SYNDEM and OPAL-RT Form Strategic Partnership to Advance Grid Stability and Hardware Validation for Modern Power Systems

MONTREAL, CANADA & CHICAGO, IL, UNITED STATES, March 10, 2026 /EINPresswire.com/ -- SYNDEM and OPAL-RT TECHNOLOGIES have formed a strategic partnership for joint marketing, integration, and sales to advance the stability and reliability of modern power systems increasingly dominated by renewable and converter-based energy resources.

OPAL-RT

As centralized power plants are replaced by distributed renewables, energy storage, electric vehicles, and power electronics-interfaced loads, maintaining grid frequency and voltage stability has become a critical global challenge. SYNDEM addresses this transformation with its pioneering Virtual Synchronous Machine (VSM) technology, enabling inverter-based resources to behave like conventional synchronous generators and actively contribute to grid regulation. SYNDEM also offers Smart Grid Research and Educational Kits, which are reconfigurable and reprogrammable all-in-one power electronic converters equipped with auto-code generation, to facilitate experimental validations and train next-generation engineers with hands-on skills.

Chicago-based SYNDEM is a global leader in grid modernization, pioneering Virtual Synchronous Machine (VSM) technology to address the stability and compatibility of modern power systems. Notably, SYNDEM's Founder and CEO led the development of the first global standard on VSM, IEEE Standard 2988-2024. To support the industry, SYNDEM also offers reconfigurable Smart Grid

Research and Educational Kits with auto-code generation to accelerate experimental validation and train engineers with essential hands-on skills.

Montreal-based OPAL-RT TECHNOLOGIES has been a global leader in real-time simulation and hardware-in-the-loop (HIL) testing. Since 1997, OPAL-RT has provided engineers and researchers with accessible, innovative, and customized simulation technologies, bridging the gap between modeling and real-world applications. By harnessing the power of high-performance computing, OPAL-RT accelerates the development of cutting-edge solutions in energy, automotive, aerospace, and other industries. Today, the company operates in more than 40 countries.

Syndem

Autonomous power system with 108 physical power electronic converters

Through this strategic partnership, OPAL-RT and SYNDEM offer an end-to-end ecosystem from real-time simulations and hardware-in-the-loop (HIL) to fully hardware-based experimental validations. By combining OPAL-RT's industry-leading real-time simulation and hardware-in-the-loop platforms with SYNDEM's Virtual Synchronous Machines and reconfigurable Smart Grid Research and Educational Kits, engineers and researchers will be able to develop and test various control strategies in both computational and realistic environments.

> This empowers the community to bridge the gap between simulations and experiments."
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> *Dr. Qing-Chang Zhong, SYNDEM Founder and CEO*

"The complexity of modern, inverter-dominated grids requires a new level of validation that simulation alone cannot provide," said Pierre-François Allaire, Executive Vice-President, Sales & Marketing at OPAL-RT. "By partnering with SYNDEM, we are closing the gap between simulations and physical hardware, giving our customers a comprehensive suite of tools to move from theory to experimental reality with absolute confidence."

“Beyond the technical challenges, we are witnessing a fundamental democratization of energy,” said Dr. Qing-Chang Zhong, Founder and CEO of SYNDEM LLC, who led the development of IEEE Standard 2988-2024 on Virtual Synchronous Machines. “We are not just advancing technology; we are equipping the workforce with the hands-on skills needed to realize global energy freedom and a sustainable society.”

By combining SYNDEM’s open-source experimental hardware with OPAL-RT’s high-performance simulation capabilities, the partnership supports:
□□ Improved frequency and voltage stability in renewable-rich grids;
□□ Faster validation of inverter-based generation and storage systems;
□□ Reduced infrastructure strain through smarter, distributed control and reconfigurable hardware;
□□ Safer, lower-risk testing of advanced grid control strategies; and
□□ Accelerated workforce development with hands-on skills.

This integrated approach enables utilities, manufacturers, and research institutions to evaluate complex grid scenarios, test disturbances, and validate next-generation control systems. This helps accelerate the transition toward more resilient and sustainable power networks.

As the global energy transition intensifies, ensuring that renewable and distributed resources can actively support grid stability is essential. Together, OPAL-RT and SYNDEM aim to help modern power systems become more synchronized, reliable, and sustainable.

About SYNDEM LLC
Chicago-based SYNDEM is a global leader in grid modernization, pioneering Virtual Synchronous Machine (VSM) technology to address the stability and compatibility of modern power systems. Notably, SYNDEM’s Founder and CEO led the development of the first global standard on VSM, IEEE Standard 2988-2024. To support the industry, SYNDEM also offers reconfigurable Smart Grid Research and Educational Kits with auto-code generation to accelerate experimental validation and train engineers with essential hands-on skills.

About OPAL-RT TECHNOLOGIES
For more than 25 years, OPAL-RT TECHNOLOGIES has been a global leader in real-time simulation and hardware-in-the-loop (HIL) testing. Since 1997, OPAL-RT has provided engineers and researchers with accessible, innovative, and customized simulation technologies, bridging the gap between modeling and real-world applications. By harnessing the power of high-performance computing, OPAL-RT accelerates the development of cutting-edge solutions in energy, automotive, aerospace, and other industries. Today, the company operates in more than 40 countries.

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