OpenADR to Enable Automated Response to Shift Load

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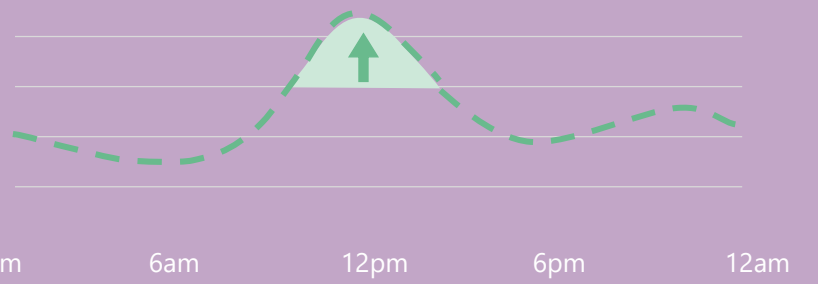
UC Merced Site & Project Overview

1,200,000

square feet of academic, residential, and administrative space

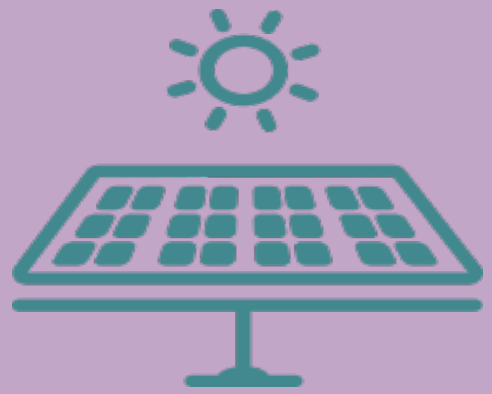


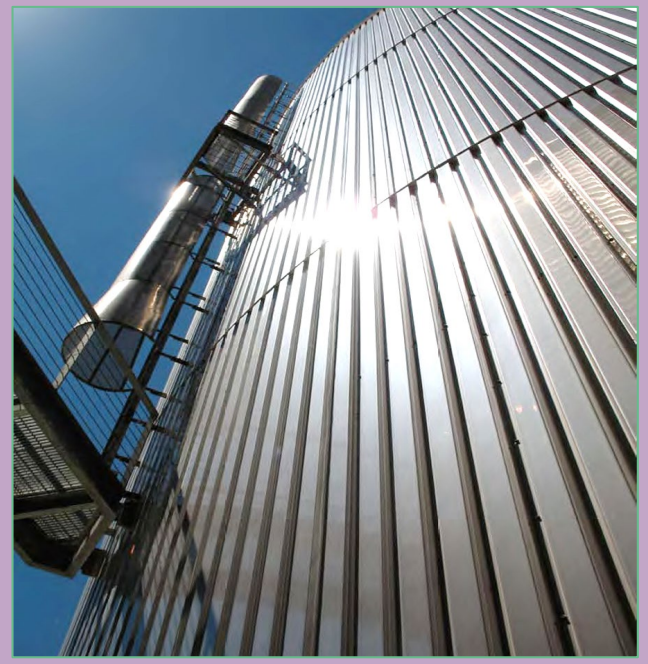
1000 kW

load increase in Excess Supply Pilot (XSP)

1 MW

onsite solar array





2,000,000

thermal energy storage tank capacity (gallons)

campus footprint will double by

2020

Motivation for Participating in PG&E ADR and XSP

PG&E ADR

- Sustainability commitments
  - Net zero energy and carbon by 2020
- Good experience with previous utility programs
- Stay on the cutting edge
- “Dry run” learning opportunity for plant staff to prepare for a rapidly expanding campus

PG&E XSP

- Better fit with campus operations
- Little to no occupant impacts
- More financial incentives available

OpenADR Project Implementation

OpenADR VEN:
2.0B

OpenADR 2.0B event notification polled by the VEN from Olivine OpenADR

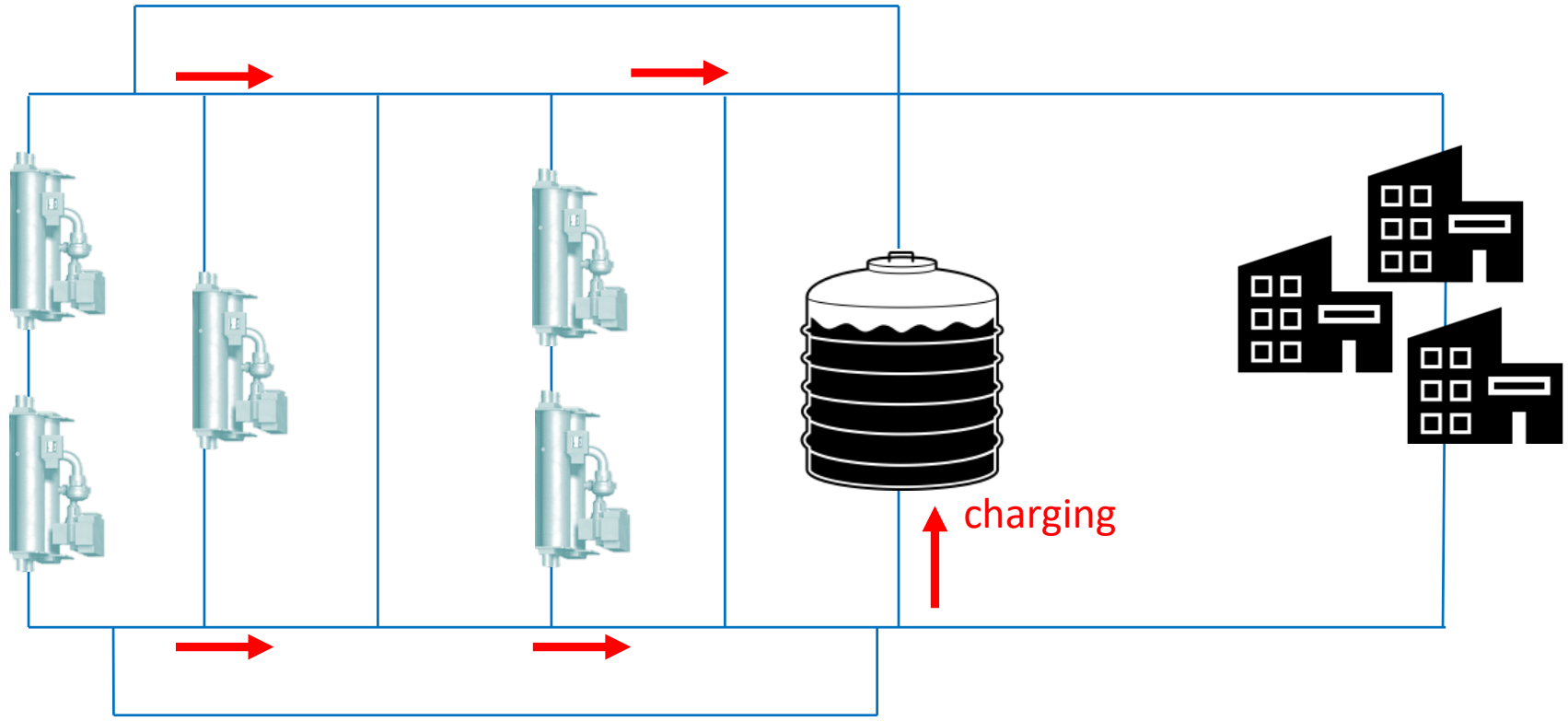
Control system shows in real time the load increase so that plant operators can monitor their participation

Project Measures and Strategy

1. Receive OpenADR 2.0B day-ahead event notification via Olivine DRAS
2. Scale down typical overnight chiller cycle
3. Receive event signal
4. Controls turn on chillers and pumps to charge the thermal storage tank and/or provide cooling to the campus

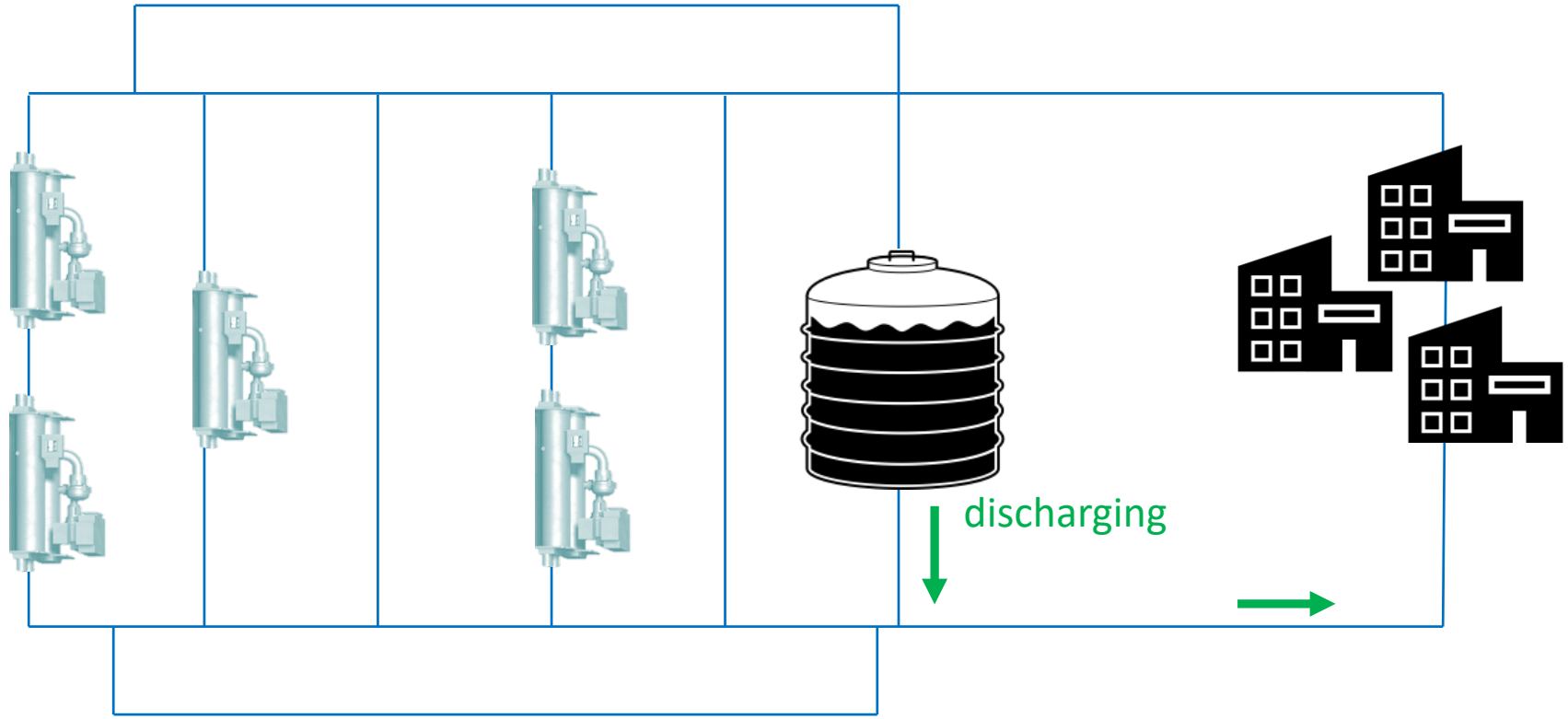
Result: Load increase compared to baseline, including during cooler months. Ability to ramp up chillers and charge thermal storage tank even when less cooling is needed.

ADR Strategy: Usual Operations



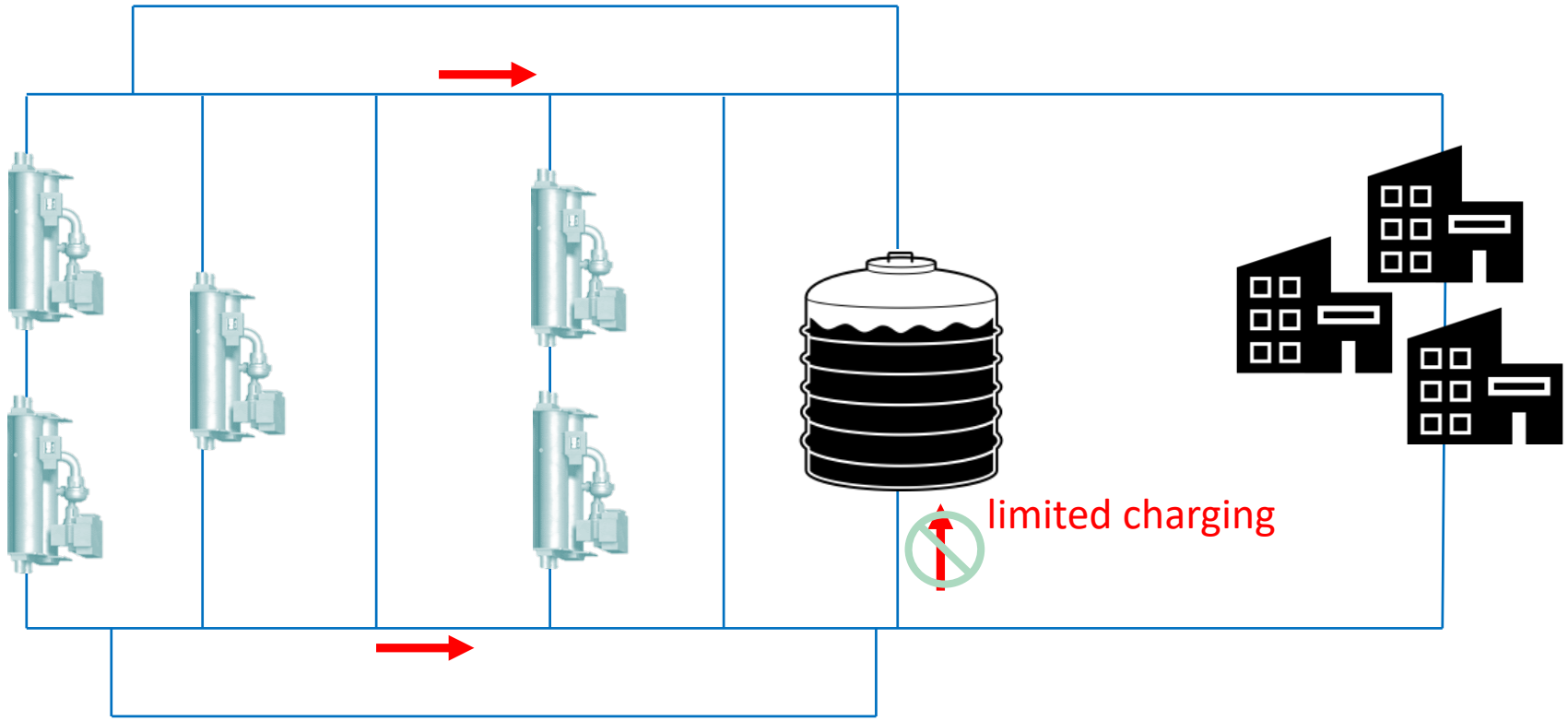
Overnight: Run chillers and charge thermal storage tank overnight to avoid demand charges

ADR Strategy: Usual Operations



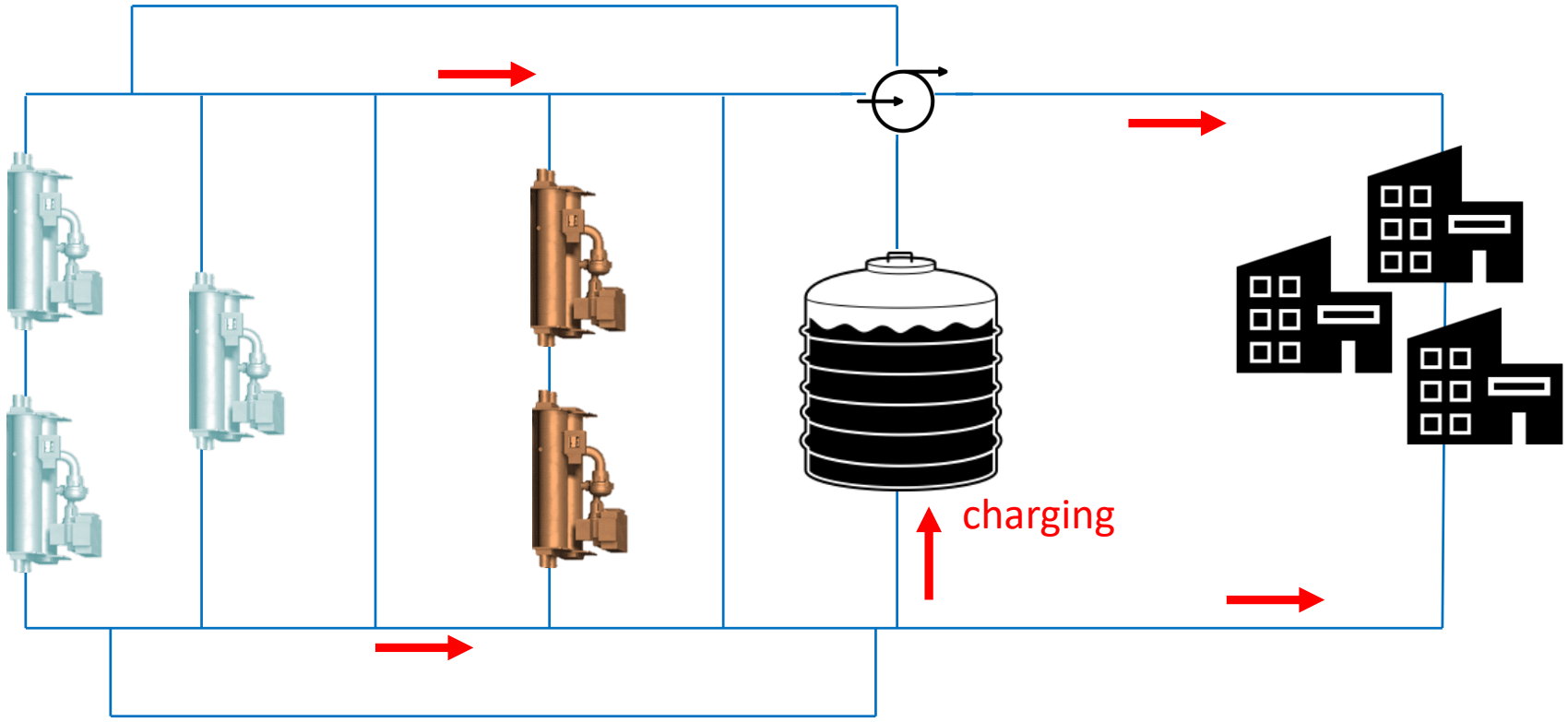
Afternoon: Use thermal storage tank to provide chilled water for campus cooling without running chillers

ADR Strategy: ADR Operations



Day-ahead: Pull XSP notification
Overnight: Don't fully charge thermal storage tank

ADR Strategy: ADR Operations



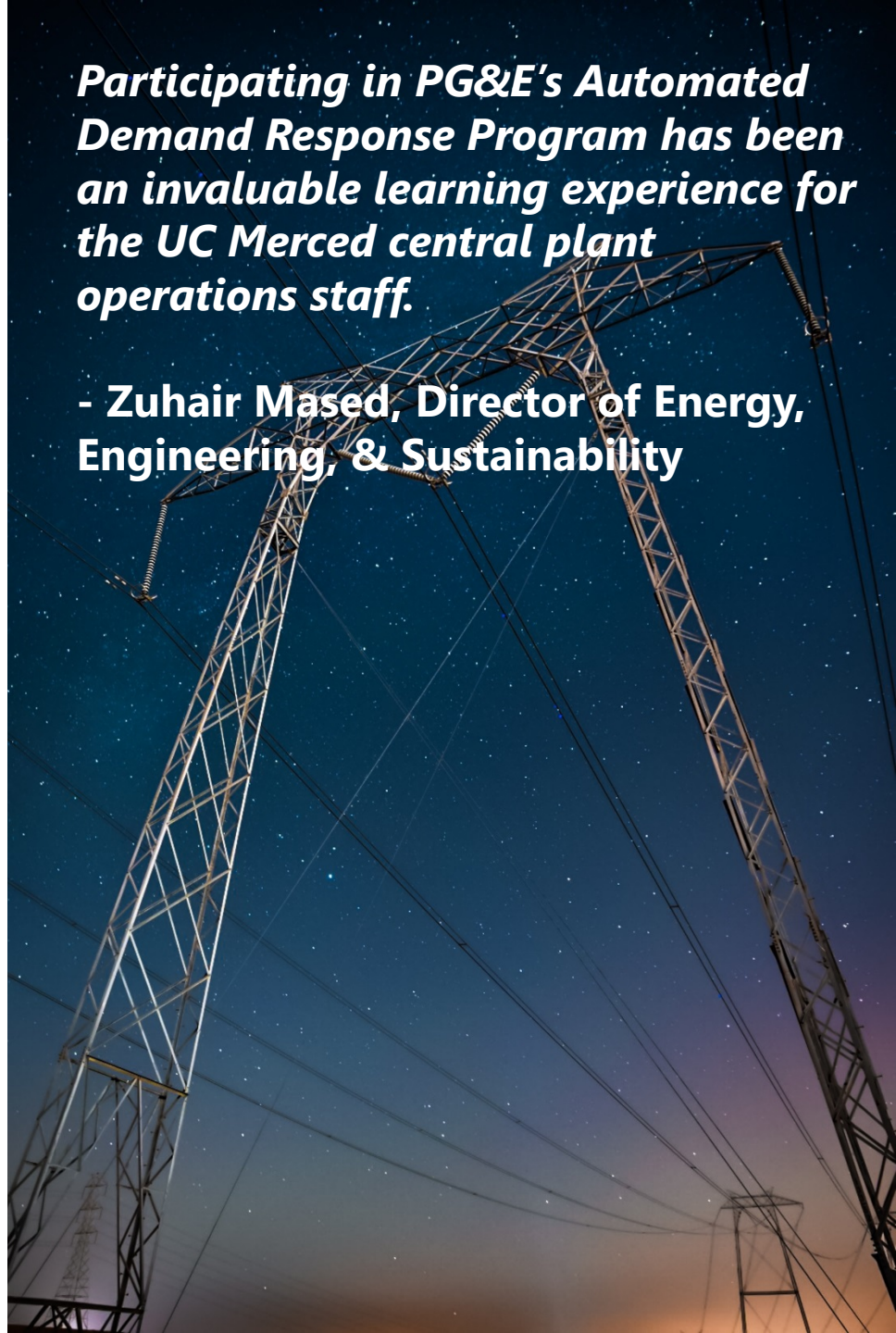
ADR Event Start: Chillers automatically turn on and charge thermal storage tank and/or provide campus cooling

Project Incentives and Savings

- Approved load increase of 1,000 kW
- PG&E ADR Program funding: $200/kW rate
- PG&E ADR Incentive: 75% of project cost
- Ongoing PG&E XSP participation payments

Project Benefits

- OpenADR 2.0B automation made participation easy and reduced manual intervention needed from the operations staff
- Invaluable learning experience for plant operations staff
- Money earned from ongoing DR participation offers is reinvested in additional technical training
- Opportunity to prepare for the campus doubling size by 2020



Participating in PG&E's Automated Demand Response Program has been an invaluable learning experience for the UC Merced central plant operations staff.

- Zuhair Mased, Director of Energy, Engineering, & Sustainability

Thank you!

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