FLEXLAB® IN ACTION

FLEXLAB helps Genentech build state-of-the-art building with 55% energy savings while maximizing comfort

THE CHALLENGE

How to integrate and optimize technology to achieve maximum energy savings and comfort.

The biotech company Genentech had ambitious energy-efficiency and employee-comfort goals for its new 255,000-square-foot building in South San Francisco. But how could the company make sure the building would perform as intended?

THE SOLUTION

The newly operational U.S. Department of Energy's FLEXLAB® facility at Lawrence Berkeley National Laboratory (Berkeley Lab) provided a world-class facility for testing and optimizing integrated building systems under real-world conditions and maintaining the high performance of the building once it is occupied. FLEXLAB takes the guesswork out of creating a comfortable work environment in an energy-efficient building and provides other benefits, as well.

THE EXPERIMENT

- Webcor Builders constructed and equipped a section of Genentech's new building on FLEXLAB's rotating test bed, including furniture, façade systems, flooring, lighting and ceiling systems.

- With decisions on lighting and shading systems to be made, Berkeley Lab researchers ran comparison tests in FLEXLAB on different options, rotating the test bed each week to test solutions for three different building orientations.

- Each series of tests examined outside fixed shades, internal automated shades and dimmable lighting systems to test how sunlight from different solar orientations would affect interior daylight, room temperature, visual comfort and energy use.

- An array of high-accuracy sensors continuously captured quantitative performance data as well as high-dynamic-range photographs from which occupant visual comfort was assessed.

- Initial design solutions were refined in three successive stages over a four-month period. Between tests, FLEXLAB researchers analyzed the data, and suggested refinements to the systems for the next test series.

- The Genentech design staff spent several days "working" in the FLEXLAB test bed to confirm first-hand the final technology selections and design solutions.

- Once Genentech decided which lighting and shading systems it wanted to use, operations, maintenance and commissioning staff took them for a test drive in FLEXLAB before final installation in the building.

> " FLEXLAB® represents a handshake between science and architecture. "

Andrew Keller, Genentech
Senior Principal Site Planner
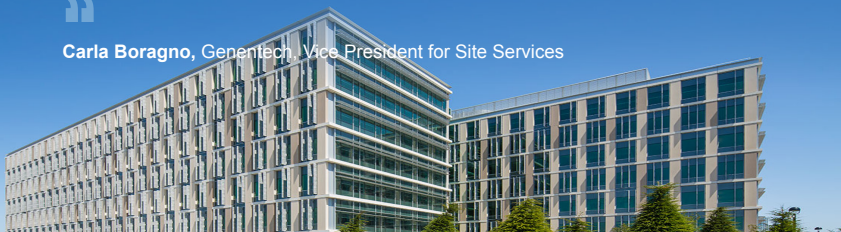
THE RESULTS

- Webcor tested technology systems at FLEXLAB® months in advance of installation, which provided for a **higher-quality installation**.

- Genentech was able to **maximize effective use of floor space**, since FLEXLAB testing showed how Genentech could set shading and HVAC controls to ensure both visual comfort (e.g. limited glare) and comfortable temperatures even if workstations are placed within a few feet of the windows.

- Genentech learned **how best to position workstations** near window systems to minimize glare. Since the building is designed for flexibility, with no permanently assigned desks, everyone needs to be comfortable no matter where they sit, so making sure all workstations are employee friendly is especially important.

- Using the results of FLEXLAB testing and the identified refined operational system settings, Webcore committed to commissioning and fine-tuning the building within a month, as opposed to traditional commissioning which takes several months. This allowed Webcore to **verify performance of lighting, HVAC and energy-saving technologies** against FLEXLAB data, and correct course where necessary.

- The FLEXLAB tests helped Genentech select shade fabric that provides the most transparency and fine tune the automated **shading** control systems to minimize glare, so employees can sit close to windows, be comfortable and enjoy magnificent views.

- FLEXLAB testing revealed that setting controls to keep shades open for six inches at the bottom would unlock substantial lighting-system **energy savings**.

- FLEXLAB didn't get involved in the Genentech project until most of the building decisions had already been made, and yet FLEXLAB provided **great value** even at this late design stage. Bringing the FLEXLAB team on board earlier in the building planning process would unlock even greater energy savings, by elevating additional facade and HVAC strategies.

> " At Genentech, we're constantly innovating and following the science. So we formed a partnership with **FLEXLAB®** at Berkeley Lab to take that same approach of innovation and following the science, and we applied it to energy efficiency and building optimization.
>
> **Carla Boragno,** Genentech, Vice President for Site Services

> " FLEXLAB® allows architects, builders, owners and others to take a whole-building approach and uncover new ways to design buildings and integrate systems for maximum performance.
>
> **Cindy Regnier,** Berkeley Lab, Executive Director, FLEXLAB®

THE BOTTOM LINE

Together the Genentech design team and Berkeley Lab researchers used FLEXLAB to prove the performance of an ambitious design to deliver a state-of- the-art building that sets a new bar for energy efficiency and comfort.

- Genentech estimates that this new building will be approximately 30 percent more efficient, based in part on the data collected with the FLEXLAB experiment.

- The FLEXLAB experiment showed Genentech how to reduce energy use for lighting by 60 percent in open-plan office areas.

- That's energy savings of 60 percent on a baseline that already included daylight dimming.

- These additional savings were achieved by aggressively tuning the lighting controls beyond the default daylight-dimming baseline commissioned by the lighting-control vendor.

- The energy saved – documented in April/May as an absolute savings of 106 kWh per day – extrapolates to a savings of roughly $4,145 per year from this one lighting-control measure alone (assuming 15¢ per kWh).

- With an estimated payback time frame of three to five years, and continued energy savings after that, FLEXLAB testing made good business sense for Genentech.

- Genentech knows a comfortable workspace enables its employees to do their best work.

flexlab.lbl.gov
flexlab.lbl.gov/publications/april-burn-testing-report-genentech

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