrangement, payments from REG customers are separated from standard DisCo collections and deposited into the ICA before being distributed according to the agreed payment waterfall. During operations, the DisCo typically remains responsible for:

- Issuing electricity bills to participating customers
- Collecting customer payments through existing payment channels
- Ensuring that eligible payments are routed to the ICA

Payments received in the ICA are reconciled and allocated according to the settlement structure agreed between the developer and the DisCo. Operational management of the ICA therefore requires regular reconciliation of metered consumption, payments received, and settlement obligations. Where discrepancies arise — such as payment shortfalls, customer disputes, or delayed remittances — both parties should follow the dispute resolution procedures defined in the ICA agreement.

Commercial operations must also address issues such as customer arrears, electricity theft, or meter tampering. DisCos should apply their standard loss-management procedures within the REG cluster while maintaining the transparency of ICA settlement processes.

Step 15 – Continuous improvement and scale-up

Early REG projects are likely to function as pilot implementations within the DisCo network. Operational experience from these projects should therefore be used to refine future implementations. During the operations phase, DisCos and developers should document lessons learned across key areas, including:

- Customer engagement and premium customer participation
- Accuracy of demand forecasts and system design assumptions
- Operational coordination between the developer and the DisCo
- Billing, collections, and ICA settlement processes

These lessons can inform improvements to project development processes, contractual templates, and developer procurement procedures.

As implementation experience grows, DisCos may expand from individual pilot projects to a portfolio approach in which multiple REG clusters are developed across their network. Standardizing project development processes, contractual structures, and operational procedures will be essential to supporting this scale-up.

Outputs of this step include:

- Documented lessons learned from project implementation and operations
- Identified improvements to project development, contracting, and operational processes
- A basis for standardizing future REG transactions across the DisCo network
- A roadmap for scaling from pilot projects to a broader REG portfolio

4 Project Work Plan and Timelines

The full life cycle of a REG project — from confirmation of a selected cluster to commercial operation — typically spans **12 to 18 months**, depending on project scale and complexity, regulatory timelines, and procurement processes. Implementation involves multiple technical, commercial, regulatory, and contractual activities that must be coordinated carefully to avoid delays. To support this coordination, DisCos should manage REG projects using a structured implementation work plan. The work plan allows project teams to track activities across the implementation life cycle, assign responsibilities, monitor progress, and identify potential delays early. An implementation workplan template is provided in **Annex H**. This section explains how the template can be used to plan, monitor, and manage REG implementation.

4.1 Purpose and Structure of the Work Plan

The work plan serves as the central coordination tool for REG project delivery. It helps teams:

- Track progress across the implementation phases described in **Section 3**
- Assign responsibilities across technical, commercial, regulatory, and legal teams
- Monitor implementation timelines and identify delays
- Coordinate activities between the DisCo and the developer
- Provide visibility to management on project status

The template contains three worksheets to support project planning and monitoring:

1. **Cover Sheet**: Provides basic project information, including the REG cluster name, implementing DisCo, project start date, and overall project timeline.
2. **Work Plan Sheet**: Serves as the primary project management tool. This sheet lists the key implementation activities across the REG life cycle and allows project teams to record:
    a. Responsible teams or individuals
    b. Planned start and completion dates
    c. Activity status (e.g., not due, ongoing, completed, or overdue)
    d. Comments on implementation progress, risks, or constraints
3. **Gantt Chart Sheet**: Automatically visualizes the implementation timeline based on the activity dates entered in the Work Plan sheet. The chart allows project teams and senior management to quickly:
    a. Understand the sequencing of implementation activities
    b. Identify overlapping workstreams
    c. Monitor progress against the planned timeline
    d. Detect potential delays affecting the critical path

The Work Plan sheet should be reviewed and updated regularly during project coordination meetings between the DisCo and the developer to track progress and identify emerging delays or bottlenecks. The Gantt chart updates **automatically** when the work plan is updated and provides a visual summary of overall project progress.

4.2 Critical Path Activities

Certain activities determine the overall timeline of a REG project because subsequent steps cannot proceed until they are completed. These activities form the **critical path** of implementation. They typically include:

- Distribution network assessment and upgrade planning
- Premium customer engagement and CSA negotiation
- Developer procurement, contract negotiation, and transaction close (including financial close where third-party financing is required)
- Regulatory approvals and permitting
- Delivery of long-lead generation and electrical equipment
- Construction and commissioning of the generation facility

Delays in these activities can significantly extend project timelines. DisCos should therefore monitor progress against these milestones closely and ensure that responsible teams are clearly assigned.

The implementation work plan should reflect the internal decision points described in **Section 0, *Governance and decision-making***, so that required approvals are built into the project timeline and do not delay subsequent activities. Each DisCo should define the internal governance body responsible for these approvals and the documentation required at each stage. Additionally, they should be incorporated into the implementation timeline so that DisCos can ensure that project teams obtain the necessary internal approvals without delaying project delivery.

5 Key Risks and Mitigation Measures

REG implementation involves a range of technical, commercial, regulatory, and operational risks. Many of these arise from the coordination required among multiple stakeholders and the integration of new generation assets into existing distribution networks. Early identification of these risks and proactive mitigation measures is essential to maintaining project momentum and ensuring that projects reach commercial operation on schedule. **Exhibit 9** summarizes key risks that may arise during REG implementation and the recommended mitigation measures.

Exhibit 9: REG implementation risks and mitigation measures

Project Phase	Risk	Description	Mitigation Measures
Project Initiation	**Incomplete or unreliable cluster information**	Distribution network and customer data may be incomplete or inconsistent, leading to inaccurate cluster evaluation or site selection	• Establish a standardized REG data collection template and assign data owners within technical and commercial teams • Validate available data through feeder-level analysis, engagement with regional teams, and customer verification exercises
	Internal DisCo misalignment	Different departments within the DisCo may have conflicting priorities regarding cluster selection, revenue implications, or network control	• Establish a cross-functional REG project team with representation from technical, commercial, regulatory, and finance departments • Clearly define governance and decision-making authority early in the project
Project Preparation	**Weak premium customer commitment**	Premium customers may be hesitant to commit to the REG model due to uncertainty about reliability, tariffs, or contractual obligations	• Conduct early engagement with potential premium customers, clearly explaining REG value proposition and contractual obligations • Secure non-binding letters of intent before proceeding with system design and procurement
	Inaccurate load assumptions	Limited or unreliable customer load data may lead to incorrect system sizing or unrealistic tariff assumptions	• Validate load assumptions using historical billing records and feeder load data • Deploy temporary data loggers where necessary to capture representative demand patterns
	Low-quality developer participation in procurement	The RFQ/RFP process may attract developers with limited technical capability or insufficient financial capacity	• Conduct market sounding prior to procurement • Include strict RFQ evaluation criteria covering proven implementation track record, financial capability, and relevant project experience
	Commercial misalignment between stakeholders	Differences in expectations between the DisCo, developer, and premium customers may delay negotiations or undermine project bankability	• Establish clear commercial principles during project preparation, including tariff assumptions, MCE levels, and risk allocation frameworks

Project Execution	**Contractual negotiations delays**	Negotiations for the PPA and CSAs may take longer than anticipated, delaying financial close	• Align internally on key contractual positions before negotiations begin, particularly on tariff indexation, MCE levels, and network upgrade responsibilities
	Regulatory approval delays	Embedded generation licensing, NEMSA certification, or other approvals may take longer than expected	• Initiate regulatory engagement early and prepare application documentation in parallel with procurement and contracting processes • Prioritize developers with experience navigating Nigerian regulatory processes
	Supply chain and logistics delays	Delivery of key equipment such as solar modules, batteries, transformers, or switchgear may be delayed due to procurement or logistics challenges	• Identify long-lead equipment early and incorporate delivery timelines into the project schedule • Require developers to demonstrate procurement readiness during bid evaluation
	Construction delays or poor installation quality	Inadequate oversight during construction may lead to substandard installations, safety issues, or schedule overruns	• Establish a joint project execution work plan with the developer and conduct regular progress checks • Maintain DisCo oversight of construction quality and safety compliance throughout the execution phase
	Foreign exchange (FX) risk	Exchange rate volatility may affect project economics where capital expenditures or financing are denominated in foreign currency	• Encourage developers to raise local currency financing where possible and incorporate tariff adjustment mechanisms linked to inflation or exchange rate movements.
Project Operations	**Weak collections or revenue leakage**	Inefficient collections processes may undermine the financial sustainability of the REG project	• Implement a ring-fenced Independent Collections Account • Integrate payment tracking into existing billing systems to ensure transparent revenue allocation
	Customer payment defaults	Premium customers may delay or default on payments, affecting revenue flows	• Ensure that CSAs clearly define payment obligations and penalties • Conduct credit assessments of premium customers before finalizing contracts
	Electricity theft or meter tampering	Unauthorized consumption or meter tampering may affect billing accuracy and revenue collection	• Deploy tamper-resistant meters and conduct regular inspections • Strengthen enforcement procedures for electricity theft within the cluster
	Underperformance of the REG system	Generation assets may fail to deliver the expected reliability or output levels	• Establish performance guarantees and availability requirements within the PPA • Maintain robust monitoring of system performance after commissioning

6 Monitoring and Evaluation

Effective monitoring is essential to ensure that REG projects deliver the expected reliability improvements, commercial performance, and customer benefits. Once a project reaches commercial operation, DisCos should track key technical, commercial, and customer service indicators to monitor system performance and identify issues requiring corrective action.

Monitoring frameworks will typically be **DisCo-driven**, reflecting each utility's operational priorities, internal reporting processes, and regulatory obligations. The indicators presented in **Exhibit 10** are therefore illustrative rather than prescriptive. They provide a recommended set of metrics that DisCos may use to assess REG performance and support operational decision-making. These indicators are broadly aligned with monitoring approaches used in distributed energy programs such as **DARES** and may also support reporting requirements to **NERC or relevant state regulators**, where applicable.

Exhibit 10: Suggested REG performance indicators

Category	Indicator	Description	Monitoring Purpose
Technical Performance	Hours of supply	Average daily hours of electricity supply delivered to the REG cluster	Tracks improvement in service reliability relative to baseline supply conditions
System Availability	Percentage of time the REG generation system is available to supply power	Ensures the developer meets reliability and availability commitments defined in the PPA	
Frequency and Duration of Interruptions	Number and duration of service interruptions experienced within the REG cluster	Helps identify operational or network reliability issues affecting supply quality	
Voltage and Frequency Stability	Monitoring of voltage and frequency levels within the cluster	Ensures compliance with grid standards and protects customer equipment	
Commercial Performance	Billing accuracy	Percentage of energy supplied that is accurately billed to customers	Identifies billing discrepancies and supports revenue assurance
Collection Efficiency	Ratio of payments received relative to billed amounts for the REG cluster	Measures effectiveness of billing and collections processes	
Premium Customer Retention	Number of premium customers remaining within the REG cluster over time	Indicates long-term commercial viability of the project	
ICA Settlement Accuracy	Timeliness and accuracy of payments distributed through the Independent Collections Account	Ensures transparent revenue allocation between the developer and the DisCo	
Customer Outcomes	Customer satisfaction	Feedback from premium and non-premium customers regarding	Measures whether REG improves customer experience

		service reliability and tariff levels	
Complaint Frequency	Number and type of service complaints received from customers within the cluster	Identifies operational issues requiring attention	
Generator Displacement (proxy)	Reduction in generator runtime or diesel consumption among customers within the cluster	Indicates whether REG supply is successfully replacing self-generation	

In addition, DisCos are encouraged to incorporate gender equality, disability, and social inclusion (GEDSI) indicators into their monitoring frameworks, where feasible. This may include tracking metrics such as access to reliable electricity for underserved or vulnerable groups, participation of women-owned businesses within REG clusters, and inclusive employment or engagement practices. Integrating GEDSI considerations can help ensure that REG projects deliver broader social impact alongside technical and commercial outcomes. RMI can provide additional guidance and resources to support DisCos in defining and applying relevant GEDSI indicators.

6.1 Baseline and Post-Implementation Measurement

To measure the impact of REG projects, DisCos should establish baseline performance metrics before commissioning, as described in **Step 2**. After the REG system reaches commercial operation, these indicators should be monitored regularly to assess improvements in reliability, revenue performance, and customer outcomes. Comparing baseline and post-implementation performance allows DisCos to quantify the operational and commercial benefits of the REG model.

6.2 Reporting and Governance

Monitoring results should be compiled into periodic performance reports to support internal management oversight and coordination with the developer. At a minimum, DisCos should maintain:

- **Operational performance reports** tracking technical indicators such as system availability and interruptions
- **Commercial performance reports** covering billing, collections, and ICA settlement performance
- **Customer service reports** summarizing complaints, service issues, and customer feedback

Where required, selected indicators may also be reported to **NERC or relevant state regulators**. DisCos should ensure that monitoring frameworks remain aligned with applicable regulatory reporting requirements. Regular review of these indicators enables early identification of operational or commercial issues and supports timely corrective action.

7 Annexes

The following attachments are provided with this guide to support project implementation activities:

- **Annex A:** RACI Matrix for DisCo REG Implementation Team
- **Annex B:** Draft Letter of Intent (LoI) to REG Premium Customers
- **Annex C:** REG Premium Customer Information Brief
- **Annex D:** REG Data Collection Framework
- **Annex E:** REG Financial Model Template
- **Annex F:** REG Power Purchase Agreement (PPA) Template
- **Annex G:** REG Customer Service Agreement (CSA) Template
- **Annex H:** REG Project Implementation Workplan Template
- **Annex I:** Regulatory Guidance for REG Projects
- **Annex J:** REG Implementation Guide Summary