MILLENNIUM
CHALLENGE ACCOUNT
BELIZE

Millennium Challenge Account Belize

CLARIFICATION NOTICE No. 1

Consultancy to Develop Dispatch Regulations

Ref. No: MCA-B/EP/QCBS/26/3009

Issue Date: 15 September 2026

No	Reference of RFO	Question	Response
1.	TOR	**Open-Source vs. Commercial Engine Requirements (Technical Tooling)** TOR repeatedly mandate "open-source, unencrypted computational tools," and open workbooks for AC-OPF, hydro optimization, and SCED. **Clarification Question:** Is the consultant expected to build custom, fully functioning open-source optimization tools (e.g., using Python/PyPSA) to perform day-to-day SCED, or are these open-source tools intended purely as regulatory benchmarking standard models alongside BEL's commercial software?	The "open-source, unencrypted computational tools" required in the TOR are **regulatory benchmarking, audit, and transparency tools**, not replacements for BEL's operational dispatch engine. The Consultant shall develop regulator-owned reference models and workbooks that can independently reproduce benchmark results using the same inputs (constraints, costs, forecasts) to verify prudence and compliance. Offerors may look to models such as: • **AEMO's planning outputs and resource adequacy artifacts** (e.g., public planning data, inputs/assumptions workbooks, and benchmarking outputs used to validate system security and adequacy); and • **CENACE's day-ahead market artifacts** (e.g., published day-ahead schedules,

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			marginal prices, and constraint reports used for ex-post verification). The expectation is analogous: **transparent, regulator-accessible benchmarks** that can test the SO's outcomes—not a production open-source dispatcher.
2.	TOR	**Modelling Complexities (AC-OPF, DPR & Sub-Second GFM)** The TOR calls for dynamic AC-OPF co-optimizing active/reactive power, Dynamic Probabilistic Reserves (DPR), sub-second Grid-Forming (GFM) control verification, and EMT/RMS dynamic impedance modeling. **Clarification Question:** Are complete, validated dynamic EMT/RMS and grid network models currently available from BEL and existing IPPs, or will the consultant be required to build network dynamic models from scratch as part of Task C?	Offerors should assume **partial availability**. BEL and some IPPs have steady-state and limited dynamic data, but comprehensive, validated EMT/RMS models and full network dynamic parameters are **not yet complete**. Task C explicitly includes building/updating these models where gaps exist, using manufacturer data, commissioning tests, and field measurements. The selected Consultant shall: • Inventory existing models and data; • Define a minimum data specification (Annex B) and a validation protocol; • Build or refine dynamic models to the fidelity needed for DPR, GFM verification, and AC-OPF studies.
3.	TOR	**Dual Operational & Contractual Reporting Chains (Governance)** The TOR states that the consultant contractually reports to MCA-Belize, operationally collaborates with the PUC, and must coordinate closely with BEL and other donors. **Clarification Question:** Could the Accountable Entity confirm the intended approval and sign-off process for technical	**Contractual reporting:** MCA-Belize is the contracting authority and issues formal approvals of deliverables. • **Technical acceptance:** The PUC is the technical acceptor for regulatory content (dispatch rules, penalty frameworks, compliance templates). BEL is the operational reviewer for procedures, data requirements, and feasibility.

		deliverables (e.g., gap assessments, penalty mechanisms, or curtailment hierarchies) in cases where BEL and the PUC may hold differing views, given the Consultant's contractual reporting line to MCA-Belize and its operational collaboration with both entities?	• **Resolution of differences:** The selected Consultant shall document divergent views in the deliverable transmittal. MCA-Belize will convene a joint review with PUC and BEL. So, in a practical sense, the PUC's position prevails on regulatory design; BEL's position prevails on operational practicability only where it does not conflict with the Regulations. MCA-Belize issues the final go-ahead.
4.	TOR	**Penalty Enforcement Framework & Financial Risk Allocation (Task F & L)** Task F outlines a mechanism to disallow imprudent costs from the RCOP and introduces a penalty framework for the Task L pilot. Real-time dispatch deviations often result from third-party forecast errors rather than operator errors. **Clarification Question:** Will financial penalties or cost disallowances be enforced against BEL during the Task L shadow dispatch pilot, or is the pilot strictly non-punitive? How will the framework distinguish between System Operator mismanagement versus uncontrollable third-party forecasting errors?	For informational purposes only (This response does not amend, modify, or supersede the Terms of Reference (TOR)): **1. Non-Punitive Shadow Dispatch Pilot (Task L)** **Purpose.** The shadow dispatch pilot is a calibration exercise, not an enforcement period. Its objectives are to: • 1) Establish realistic KPIs and tolerance bands; 2) Test data quality, event logging, and exception workflows; 3) Calibrate the penalty formula against observed outcomes; and 4) Validate benchmarking tools and reference models. **2. Post-Pilot Causation Methodology (Controllable vs. Uncontrollable)** **Scope.** After the Final Regulations are in force, any deviation between benchmarked SCED outcomes and actual dispatch shall

			undergo causation analysis prior to penalty or cost-recovery actions.
			
			Categories.
			
			• **Controllable deviations (SO mismanagement):** Actions or omissions within the SO's reasonable control that lead to sub-optimal outcomes. Examples include:
			  ○ Dispatching higher-cost units when lower-cost, available units could have met need without a justified security reason;
			  ○ Failure to follow approved dispatch procedures or to act on available information;
			  ○ Inefficient coordination or resource management.
			• **Uncontrollable drivers:** Events beyond the SO's reasonable control. Examples include:
			  ○ Verified forecast errors for load/VRE that exceed published tolerance bands;
			  ○ Force majeure (natural disasters, extreme weather, sudden major outages);
			  ○ Third-party actions (e.g., IPP non-delivery) where the SO took all reasonable mitigation steps.
			
			2.1 Evidence standard. Causation shall be determined using forensic evidence, including but not limited to: SCADA/EMS event logs, dispatch instructions and timestamps, constraint logs, reserve deployment records,

			disturbance/PMU records, and validated forecast vs. actual datasets. The SO bears the burden of proof for exception claims.
5.		**BESS Ownership, Degradation Costs, and Compensation (Task D & E)** Task D mandates BESS operate in continuous Grid-Forming (GFM) mode and requires that economic dispatch yields to grid stability, while SRMC must account for battery degradation. **Clarification Question:** Are the planned 60 MW BESS assets assumed to be utility-owned (BEL) or third-party IPP-owned? If IPP-owned, is the consultant expected to design a standalone market or tariff to reimburse private operators for accelerated cell degradation caused by continuous GFM?	**1. Ownership assumption:** For the purposes of this assignment, assume a **mixed portfolio**: some BESS may be BEL-owned; the current plans are IPP-owned under PPAs or service contracts. The Regulations and procedures must work under either model. **2. Modality:** BESS may be (i) **standalone** (system-charged via the grid) or (ii) **integrated/hybrid** with a PV array (DC- or AC-coupled) where the PV array charges the storage. The Consultant shall define dispatch, telemetry, and settlement rules that cover both modalities, including: • SoC management and minimum thresholds for stability services; • Priority of grid-critical services (GFM, FFR, synthetic inertia) over energy arbitrage when required by the Grid Code; • Degradation-aware SRMC calculation for dispatch ranking; • Data and metering requirements to separate self-supply (PV charging) from system charging.

			3. Compensation Principles for Mandated Stability Services **Scope.** This assignment does not require the Consultant to design a full standalone ancillary-services market or a new tariff code. However, the Draft Dispatch Regulations and Procedures Manual must establish clear **compensation principles** for resources that are **mandated** by the System Operator (SO) or the Grid Code to provide grid-critical stability services (e.g., continuous Grid-Forming operation, Fast Frequency Response, synthetic inertia, voltage/reactive support, black-start readiness); **leaving final compensation design to PUC proceedings**. The principles shall ensure that: 1. Resources required to prioritize stability over energy arbitrage are not financially disadvantaged; 2. Compensation is linked to **availability, performance, and opportunity cost**, not merely energy throughput; 3. Costs are transparent, auditable, and recoverable through existing PUC processes; and 4. The framework works for both **BEL-owned** and **IPP-owned** assets. **3.1 Degradation and Opportunity Cost.** Where stability mandates accelerate degradation or constrain revenue-earning

			energy arbitrage, the principles shall allow compensation mechanisms that reflect: • **Throughput-based degradation costs** (e.g., $/MWh cycle cost) in dispatch ranking and/or settlement; • **Opportunity cost** when a resource is restricted from arbitrage to maintain SoC minima or stability headroom.
6.	TOR	**Granularity and Thresholds for Distributed Energy Resource (DER) Integration (Task E & J)** Task E requires developing scheduling, visibility, and control protocols for Distributed Generation (DG) and aggregated Distributed Energy Resources (DERs). **Clarification Question:** What is the minimum capacity threshold (e.g., ≥ 100 kW vs. ≥ 1 MW) for DERs to require direct SCADA visibility and active dispatch control by the System Operator? Are smaller BTM systems intended to be actively co-optimized or treated as passive negative load?	1. **Direct SO visibility/dispatch:** DERs ≥ **1 MW** aggregated at a node shall be subject to telemetry, scheduling, and active dispatch control. 2. **Aggregation threshold:** Aggregated DER portfolios ≥ **5 MW** shall be dispatchable via an aggregator with defined telemetry and performance standards. 3. **Smaller BTM systems:** Systems < 1 MW (individual or non-aggregated) shall be treated as **passive negative load** for SCED, subject to inverter standards (IEEE 2800) and any future DER codes, but not directly dispatched.
7.	TOR	**Feasibility of a Two-Phase Dispatch Methodology (DC-OPF + AC-Power Flow)** Tasks mandate a SCED formulation incorporating AC Optimal Power Flow (AC-OPF). However, standard short-term optimization engines natively use DC-OPF approximations to maintain computational speed, as full multi-period	MCA-Belize cannot pre-approve any proposed methodology/approach. The below is for informational purposes: **1. AC feasibility and security assessment for all operational horizons**

		AC Power Flow is often computationally prohibitive. **Clarification Question:** Given that existing software tools for short-term planning and operational dispatch handle network security constraints via DC-OPF, will the PUC accept a two-phase operational methodology? For example: 1) Phase 1: Execution of a DC-OPF engine for multi-horizon unit commitment and dispatch; and 2) Phase 2: Running detailed AC Power Flow analysis based on Phase 1 dispatch output to evaluate voltage profiles, reactive power (MVAr) headroom, and system losses, applying manual or automated post-processing adjustments where AC security criteria are breached?	• **Day-ahead:** AC feasibility and security validation of the schedule, including relevant contingencies. • **Intra-day:** Re-assessment following material changes in forecasts, topology, outages, imports, BESS availability, or other relevant operating conditions. • **Real-time:** Continuous state estimation and security monitoring, with AC feasibility/security assessment and corrective dispatch as necessary and in accordance with the approved real-time operating procedures. Assessments shall cover applicable voltage and reactive power limits, thermal ratings, losses, transformer taps, contingency criteria (e.g., N-0/N-1 or other approved criteria), and resource capability, including inverter and BESS limits. **2. Mandatory corrective action** Where the proposed dispatch fails an applicable AC feasibility or security assessment, the SO shall initiate approved corrective action, including, as applicable, active/reactive re-dispatch, unit commitment changes, import adjustments, BESS control, tap changes, VRE curtailment, or other approved remedial measures. The resulting plan shall be re-assessed until the applicable security criteria are satisfied, or an approved emergency operating procedure

			shall be implemented where no feasible normal operating solution exists. **3. Regulatory benchmarking** The PUC may independently assess feasibility, security, and economic efficiency using AC-OPF, DC-OPF, enhanced linearized models, or other validated tools. Benchmarking shall use appropriately matched network models, resource data, reserves, and operating constraints, and shall account for the limitations and assumptions of the selected optimization methods. The frequency, methodology, and use of benchmarking in compliance assessments shall be established in the Procedures Manual. *Model governance and audit* The SO shall maintain version-controlled network and resource models, retain dispatch/AC-security logs and corrective-action records, and provide machine-readable outputs for PUC audit. *Grid Code interface* Mandatory technical standards, including voltage/frequency limits, reactive requirements, contingency/reliability criteria, and inverter/BESS requirements, reside in the Grid Code. The Procedures Manual specifies how these requirements are operationalized in

			SCUC/SCED, AC validation, security assessment, and real-time operations.
8.	TOR	**Data Infrastructure Readiness for the Pilot (Task L)** Task C requires assessment of gaps in BEL's WAMS and high-resolution (≥1 kHz) disturbance recorder capabilities. Task L, scheduled to commence at Week 70, assumes availability of ≥1 kHz oscillography data for the shadow dispatch validation. **Clarification Question:** Could the Accountable Entity clarify whether this instrumentation is currently operational at BEL, or whether its deployment falls outside the scope of this Contract and is being addressed through a separate initiative?	Deployment of ≥1 kHz disturbance recorders and WAMS is **outside the scope** of this Contract and is being addressed under separate initiatives. For Task L (pilot), the Consultant shall: • Use existing event records, PMU/SCADA data, and available disturbance recordings; • Where ≥1 kHz data are unavailable, propose a **proxy validation approach** (e.g., lower-resolution records plus targeted tests) and clearly document limitations; • Include in Deliverable 10 a phased plan to achieve full ≥1 kHz coverage aligned with the SGMM/IMM roadmap.
9.	DS ITO 12.10	**Number of In-Country Visits** Given that per diem and in-country travel are to be included in the total price (DS ITO 12.10), and that the TOR envisages in-person stakeholder workshops (Task H) and training delivery (Task K), **Clarification Question:** Could the Accountable Entity indicate the number of in-country visits and/or the expected duration of in-country presence anticipated over the course of the assignment, for costing purposes?	MCA-Belize does not prescribe a specific number of in-country visits or duration of in-country presence. Offerors are expected to estimate and cost these requirements as part of their proposed methodology, ensuring that the level of effort and associated travel are adequate and consistent with the successful delivery of all assignment outputs, including stakeholder workshops and training activities.

10.	TOR	**Coordination with Parallel Initiatives** Task E requires coordination with the "IFC Solar Tender" and planned World Bank BESS and dispatch-related activities. **Clarification Question:** Could the Accountable Entity provide further information on the scope, timeline, and points of contact for these parallel initiatives?	1. **IFC Solar Tender:** Focuses on utility-scale solar PV procurement with grid-code compliance (IEEE 2800) and forecasting/curtailment provisions. Expected tender issuance within the next 6–9 months. Primary contact: [IFC Belize Energy Team – to be provided by MCA-Belize upon request]. 2. **World Bank BESS/Dispatch:** Supports BESS deployment and complementary dispatch/market reforms, including possible SCED/EMS upgrades. Activities are anticipated to overlap with this assignment's later tasks (Tasks J–N). Primary contact: [World Bank Energy Global Practice – to be provided by MCA-Belize upon request]. The Consultant shall coordinate via MCA-Belize, who will facilitate introductions and data-sharing protocols. 3. **Saudi Solar + Storage Project:** 4. **BEL Smart Grid Upgrade:**
11.	TOR	**Status of the IEEE 2800-Compliant Grid Code** Task B references the Transmission Grid Code as being "in draft." **Clarification Question:** Could the Accountable Entity indicate the expected timeline for finalization of this Grid Code relative to the Contract's timeline?	The Grid Code is in advanced draft and is expected to be **finalized within 6 months** of Contract commencement. The Consultant shall design the Dispatch Regulations to be **compatible** with the draft Grid Code and incorporate any final changes during Task H (Stakeholder Consultation) and Task M (Final Regulations). Transitional clauses should address any interim gaps.

12.	ITO 12.4 (c)	**Q 1: RFO in pg. 6, C. Preparation of Offers states "(d) Not Applicable"** Clause ITO 12.4(c) specifies an estimated budget for the assignment, while Clause ITO 12.4(d) refers to requirements related to the Financial Offer. Please clarify whether an Offer whose total Financial Offer exceeds the estimated budget stated in ITO 12.4(c) will remain eligible for award, or whether the Accountable Entity intends to negotiate or reject Offers priced above the estimated budget.	The budget indicated in ITO 12.4(c) is an estimated budget and should not be interpreted as a maximum or upper limit. Offerors are expected to submit their own proposed price based on their technical approach and methodology, which may be higher or lower than the estimated budget. MCA-Belize reserves the right to enter into negotiations, where applicable, and in accordance with the procedures set forth in the Solicitation Document and the applicable policies and guidelines.
13.	TOR	RFO in pg. 59 SECTION V. TERMS OF REFERENCE (TOR) states "… Estimated Duration: 90 weeks (Drafting & Finalization) + 24 Months Optional Services (If Option is Exercised)" and in pg. 68 Terms of Reference: Task N — Optional: Implementation Support (6 Month Optional Extension, if exercised) states the duration to be 6 months but The solicitation references an Optional Period; however, the duration of the Optional Period is not clearly specified. Kindly clarify the duration of the Optional Period. Additionally, please confirm whether the estimated budget provided for this assignment includes the Optional Period, or whether the Optional Period will be funded separately if exercised by the Client.	MCA-Belize confirms that the Optional Services correspond to Task N with an estimated duration of 6 months. The estimated budget of USD 1,600,000 includes both the Base Contract and the separately priced Optional Period, if exercised.

14.		RFO in pg. 59 SECTION V. TERMS OF REFERENCE (TOR) states "… Position and requirements for Key Personnel…" The RFO specifies the Key Personnel. However, it does not provide guidance regarding the proposed Non-Key Personnel. As Non-Key Personnel are typically required to support the Key Personnel and contribute to the successful execution and completion of the assignment, kindly clarify whether the Client has considered the costs associated with Non-Key Personnel within the estimated budget for this assignment.	MCA-Belize has not prescribed any specific Non-Key Personnel positions. Offerors are expected to propose the Non-Key Personnel they consider necessary and appropriate, consistent with their proposed technical approach and methodology for successfully delivering the assignment. All associated costs for such personnel shall be included in the Financial Offer. For evaluation purposes, only the Key Personnel identified in the RFO will be subject to individual assessment based on the qualifications and experience of the proposed candidates.

These clarifications are issued for interpretative purposes only and do not constitute an amendment to the RFO document. All terms and conditions remain unchanged.

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