



ACTIVE COMMISSIONING
ENTERPRISE

Building an Energy Team

UCDAVIS | FACILITIES

Today's Topics

- Team structure
- Making the case
- Sample projects
- Diverse skill set
- Relationships with operational staff
- Open Discussion

Energy Team Structure



Josh Morejohn - Energy Manager



Nico Fauchier-Magnan
Energy Engineering
supervisor



Tom Ryan - Project
Manager



Sam Cole, Hiroko Masuda
Energy engineers



Dan Colvin, Correy
Koshnick, Daniel Imperiale
Data scientists

Energy Team Structure

- Financial setup:
 - Portfolio of energy projects generates verified savings
 - Verified savings transferred to team's budget
 - “Seed funding” for initial team start-up, paid back over time as portfolio grows

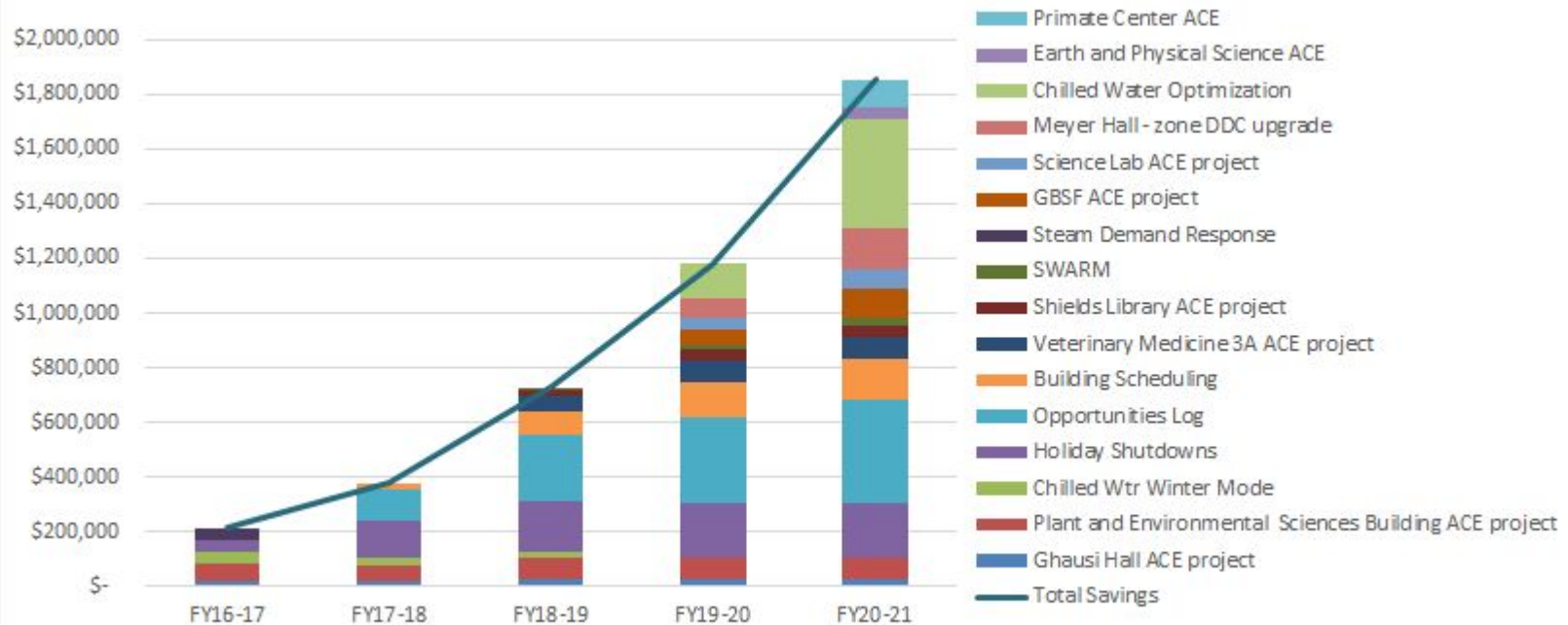
Making the Case for an Energy Team

- Large utility budget = opportunity to reduce waste
- Total UCD spend on utilities ~\$25 M / year
 - 10% savings = \$2.5 M / year!
 - Team budget about \$1.2 - 1.5 M / year
- Half of savings potential in bldgs is “operational”
- 75% of savings is in 25% of bldgs

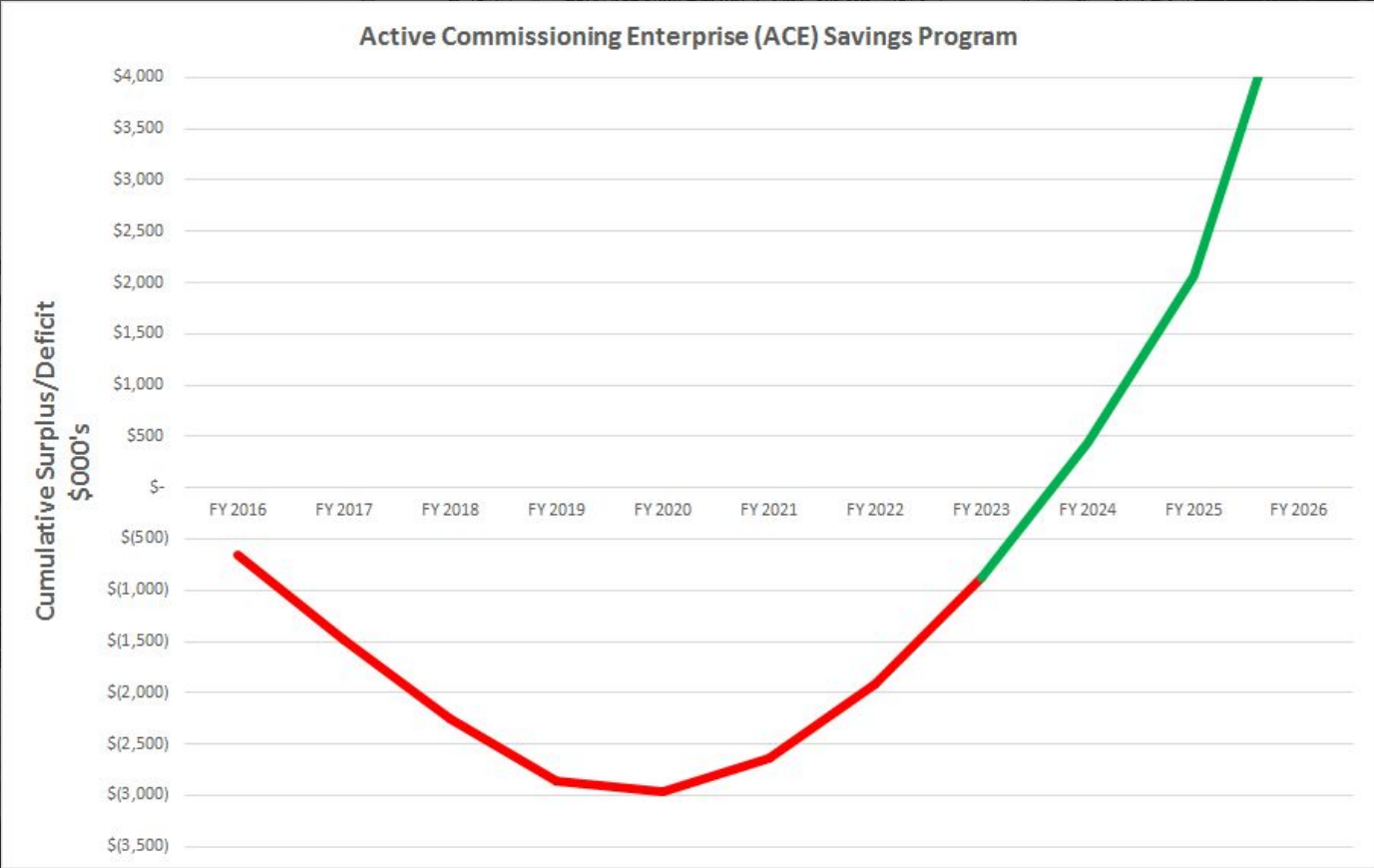


Making the Case for an Energy Team

Energy Team Savings - Forecast

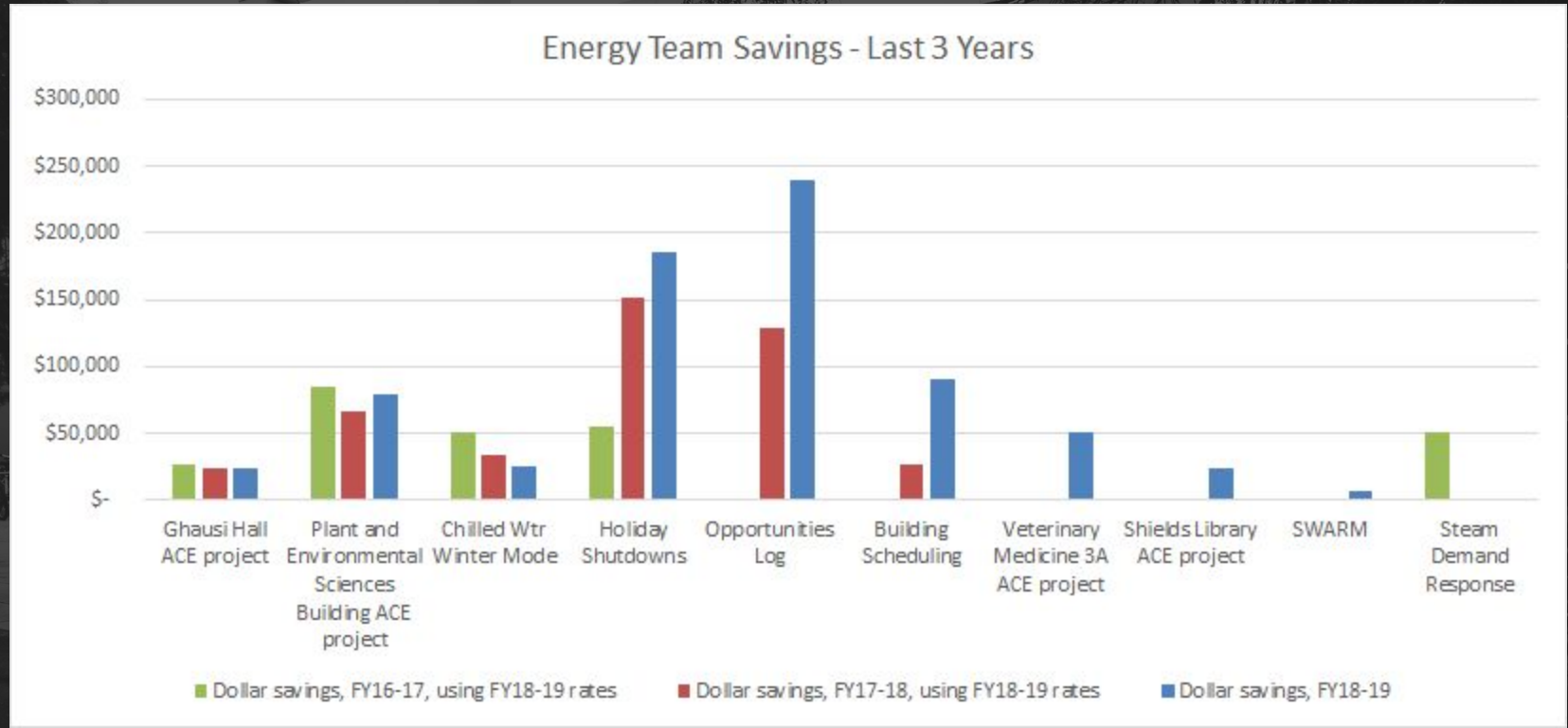


Making the Case for an Energy Team



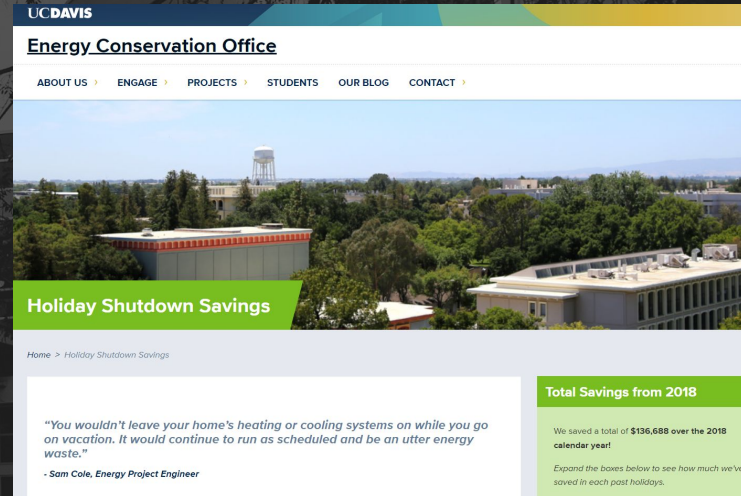
Making the Case for an Energy Team

- FY 18-19: total savings \$725k from 9 different projects



Sample projects at UC Davis

- Holiday shutdowns - \$180k/yr savings
 - Adjust HVAC schedules for non-lab areas on all administrative holidays
 - Requires good coordination with building managers
 - Many parts of the process have been automated and streamlined



The screenshot shows a webpage from the UC Davis Energy Conservation Office. The page features a navigation menu with links for 'ABOUT US', 'ENGAGE', 'PROJECTS', 'STUDENTS', 'OUR BLOG', and 'CONTACT'. Below the navigation is a large photograph of a UC Davis campus building. A green banner below the photo reads 'Holiday Shutdown Savings'. Underneath, there is a breadcrumb trail: 'Home > Holiday Shutdown Savings'. The main content area contains a quote: "You wouldn't leave your home's heating or cooling systems on while you go on vacation. It would continue to run as scheduled and be an utter energy waste." attributed to Sam Cole, Energy Project Engineer. To the right, a green box highlights 'Total Savings from 2018' as \$136,688 over the 2018 calendar year, with a note to expand the boxes to see savings per holiday.

UC DAVIS

Energy Conservation Office

ABOUT US > ENGAGE > PROJECTS > STUDENTS OUR BLOG CONTACT >

Holiday Shutdown Savings

Home > Holiday Shutdown Savings

"You wouldn't leave your home's heating or cooling systems on while you go on vacation. It would continue to run as scheduled and be an utter energy waste."

- Sam Cole, Energy Project Engineer

Total Savings from 2018

We saved a total of **\$136,688** over the 2018 calendar year!

Expand the boxes below to see how much we've saved in each past holidays.

Sample projects at UC Davis

- Scheduling project - \$90k/yr savings
 - 35 buildings have an improved HVAC schedule
 - Detailed coordination with each building's stakeholders
 - 20+ more potential buildings to address

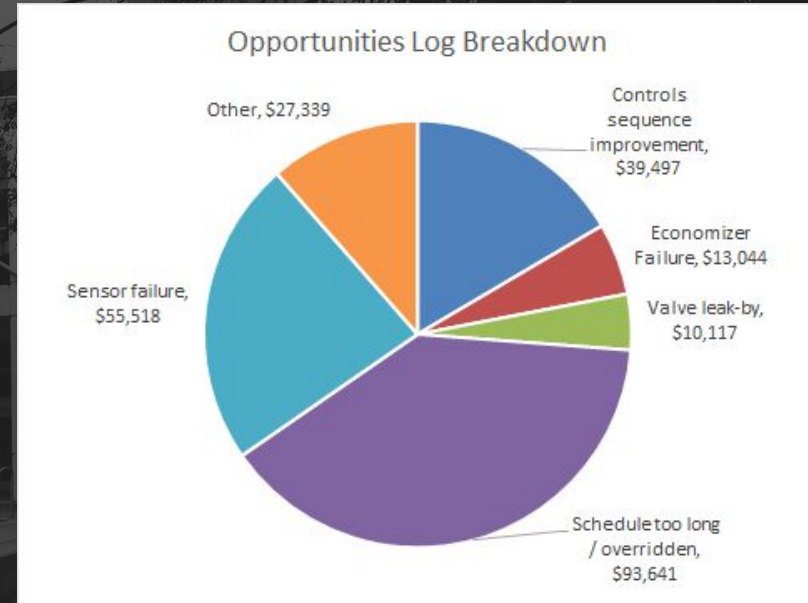
The screenshot displays a project management dashboard with four columns:

- Backlog:** Academic Surge, Chemistry, Earth & Physical Sciences ..., Environmental Services Fa..., Graduate School of Manag..., Housing Administrative Bu..., International Center (NEW), Medical Sciences C, Memorial Union, Plant & Environmental Sci..., Physics Geology, Pitzer, Schalm. (19 records)
- Investigation:** Student Health & Wellness..., Cruess Hall, Life Sciences, Meyer Hall, Olson Hall, TAPS. (6 records)
- Implementation:** Wright Hall, University Services, Center for Companion Ani..., Freeborn Hall, Physical Science & Enginee..., Sciences Lab Building. (6 records)
- Completed:** Cole A, Art Building, Plant Reproductive Biolog..., Kleiber Hall, Sciences Lab Lecture Hall, Kerr Hall, Vet Med Student Services ..., Math Sciences, Student Community Center, Gourley Clinical Teaching ..., Watershed Science Facility, Vet Med Equine Athletic P..., Hart Hall. (33 records)

Sample projects at UC Davis

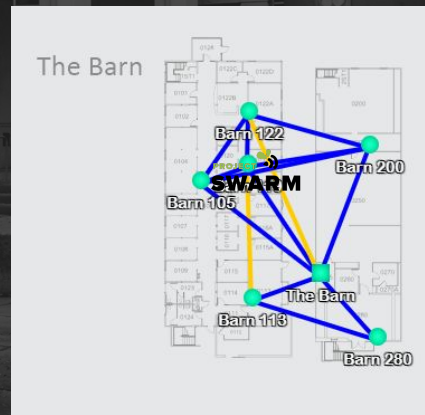
- Opportunities log project
 - Large savings (\$239k), projects across campus
 - Fixing dysfunctional equipment / overridden schedules
 - Improving control sequences
 - Other miscellaneous improvements

Either found by our team or brought to our attention by field technicians, foremen and IPEs.



Sample projects at UC Davis

- SWARM project (automation system for small buildings)
 - 30 buildings connected so far
 - Led by 1 staff member (part-time) with a team of grad & undergrad interns
 - Great support from BMS HVAC refrigeration shop



Sample projects at UC Davis

- Lab retro-commissioning projects
 - Occupancy based controls for ventilation and temperature (6/4 ACH)
 - Dynamic wind control for exhaust stacks (modeled with wind consultant to ensure safety at every wind speed and direction)
 - Improved resets (SAT, DSP)
 - Controls upgrades
 - PES, Ghausi, VM3A, Shields (done), Genome (ETA Dec '20)



Team Diversity

- **Energy Engineers**
 - Project identification, implementation, commissioning
 - Interactions with campus customers, operational teams
- **Data scientists / programmers**
 - Performing Measurement & Verification for completed projects
 - Building tools to speed up & streamline workflows
- **Engineering Interns**
 - Fresh, outside perspective, creativity
 - Able to handle simple projects on their own
 - Build skills & experience

Relationships with Operational Staff

- How do we prove our value to them?
- TherMOOstat as a crowd-sourced FDD tool
 - Surges in feedback often indicate a mechanical issue
 - Can address problems before a work order is even put in

Relationships with Operational Staff

- How do we prove our value to them?
- SWARM
 - Started as energy project with operational benefits
 - Refrigeration team now a huge supporter

Relationships with Operational Staff

- How do we prove our value to them?
- HVAC scheduling for special events
 - Used to be HVAC techs' responsibility
 - Energy Engineering took over and improved process (from 1 day / week to 1-2 hours)

changes

Date	Building	Siemens Schedule	New Start	New End	Current Start	Current End	no. of Reserves	Facility
2019-08-24	CRUESS	CRUESS AHU1 SCHEDULE	07:00	02:00			Second Summ	107 CRUESS
	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
		D107.FHW1.ZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
	MU	LK132.SCHEDULE	06:00	23:00	09:00	19:00		Summer 2019'S LOWER FREEB
		MU.MU1 TOWER SCHEDULE	06:00	03:00	09:00	19:00		Summer 2019'DE CARLI ROOM
WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2	
2019-08-25	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
		D107.FHW1.ZONE	07:00	02:00	12:00	18:00	NAI book	LECTURE HALL
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	WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2
2019-08-26	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FHW1.ZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
	MU	MU.MU1 TOWER SCHEDULE	06:00	23:00	06:00	19:00		Summer 2019'DE CARLI ROOM
		WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59			SUMMER MAJ123 WELIMAN 2
	2019-08-27	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	07:00	20:00	NAI book
D107.FCL4.SYSZONE			07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
D107.FHW1.ZONE			07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
MU		LK132.SCHEDULE	18:00	23:00	07:00	19:00		Summer 2019'S LOWER FREEB
		MU.MU1 TOWER SCHEDULE	09:30	23:00	06:00	19:00		Summer 2019'DE CARLI ROOM
WELIMA		WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2
2019-08-28	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FHW1.ZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
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	WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2
2019-08-29	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FHW1.ZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
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	WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2
2019-08-30	CALIFO	D107.AHU1.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
		D107.FCL4.SYSZONE	07:00	02:00	07:00	20:00	NAI book	LECTURE HALL
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	WELIMA	WELIMAN.AHU1.SCHEDULE	04:00	23:59				SUMMER MAJ123 WELIMAN 2

Discussion

- Open discussion



Savings / Cost Projections

Active Commissioning Enterprise (ACE) Savings Program

