

INNOVATION

Harnessing efficiency to
inspire innovation

SAHMRI - North Terrace, Adelaide, South Australia

How EcoStruxure™ for Healthcare, an integrated solution, is enabling the next wave of medical research at SAHMRI.

schneider-electric.com/lifesciences

Life Is On

Schneider
Electric



Background

Health and medical research generate new ideas and innovations every day. To swiftly transform these developments into positive patient outcomes, the South Australian Health and Medical Research Institute (SAHMRI) set out to build a new research facility that would foster creativity, productivity and innovation, while achieving operational, environmental, and regulatory compliance goals. Together with Schneider Electric Life Sciences solution experts, SAHMRI achieved its vision of a highly intelligent and responsive facility that serves the needs of the institute, its occupants and the community.

The 30,000 square meter, purpose-built medical research facility is already destined for icon status on the Adelaide city skyline because of its striking design. Its diamond-shape silhouette, elevated on 'flower columns', features a pine-cone inspired transparent skin that maximizes natural light, provides shade, and deflects wind. The interior is equally captivating, with its cutting edge laboratories, open floor plans, atria, spiral staircase, café, auditorium, and public spaces.

During the creation of the new facility, SAHMRI's design team was committed to developing a building plan that would create an optimal environment for effective, creative medical research and laboratory-based collaboration, while attracting top talent.

Challenges: Meeting the need for flexibility, security, sustainability, and operational efficiency

The design intent was to create a facility that could respond to new and emerging research challenges, foster innovation and facilitate improvements in research services. This required a purpose-built, iconic facility for health and medical research, with state-of-the-art laboratories and equipment, and an intelligent, responsive, building technology infrastructure.

"We need environments that encourage creativity, the right temperature, right lighting, and right systems to ensure researchers are at their best, most creative and productive," says Professor Steve Wesselingh, executive director, SAHMRI. As part of this commitment, SAHMRI sought an integrated building system that would optimize and streamline building operations. In particular, the SAHMRI team was looking to:

- Create a safe and secure environment with efficient operating systems and incident management to prevent adverse events and safeguard researchers.
- Maximize technology to deliver the right information to the right person or place through a consistent, integrated interface.

Goal

Build a highly intelligent, responsive facility that maximizes operational efficiencies, energy conservation, and security while reducing risk, meeting regulatory compliance, and achieving green building certification.

Solution

Design phase engagement with Schneider Electric's Life Sciences solution experts to create an Integrated Building System based on EcoStruxure architecture.

Results

- Interoperability, scalability, reliability, and flexibility in operation
- Outstanding energy efficiency
- Sustainable, world-class building systems infrastructure
- 50K integrated points
- Up to 30% savings in energy
- Water savings of 40%
- Maximum Ventilation Rate to be exceeded by 50%
- First laboratory building in Australia to achieve LEED® Gold certification

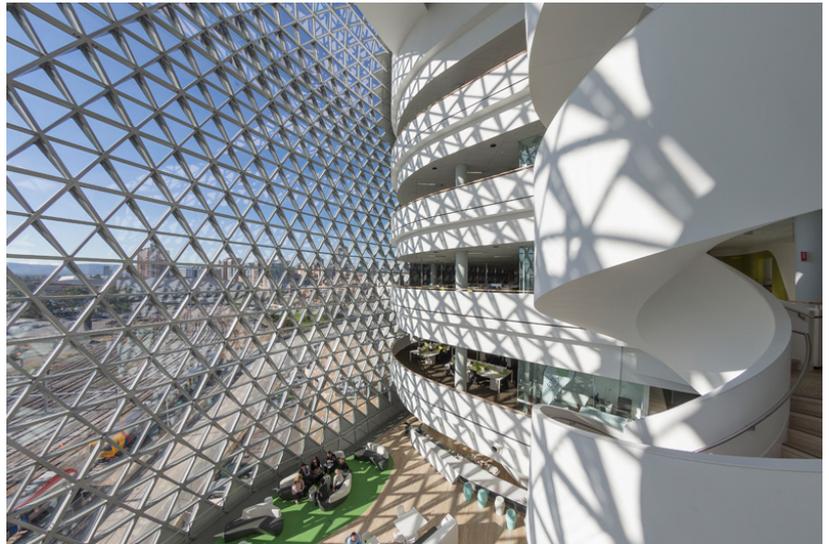
- Build a sustainable facility that provides integrated data to manage operations, continuity of service, and energy efficiency.
- Implement an integrated technology solution that provides efficiency, productivity and sustainability in Life Science processes.
- Use flexible and scalable systems that can adapt to future changes while protecting the initial investment.

With this in mind, the design team consulted with experts who could translate SAHMRI's goals into an optimal electrical, mechanical, and design solution. Following an engaging discussion process, they selected Schneider Electric's engineering teams to help advance the facility's innovative building design and bring the project to life. The Integrated Design Team also included architects Woods Bagot, structural/civil/electrical engineers Aurecon, managing contractor Hindmarsh, sustainable design and green building certification consultants Cundall, and laboratory design specialists Research Facilities Design, among others.

Local representation was also an important prerequisite for SAHMRI; if any technical issues arose, they would need to be resolved quickly, thereby limiting any project delivery delays. Schneider Electric provides a unique combination of local support, global access to world-leading expertise in technology implementation, and extensive experience in healthcare and life sciences. The company was, therefore, ideally suited for this high-profile, integrated design project.

Planning: Design phase engagement critical to project success

Key to the building's success was early engagement with Schneider Electric and the company's EcoStruxure architecture during the design phase. EcoStruxure provides a solid foundation for an Integrated Building System (IBS), bringing together five key domains: power management, process automation, building management, IT management, and security. SAHMRI is the first medical research facility to use the architecture in Australia.



The IBS integrates the most innovative building technologies in heating and cooling, hydraulics, lifts, fire monitoring, electrical monitoring, lighting, security, and lab controls, to maximize building performance, energy efficiency and ongoing cost savings throughout the facility's life cycle. It also provides a safe and secure environment for researchers, visitors and staff improving their experience, satisfaction and operational productivity. This unique system will easily accommodate future technologies and regulatory changes.

SAHMRI's Integrated Building System started as a concept to align the importance of technology and innovation in delivering a flexible and adaptable facility, responsive to the needs of a world-class research environment. The integrated platform has evolved from a design concept into a fully integrated system where all building services communicate and are accessed on a single platform. The IBS design philosophy is to provide a holistic system architecture which will bring together these services, to improve building efficiencies, and play an integral part in extending the life of the building.

Through a collaborative design, construction and delivery process utilizing innovative 3D building information modeling (BIM) software, the IBS is able to provide maximum building systems efficiency. This design approach helps to avoid major design changes and rework, and ensures sustainability and optimization of the facility's post-construction operation.

"We need environments that encourage creativity... to ensure researchers are at their best, most creative and productive."

— Steve Wesselingh,
Executive Director,
SAHMRI

Design & construction

SAHMRI's Integrated Design Team opted for a passive building design, using orientation, shading, facade scheme and thermal mass to maintain optimal light and temperature levels to foster creativity and attract the best researchers to the institute. In addition, the team focused on building a space that would encourage collaboration and interaction among 675 in-house researchers via features such as flexible floor space, nine fully flexible wet and dry laboratory modules, vivariums, a cyclotron, and dedicated space for research infrastructure. Finally, the design plan included ongoing building services, which will ensure that the facility maintains efficiency and is being constantly evaluated and improved throughout its life cycle.

"We wanted to have someone that will continuously work with us after the facility is finished and look for more ideas to improve the energy management capabilities," said Michelle Gheorghiu, director of Capital Infrastructure and Planning, SAHMRI. "We aim to have an intelligent building that will respond to a very intelligent group of users."

Over 50,000 points are integrated with the building services and generates cause-and-effect scenarios that assist lab managers and other occupants with making informed decisions on actions and tasks in their normal operation, ensuring that operational decisions do not have a detrimental impact on other systems.

Along with the IBS, the building was also equipped with:

- An intelligent metering system that provides real-time data on energy and water consumption, enabling facility managers to identify issues proactively and adjust operations to minimize resource consumption.
- An efficient water design, including rainwater harvesting and the reuse of process water from a reverse osmosis plant, eliminating the need to use potable water in cooling towers and toilets.
- Security and access control, which was of extreme importance for the organization. As such, the system is equipped with 24 lock down zones that can be activated by the graphical user interface. The system can also automatically distribute security alerts to laboratory managers via email and SMS.
- Integrated DALI lighting control profiles including lux control, transition times and day/night mode. This is especially relevant for the specific conditions required in the Bioscience area, where lighting control is an integral part of the research process and directly affects outcomes.

50K

Integrated points

Energy efficient environmental control

As a large, multi-use research facility, SAHMRI requires a significant number of pumps, fans and motors to ensure the heating, ventilation and air conditioning (HVAC) system is operating optimally along with to several components and broader systems that consume vast amounts of energy. To achieve the best possible energy and resource use, the SAHMRI design team incorporated Schneider Electric's Altivar variable speed drives, which limit energy usage on startup and allow for the precise control of heating and cooling through the IBS. This technology helped the team achieve further efficiencies while also extending the mechanical life of the equipment.

Integrated security solution

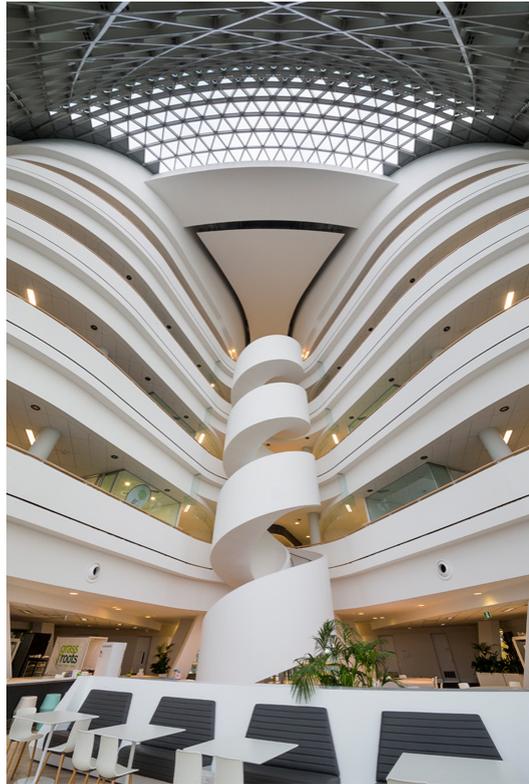
Schneider Electric's integrated security offering, including smart card access control, closed circuit video management, high-definition cameras, and monitoring, provided a very safe, flexible and secure solution, attractive to SAHMRI.

Each smart card can be programmed to allow access to designated areas only for key personnel and prevent entry to restricted areas such as laboratories.

The Video Management System designed for SAHMRI deploys the latest in Pelco by Schneider Electric's high-definition cameras, with increased capabilities for video analytics and identification. More than 55 cameras were installed on site, based on a fully integrated platform incorporating intercom networks.

Intelligent lighting control

Another key part of the EcoStruxure architecture is the Clipsal by Schneider Electric DALIcontrol lighting control system, designed to maximize energy efficiencies in the building. DALI is an open protocol system that ensures compatibility between lighting and control devices. Although there are key scenes programmed into the building, the system also allows for customized programming in research areas that require constant lighting to simulate daylight levels of light. DALIcontrol also includes an emergency lighting solution. Test sequences have been scheduled



into the operation and provide reports to the facility operator to confirm that the evacuation lighting is functioning properly. Clipsal by Schneider Electric has also supplied energy efficient exit light fittings for the entire building.

A reliable emergency power supply

On top of optimizing energy use, the team wanted to ensure the facility had a backup power system for emergencies. They opted to implement Schneider Electric's Emergency Power Supply System (EPSS) Test Solution, which provides automated analysis, energy system reporting, and complete power system information. It tests the backup generator supply, reports on the precise timing of transfer switches, and monitors EPSS load levels and the duration of tests. The EPSS essentially makes manual testing obsolete and collects data during real outages to ensure that the system is healthy and will perform when needed. Most importantly, the EPSS solution promotes safety by reducing the chance of a failure caused by human error or inadequate manual testing procedures.

Power interruptions have the potential to create data loss and hardware damage to all communications and computer

equipment. With 18 communication hubs located throughout the SAHMRI building, the team leveraged uninterruptible power supplies (UPS) to maintain power continuity and protect vital communications equipment such as computers, data centers and telecommunication. Each UPS is networked to the IBS for instant monitoring and status.

Meeting certification standards in the molecular imaging therapy research unit

The Molecular Imaging Therapy and Research Unit (MITRU) within SAHMRI includes a purpose-built radiopharmaceutical manufacturing facility, which must comply with regulatory guidance, such as Therapeutic Goods Administration, Environmental Protection Agency, Good Automated Manufacturing Process, and Good Manufacturing Practice—a key consideration for SAHMRI. To meet these stringent standards, the facility required a dedicated and independently validated Environmental Monitoring System (EMS).

The overall scalability of the Integrated Building System allowed for a dedicated Code of Federal Regulation-compliant EMS system using the same IBS hardware and

network infrastructure to provide extended efficiency and redundancy capabilities. With the EMS, SAHMRI can monitor, alarm, and archive environmental conditions, including temperature, humidity, differential pressures, and particle counts. This enables the organization to provide validation of conditions during the pharmaceutical manufacturing process. In addition, the system provides facility-wide accountability and traceability of environmental and security conditions while also providing cost and system management benefits to SAHMRI.

Implementation: Driving efficiency through integrated technology

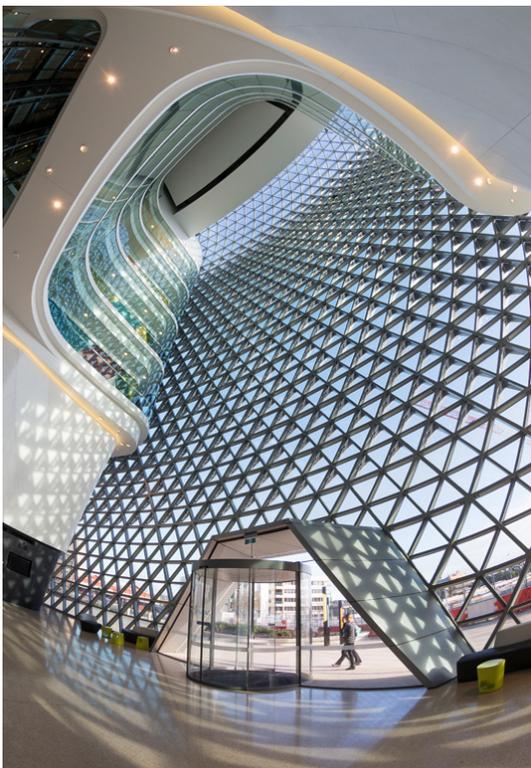
Schneider Electric's intelligent building solution for SAHMRI is based on the success of its Andover Continuum technology. Andover Continuum is an internationally recognized integration and building management platform that allows the facility operator to monitor and control heating, ventilation, air conditioning, humidity, lighting, power, access control, video, lifts, and other security features across the facility.

End users within the building can view and control any of the services via the Magelis Human Machine Interface (HMI) touch screens located throughout the building. The screens employ 3D graphics and provide a simple and effective means of connecting systems, collecting data and presenting information.

Many clients are now asking for more functional energy monitoring and reporting capabilities as part of their electrical distribution network and SAHMRI is no exception. Schneider Electric included their new EcoStruxure Power Monitoring Expert* 7.0 (SPM7) energy management software platform to better integrate SAHMRI's energy metering. To achieve even better Power Quality and reliability outcomes for SAHMRI, Schneider Electric collaborated with electrical contractors, Nilsen, to upgrade the metering hardware to allow for better Power Quality event diagnostics and therefore ensure a shorter 'mean time to repair' should any electrical network issues arise.

Maximum Ventilation Rate (MVR) to be exceeded by

50%



Operational practices: Measure, monitor, improve

EcoStruxure Power Monitoring Expert* allows SAHMRI to monitor the entire installation from the utility grade power quality (PQ) meter on the main incomer, to the PQ meters on the sub sectional feeders; and via low voltage MasterPact air-circuit breakers and Compact NSX molded case circuit breakers fitted with Micrologic control units installed on key sub mains. SAHMRI's project design team, including electrical services consultant Aurecon, ensured that sub-metering was installed strategically in specially designed distribution boards, to separately meter the power and lighting chassis. This makes it easier to identify energy wastage, act on opportunities, improve efficiencies, discriminate energy consumption per level and per pod, and to comply with SAHMRI's energy efficiency expectations.

EcoStruxure Power Monitoring Expert* offers real-time power quality and energy monitoring and can alarm and report by exception using its various out of the box and customizable reports that users can subscribe to.

SPM7 is also able to present a user with an easy to operate energy dashboard display to indicate how a facility is performing against its energy usage and carbon emission targets. By adopting an EcoStruxure approach, the SAHMRI design team could foresee the further operational and maintenance benefits by combining SPM7 with a fit-for-purpose Schneider Electric Medium and Low Voltage electrical distribution system. Schneider Electric partnered with local energy solution integrator, AZZO, to deliver this integrated technological solution to maximize the functionality and efficiency of SAHMRI's electrical distribution network. The key distinguishing factor for Schneider Electric with this type of integrated circuit protection and monitoring system is that no other manufacturer can offer this one package.



Measurable results

Due to the careful strategic planning and integrated, collaborative design process, the project is already realizing environmental, financial, and intellectual capital benefits. Upon completion, SAHMRI is expecting an 18% whole-building energy savings (including equipment plug loads) against ASHRAE 90.1 benchmarks. Additional design targets include potable water savings of 40%, thanks to water efficient fixtures, metering, and continuous monitoring by the IBS, while landscaping potable water savings are expected to reach 100%, due in part to rainwater harvesting and process water reuse. Meanwhile, stringent building and system design parameters, along with tight control from the IBS, have resulted in enhanced indoor air quality, with the Minimum Ventilation Rate (MVR) expected to be exceeded by 50%. This has a positive impact on occupant health, well-being and productivity. In terms of financial impact, SAHMRI is attracting significant grants and donations.

In August 2014, after a visit to the institute, 80-year-old philanthropist and retired business person, David Ronald Gunn, donated close to AU\$2 million to the institute—the largest individual donation made to date. The donation is from the Muriel Gunn Medical Research Trust Fund, which was established in the memory of Mr. Gunn's wife, who died suddenly from brain cancer at age 44. The monies are earmarked for state-of-the-art new equipment for cancer research.

Water savings of

40%

Recognizing that recruitment and retention of the highest caliber talent is a critical success factor, the institute was specifically designed to support this endeavor. Not surprisingly, SAHMRI is successfully filling its key leadership roles with world-class research innovators, including Professor Steve Nicholls, tapped to lead the Heart Disease Theme, who served most recently at the world renowned Cleveland Clinic in the United States; Professor Alex Brown, SAHMRI's Indigenous Health Theme Leader, who has a national and international profile in Indigenous cardiovascular and metabolic disease research and policy development; and Professor Neil Dear, appointed as the inaugural director of Research and Biomedical Services, who joined SAHMRI after five years at the Leeds Institute of Molecular Medicine at the University of Leeds in the United Kingdom, where he was a principle investigator focusing on genetics of disease.

Looking forward

With its completion in late 2013, the SAHMRI facility demonstrates how a holistic approach, based on an integrated building system architecture, is poised to create great operational and energy efficiencies while providing an intelligent building infrastructure for the long term.

Through the building's integrated system, the institute is positioned to continue to optimize its energy spending in the coming years by 15-30%. In addition, SAHMRI is utilizing a centralized system that enables continuous monitoring to improve and sustain optimal operations. Automated fault detection and diagnostics provide actionable intelligence and results based on information—not just data—that can be used for fact-based decision making. Because the IBS is based on open communication protocols, it has inherent flexibility to accommodate future technologies and regulatory changes, allowing for long-term scalability to incorporate new technology or adjust to meet regulations.

Critical keys to project success

- Alignment among key stakeholders around specific goals
- Early engagement in the design process from all members of the Integrated Design Team
- Collaborative design, construction and delivery process
- Integrated commissioning approach (Ingenuity applied & led to success)
- Flexible, scalable, fully integrated building technology systems based on EcoStruxure architecture
- Local and global Life Sciences and Healthcare expertise

Conclusion

Together with Schneider Electric's solutions, technology and expertise, SAHMRI's team was able to translate its objectives and goals into a facility that is a model of sustainable design and business value. SAHMRI is the first project in South Australia and the first laboratory building in Australia to achieve LEED® Gold certification. LEED (Leadership in Energy & Environmental Design), is a green building certification program that recognizes best-in-class building strategies and practices. LEED certification is recognized across the globe as the premier mark of achievement in green building.

SAHMRI is realizing its vision of a highly intelligent and responsive facility that maximizes operational efficiencies, energy conservation and security, while reducing risk and achieving regulatory compliance and green building certification. SAHMRI and the Integrated Design Team have built a facility that provides medical researchers with the capacity to respond to new and emerging life science challenges using design strategies, technology, and building systems tailored to meet those needs.

* Formerly known as StruxureWare Power Monitoring Expert

up to
30%

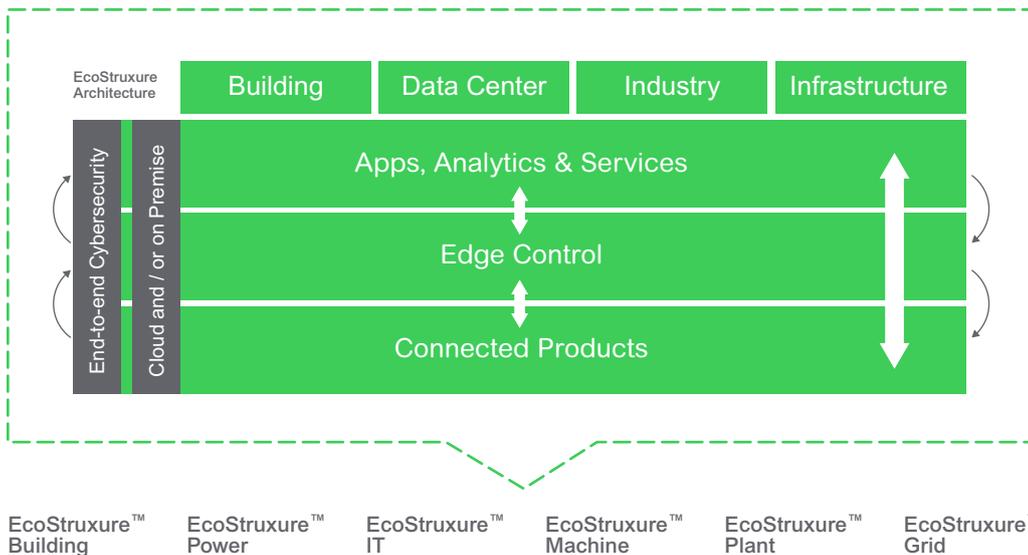
energy savings

EcoStruxure™

Innovation At Every Level

IoT-enabled system architecture and platform that drives operational and energy efficiency

EcoStruxure™ by Schneider Electric is our open, interoperable, IoT-enabled system architecture and platform. EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers. We leverage technologies in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level. This includes Connected Products, Edge Control, and Apps, Analytics & Services, Analytics & Services. EcoStruxure has been deployed in 450,000+ installations, with the support of 9,000 system integrators, connecting over 1 billion devices.



Connected Products

The Internet of Things starts with the best things. Our IoT-enabled best-in-class connected products include breakers, drives, UPSs, relays, sensors, and more. Devices with embedded intelligence drive better decision-making throughout operations.

Edge Control

Mission-critical scenarios can be unpredictable, so control of devices at the edge of the IoT network is a must. This essential capability provides real-time solutions that enable local control at the edge, protecting safety and uptime.

Apps, Analytics & Services

Interoperability is imperative to supporting the diverse hardware and systems in building, data center, industry, and grid environments. EcoStruxure enables a breadth of agnostic Applications, Analytics & Services for seamless enterprise integration.

Find out more about EcoStruxure™

schneider-electric.com/ecostruxure

Learn More



Discover EcoStruxure™



Discover EcoStruxure™ for Healthcare



Discover Efficient & Connected Buildings



Contact us to start your journey



Creating a life-saving environment through the IoT-enabled EcoStruxure™ architecture and platform



A bold vision for efficient care

Schneider Electric

Boston ONE Campus
800 Federal Street
Andover, MA 01810 USA
Phone: + 1 978 794 0800

www.schneider-electric.com

February 2017

©2017 Schneider Electric. All Rights Reserved. Life Is On Schneider Electric is a trademark and the property of Schneider Electric SE, its subsidiaries and affiliated companies. All other trademarks are the property of their respective owners.

19982017

Life Is On

Schneider
Electric