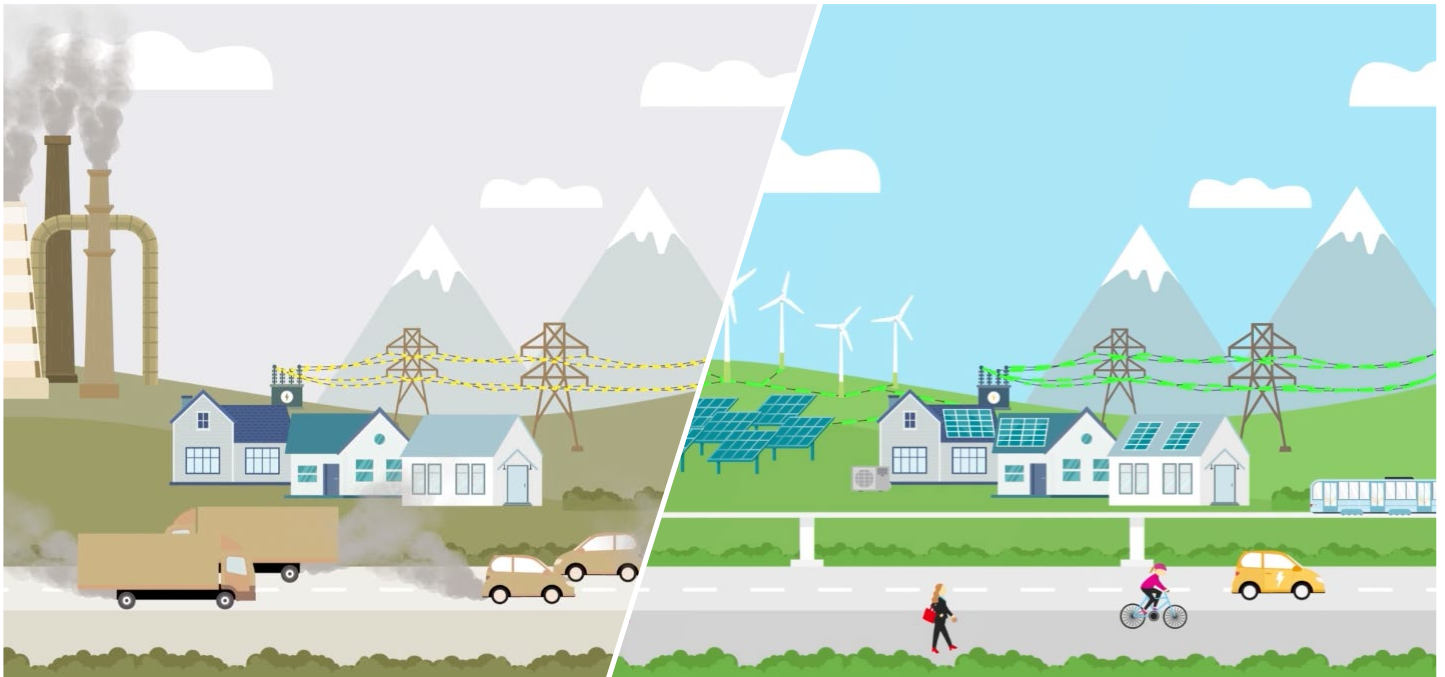


# Accelerating Transitions to Zero Carbon Power Systems

As power systems evolve, becoming increasingly renewable, distributed, dynamic, and digital, managing them becomes ever more challenging and complex.

System operators serve as the “air traffic controllers” for electricity grids, working to balance supply and demand, manage evolving electricity markets, and ensure the safety and reliability of electricity systems. To adapt to the rapidly changing energy landscape and support the transition to modern, zero carbon power systems, system operators must develop and adopt new technologies, approaches, and frameworks.



*As grids across the globe add more renewables and other advanced energy technologies, system operators must adopt novel approaches to adapt to the changes and overcome key barriers to power system transformation.*

But without robust global collaboration and investment to advance key technical solutions on time and at scale, the energy transition faces significant risks, including:



**Curtailment of renewables and distributed energy resources (DERs)**



**Delays in rollout of renewables and DERs**



**Potential for reliability and safety issues**



**Increased costs**

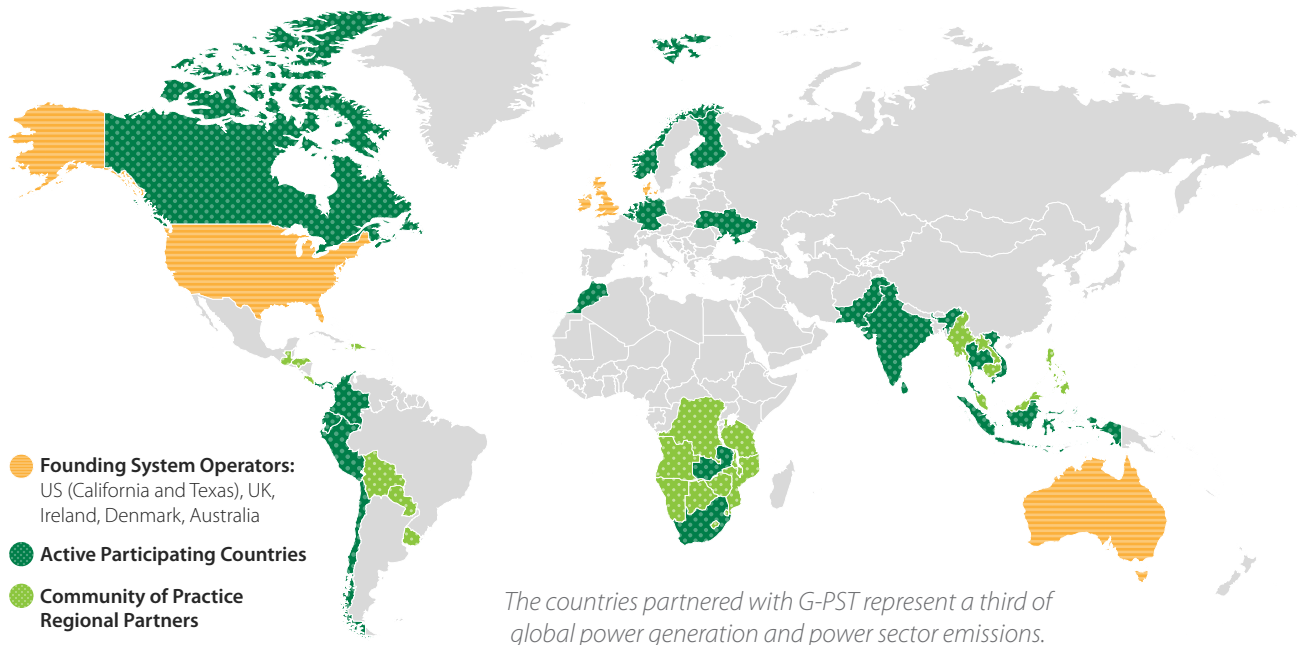


**Decreased decarbonization ambition and confidence in renewables**

# G-PST Empowers System Operators To Accelerate the Clean Energy Transition

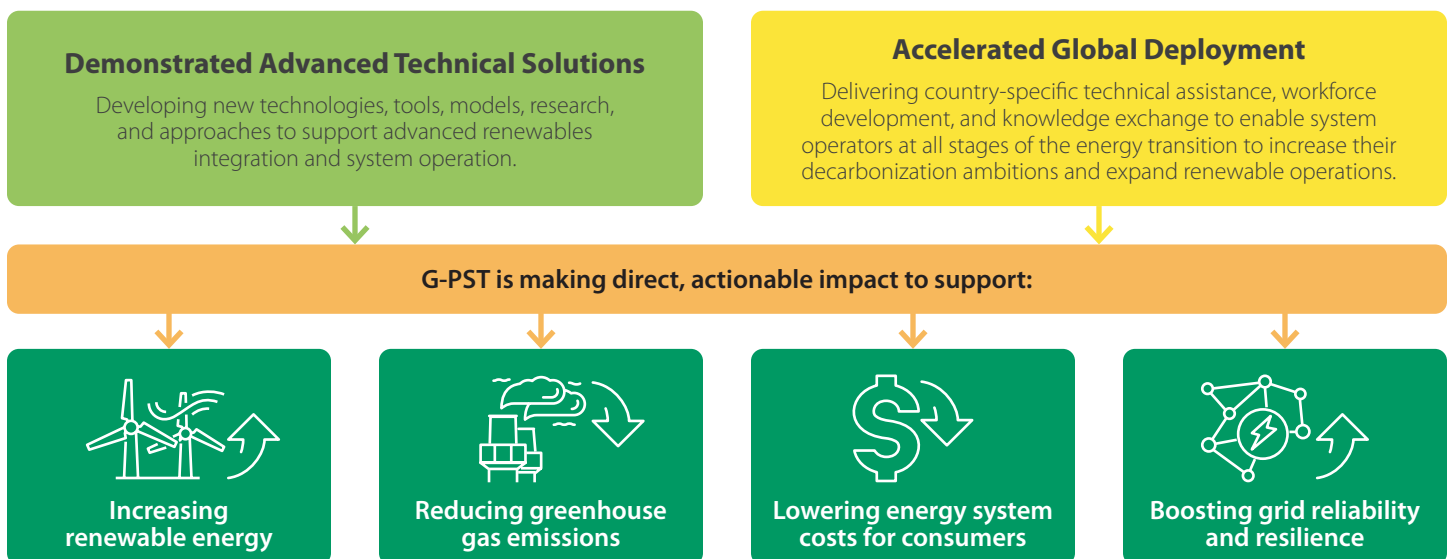
The **Global Power System Transformation (G-PST) Consortium** is a network of system operators, research institutions, and industry partners working to accelerate and scale the technical solutions required to transform our world’s power systems.

By developing and sharing robust models and tools, research and demonstration results, and knowledge and innovation, the G-PST Consortium is empowering system operators to transition to 100% renewable energy while ensuring the reliability, safety, and cost-effectiveness of grid operations.



## G-PST’s Holistic Approach Drives Actionable Results

Current power system software tools, equipment specifications, analytical approaches, and market frameworks are inadequate to ensure electricity reliability, stability, and affordability throughout the clean energy transition. G-PST is the only organization addressing these challenges at pace and scale.



As a global network, G-PST can dynamically identify and prioritize the solution areas system operators need to advance these goals and accelerate the clean energy transition as power systems evolve and new challenges arise. G-PST's current efforts focus on six priority technical solution areas:



**System Needs and Services**—Developing and testing new frameworks for assessing system needs and services, including identifying new technologies and the codes, standards, tariff structures, and market mechanisms necessary for their deployment



**Grid Forming Resources**—Developing and verifying codifiable requirements and standards to help align manufacturers and system operators on grid-forming resources, accelerating their deployment to increase grid stability, reliability, and resilience



**Stability Tools**—Developing and deploying new software tools while also supporting computational efficiency and advanced control room technologies for rapidly assessing and managing system stability



**Resource Adequacy**—Developing new methodologies, metrics, and criteria to assess resource adequacy and conduct integrated resource planning to ensure systems can meet demand



**Control Room of the Future**—Developing and implementing advanced operational capabilities for system operators, including probabilistic and risk-based methods; advanced forecasting for renewables and DERs; and automation, situational awareness, and decision support tools



**Distributed Energy Resources**—Developing operational tools, approaches, and architecture to support optimal deployment and utilization of DERs for system stability and restoration in a blackout.

## Coordinated Action Pillars Maximize Impact

Upon its inception, G-PST laid out a strategic vision that identified five activity areas essential for delivering the technical solutions and support needed to scale G-PST's impact and accelerate power system transformation. These areas formed G-PST's five action pillars and serve as an organizing framework to enable strong coordination and progress across multiple fronts. Working together, the action pillars have made transformative strides toward building system operators' confidence and ability to run cost-effective, reliable, and fully decarbonized power systems.



### Pillar 1: System Operator Research

- Launched the Grid-forming Technology Implementation Council
- Facilitated collaborative demonstrations between system operator partners
- Published key reports about [resource adequacy](#)<sup>1</sup>, [system needs and services](#)<sup>2</sup>, and the vision of the [control room of the future](#)<sup>3</sup>

<sup>1</sup> <https://www.esig.energy/resource-adequacy-for-modern-power-systems/>

<sup>2</sup> <https://globalpst.org/wp-content/uploads/GPST-IBR-Research-Team-System-Services-and-Needs-for-High-IBR-Networks.pdf>

<sup>3</sup> <https://globalpst.org/vision-for-the-control-room-of-the-future-report/>

### Pillar 2: System Operator Technical Support

- Developed road maps for control center upgrades in [Peru](#)<sup>4</sup> and Indonesia
- Actively hosting [peer-to-peer learning sessions](#)<sup>5</sup> among system operators in Australia, Colombia, Denmark, India, Indonesia, Ireland, South Africa, Ukraine, the United Kingdom, the United States, Vietnam, and others
- Developing technical assistance programs for advanced tool implementation

<sup>4</sup> <https://globalpst.org/control-center-of-the-future-road-map-for-perus-system-operator-coes-sinac-hoya-de-ruta-para-el-centro-de-control-del-futuro-para-el-operador-del-sistema-peruano-coes-sinac/>

<sup>5</sup> <https://globalpst.org/resources/#peer-learning>



### Pillar 3: Workforce Development

- Created a 100-module [teaching agenda](#)<sup>6</sup> for global power system transformation
- Launched the [Women in Power System Transformation](#)<sup>7</sup> initiative to promote gender equality in the clean energy transition
- Established internship, fellowship, and mentorship programs

<sup>6</sup> [https://globalpst.org/wp-content/uploads/G-PST\\_Inaugural\\_Teaching\\_Agenda\\_updated.pdf](https://globalpst.org/wp-content/uploads/G-PST_Inaugural_Teaching_Agenda_updated.pdf)

<sup>7</sup> <https://globalpst.org/what-we-do/workforce-development/women-in-power-system-transformation-initiative/>

### Pillar 4: Localized Technology Adoption

- Published [survey of global system operator needs](#)<sup>8</sup> for standards and local technology
- Supporting India and Panama in standards implementation
- Developing framework approaches to enable new technology deployment

<sup>8</sup> [https://resourcecenter.ieee-pes.org/publications/white-papers/PES\\_TP\\_WP\\_GPSTC\\_011121.html](https://resourcecenter.ieee-pes.org/publications/white-papers/PES_TP_WP_GPSTC_011121.html)



### Pillar 5: Open Data and Tools

- Developed inertia monitoring toolkit and supported complementing capacity building
- Launched the [System Operator Open Tools Portal](#)<sup>9</sup>
- Implemented open-source tools for oscillation source detection and economic dispatch modeling in India, South Africa, and Vietnam

<sup>9</sup> <https://globalpst.org/what-we-do/open-data-tools/>



**We must make a century's worth of power system progress in this decade. Join the us in unlocking the solutions to achieve 100% renewable power grids. Get involved at [www.globalpst.org](http://www.globalpst.org).**

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