Our country - New Zealand - is the first in the world to see the light each day - that's what inspired our name.

The Victoria University of Wellington team represents New Zealand and is the only entry from the Southern Hemisphere ever to be selected for the U.S. Department of Energy Solar Decathlon. Led by students from the School of Architecture, our team comprises students from various schools at Victoria University and is supervised by university staff and industry partners who donate their time and expertise to the project.

The New Zealand team had the farthest to travel of all the competitors in this year’s Solar Decathlon with a distance of 8750 miles from Wellington, New Zealand’s capital, to Washington D.C.

The First Light house was constructed in early 2011 and opened its doors to the New Zealand public in Wellington during May before being packed up and shipped to the U.S. in July.

Our island nation is known for its sheer natural beauty, outdoor adventure and distinctive scenery and seasons. From fiords and lakes to lush pasture, sweeping beaches and semi-tropical forests, there’s a lot packed into a small place.

New Zealand has a low population density with a population of just over 4 million living in an area similar in size to Colorado.

Victoria University is situated in the country’s capital city, Wellington which is home to government, an abundance of arts and cultural events and a thriving film industry.

The landscape surrounding our bach takes you on a journey through the changing landscapes of New Zealand. Starting at the beach, you travel through coastal shrub lands and bush right up into the mountains.
The First Light house is a net zero energy dwelling; designed to produce at least as much energy as it uses. The house has been designed to maximize energy drawn from the natural climate using a combination of passive and active energy strategies. The result is an efficient and comfort-controlled house that consumes less than a third of the energy of a typical U.S. home.

**PHOTOVOLTAIC PANELS**

The First Light house has a 6.3 kilowatt solar array with 28 polycrystalline photovoltaic panels that convert energy from the sun into electricity to be used in the house. Each panel consists of a group of silicon wafers that are connected electrically and packaged into a frame. The panels generate electrical power by converting solar radiation into direct current electricity. The system generates enough power to run the house throughout the year by collecting extra power during the summer months to be used during times of the year when sunshine hours are reduced. The owner of this net zero home should never need to pay another power bill.

**HOT WATER**

Hot water accounts for one third of residential energy use in the U.S. The First Light house has 45 evacuated tube solar collectors that use energy from the sun to heat water for all of the house’s hot water needs. An innovative drying cupboard using very little energy was developed for the house. It uses energy stored in the hot water to dry clothes as quickly as a traditional dryer. Hot water is pumped through a heat exchanger which then heats the air inside the cupboard. Hot and hot water filled rails work to dry the clothes quickly while a fan extracts humid air from the cupboard.

**HEATING AND COOLING**

A comfortable interior environment is maintained using an energy-efficient heat pump. Heat is pulled from the air on cold days or from the ground on hot days to provide cool air in summer. This heat pump is capable of transferring up to four kilowatts of heat into the space while consuming only one kilowatt of electrical energy.

**VENTILATION**

Along with fully opening windows, a highly efficient energy recovery system provides ventilation for the house. Energy from the air in the house is used to preheat or pre-cool filtered fresh air coming into the house while leaving the temperature and humidity in the house relatively stable.

**DESIGN FEATURES**

The design of the First Light house is oriented towards the outdoors. Decking runs around the house and right through its centre, allowing occupants to effectively live outside during summer and bring a sense of the outdoors inside all year round.

The central section of the house is surrounded by glass and functions as a bridge between the natural environment and the indoors. This is at the heart of the design—reflecting a Kiwi lifestyle where the outdoors, socializing and entertaining are central to living.

**ENVIRONMENTALLY SUSTAINABLE DESIGN PRINCIPLES**

The First Light house has been designed using environmentally sustainable design principles. Where possible we have:

- made use of materials that use recycled content and/ or can be recycled
- selected materials that have certification with environmental agencies
- used locally sourced, low cost, low energy materials.

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The connection to the land was central to the design of the First Light house and the materials used reflect this. Key construction materials used within the house are natural, enduring and classic.

**WOOD**
- Wood is a widely used building material in New Zealand due to its resilience, relative low cost and ease of construction. The First Light house uses a combination of woods that lend a feeling of warmth to the house.

**CONCRETE**
- Concrete is a new form of flexible concrete resistant to exposure to the elements through their stunted size, erratic flowering and elaborate food storage systems.

**WOOL**
- Wool is a natural, enduring and classic material which support the canopy and for the whitewashed tongue and groove wall linings.

**GLAZING**
- Large areas of triple glazing provide natural light throughout the house while maintaining the thermal integrity of the house. Large windows face the sun along the front of the house, letting the sun and warmth in.

**CONSERVATION**
- The First Light house has been designed to create multi-functional spaces while keeping practical concerns, such as storage, in mind. Space has been used sensibly to minimize the overall size of the house. The house - perfect for a couple - can be modified quickly and easily to accommodate friends and family.

**JOURNEY THROUGH OUR LANDSCAPE**
- Alpine zone - The landscaping takes you right up to the mountains with planting inspired by the alpine Alpine zone – the spine that stretches down the length of the South Island and around the central Alpine zone.

**KITCHEN/DINING**
- The kitchen and dining areas can entertain both small and large groups. Large bi-fold doors open to extend the living space to the outdoors, providing for a continuous flow between the internal and external areas. The table comfortably seats eight and can be extended to create extra seating and entertaining space with a movable bench unit.

**LIVING**
- The living area has been designed to be a comfortable and social space. A custom-built furniture unit can be used as a seating area with ample storage or be transformed to accommodate up to four overnight guests.

**STUDY**
- A self-contained study unit creates a partial partition between the bedroom and living areas, creating visual privacy while keeping the open feel of the house. The unit offers storage on both sides and it can be transformed from a relaxing reading nook to a fully functional work space.

**FURNITURE**
- Compact and energy efficient appliances have been chosen to maximize space and minimize energy use. Materials throughout the interior of the house were chosen for their durability and ease of maintenance. Concrete, wood and stainless steel materials were chosen as they are hardy, attractive and easy to clean.

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