



Newsletter Issue #1 | 21 May 2026

# From More Renewables to Secure Grid Operation

## Why this first issue matters

As Cambodia, Tajikistan and Uzbekistan prepare for higher shares of solar, wind and other inverter-based resources, the challenge is moving beyond capacity expansion. The next question is operational: how can power systems remain stable, visible and controllable as the generation mix changes?

This first newsletter introduces the “TA-10533 REG: Integration of Innovative Grid Control Technology to Scale Up Renewable Energy” focus and captures the core messages from Webinar No. 1, which opened the quarterly regional webinar series.

### TA-10533 at a Glance

#### Beneficiary countries:

Cambodia, Tajikistan and Uzbekistan

#### Knowledge-sharing programme:

Six regional webinars planned under the TA

#### Technical focus:

High-level technologies for system stability, grid control, and regional coordination

**Fund:** High-Level Technology Fund

## 01

### The context

Rising VRE changes frequency, voltage, fault-current and balancing behavior. These are operational-security questions, not only planning questions.

## 02

### The project lens

TA-10533 focuses on grid control technologies and digital coordination tools for secure renewable integration.

## 03

### The first webinar

Webinar No. 1 set the common technical language for later country-specific assessments and deeper thematic sessions.

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## What problem is being addressed?

- Declining system inertia as inverter-based generation grows.
- Weak-grid and fault-current concerns that affect protection and voltage recovery.
- Greater need for balancing, forecasting, reserve quality and cross-border coordination.
- The practical gap between renewable capacity on paper and renewable capacity that can be operated securely.



## What will the TA support develop?

### Component 1: analytical studies

Country-specific assessment of HLT options, stability issues, technology screening, knowledge products, webinars and newsletters.

### Component 2: implementation orientation

Further analysis for selected priorities, including roadmaps, technical specifications and pre-feasibility-level inputs where applicable.

## “Webinar No.1: Considerations for System Stability under Increasing Variable Renewable Energy Integration” Successfully Held

11 May 2026 | Online via Zoom

The event brought together participants from Cambodia, Tajikistan, Uzbekistan, development partners, transmission system operators (TSOs), utilities, dispatch centers, ministries, consultants, and Asian Development Bank representatives.

The session was delivered by Mr. Gökhan Tosun, Head of Technology & Smart Infrastructure at MRC Türkiye, under the consultant team implementing the Technical Assistance.

## Webinar Objectives

The webinar aimed to establish a common technical foundation for the regional series by introducing how increasing inverter-based renewable energy affects power system operation, highlighting key stability challenges, presenting relevant high-level technologies, and sharing international implementation experiences to support future technical assessments under the TA.

## Webinar Agenda Highlights

The session covered a broad range of operational and technical themes related to high-VRE system operation and grid control technologies.

### Main topics Included:

- ✧ Power system transition under high VRE penetration;
- ✧ Adequacy versus operational security considerations;
- ✧ Low-inertia and weak-grid operational challenges;
- ✧ Frequency stability and system strength requirements;
- ✧ Grid-forming and grid-following battery energy storage systems (BESS);
- ✧ Synchronous condensers and FACTS technologies;
- ✧ AGC modernization, WAMPAC systems, and forecasting platforms;
- ✧ Operational telemetry, model validation, and disturbance replay approaches;
- ✧ International operational experiences and system security practices.

The screenshot shows a webinar slide titled "Why HLTs Matter?" with the following content:

TA-10533 • Webinar No.1 | 11 May 2026

**Why HLTs Matter?**

As power systems integrate higher shares of solar, wind, and other inverter-based resources, the challenge is no longer only to connect more capacity.

The real challenge is to keep the grid secure, controllable, and resilient under changing operating conditions.

High-Level Technologies matter because they help TSOs:

- manage low-inertia and weak-grid conditions
- improve voltage and reactive power control
- increase observability and faster system awareness
- unlock transfer capacity and operational flexibility
- translate renewable capacity into securely usable capacity

*HLT*s provide the tools needed to keep the grid secure, visible, and controllable

The slide also features an image of high-voltage power transmission towers under a blue sky.

On the right side of the screenshot, a participant list is visible, including names like A.Zaydullayev, Marinette Glo, 1AIC2131, ang sovann, atena.tazikeh, Avaz Zufarov, Axror Axmadov, Ayse Acikgoz, Bekzhan Mukatov, Berk.Gorgec, CHHUONG Sienghong\_EDC, Cindy Cisneros-Tiangco - ADB, Damla Sagiroglu, and Daniel.

**High-renewable systems should be planned and operated around clearly identified stability constraints and measurable grid-support services - not around technology labels alone.**

Transmission system operators increasingly need tools and operational frameworks capable of maintaining:

- ✧ Secure frequency behavior;
- ✧ Voltage stability and reactive power support;
- ✧ Operational visibility and observability;
- ✧ System strength and protection reliability;
- ✧ Transfer capability and operational flexibility.

## Four takeaways from the session

### Adequacy is not the same as security

A system can have enough MW and still face RoCoF, voltage recovery, protection or system-strength limits.

### HLTs must start from the constraint

Technology selection should follow the binding operational need: frequency, voltage, transfer, visibility or balancing.

### Validation matters

Models, telemetry, disturbance replay and operational evidence are essential for credible HLT adoption.

### Regional coordination is part of the solution

AGC maturity, data exchange and reserve-sharing rules can reduce balancing pressure when governance is ready.

## International Operational Practices Presented

The session also reviewed international implementation experiences from Ireland, Great Britain, Australia and European regional balancing platforms.

The case studies demonstrated how system operators have addressed challenges related to low system inertia, weak-grid constraints, frequency response requirements, cross-border balancing coordination, renewable dispatch limitations and stability service procurement frameworks.

Special attention was given to the operational importance of grid-forming inverter technologies, synchronous condensers, PMU/WAMPAC systems, dynamic operational monitoring, AGC and reserve-sharing mechanisms.



## About the Webinar Series

The webinar series is being implemented under TA-10533 REG to support participating developing member countries in assessing innovative grid control technologies and digital coordination solutions required for large-scale renewable energy integration. This TA is financed by the High-Level Technology Fund.

Subsequent quarterly webinars (minimum 6 webinars in total) under the series will further explore:

1. Power System Behavior under Declining System Inertia;
2. Power System Modelling Approaches for VRE Integration;
3. Operational Flexibility and Balancing in High-Renewable Power Systems;
4. Regional Coordination and Cross-Border Grid Control Approaches;
5. Institutional and Operational Context for Advanced Grid Control Technologies.

# STAY TUNED FOR UPCOMING WEBINARS AND NEWSLETTERS!

## Coming Next

### When Inertia Declines: What Keeps the Grid Stable?

As power systems integrate more solar, wind and battery storage, conventional sources of inertia may not always be online when the grid needs them most.

### What happens when the grid has less conventional inertia to rely on?

The next issue will explore declining system inertia as one of the key operational challenges of high-renewable power systems. It will preview the main themes of *Webinar No. 2: Power System Stability under Declining System Inertia*, including frequency stability, RoCoF, grid-forming technologies, BESS, reserve readiness and operational flexibility.

### Call for insights

Future newsletter issues may include short think pieces, technical notes or selected articles from participating institutions and experts. Contributions may address innovative grid control technologies, renewable energy integration, system stability, operational readiness or regional coordination.

To share a contribution idea, technical note or article for future issues, please contact us using the contact details below.

**Should you have any question or require any additional information, please do not hesitate to contact us.**

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