

CASE STUDY

Adaptive Reuse Effectively Cuts Cost and Carbon

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The renovation of Kincaid Hall at the University of Washington (UW) was a comprehensive modernization project that transitioned the aging facility into a high-performance center for the Department of Psychology. Originally constructed in 1971, the renovation focused on replacing outdated infrastructure that had remained largely unchanged for decades.

Led by [Skanska](#), a global project development and construction company, and architecture firm [Perkins & Will](#), the project involved a complete interior rehabilitation that largely preserved the exterior shell. Major upgrades included seismic design improvements, a new roof, and upgrades to the outdated HVAC, plumbing, and electrical systems. The interior layout was entirely reimaged across five floors and basement to include modern research clinics, specialized labs, administrative offices, and conference rooms. The project demonstrates how adaptive reuse can align cost savings with substantial embodied and operational carbon reductions.

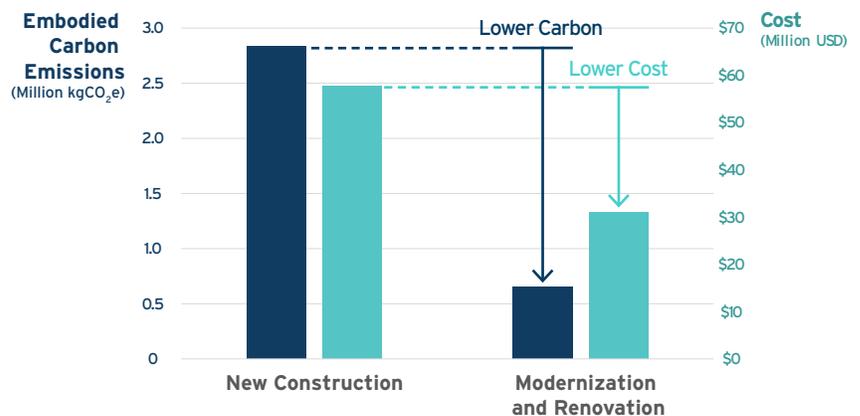


The Challenge: UW faced a common institutional decision: renovate and extend the life of an aging facility or demolish and construct a new building. The existing building had outdated systems and infrastructure that had remained largely unchanged for decades. However, its structural frame and facade remained serviceable. The question was whether reuse could deliver comparable performance at lower cost and carbon impact.

The Approach: Sustainability was prioritized in both the project's embodied and operational carbon investments. Operational carbon was reduced through the installation of energy efficient building systems, which helped the project achieve LEED Gold certification. The embodied carbon emissions savings compared to building new are substantial, as the team extended the building's life by at least 40 years by gutting and renovating its spaces to modern standards. Notably, the overall project budget was 46% smaller than the cost of new construction for a similar building.

To help UW evaluate the potential energy and cost savings opportunities, Skanska compared the costs and emissions across the two core scenarios: (1) renovation and adaptive reuse of the Kincaid building and (2) demolition of the Kincaid building and construction of a modern facility. The results of this comparison showed substantial cost and carbon emissions savings for the renovation scenario.

Exhibit 1: New Construction vs. Renovation Comparison



Note: This simplified embodied carbon analysis only includes steel, concrete, aluminum, drywall, ceiling tiles, glazing, and insulation. If additional categories, such as plumbing, HVAC, and electrical systems, were incorporated, the embodied carbon savings would be even greater.



Case Study: Adaptive Reuse (cont.)

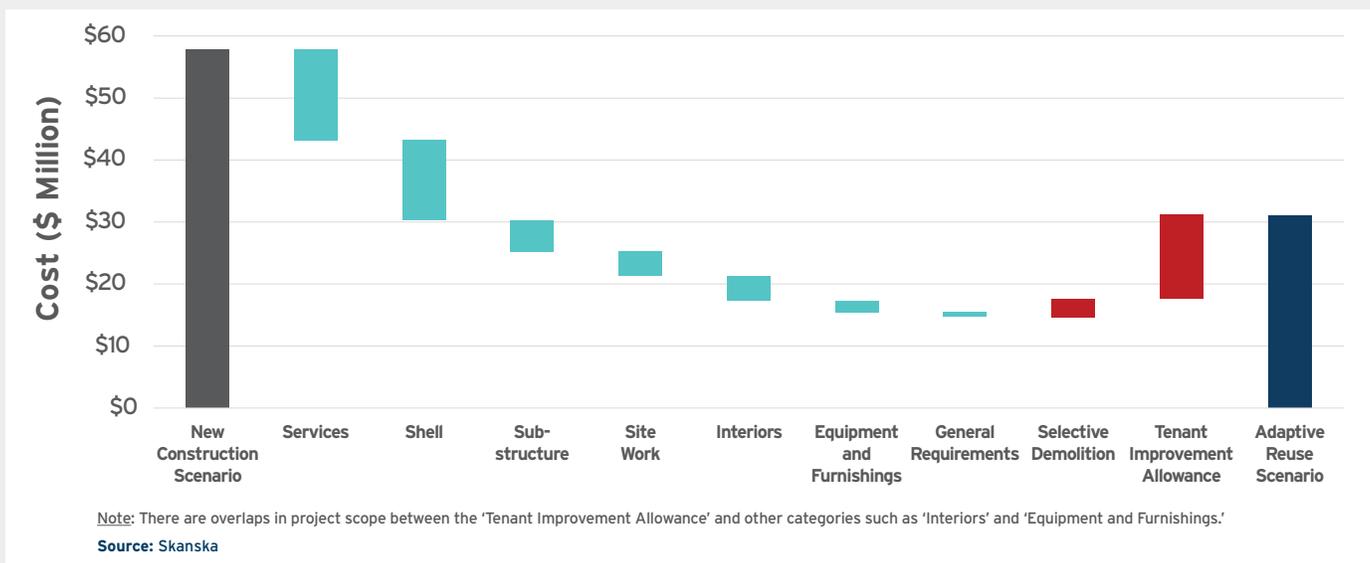
The estimated cost savings from renovating Kincaid Hall instead of constructing a new university building (in 2025 dollars) is approximately \$26.7 million. As shown in Exhibit 2, the largest savings came from building services – HVAC, electrical, fire protection, and plumbing systems – which collectively accounted for \$14.6 million in avoided costs. The plumbing system was completely reused, while portions of the HVAC and electrical systems were reused, resulting in a 46% cost savings for HVAC and 65% savings for electrical systems.

The second-largest contributor to savings was the building’s shell, including its structure and brick façade, which were 100% reused. Additional cost and carbon savings were from the substructure, avoided site work, and several commonly overlooked building elements such as elevators, stairs, and common furnishings like

casework. There were also notable cost savings because the existing roof was serviceable and only required patching. While renovation generated substantial savings overall, two categories had higher costs in the renovation scenario: selective demolition and tenant improvements (TI) allowances.

The selective demolition, totaling about \$2.9 million, accounted for decommissioning, demolition, and abatement in lab spaces that were repurposed as part of the process. The TI allowances, about \$13.5 million, were added to account for tenant space buildout and improvements, such as the purchase of new office equipment. Together, these costs represented about half of the total renovation project budget. However, the total construction cost savings from adaptive reuse substantially outweigh these additional costs, demonstrating greater economic value in circular construction practices.

Exhibit 2: Cost Differences Between New Construction and Adaptive Reuse



The most substantial cost and carbon savings in the renovation of the Kincaid building came from preserving structural concrete and steel – materials that typically have the highest cost and A1-A3 embodied carbon emissions in buildings. The renovation scenario showed **96% savings in A1-A3 embodied carbon emissions for concrete and 83% savings for steel**. Avoiding the replacement of foundations, basements, and superstructures had a large impact on carbon emissions and cost reductions. This analysis accounted for demolition emissions but not demolition costs in the new construction scenario, which would have further strengthened the economic case for adaptive reuse.

Outcome: Overall, Skanska estimates that the renovation of Kincaid Hall avoided approximately 2,179 MT CO₂e in cradle-to-gate emissions – a 77% reduction compared to new construction. Through adaptive reuse, the construction team also avoided structural demolition, associated dust control, and substantive waste hauling, saving an estimated 74 MT CO₂e and 240,000 gallons of water, roughly equivalent to the annual indoor water use of 2-3 average US households.

The alignment between carbon reduction and cost savings in adaptive reuse is inherent. By preserving the primary structure and shell, it eliminates the most resource-heavy phases of development. When reuse is done right, it highlights a powerful synergy: modern, high-comfort environments built within a legacy footprint, proving that the most sustainable building is often the one that already exists.

ADDITIONAL RESOURCES

[Carbon Avoided Retrofit Estimator Tool \(Architecture 2030\)](#)

[Structural Circular Economy Case Studies \(SEI\)](#)

[Embodied Carbon Reductions Built Project Case Study Collection \(CLF\)](#)