



The David and Lucile Packard Foundation's offices have obtained LEED Platinum Certification and have been designed as a NetZero Energy facility.

Redwood Electric Group Wires The David and Lucile Packard Foundation With Energy Saving Control Systems

Thanks in part to the work of Redwood Electric Group, the David and Lucile Packard Foundation has been recognized as one of California's greenest office buildings.

Redwood Electric Group dramatically minimized the overall energy footprint at the David and Lucile Packard Foundation by making aggressive reductions in plug loads through the installation of state-of-the-art building management and power monitoring controls systems.

As a result of this and other energy saving strategies such as a 292kW photovoltaic system installed by Redwood Electric Group, the Foundation's new Los Altos offices have obtained LEED Platinum Certification. They have also been designed as a NetZero Energy facility.

When the David and Lucile Packard Foundation designed their headquarters to be LEED Platinum and NetZero Energy, they were making a conscious decision to live the

values they support. For maximum impact, the facility is designed to be replicated elsewhere in the country to provide a model for those looking for more sustainable building practices.

Redwood Electric Group performed all the low voltage system installation, including voice/data, fire alarm, security and sound

masking. Redwood Electric Group contracted with Integrated Communication Systems (ICS) to engineer and install the state-of-the-art audio video systems. (*see related story, page 8*).

The Foundation's new two-story 49,000 square foot building was completed in July 2012 and is designed with many sustainable

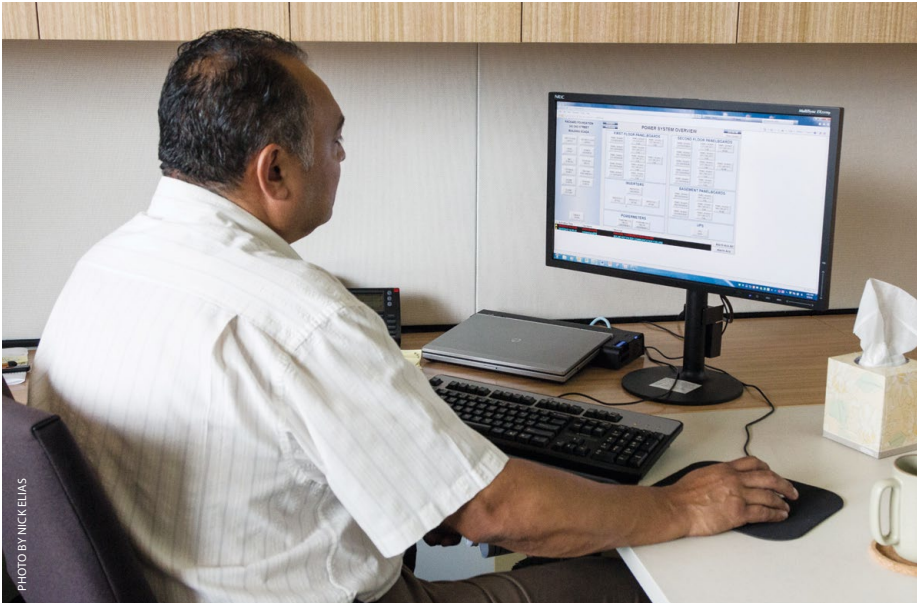
elements. However, it is the reduced plug loads, incorporated by Redwood Electric Group, along with the installation of state-of-the-art building management and power monitoring control systems that contribute to the facilities design as a NetZero Energy office. Installer Technicians for IBEW Local 332 in San Jose installed the controls systems as well as the other low voltage systems.

To begin the process, Redwood Electric Group utilized 3D/BIM design to layout the electric systems and coordinate with other contractors. Through BIM activity, Redwood Electric Group coordinated larger feeder conduits, light fixtures and cable tray systems with all the mechanical ducting.

Redwood Electric wired the IDF on the first floor and an MDF on the second floor. The teledata system, which connected 300 cable outlets using 250,000 feet of cable, specified shielded category 6A wiring, not commonly selected in the U.S. According to Richard Yeadon, Systems Group leader for



The lobby of the David and Lucile Packard Foundation is designed for maximum use of day lighting and is wired by Redwood Electric Group with automatic controls that regulate shades and ambient lighting.



A Foundation staff member monitors energy usage through the SCADA system wired by Redwood Electric Group.



Redwood Electric Group wired control panels outside each conference room to allow Foundation staff to reserve meeting time.

Redwood Electric Group, the shielded wiring solution, often chosen in Europe, offers higher performance and better security.



Redwood Electric Group installed a Notifier fire alarm system.

To track the building's electrical load, Redwood Electric Group installed a metering service which is integrated into the building control system. The metering service tracks all branch power circuits as well as PV production.

The building control system, in turn, is integrated into the SCADA System (Supervisory Control and Data Acquisition System). SCADA monitors all energy collection and consumption, including what the building draws from PG&E and what it collects from the solar panels. It also

networks with the mechanical and electrical systems.

Redwood Electric Group wired the SCADA System into all the networks using Category 6A cabling. Foundation employees have access to a SCADA-controlled dashboard that allows them to monitor in real-time the amount of energy used during their office activities, such as printing.

Redwood Electric Group installed a lighting control system designed by Lutron Electronics, Inc. It ties back to the building management system and is wired into all the rooms by sensors. The lighting control system interfaces with the building management system to provide a display of pertinent information and maintain the most efficient levels of light.

Controls operate interior shades, automatically moving them up and down to keep the sun from directly shining into the building. This brings natural light into the building, without the heat and glare of direct sunlight. Sensors automatically dim light in the offices to efficient levels. In meeting rooms, touch pad screens with Lutron GRAFIK Eye® controllers integrate with the AV system to control light levels.

Redwood Electric Group installed a

sound masking system with 72 speakers in the open spaces above the cubicles. The masking system provides white noise, with easy adjustments available based on sound levels.

For the David and Lucile Packard Foundation, the time, expense and challenges of construction were well worth the effort. "This building is a physical manifestation of our long-term commitment to reduce greenhouse gas emissions around the world," said the Foundation.



Redwood Electric Group's team members include:

REAR LEFT TO RIGHT:
Tyce Wilhite, Project Manager Fire Alarm;
Leon McMillan, Project Manager; Mark Keys, Partner

FRONT LEFT TO RIGHT:
Richard Yeadon, Group Leader Systems;
Patrick Leinart, Systems Project Manager;
Mike Ruiz, Superintendent

The David And Lucile Packard Foundation Electrical Team:

ELECTRICAL CONTRACTOR:

Redwood Electric Group,
Santa Clara, CA

AUDIO-VISUAL CONTRACTOR:

Integrated Communication Systems (ICS),
San Jose, CA

INSTALLER TECHNICIANS:

IBEW Local 332, San Jose, CA

ELECTRICAL ENGINEER:

Integrated Design Associates, Inc.,
San Jose, CA

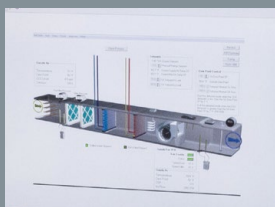
PROJECT MANAGEMENT:

Mark Keys, Project Executive
Leon McMillan, Project Manager
Richard Yeadon, Project
Manager, Low-Voltage Systems
Patrick Leinhart, Project
Manager, Low-Voltage Systems

SCOPE OF WORK:

Lighting control; security access and surveillance system; sound masking system; wireless crosswalk lighting system; fire alarm system; tele/data system; metering system; SCADA and BMS system wiring

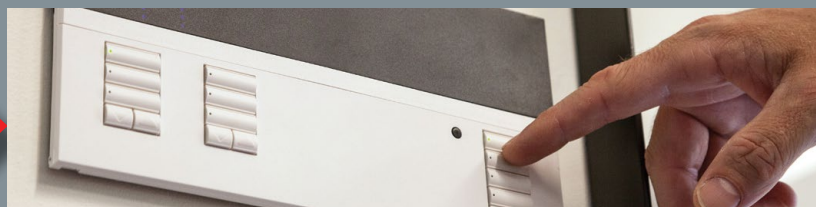
Redwood Electric Group: From BIM To Total Integration



3D/BIM DESIGN

Redwood Electric Group is a key player within the team that lays out and coordinates all building systems during 3D/BIM design:

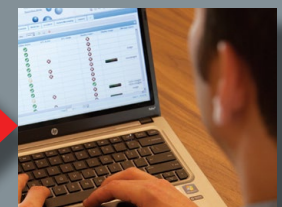
- Electrical
- HVAC
- Mechanical



BMS (BUILDING MANAGEMENT SYSTEMS)

Redwood Electric Group integrates all systems into one Building Management Interface:

- Lighting control
- Power monitoring and metering
- PV monitoring
- Weather station monitoring
- HVAC monitoring
- Sound masking
- Car charging monitoring
- Water usage
- AV system
- Rain water harvesting
- Storm water management
- Irrigation systems
- Elevators
- Security



SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM)

Redwood Electric Group integrates BMS, power system, mechanical, energy usage into one central system to monitor energy usage.

The Silicon Valley Wire

The latest news from the electrical industry in Silicon Valley

1st Quarter 2013



Redwood Electric Group Wires the David And Lucile Packard Foundation, One Of California's Greenest Office Buildings

The David and Lucile Packard Foundation's offices have obtained LEED Platinum Certification and have been designed as a NetZero Energy facility.

One of California's greenest office buildings, the David and Lucile Packard Foundation, is wired by Redwood Electric Group to be a national model of sustainability.



This car charging station at the David and Lucile Packard Foundation is wired by Redwood Electric Group.

THE Foundation's \$37.2 million Los Altos offices have obtained LEED Platinum Certification and have been designed as a NetZero Energy facility.

Using a two-pronged strategy, Redwood Electric Group dramatically minimized the overall energy footprint at the David and Lucile Packard Foundation. First, Redwood Electric Group made aggressive (up to 65%) reductions in plug loads through the installation of state-of-the-art building

management and power monitoring controls systems. Second, Redwood Electric Group installed a roof-mounted 292kW photovoltaic system which harvests the energy at the building.

The energy savings, coupled with the energy generation of the solar array, will result in zero energy use. The General Contractor for the award-winning project is DPR; EHDD is the Project Architect.

CONTINUED ON NEXT PAGE



Redwood Electric Group wired the weather station on top of the facility.

Inside This Issue



Redwood Electric Group, Packard Foundation Headquarters, one of California's greenest office buildings.

2



Integrated Communications Systems, Packard Foundation's energy saving conference rooms.

4



Redwood Electric Group wires two new state-of-the-art hospitals.

6

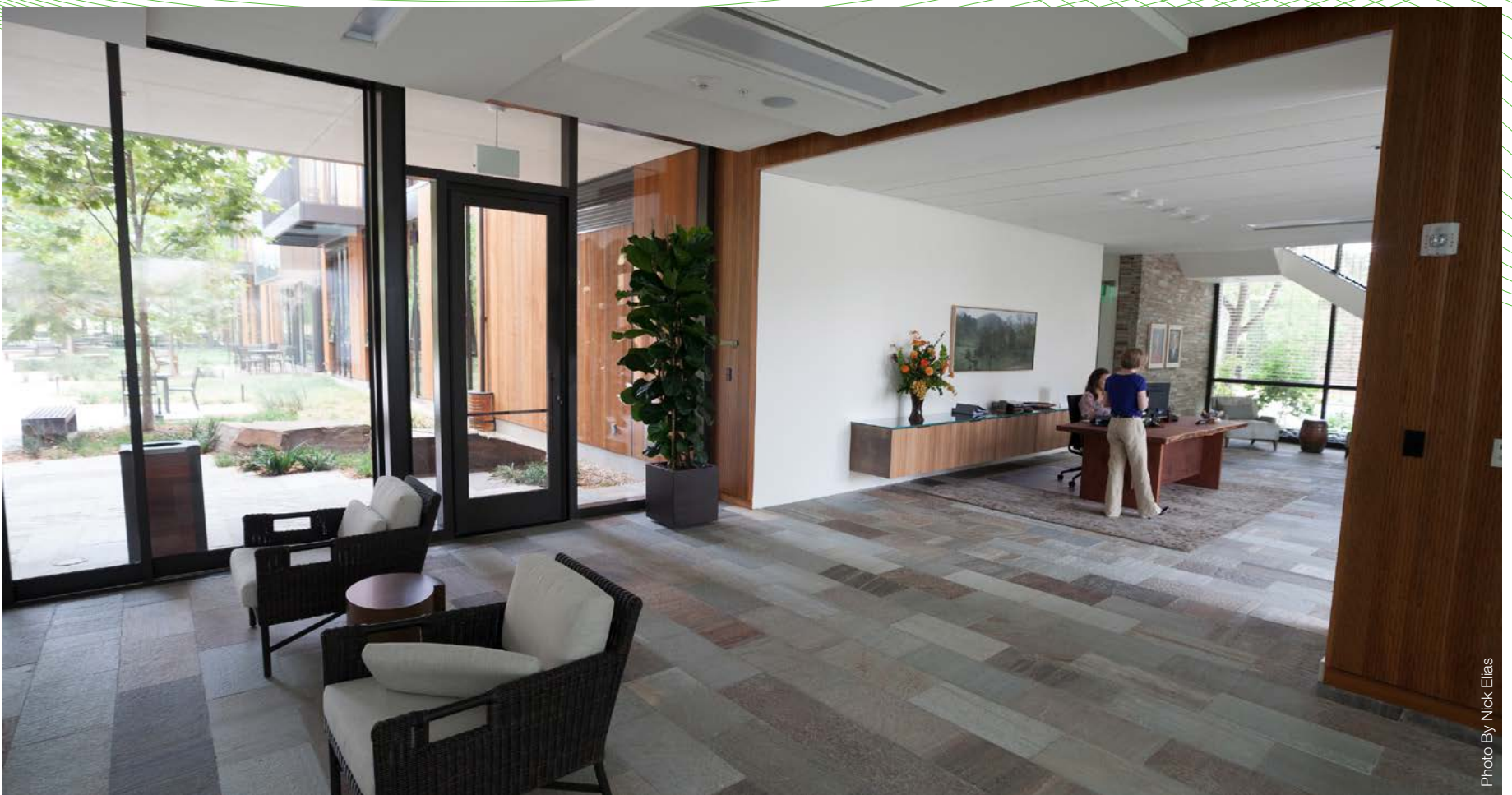


Photo By Nick Elias

The lobby of the David and Lucile Packard Foundation is designed for maximum use of day lighting and is wired by Redwood Electric Group with automatic controls that regulate shades and ambient lighting.

The David And Lucile Packard Foundation Wired By Redwood Electric Group

Continued From Page 1



Photography By Nick Elias

Hundreds of solar panels on the roof offset any energy use.

WHEN the David and Lucile Packard Foundation designed their headquarters to be LEED Platinum and NetZero Energy, they were making a conscious decision to live the values they support. For maximum impact, the facility is designed to be replicated elsewhere in the country to provide a model for those looking for more sustainable building practices.

Redwood Electric Group was selected for the project through a bid/interview process. The company provided comprehensive

electrical services for the \$7.5 million project, including all power, lighting, branch wiring and extensive controls and monitoring systems. Electricians from the International Brotherhood of Electrical Workers (IBEW) Local 332 in San Jose installed the systems.

Redwood Electric Group performed all the low voltage system installation, including voice/data, fire alarm, security and sound masking. The company also installed the solar panels and electric car

THE DAVID AND LUCILE PACKARD FOUNDATION TEAM:

OWNER:
The David and Lucile Packard Foundation

GENERAL CONTRACTOR:
DPR Construction, Redwood City, CA

ELECTRICAL CONTRACTOR:
Redwood Electric Group, Santa Clara, CA

DESIGN ARCHITECT AND ARCHITECT OF RECORD:
EHDD, San Francisco, CA

GREEN MECHANICAL ENGINEERING:
Integral Design Group, Centennial, CO

LIGHTING AND DAYLIGHTING DESIGNERS:
J S Nolan + Associates Lighting Design, LLC., San Francisco, CA

ELECTRICAL ENGINEER:
Integrated Design Associates, Inc., San Jose, CA

The David And Lucile Packard Foundation One Of California's Greenest Office Buildings

LEED PLATINUM CERTIFICATION

- 40% reduction in water use
- Recycle or reuse of 95% of materials from old buildings demolished on site
- 90% of landscaping uses native plants, eliminating extensive watering
- Rain gutters on roof collect water for reuse in toilets and landscaping irrigation
- Transportation plan reduces carbon footprint
- Network of storm gardens divert storm water
- Chilled water beam system
- Highly thermal rated exterior skin
- Interior doors made from eucalyptus felled during the relocation of Doyle Drive
- Living roof on one side planted with succulents to capture water

NETZERO ENERGY BUILDING

- Energy use lowered 65% through aggressive reductions in HVAC, plug loads and lighting
- Roof-mounted 292 kW solar panels offset any energy use
- Extensive use of natural daylighting; automatic shade control
- Triple element windows
- 5 car charging stations on site
- Dashboard allows employees to monitor energy use in real time
- Wide eaves shade windows from the sun on southwestern side



TAKE THE VIRTUAL TOUR



<http://vimeo.com/45338217>



Photo By Nick Elias

Redwood Electric Group wired control panels outside each conference room to allow Foundation staff to reserve meeting time.



Photo By Nick Elias

Redwood Electric Group installed a Notifier fire alarm system.



Redwood Electric Group's team members include:

REAR LEFT TO RIGHT:

Tyce Wilhite, Project Manager Fire Alarm;
Leon McMillan, Project Manager;
Mark Keys, Partner

FRONT LEFT TO RIGHT:

Richard Yeadon, Group Leader Systems;
Patrick Leinart, Systems Project Manager;
Mike Ruiz, Superintendent

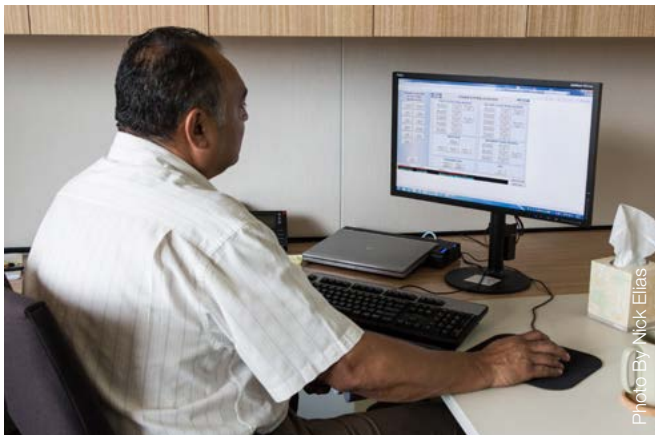


Photo By Nick Elias

A Foundation staff member monitors energy usage through the SCADA system wired by Redwood Electric Group.



Photo By Nick Elias

Redwood Electric Group wired a total of 5 car charging stations at the Foundation.

charging stations. Redwood Electric Group contracted with Integrated Communication Systems (ICS) to engineer and install the state-of-the-art audio/video systems. *(see related story, pages 4-5)*

The new two-story 49,000 square foot building, completed in July 2012, allowed consolidation of the Foundation's 110 staff members, who had been scattered among several buildings in Los Altos. The design includes two slender daylit office wings flanking a beautifully landscaped courtyard.

The new building is packed with sustainable features. It reused and recycled 95 percent of the materials from the old buildings that were demolished on its site. Other green elements include day lighting, triple element glass, a chilled water-beam system, rain water

harvesting and storm water management.

However, it is the reduced plug loads, incorporated by Redwood Electric Group, along with the installation of state-of-the-art building management and power monitoring control systems, that help make the facility a NetZero Energy office.

To begin the process, Redwood Electric Group utilized 3D/BIM design to layout the electrical systems and coordinate with other contractors. Through BIM activity Redwood Electric Group coordinated larger feeder conduits, light fixtures and cable tray systems with all the mechanical ducting.

"Coordinating BIM was a pretty challenging process," said Mark Keys, project executive for Redwood Electric Group. "With all of the open ceilings and congested utility chases, BIM

was the best solution."

Redwood Electric Group brought new utility service into the building from a PG&E feed across the street, with a secondary utility service added from the tenant parking lot. The main incoming electrical room was located in the basement, with an IDF on the first floor and an MDF on the second floor.

The electrical system is backed up by a 40 kVA UPS (uninterruptible power supply) unit in the electrical room. The teledata system, which connected 300 cable outlets using 250,000 feet of cable, specified shielded category 6A wiring, not commonly selected in the U.S. According to Richard Yeadon, Systems Group Leader for Redwood Electric Group, the shielded wiring solution, often chosen in Europe, offers higher performance and better security.

THE DAVID AND LUCILE PACKARD FOUNDATION ELECTRICAL TEAM:

ELECTRICAL CONTRACTOR:
Redwood Electric Group,
Santa Clara, CA

AUDIO-VISUAL CONTRACTOR:
Integrated Communication
Systems (ICS), San Jose, CA

AMOUNT OF CONTRACT:
Over \$7.5 million

ELECTRICIANS:
IBEW Local 332, San Jose, CA

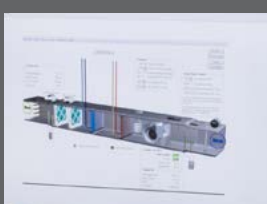
ELECTRICAL ENGINEER:
Integrated Design Associates,
Inc., San Jose, CA

PROJECT MANAGEMENT:
Mark Keys, Project Executive
Leon McMillan, Project Manager
Richard Yeadon, Project
Manager, Low-Voltage Systems
Patrick Leinhart, Project
Manager, Low-Voltage Systems

SCOPE OF WORK:
Power and lighting; lighting
control; PV system; security
access and surveillance
system; sound masking system;
wireless crosswalk lighting
system; car charging unit; fire
alarm system; tele/data
system; metering system;
SCADA and BMS system wiring

CONTINUED ON PAGE 8

Redwood Electric Group: From BIM To Total Integration



3D/BIM DESIGN

Redwood Electric Group is a key player within the team that lays out and coordinates all building systems during 3D/BIM design:

- Electrical
- HVAC
- Mechanical



BMS (BUILDING MANAGEMENT SYSTEMS)

Redwood Electric Group integrates all systems into one Building Management Interface:

- Lighting control
- Power monitoring and metering
- PV monitoring
- Weather station monitoring
- HVAC monitoring
- Sound masking
- Car charging monitoring
- Water usage
- AV system
- Rain water harvesting
- Storm water management
- Irrigation systems
- Elevators
- Security



SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM)

Redwood Electric Group integrates BMS, power system, mechanical, energy usage into one central system to monitor energy usage.

ICS Helps To Cut Carbon Footprint With Systems At The David And Lucile Packard



Photography By Nick Elias

Mark Berlo and Jason Meyer of ICS, along with Marcus Krawinkler of the David and Lucile Packard Foundation, view the Foundation's energy saving teleconferencing system.



Photography By Nick Elias

Microphones: Portable microphones are used during audio calls or video conferencing.



Photography By Nick Elias

This room includes a projector/projector screen, flat panel screens, microphones (black boxes down the center of the table), HDMI plug-in for laptop (under the table in this room).

As part of its mission to create a sustainable headquarters, the David and Lucile Packard Foundation wanted to lower its carbon footprint.

THE solution—done with the help of Integrated Communication Systems (ICS) of San Jose—was to expand the Foundation's teleconferencing options. ICS, contracted by Redwood Electric Group and General Contractor DPR, outfitted meeting rooms for remote collaboration, providing options to reduce travel-related carbon emissions. ICS also worked towards NetZero Energy status by

installing energy-saving AV systems, including a control system integrated with multiple disciplines to maximize the buildings usability and minimize its energy use. "The David and Lucile Packard Foundation is one of the most sustainable buildings in the U.S., and ICS was excited to contribute to the building's LEED Platinum Certification and NetZero Energy status," said Mark Berlo, ICS project manager. The ICS scope included outfitting numerous large and small meeting rooms, and assembly spaces with

state-of-the-art audio visual systems for both presentations and video teleconferencing. Signal routing throughout the space was accomplished using Crestron DigitalMedia™ products, which provide an ability to accommodate both analog and digital video, although HDMI is predominate among the David and Lucile Packard Foundation users. ICS also used a HARMAN BSS Audio Soundweb™ London conferencing system, which provides superior sound quality. ICS used Creston again for AV system control. Wall-mounted

State-Of-The-Art Teleconferencing at David & Lucile Packard Foundation Headquarters



Photography By Nick Elias

ICS wired the flat panel display that controls multi-functions in each conference room, including screens, shades and lights.



Photography By Nick Elias

ICS wired HDMI input on conference room tables so a laptop can be connected to display content on a flat screen or projector screen.

touch panels were installed throughout the space, which provide the users an ability to launch presentations and adapt systems to extend AV coverage into overflow spaces or to change a room set up when the space needs to be divided into two separate presentations. For ease of use, ICS deployed wireless touch panels that could be removed from their normal wall mounted position and placed conveniently near a presenter.

The control system program was structured to efficiently manage devices that consume electrical power. When room

occupancy sensors indicate that rooms are vacant, the AV system automatically goes into a power-save mode. Likewise, the ICS control system manipulates shades and lighting based on room usage and occupancy.

In addition, ICS also installed a room scheduling system from Crestron called RoomView®, which makes it easy for users to view scheduled meetings or reserve rooms using Outlook via a Microsoft Exchange server. Each conference room was equipped with a wall-mounted display device that details the

committed room schedule or usage.

Users can go to any scheduling panel outside a conference room to check for room availability or schedule drop-in meetings. A software program by Crestron called Fusion RV™ Remote Asset Management tracks room usage statistics. Help desk requests were also installed.

For more information, contact Aaron Colton at aaron.colton@ics-integration.com or Mark Berlo at mark.berlo@ics-integration.com or call 408.491.6000.



Photography By Nick Elias

An AV presentation on a laptop is shown in one of the Foundation conference rooms on a projector.



Photography By Nick Elias

ICS wired this downstairs conference room at The David and Lucile Packard Foundation.

THE DAVID AND LUCILE PACKARD FOUNDATION AV PROJECT TEAM SNAPSHOT:

AV CONTRACTOR:
Integrated Communication Systems (ICS), San Jose, CA

AV PROJECT MANAGER:
Mark Berlo, ICS

TECHNICIANS:
IBEW Local 332, San Jose, CA

SIGNAL ROUTING:
Crestron DigitalMedia™

AV SYSTEM CONTROL:
Crestron

AUDIO DSP AND AUDIO CONFERENCE SYSTEM:
HARMAN BSS Audio Soundweb™

VIDEO CONFERENCE:
Cisco TelePresence Codec C90 and Cisco TelePresence Camera PrecisionHD 1080p

FLAT PANEL DISPLAYS:
Sharp and NEC Display Solutions

PROJECTORS:
Projection Designs and Panasonic

The David And Lucile Packard Foundation Wired By Redwod Electric Group

Continued From Page 3

"When the Packard Foundation was designing our new headquarters to be a NetZero energy and LEED Platinum building, we were making a conscious decision to live the values we supported."

- The David and Lucile Packard Foundation

TO track the building's electrical load, Redwood Electric Group installed a metering service which is integrated into the building control system. The metering service tracks all branch power circuits as well as PV production. The building control system, in turn, is integrated into the SCADA System (Supervisory Control and Data Acquisition System). SCADA monitors all energy collection and consumption, including what the building draws from PG&E and what it collects from the solar panels. It also networks with the mechanical and electrical systems. Redwood Electric Group wired the SCADA System into all the networks using Category 6A cabling.



The David And Lucile Packard Foundation recycled many of the materials from its old site before building its new headquarters.

Foundation employees have access to a SCADA-controlled dashboard that allows them to monitor in real-time the amount of energy used during their office activities, such as printing.

Redwood Electric Group installed a lighting control system designed by Lutron. It ties back to the building management system and is wired into all the rooms by sensors. The lighting control system interfaces with the building management system to provide a display of pertinent information and maintain the most efficient levels of light.

Controls operate interior shades, automatically moving them up and down to keep the sun from directly shining into the building. This brings natural light into the building, but without the heat and glare of direct sunlight. Sensors automatically dim light in the offices to efficient levels. In meeting rooms, touch pad screens with Lutron GRAFIK Eye® controllers integrate with the AV system to control light levels.

Redwood Electric Group installed a sound masking system with 72 speakers in the open spaces above the cubicles. The masking system provides white noise, with



Redwood Electric Group installed part of the photoelectric system on the roof of the parking garage.

easy adjustments available based on sound levels.

To generate energy for the building, Redwood Electric Group installed a .3MW photoelectric system using 915 solar modules. Each module is rated at 320w. The solar electric system is located on the roof of the main building, as well as on the visitor parking lot canopy. 800 SPR-300 modules from SunPower Corporation are on the roof, with another 100 modules on the parking structure canopy. The modules are mounted with S5 spot clips, also from SunPower.

To further reduce the carbon footprint, Redwood Electric Group installed five car charging stations on site. Made by ChargePoint®, one charger station is a single unit and the other two charger stations are dual units. One charger is located in the

visitor parking lot underneath the PV canopy, and the other two are in the staff parking lot.

For the David and Lucile Packard Foundation, the time, expense and challenges of construction were well worth the effort. "This building is a physical manifestation of our long-term commitment to reduce greenhouse gas emissions around the world," says the Foundation. "We designed our new headquarters with a conscious decision to live the values we supported. Perhaps most importantly, a building like this can be replicated, opening the door for others to move toward constructing more environmentally sustainable buildings."

For more information, contact Mark Keys at mkeys@RedwoodEG.com or call 408.450.4800.