



The Power of Collaboration in Advancing Decarbonization Solutions

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Global Power System Transformation (G-PST) Consortium

What?

A global consortium focused on support to **power system operators** with advanced, low-emission solutions

Who?

Founding System Operators



*G-PST Core Team
Technical Institutes*

*Emerging Economy
System Operators*

*Indonesia, Ukraine, Vietnam, India, South Africa,
Tanzania, Morocco, Peru, Colombia, and others*

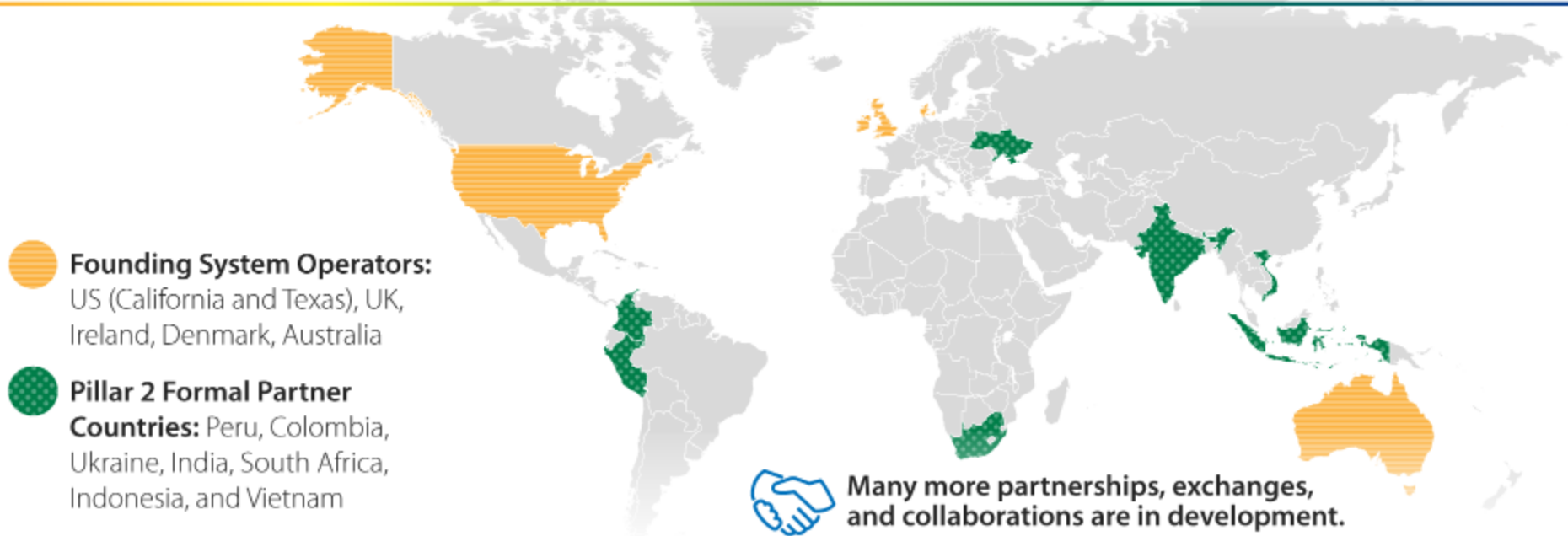
How?

5 Pillars

1. System Operator Research and Peer Learning
2. System Operator Technical Assistance
3. Workforce Development
4. Localized Technology Adoption Support
5. Open Tools and Data

G-PST around the world

To date, G-PST is formally partnered with **13 system operators across 12 countries.**



Additional projects being explored in Thailand, Morocco, Ecuador, Panama, & Tunisia

G-PST's vision is to reduce power sector emissions by **50%** from 2020 to 2030.



Control Room – Source: NGENSO

G-PST's work centers on advancing and sharing knowledge in the limiting technical areas where system operators worldwide experience the greatest challenges.

We are focused on **practical action and results** that enable all countries to maximize their deployment of renewable generation.

G-PST's near-term technical objective is to **operate a gigawatt-scale power system with 100% clean, inverter-based resources by 2025.**

To drive step-change in power system decarbonization and enable a broader set of system operators to achieve that milestone, G-PST is building system operator confidence and creating robust knowledge exchange among our network.



Partner Country System Operator *Modes* of Support



Peer learning with other system operators



Direct technical assistance and training



Internship and fellowship programs



Embedded expert assistance



Learning on research innovations



Conducting joint applied research



Types of Support to System Operators



Grid Integration Solutions

- Road-mapping control center modernization
- Management and real-time monitoring of power system inertia
- Oscillation source detection



Workforce Development

- Technical fellowships
- Partnership with local universities
- Specialized system operator continuing education



Localized Technology Adoption

- Establish or upgrade power electronics testing capabilities
- Expert input on national equipment performance standards



Open Tools and Data

- Open tools to support planning and operation of high renewable energy grids
- Datasets necessary for advanced analysis

Control Room Upgrades

System Operator: Indonesia's Perusahaan Listrik Negara (PLN)

G-PST Partners: National Renewable Energy Laboratory (NREL), Electric Power Research Institute (EPRI), Electric Reliability Council of Texas (ERCOT), California Independent System Operator (CAISO)

Projects: Recommendations for the new Java-Bali grid control center; Upgrades of Sulawesi control center for rapid load growth and renewable energy integration.

System Operator: Peru's Comité de Operación Económica del Sistema Interconectado Nacional (COES)

G-PST Partners: NREL, EPRI

Project: Comprehensive roadmap for updating control center.

These engagements ensure power systems can operate reliably and cost-effectively with increasing quantities of inverter-based resources such as wind, solar, and batteries. They also serve as examples for other countries.



Open Tools

System Operator: Vietnam's National Load Dispatch Centre (NLDC), South Africa's Eskom

G-PST Partners: NREL, EPRI, CSIR

Project: Development of open-source toolbox for power system inertia monitoring

System Operator: India's Power System Operation Corporation (POSOCO)

G-PST Partners: NREL, ISO-New England

Project: Implementation of open-source oscillation source detection tool on regional grids



This support leverages advancements under Pillar 5 (Open Tools and Data) to provide scalable tools to meet the needs of system operators with the flexibility to be applied in other G-PST partner countries.

Peer Learning on Priority Topics

System Operator: Indonesia's PLN, India's POSOCO, Colombia's Compañía de Expertos en Mercados (XM), etc.

G-PST Partners: CAISO, NREL, EPRI, EirGrid, Hawaiian Electric (HECO), Danish Technical University (DTU), and Australian Energy Market Operator (AEMO), Midcontinent Independent System Operator (MISO), ERCOT

Project: Technical roundtables (knowledge-sharing sessions) on high-priority topics

G-PST founding system operators and experts are responding to requests from system operators worldwide for peer learning on technical topics of most interest, including system flexibility, resiliency metrics, reactive power and voltage optimization, capacity procurement, cyber security, SCADA/EMS architecture, grid codes, and managing high levels of distributed photovoltaics (PV).



Workforce Development

System Operator: Indonesia's PLN

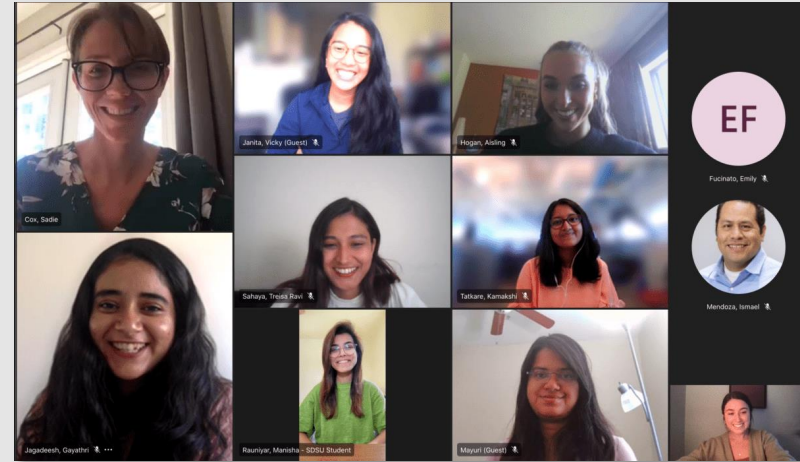
G-PST Partners: CAISO, NREL

Project: Technical fellowship exchanges between power system operators, with gender equity training and professional development opportunities

G-PST also developed five curriculum modules on critical topics in power system transformation, and will launch them with university partners over the next months.

G-PST is growing its internship program for young professionals to gain hands-on experience. NREL and EPRI hosted 8 interns in 2022.

The **Women in Power System Transformation** program offers gender equity training opportunities to G-PST fellows, interns, and others, and works to advance women's participation in the power sector. 23 leaders from India's POSOCO, Colombia's XM, and Indonesia's PLN are participating this month in USAID's Engendering Industries Workforce Gender Equality Accelerated Program.



Standards Implementation

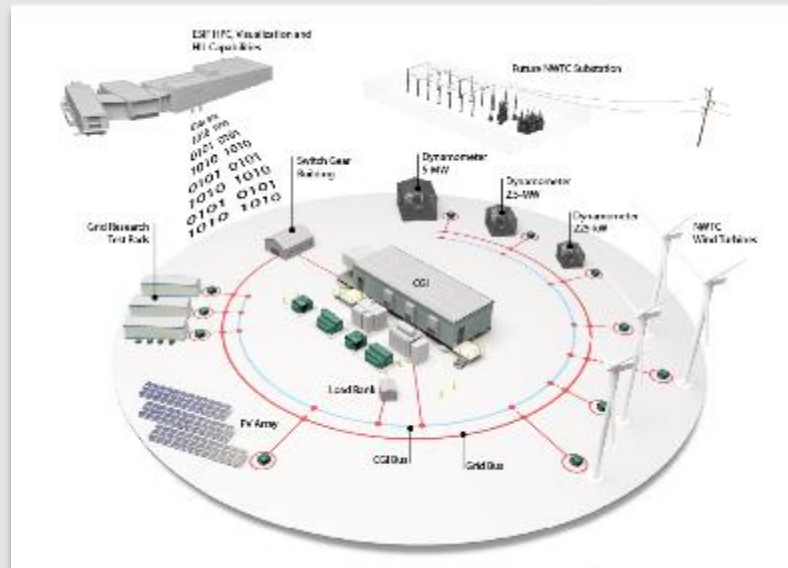
System Operator: Panama's transmission system operator (ETESA)

G-PST Partners: IEEE, Panama Dept. of Energy, Dispatch center (CND), Panamanian energy regulator (ASEP), utility companies (Ensa, Naturgy), solar industry and generators representatives, technical universities

Project: Implementation of IEEE standard 1547 on integration of distributed energy resources

IEEE also published a survey of the use of, and need for, grid codes and standards for renewable integration around the world.

Implementation workshops and working groups support the many countries accelerating renewable integration that are interested in developing standards and grid codes for inverter-based and grid-forming technologies.



G-PST delivers a **unique value** in a busy landscape.

We don't do it alone.

Our collaboration makes G-PST *and* our partners more useful and effective.



Thank you

globalpst.org

Learn more about how G-PST is unlocking zero-emission, low-cost, secure and reliable power systems.

