Sustainability Base is a powerhouse, using its location and climate optimally and harnessing its resources and demands ambitiously.

Energy Dieting

Sustainability Base has been designed to take advantage of the climate in Santa Clara Valley, on the edge of San Francisco Bay. The primary heating and cooling systems take advantage of the prevailing deep ground temperature of 58°F (14.4°C). These "native-to-place" solutions combine with on-site electricity generation for the comfort and productivity of the building's residents.

Earth's first installation of the second generation Energy Server (ES-5700), or BloomBox®, from Bloom Energy can more than provide for the facility's electricity demand. This solid oxide fuel cell produces about 200kW of electrical power by chemical reaction with steam and air, rather than combustion, reducing CO^2 green house gas emissions by 40%. The fuel cell's efficiency is estimated at 55%, roughly twice that of a conventional gas-fired power plant. With its small size and low profile, this dynamo is surprisingly unnoticeable—close by there is only a low hum. This pilot installation is constantly monitored by NASA Ames and Bloom Energy to analyze and optimize operations.

Sustainability Base also harnesses the sun, with 432 SunPower® E-19 photovoltaic panels distributed across the building's roof. These arrays have 19% efficiency in converting incident photons to harvested electrons, among the highest conversion efficiencies commercially available. At peak output, the arrays will produce 87kW. This may be at or above Sustainability Base's peak demand. Over the course of a year, PV-generation can account for approximately 30% of the building's electricity needs. Both the solar and fuel cell power generation are measured and their contribution of excess energy to the electricity grid is a net benefit to NASA Ames.

Also located up on the white polyvinylchloride (PVC) 'cool roof' is another solar collection assembly, this time solar thermal. The Sun heats water for sinks and showers, further reducing the building's need for electricity or natural gas. Sustainability Base is a powerhouse, using its location and climate optimally and harnessing its resources and demands ambitiously.

sustainability base