



sustainability base

Welcome to NASA's latest mission on Earth.

Imagine working in a building designed in harmony with its environment. A building where you can work by natural daylight and breathe fresh air; one designed and constructed to LEED Platinum standards and decorated with materials that are beneficial to your health. And one so smart and intuitive it knows exactly how much energy you're using – and adapts itself based on weather, season and work patterns.



NASA's Sustainability Base is unlike any other government building ever created. Using NASA innovations originally engineered for space travel and exploration, the 50,000 square-foot, lunar-shaped Sustainability Base is simultaneously a working office space, a showcase for NASA technology and an evolving exemplar for the future of buildings.

"This tiny planet we share is our only home."

—NASA Ames Center Director
Pete Worden



Awards

Although still under construction, Sustainability Base is already winning awards for its innovative and sustainable design:

Silicon Valley Structures Awards

2010 Green Project of the Year, Public

GSA Achievement Award for Real Property Innovation

2010 Award in the category of Green Innovation

Space-Age Technology

Sustainability Base builds on NASA's decades of experience designing for closed-loop systems in space – it is truly a green building done as only NASA can.

The building will serve as a showcase and living test bed for technologies from NASA and its research partners. Initially, research will be concentrated in two areas of the building – an intelligent building control system and a forward-osmosis water recovery system.

The intelligent control system will gather information from sensors

throughout the building and learn to optimize the internal environment of the building based on weather, air-flow patterns and room occupancy schedules. Over time, the system will learn from the building's actual performance and adapt to become more effective.

NASA's forward-osmosis water treatment system is a significant factor in reducing water consumption at Sustainability Base. Designed by NASA scientists for use on the International Space Station, this system cleans greywater and then recycles it in the

building to flush toilets and urinals. Sustainability Base offers a real-world environment in which to test, experiment with and improve this system – research that would be prohibitively expensive to conduct in space.

Sustainability Base will also feature products that had their start at NASA, such as the Energy Server solid oxide fuel cell from Bloom Energy and photovoltaic panels from SunPower, as well as products from NASA partners, such as the IBIS interface system from Integrated Building Solutions.

All the building's power will be generated on-site – from photovoltaic panels, a fuel cell and a small wind turbine. Heating and cooling will come from 99 geothermal wells with ground-source heat pumps.

Off-Site Renewable Power

Make-up Remaining Building Energy Needs



Photosynthetic Roof

On-site Renewable Energy Generation



Building Controls + Monitoring

Smart Building Adaptive Learning Systems
Building Sensors + Visualization



Intelligent Materials

Material Assessment



Connection to Exterior

Optimized Daylight + Views,
Natural Ventilation



Photosynthetic Envelope

Vegetative Screen



High Performance Building Envelope

External Shading

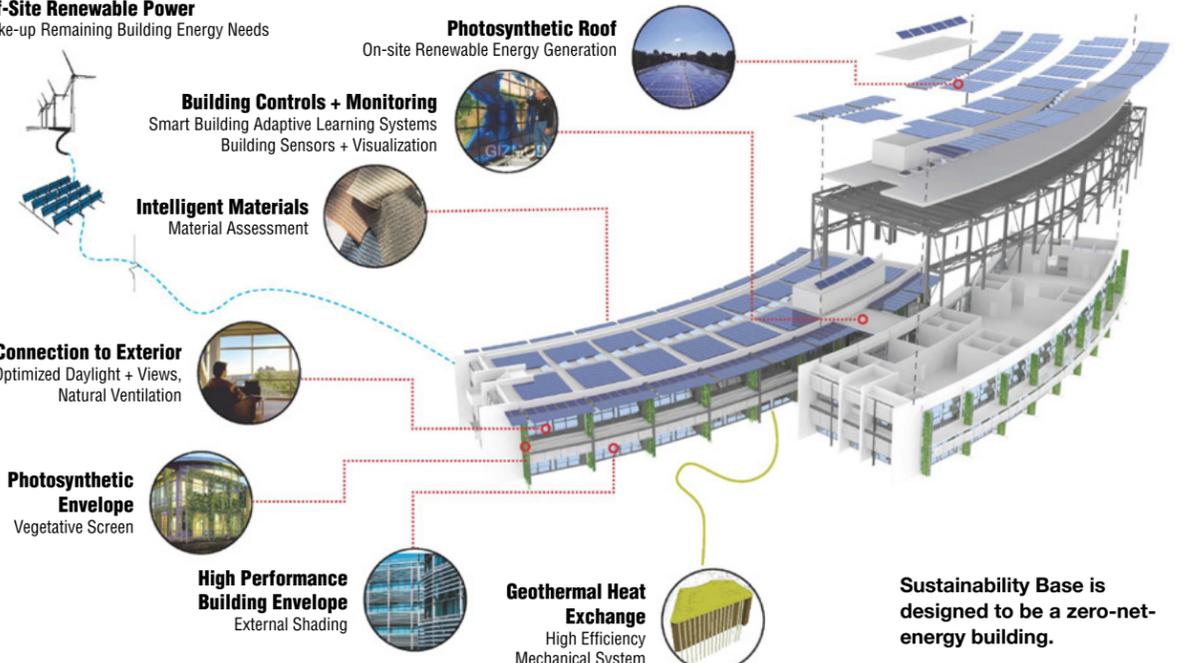


Geothermal Heat Exchange

High Efficiency
Mechanical System



Sustainability Base is designed to be a zero-net-energy building.





The building is oriented to maximize daylight and fresh air flow.

A Building That Gives Back

Sustainability Base is one of the greenest Federal buildings ever constructed. Designed by renowned architects and sustainability pioneers William McDonough + Partners, the building is intended to go beyond 'not hurting' the environment to actually being beneficial to nature and humans. Through a combination of innovative design and leading-edge technology, Sustainability Base will generate all the power it needs to operate and use 90 percent less potable water than a traditional building of comparable size.

The building and landscape were designed 'native to place,' which means they capitalize on the natural resources of its Northern California location and blend seamlessly with their contextual environment and culture. The building's orientation takes advantage of both the sun's arc across Moffett Field and the prevailing Bay Area winds. This allows fresh air to flow and means that for all but approximately 40 days of the year, no artificial lighting will be necessary.

A Healthy Workplace

People are happier and more productive when their environment includes abundant connections to the natural world. This concept, biophilia, is one of the core principles around which Sustainability Base was designed. The building and site are designed not only for planetary well-being, but also for individuals' physical and emotional health.

From providing occupants with daylight and fresh air to outdoor workspaces and abundant connections to nature, Sustainability Base is intended as a nurturing and supportive work environment.

For More Information

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From the Moon to the Earth

Sustainability Base is named in honor of Tranquility Base, the name Apollo 11 astronaut Neil Armstrong gave to the site of the first Moon landing.

Just as the lunar landing on Tranquility Base represented a giant leap during the space race, so Sustainability Base will stand as an icon symbolizing NASA's dedication to solving the environmental challenges we face on Earth.

A lunar outpost is optimized for the unique environment of the Moon, and it is designed to be self-sufficient; by the same token, Sustainability Base is tailored to its unique location on Earth – and designed to be self-sufficient with respect to consumption of Earth's resources.

Construction began on Sustainability Base in 2009, during the 40th anniversary celebration of the Moon landing.

The building is scheduled to open in the Spring of 2011.

“NASA is committed to advancing technologies and innovation that will bring solutions to address Earth's critical challenges.”

—Olga Dominguez, Assistant Administrator for Infrastructure, NASA HQ

ARCHITECT RENDERINGS: William McDonough + Partners
COVER COLLAGE: C. Triano
NASA PHOTO: Eric James

