



ASIA CLEAN ENERGY FORUM 2026
Beyond Transition: Building Secure,
Resilient, Inclusive and Intelligent Energy
Systems

8-11 JUNE 2026- ADB Headquarters , Metro Manila ,
Philippines

Stability Solutions for Low- Inertia Renewable Power Systems

*Turning Renewable Capacity into Reliable Grid
Operation Through Advanced Modelling, Grid
Services and Modern Control Strategies*

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Session Information: Thematic Track 2.1 – Anticipating and
Managing Disruptions
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Agenda



From Low-Inertia Risk to Practical Stability Solutions

Why Low Inertia Changes System Stability

From synchronous-machine-dominated operation to converter-dominated operation

Adequacy $\neq$ Stability: Why “Enough MW” is Not Enough

Enough MW does not mean secure operation under realistic disturbances

Technical Study Toolbox for Low-Inertia system Analysis

PowerFactory steady-state, short-circuit and RMS/EMT dynamic studies, supported by flexibility and KPI screening tools

Stability Solution Packages(Technical + Operational)

GFM IBRs, BESS/FFR, SynCons, STATCOM/SVC, WAMPAC and protection adaptation

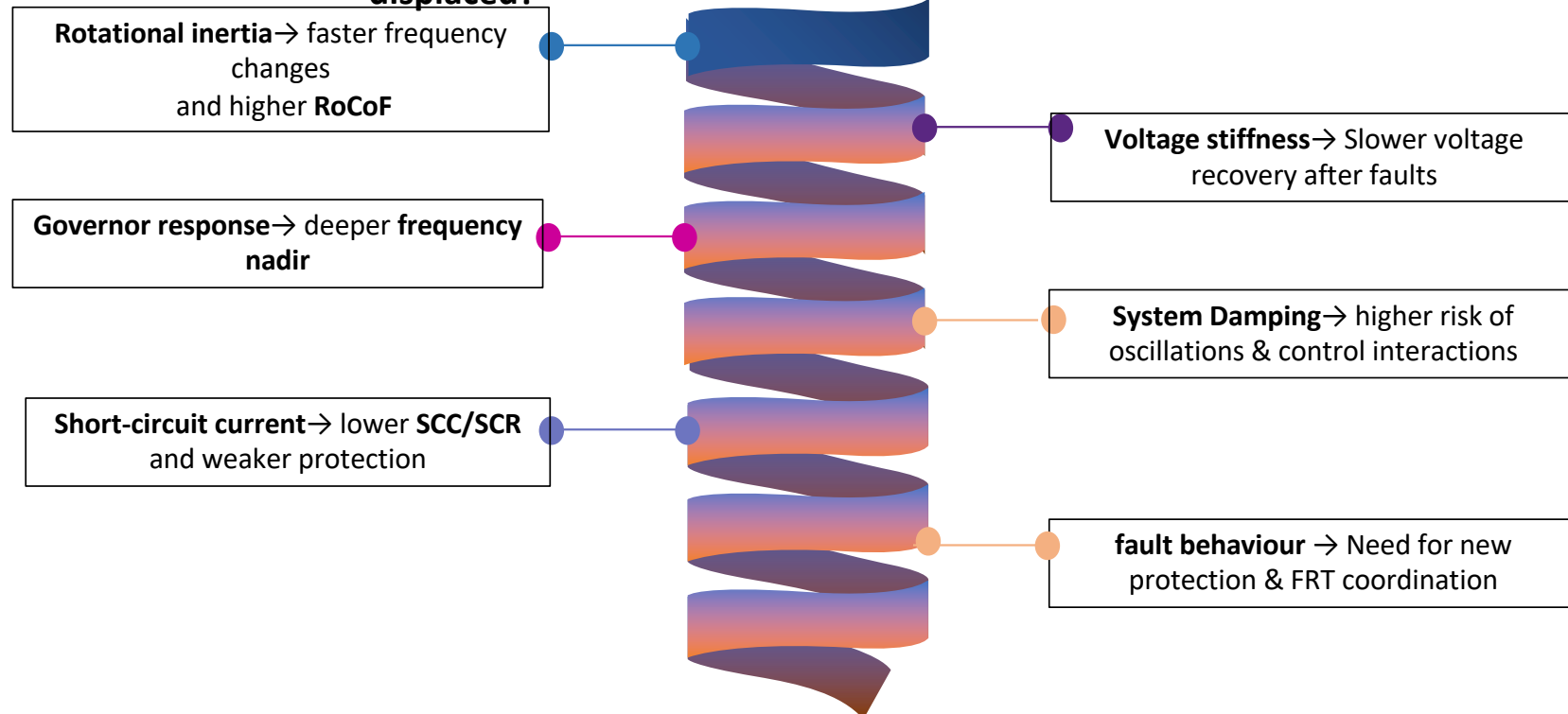
Implementation Roadmap – From Theory to Real Operation

Grid code, validated models, procurement specifications, pilots and control-room integration

Why Low Inertia Changes System

Stability
Transition from Synchronous Machines to Converter-Dominated Grids

What declines as synchronous generation is displaced?



NOTE. Low-inertia systems are not inherently unstable, but their stability depends heavily on control design, validated models and operational practices.

Adequacy ≠ Stability

Enough MW does not guarantee secure operation under realistic disturbances

Adequacy answers:

Is installed / available capacity sufficient to meet demand?
Are planning reserves adequate?
Is the annual or seasonal energy balance acceptable?

Stability / security answers:

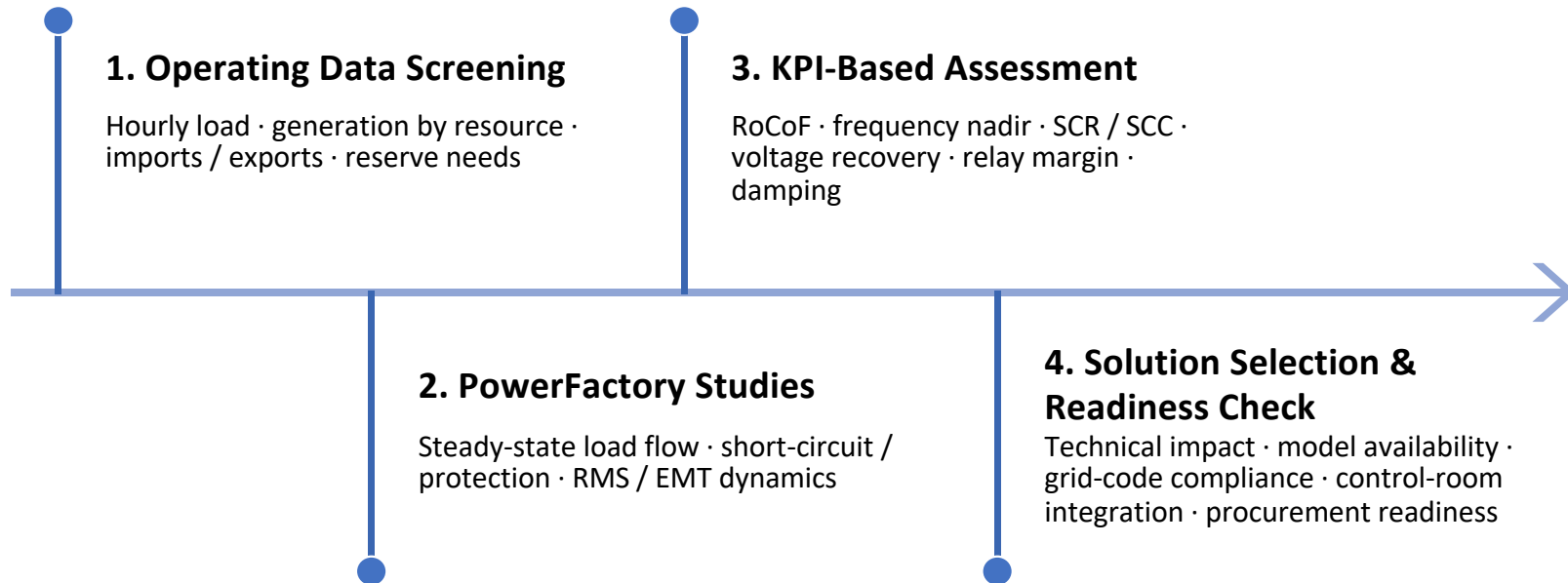
Can the system survive credible contingencies?
Are **RoCoF** and **frequency nadir** within limits?
Is **voltage recovery** acceptable after faults?
Are **SCC / SCR** levels sufficient at renewable connection points?
Will protection operate correctly under lower converter fault current?
Are oscillations and control interactions sufficiently damped?

Capacity adequacy does not automatically mean dynamic security.

NOTE. Renewable MW becomes reliably usable only when the system can maintain frequency, voltage, protection and dynamic stability during real operation.

Technical Study Toolbox for Low-Inertia Stability Screening

From operating data to PowerFactory studies and KPI-based solution selection



NOTE. A solution should be selected only if it improves the binding KPI and can be realistically specified, operated and integrated.

From Stability Constraint to Implementable Solution Package

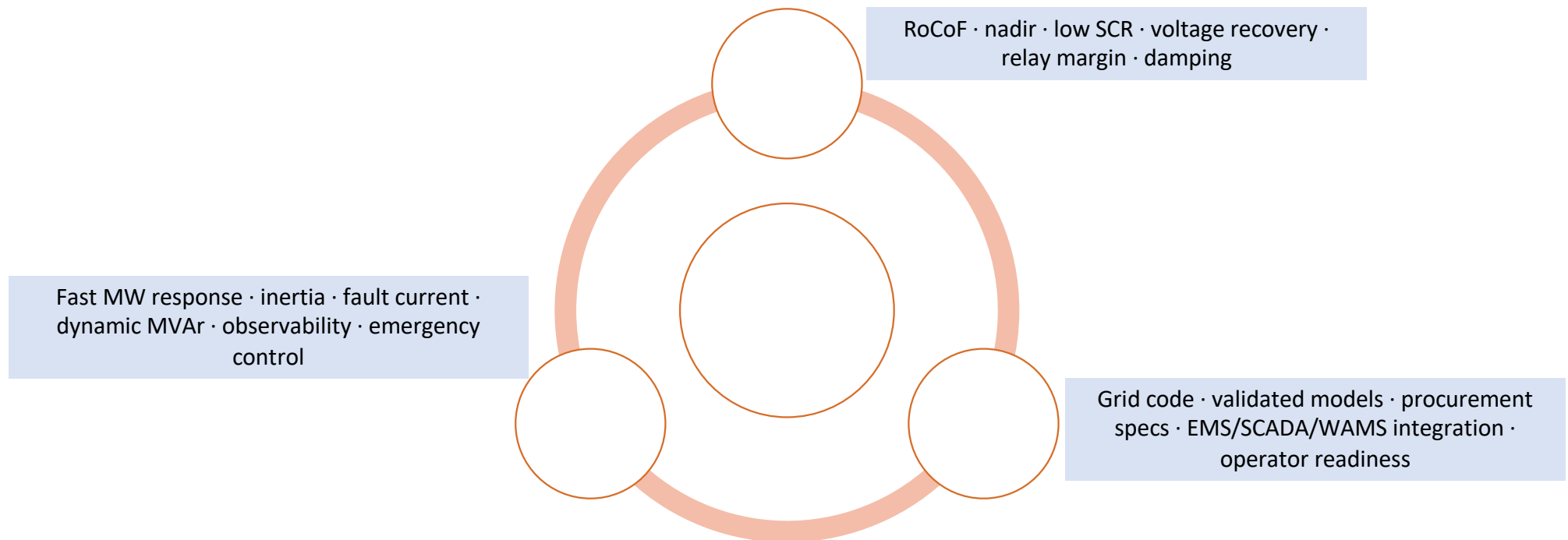
Technical performance must be combined with operational and procurement readiness

Frequency Stability Package	System Strength & Voltage Package	Protection & Dynamic Security Package	Implementation Enablers
BESS / FFR · GFM IBR · governor and AGC enhancement Target: RoCoF, frequency nadir, recovery time	SynCon · STATCOM / SVC · GFM controls · reactive coordination Target: SCR / SCC, voltage recovery, weak-grid operation	Protection setting review · FRT coordination · WAMPAC / SPS / RAS Target: relay margin, damping, emergency control	Grid code · validated RMS/EMT models · procurement specs · EMS/SCADA/WAMS integration · pilot projects

NOTE. Low-inertia stability should be procured and operated as a grid service, not treated only as an equipment investment.

Key Takeaway

Low-inertia stability requires evidence-based grid-service design



NOTE. The future grid must move from inherited synchronous stability to engineered, measurable and operationally integrated stability services.