A Day in the Life of a Smart Campus

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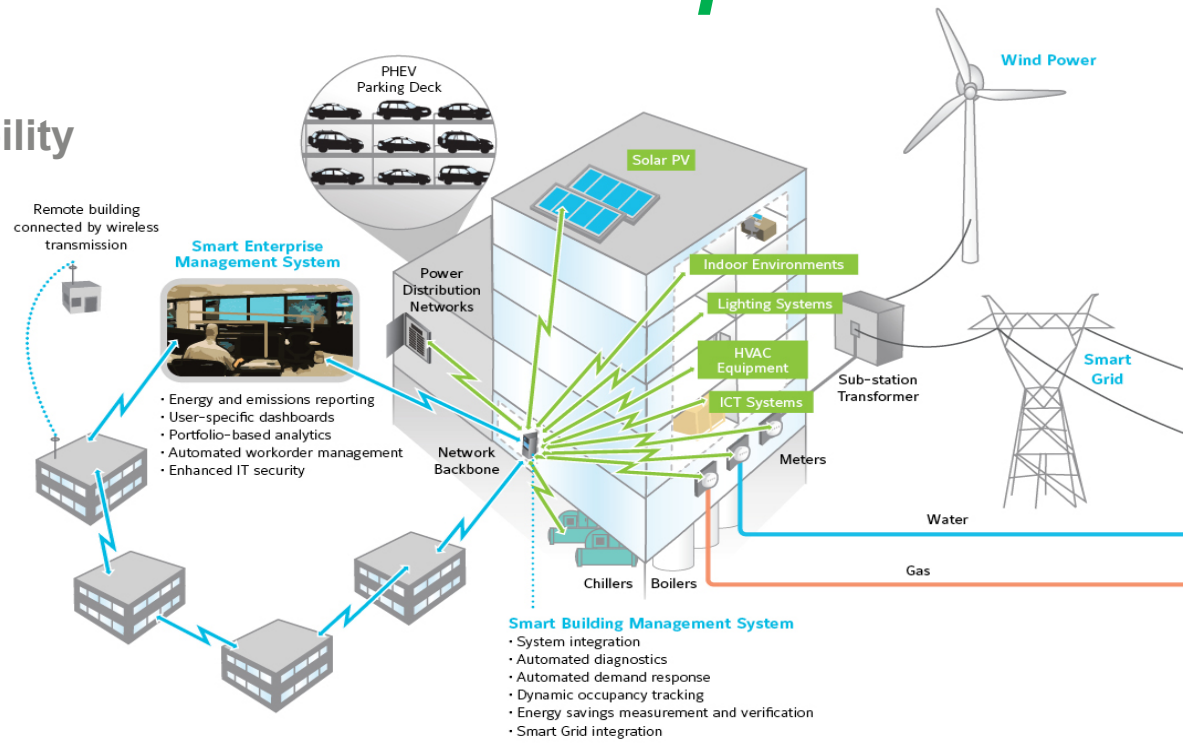
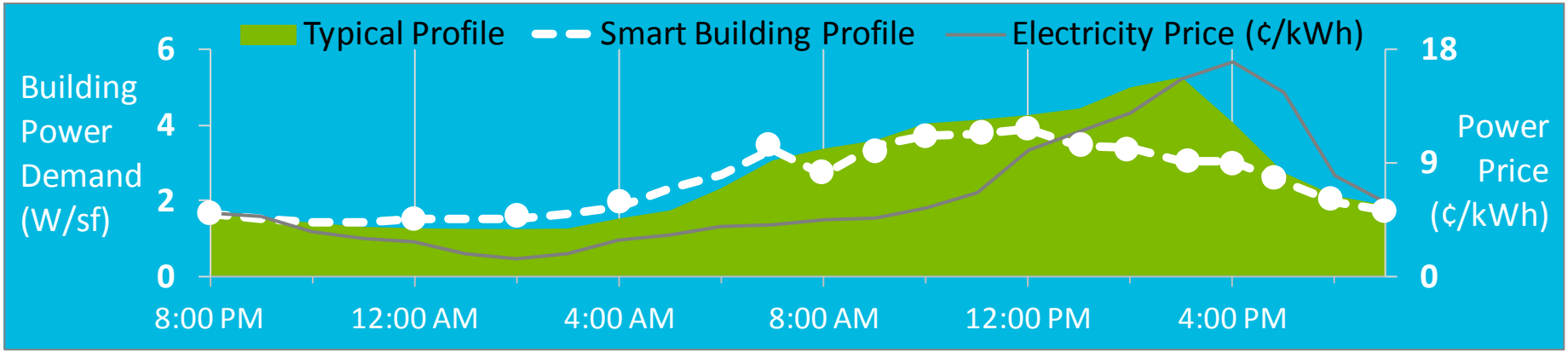
19 July 2013





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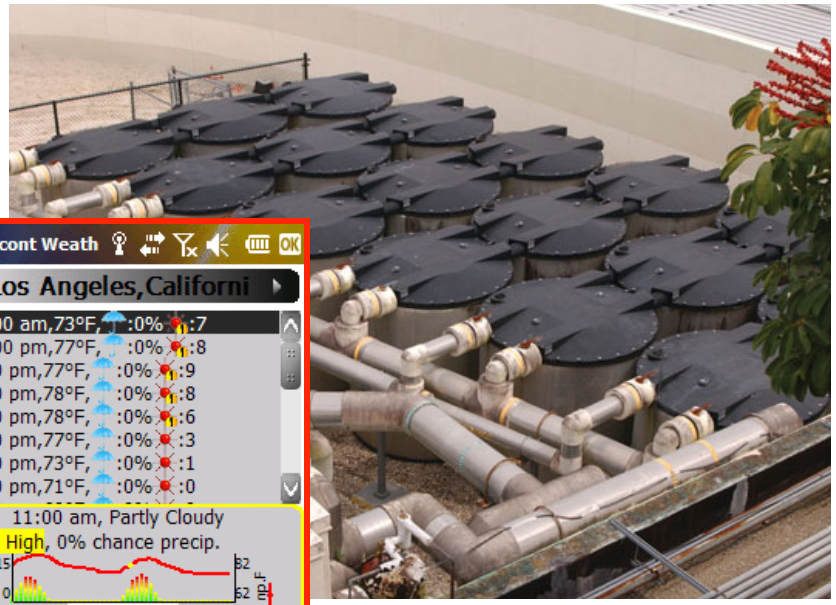
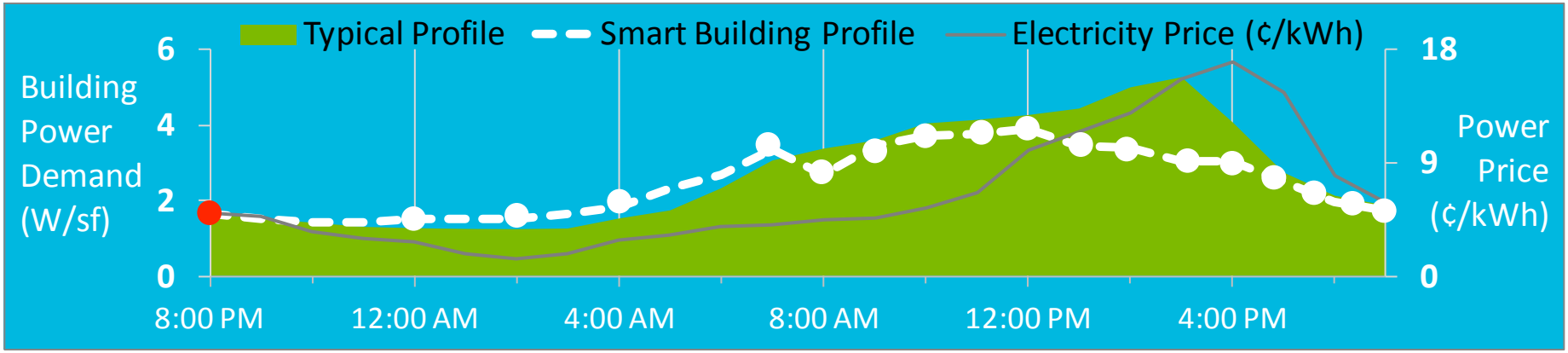
8:00 pm
Smart planning for tomorrow

- System accesses tomorrow's weather forecast
- Real time price forecasts are received from the electric utility
- System schedules night time ice storage generation





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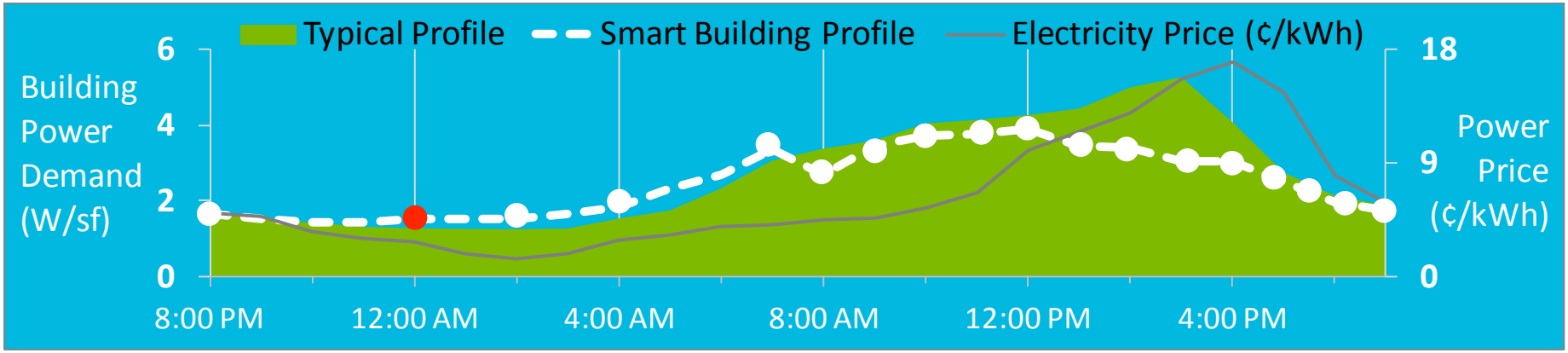
12:00 am

Smart charging of EV fleet

- Optimized off-peak charging of electric fleet vehicles
- System accesses real-time grid status and wind energy forecasts
- Charging is timed to coincide with excess renewable energy supply on the grid



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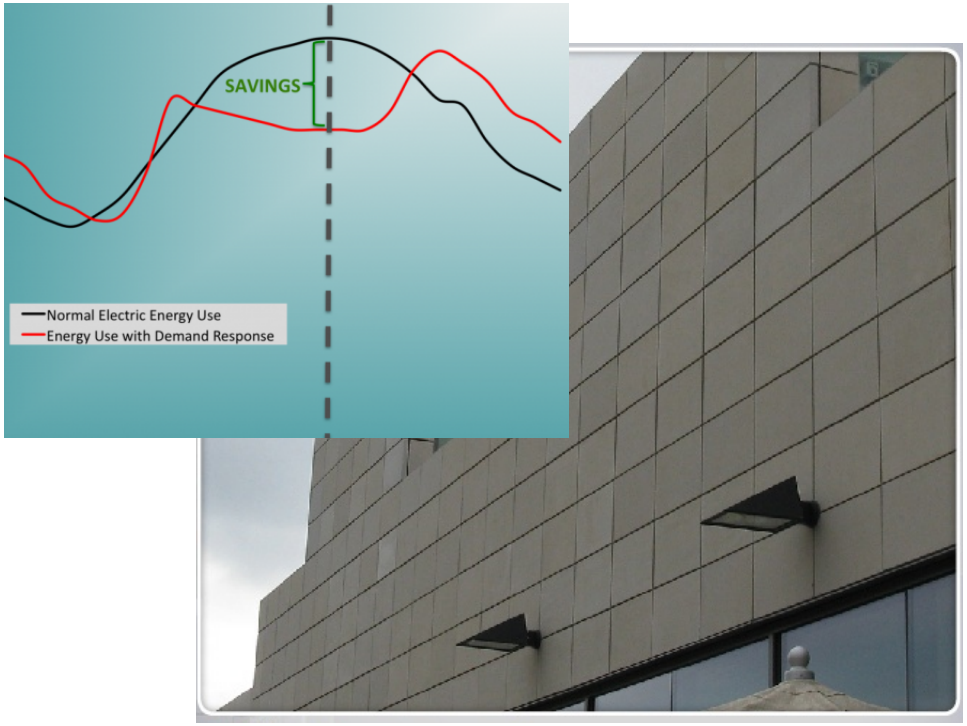
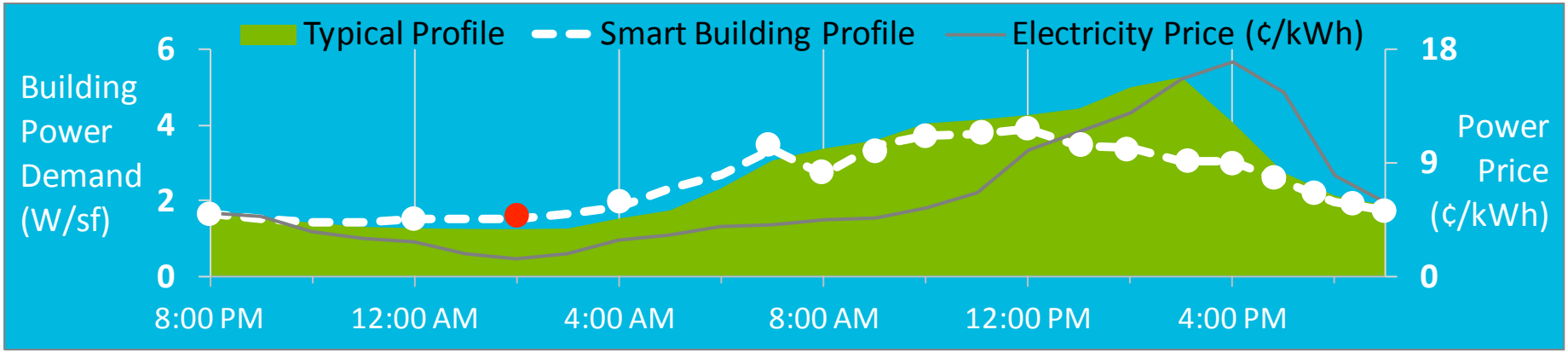
2:00 am
Pre-cool building mass

- At the optimal time, the building mass is pre-cooled to the lower end of the comfort zone
- Throughout the day, the room set points are adjusted to “release” the storage energy





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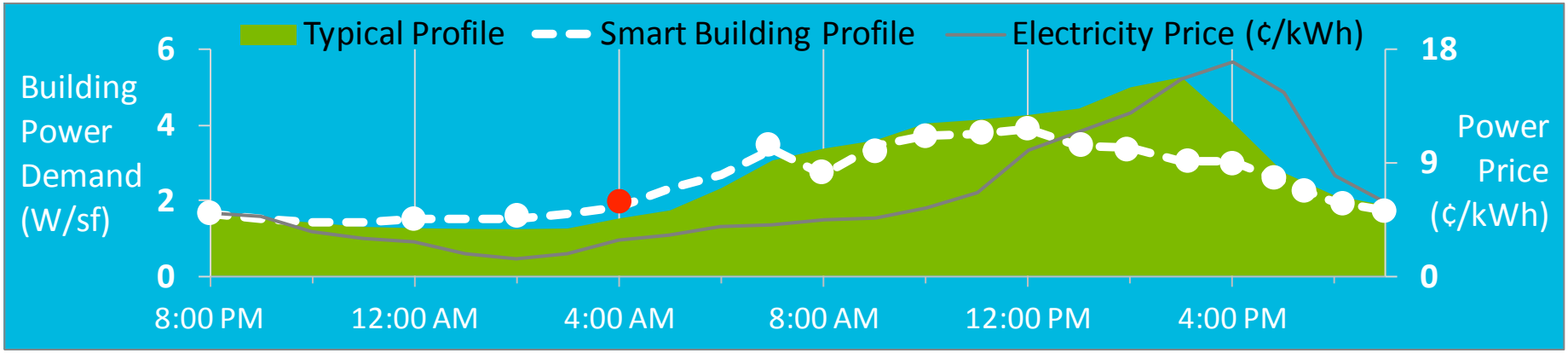
4:00 am

Chiller fault detected

- On-board diagnostics determines a chiller valve has failed
- System calculates costs associated with this fault based on real time price forecasts
- System auto-generates a work order and notifies facility manager by smart phone



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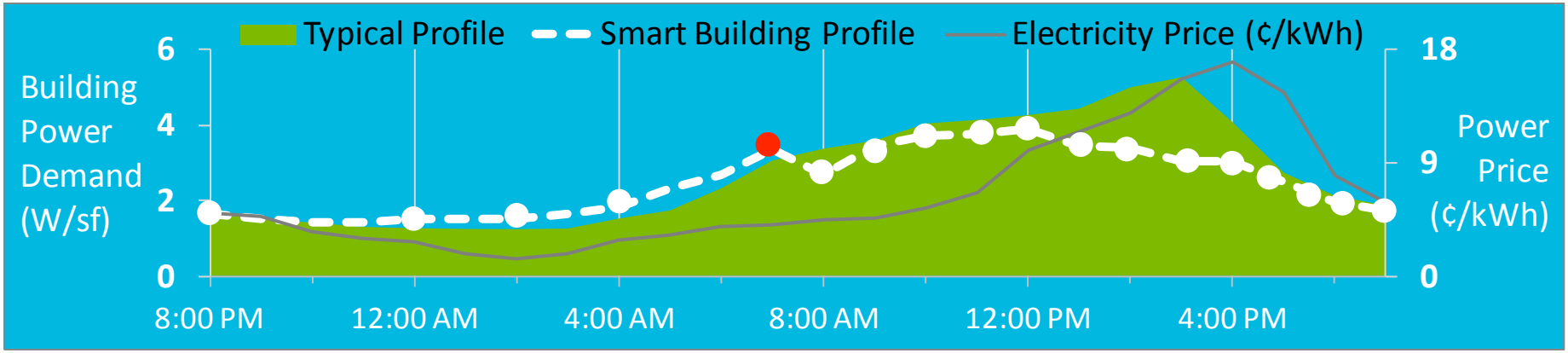
7:00 am

Chiller repaired

- Service technician arrives after being dispatched automatically
- Technician quickly fixes problem knowing the source and the new parts required
- Repair allows system to generate enough ice prior to spike in prices anticipated later in the afternoon



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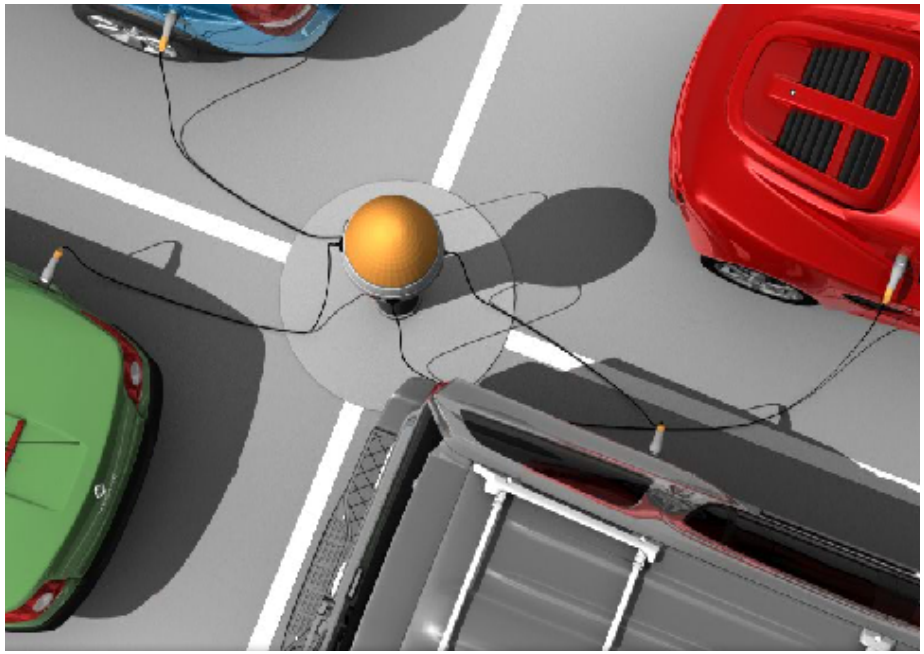
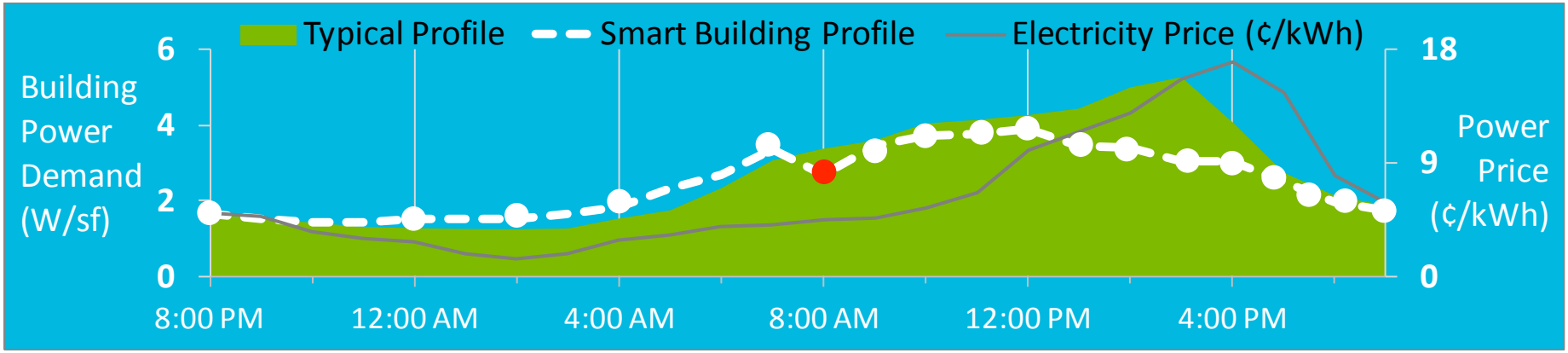
8:00 am

Faculty and staff plug in vehicles

- Electric or plug-in hybrid vehicles recharge when real time price of electricity is low
- Smart charging supports voltage regulation for the local utility
- Purchase or sale of power to building is automatically factored into payroll system





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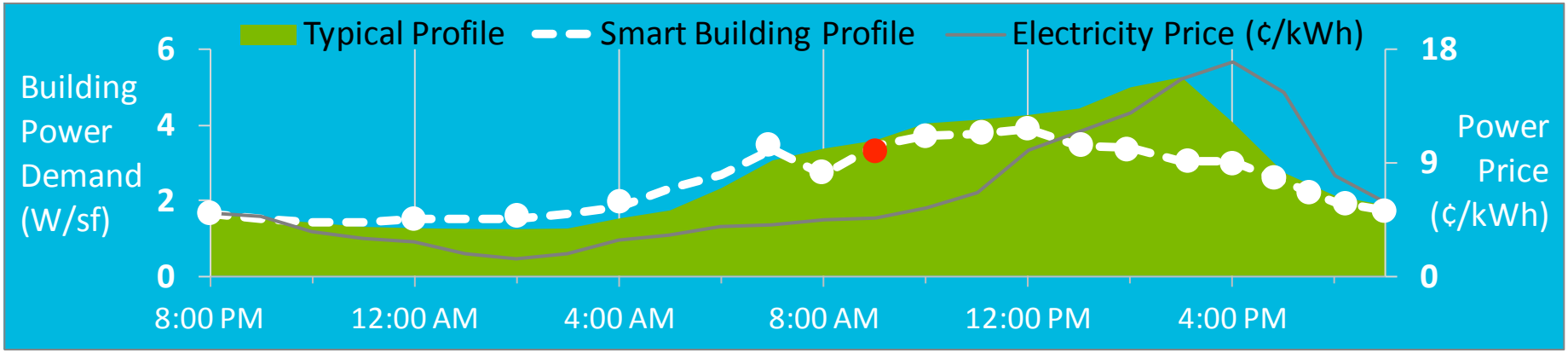
9:00 am

Meeting space is ready to go

- The building management system prepares the conference room for a meeting with 15 people
- Occupancy and CO_2 sensors provide an override in the case less or more people attend the meeting



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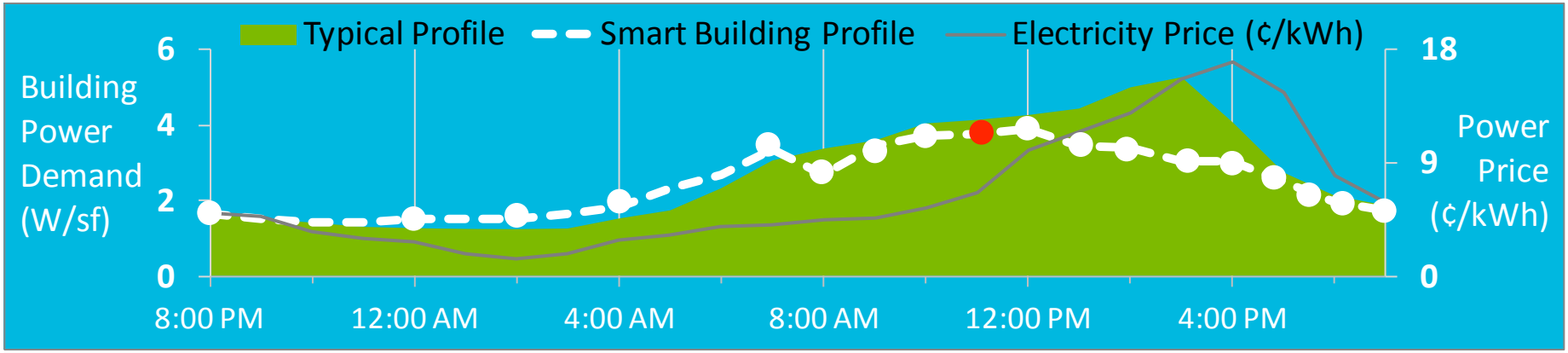
11:00 am

Utility power price triggers automatic demand reduction

- The price for electricity from 12pm-2pm exceeds the threshold pre-defined by the university
- The following actions to reduce power demand are taken:
  - reset space temps by 2°F
  - slowly dim lighting 20% in occupant spaces
  - dispatch ice storage cooling
- Actions and impact reported back to utility



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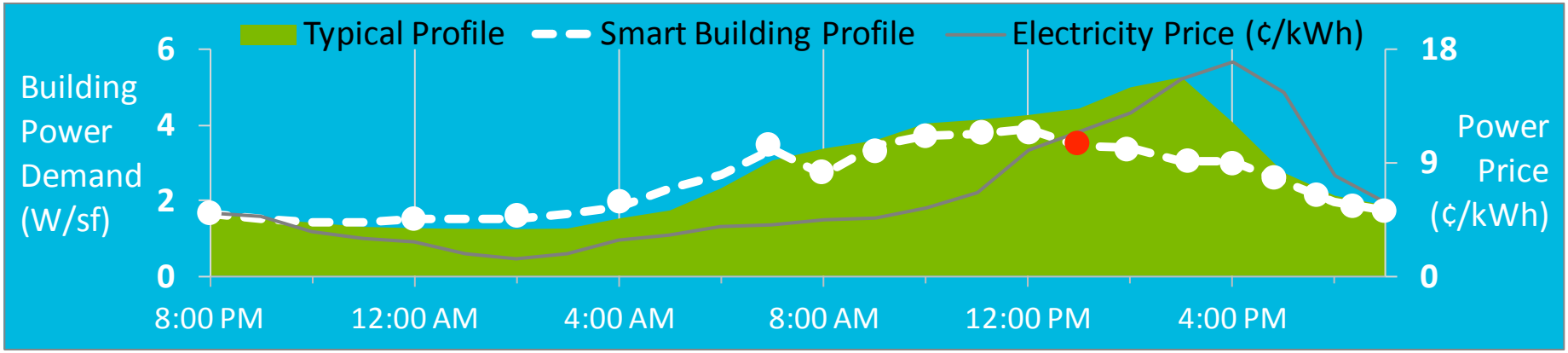
1:00 pm

Lighting and blinds adjust to ambient conditions

- Automated lighting system reduces indoor lighting energy when there is sufficient natural day light available
- Automated blinds track sun position and adjust to maximize natural lighting and reduce glare



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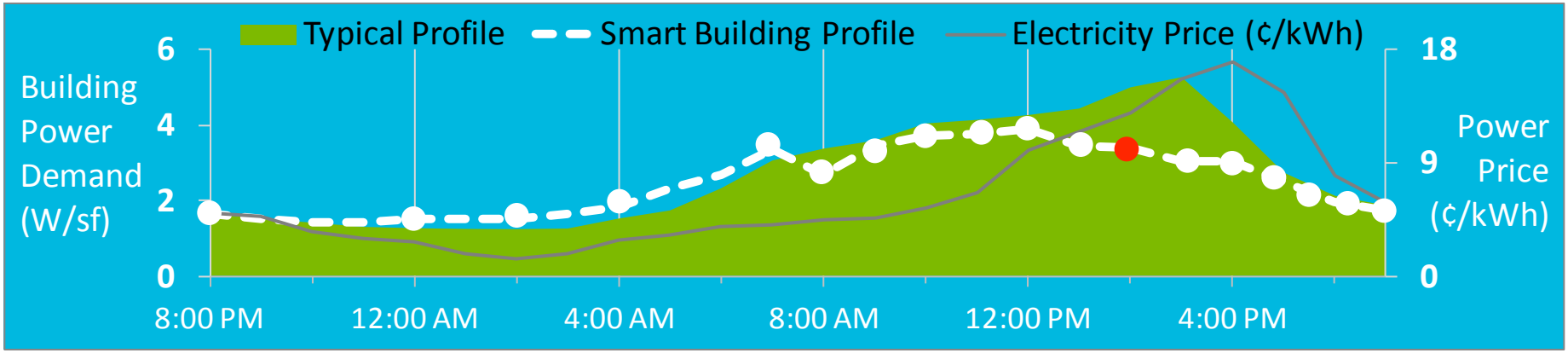
2:00 pm

Automated demand reductions leverage IT system integration

- System alerts students and staff via email or text message to unplug their laptops and run on battery power from 2-4pm
- PC power management software agent automatically reduces desktop power consumption
- Computing load is reduced for non-production servers and non-critical tasks are deferred



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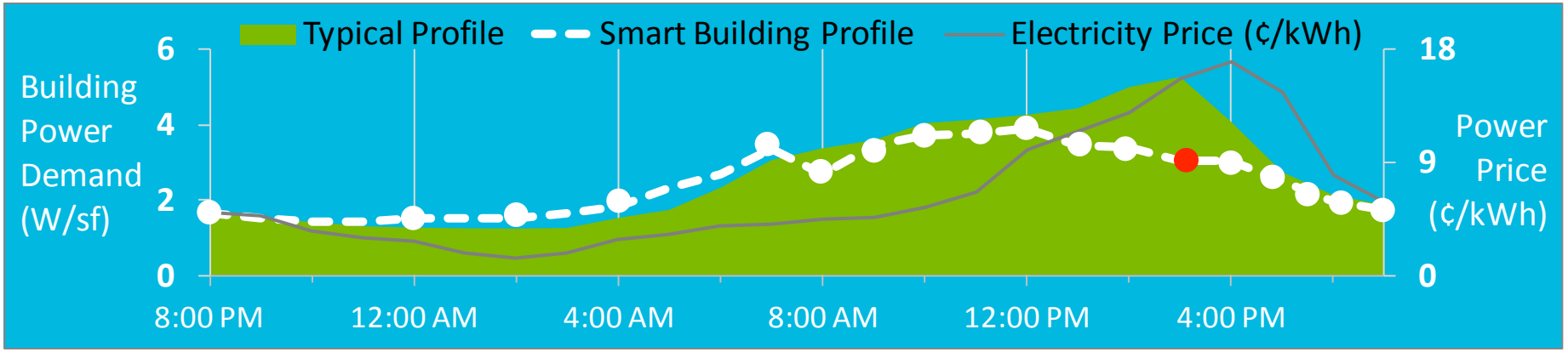
3:00 pm

Cloud cover causes solar photovoltaic generation to drop

- Building receives a demand limiting signal from utility during the 2pm -5pm period.
- When cloud cover causes solar production to drop, system uses on-site electric storage to meet demand reduction goal
- Combination of distributed generation, electric and thermal storage and vehicle charging is used to control the load profile



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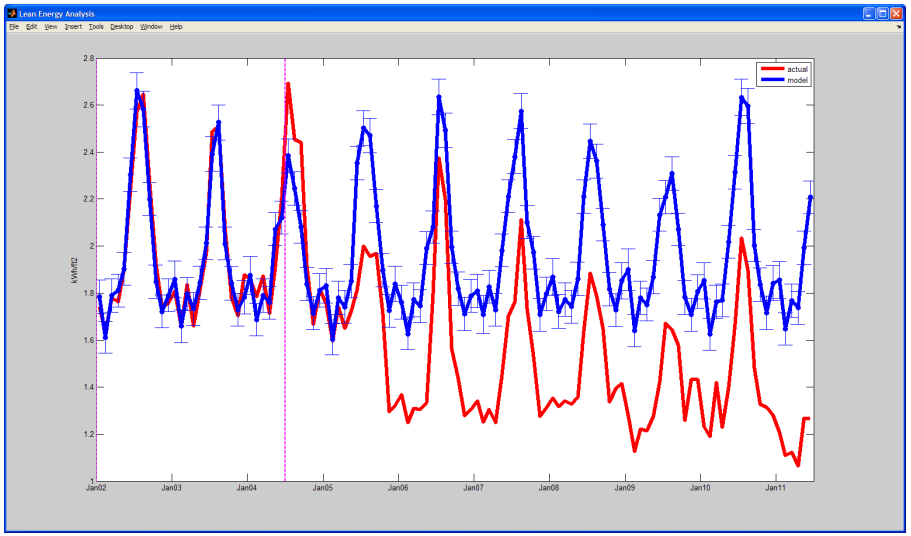
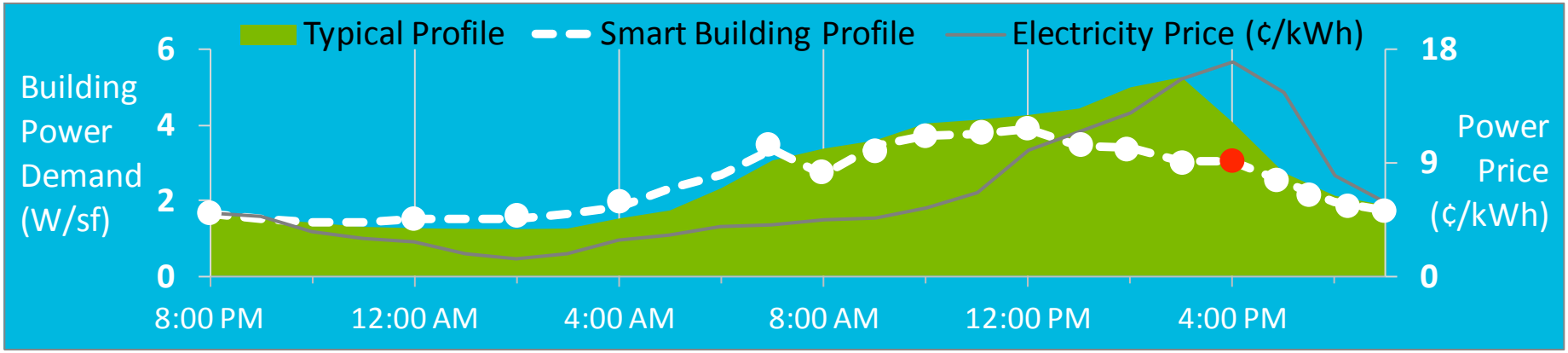
4:00 pm

Facility Director checks savings from energy efficiency projects

- System develops statistical model of building energy performance based on weather and occupancy
- Energy savings from retrofit projects and operational improvements are tracked daily on a “negawatt meter” and over time





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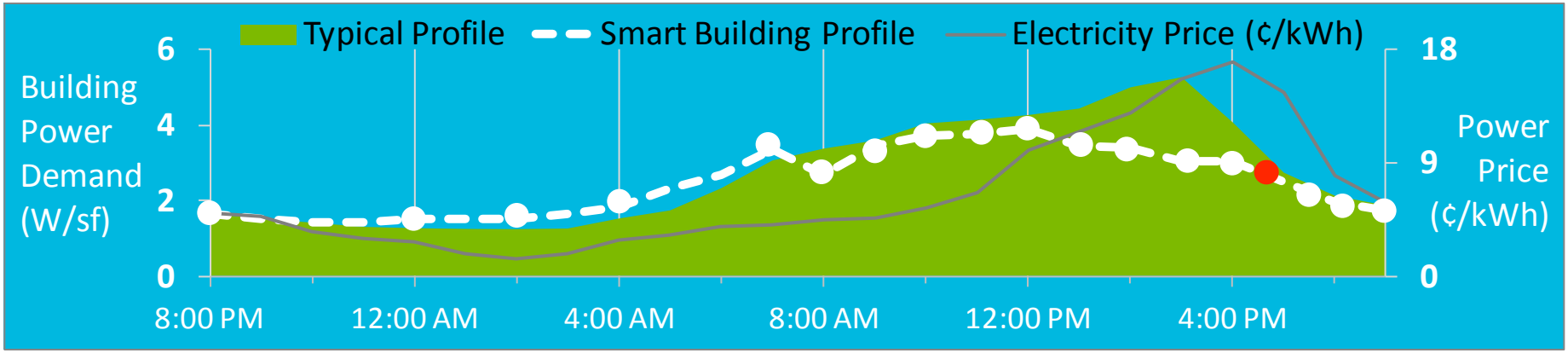
5:00 pm
Leaving the office

- As faculty and administration badges out, the system automatically turns off the lights and puts their computer into stand-by
- When he arrives to parking deck, his plug-in electric vehicle has been charged just enough for him to get home



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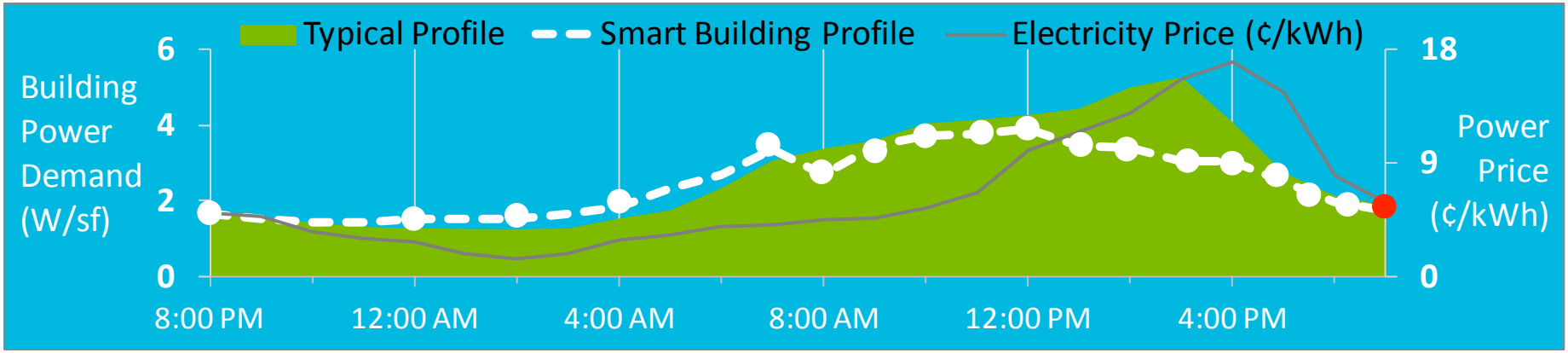
8:00 pm
Leaving on vacation

- Facility Director makes one last check of building status around the campus before leaving for vacation
- While gone, all alarms and alerts are automatically routed to alternative contacts
- The Facility Director can log in to the system remotely from any internet enabled device, but won't…



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More information about smart buildings and energy systems is available at:

www.InstituteBE.com

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