MICROGRID KNOWLEDGE

Virtual Conference

Preparing the Next Generation:

Microgrids as an Energy and Educational Resource for Universities

Agenda

Moderator: Bill Kipnis (Siemens Building Performance & Sustainability Division) Senior Business Development Manager

Speakers:

1. Patrick Lee (PXiSE Energy Solutions) President & David Liebman (Sonoma County Junior College District) Energy & Sustainability Manager
2. William Byun (University of California, San Marcos) Professor of Finance & James Bennett (Scylla Microgrid) President
3. Kyle Gandy (DCO Energy) Department Manager, Electrical

Resources:

- Speaker Bios
- Ask the Experts: Q&A at End
- Microgrid Resources Library

Preparing the Next Generation: Microgrids as an Energy and Educational Resource for Universities

Ensuring the Educational Mission in a Wildfire Zone

Patrick Lee

President and CEO,
PXiSE Energy Solutions

David Liebman

Energy & Sustainability
Manager, Sonoma County
Junior College District

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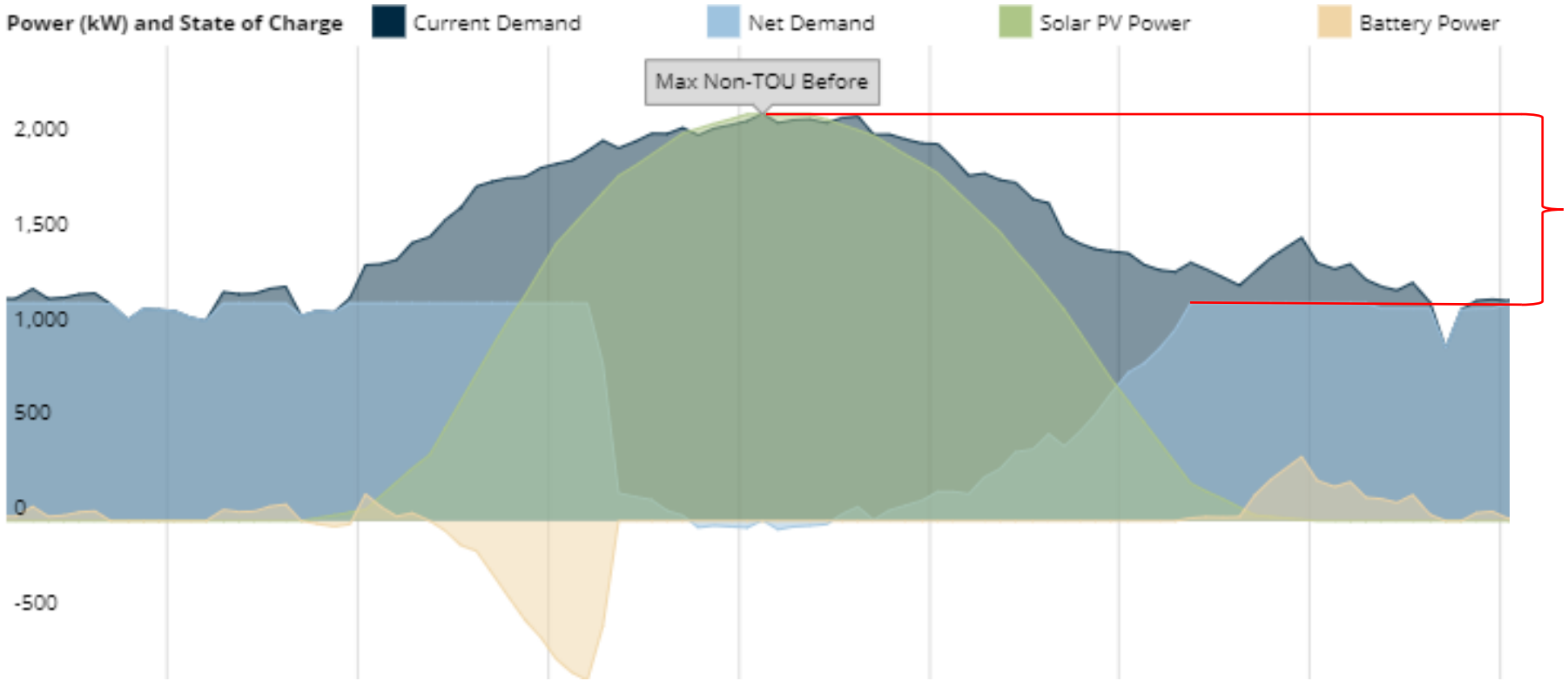
Challenges & Project Objectives

Resiliency, Reliability, & Power Quality	• Develop a model for flexible and adaptable systems • Provide educational resource for future trade education programs • Improve and support organizational / academic continuance • Maintain energy resiliency in the face of natural disasters
Operational Savings (utility expense & labor)	• Explore and test value streams for microgrids • Test the business case for advanced microgrids for California Community Colleges
GHG Emissions Reduction	• Demonstrate how a microgrid can help drive GHG emissions reductions • Reduce dependency on fuel-powered generators

Results / Recommendations

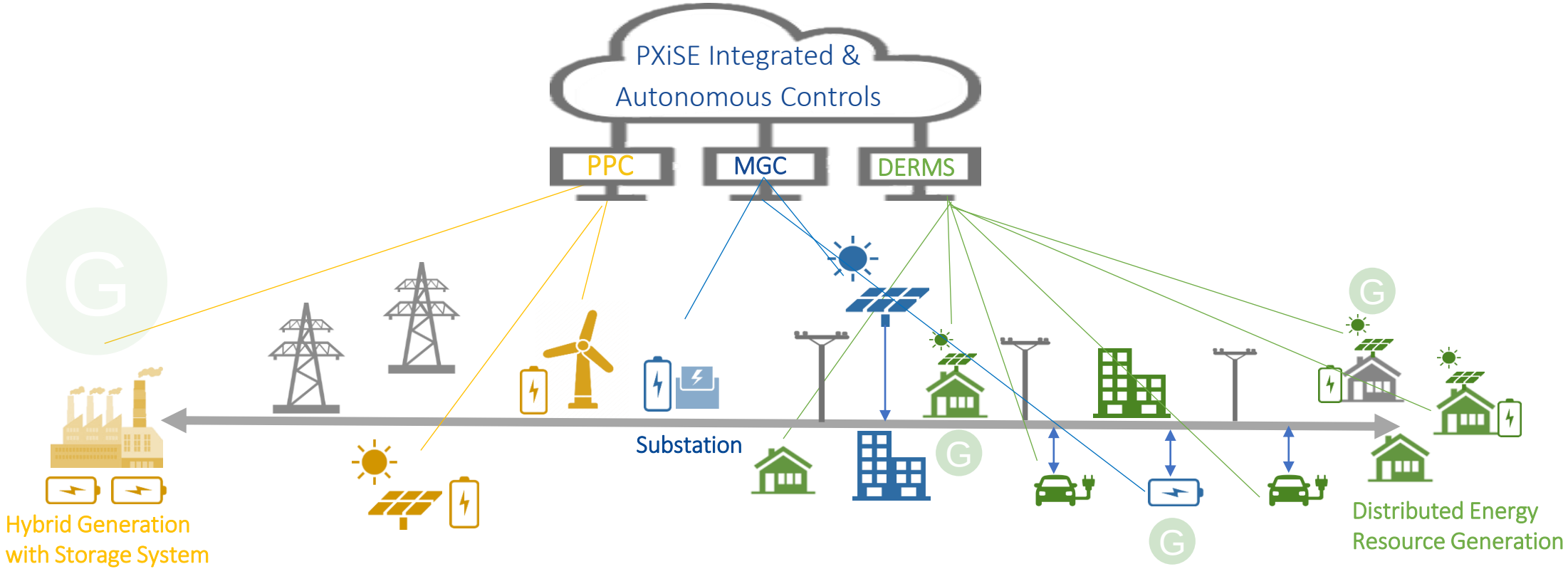


998 kW demand reduction

- Expected Solar Production: ~4 GWh / year
  - ~36% offset of total campus kWh energy use
- Expected Energy Savings: $330K / year
- Expected Demand Savings: $170K / year
- Expected Demand Response Revenue: $50K / year

A Changing Grid Requires New Solutions

PXiSE controls integrate and orchestrate a diverse set of energy resources for optimal economic returns while ensuring system balance, asset flexibility, power quality, and reliability.



2) How to Mobilize Students for University Microgrid Development

Speakers: William I.Y. Byun (California State University San Marcos) Professor of Finance & James Bennett (Scylla Microgrid) President

Overview:

California State University San Marcos ("CSUSM") is the newest and one of the fastest growing of the campuses of the CSU system.

Located in a rapidly growing suburb of San Diego, CSUSM has currently 17,000 students with significant enrollment growth every term and new departments or major physical buildings being added every year.

CSUSM - Challenges

With such heavy growth, there is significant pressure on the physical plant infrastructure (and energy stability) as well as need to maintain integrative and long-term growth planning consistent with the campus Sustainability Master Plan (incl. net zero energy 2040).

Such growth also needs to align with growing student/stakeholder interest campus sustainability efforts and overall objectives to increase student engagement.

CSUSM – Student-Led Initiative

California State University SAN MARCOS | College of Business Administration

Through the College of Business Administration's (COBA) "Senior Experience" project course, a student team was formed to assist in forming a project pathway for the study, analysis and implementation of a campus microgrid project.

That team worked in coordination with the various University stakeholders to chart a potential pathway through the unique and complex state administration process.

CSUSM – Scylla Microgrid

That team has since been spun-off as a new startup business, Scylla Microgrid.

Scylla is continuing such works for CSUSM, in turn mobilizing follow-through pipeline of other Senior Experience student teams, and is also developing a programmatic pipeline of microgrid projects in regional as well as contracted key overseas markets.

SCYLLA
MICROGRID

Montclair State CHP/Microgrid-
Concept to Reality

DCO Energy Kyle Gandy, PE, DCO Energy, LLC, Department Manager

CHALLENGES:

Aging Central Plant and Cogen System (steam distribution needed replacement, no central CHW system, campus expanding). Needed comprehensive plan. University needed partner under public/private partnership model.

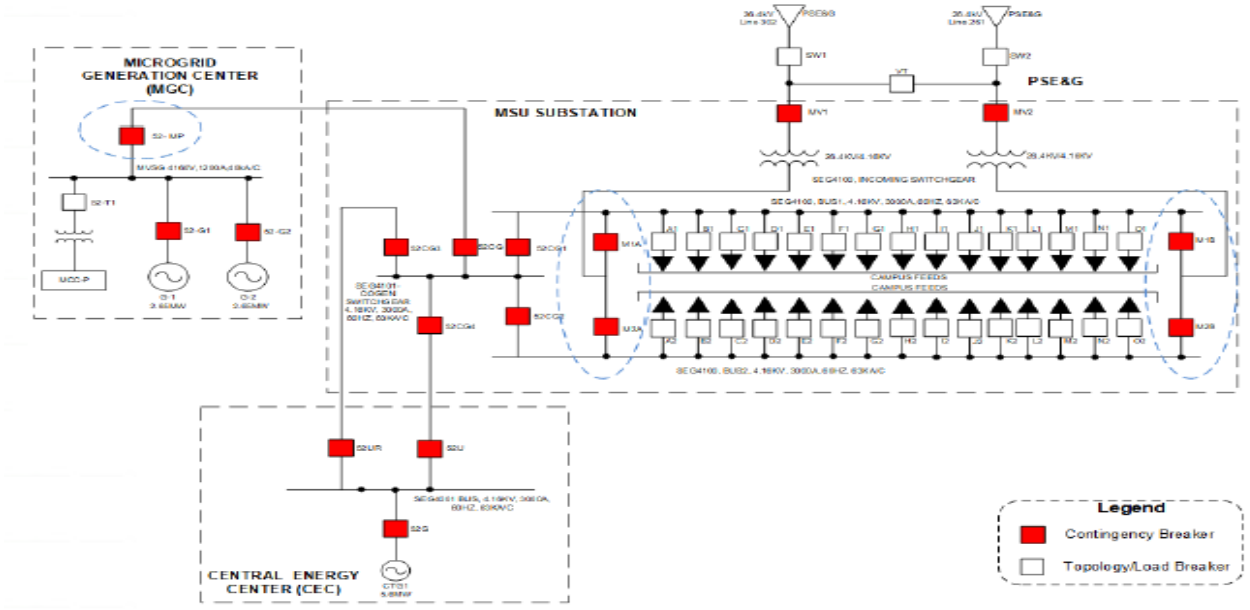
Electric load growing due to expansion, reliability of electric grid, high ratchet for supplemental power, campus emergency generation aging.

Campus resiliency. 24/7 power during all conditions (utility interruptions, weather, etc.).

Solutions

- 2014 - Installation of new district energy system including CHCP. (5.4 MW Gas Turbine, dual fuel, 29 MMBTU/Hr. heat recovery steam generator). Capable of satisfying 75% of campus electrical load and 100% of thermal load.

- 2014 - Installation of new piping infrastructure to serve campus. 9,500 linear feet of trench, 7.5 miles of Chilled Water, Steam and Condensate piping. Supplying: Steam (100,000 LBM/hr. Steam, 9,000 Tons/hr. Chilled Water) to 29 buildings on campus.



- 2019 Microgrid: To supplement CHCP, installation of new generation system (peaking/Microgrid) (2) 2.6 MW natural gas reciprocating engine generators, “State of the Art” Load Management System that provides the University with the ability to control every major end use breaker in the substation, black start capability, Seamless Island mode functionality with loss of utility grid, permitted for 2,000 hours/year of operation.

Results / Recommendations

MICROGRID provides the ability for the University to remain operating during periods when the Utility Grid is not in service.

MICROGRID provides a measurable economic benefit to University.

MICROGRID includes automatic functions.

MICROGRID supports the stability of the local utility network during peak demand days.

MICROGRID improves achieving sustainability.

MICROGRID is expandable.

PRE- MICROGRID

Month	Supplemental Peak Demand (KW)
May	4,871
June	4,761
July	4,778
August	4,680
Sept	6,981

POST – MICROGRID SUMMERS 2018-19

Month	Supplemental Peak Demand (KW)
May	0
June	0
July	0
August	0
Sept	0

AVERAGE SUMMER DEMAND REDUCTION = 4,792 Kw **100% reduction**

Savings under CHCP - Savings on average $2.2 million annually on energy and taking into account debt service.

NET SAVINGS : $ 375,000 (2019) – MICROGRID ONLY

PRIOR TO MICROGRID: 8-10 Campus interruptions per year from 15 minutes to 3 hours

SINCE MICROGRID: 0

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Ask the Experts: Q&A Session

Type your questions in to the Q&A box

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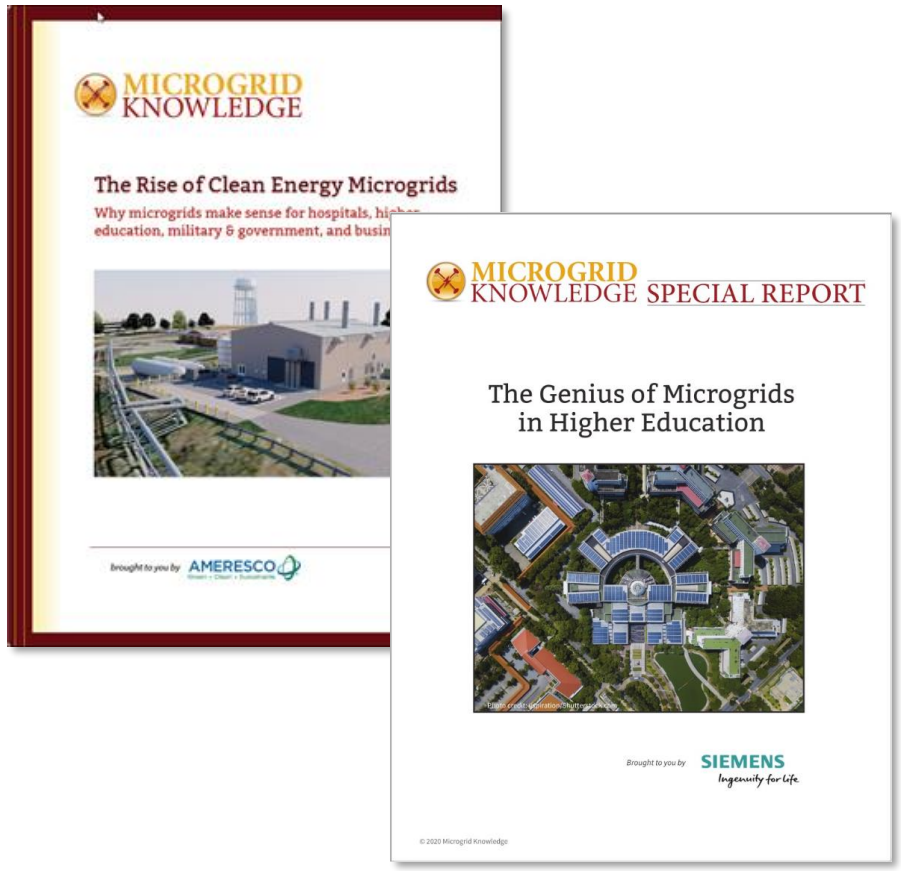
Microgrid Knowledge Virtual Conference Resource Library

Recommended Resources

Microgrid Resource Library

- ThinkMicrogrid.com

Tour Villanova Microgrids at Microgrid 2020 on Nov. 18



Microgrid 2020 LIVE Conference – Nov. 18-20

Philadelphia, PA

University Session:
Graduating to Greater Innovation: The Earliest Adopters Universities, Take Microgrids to the Next Level

Plus 90 speakers in 30+ sessions on best practices

- 35 exhibitors
- Networking opportunities

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Thank You!

Next Session: *Utilities at the Forefront: Microgrids for Resilience, Customer Service, Cost Savings & Sustainability @ 2PM Eastern*

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