



# SOUTH LANDING

Our Zero-Energy, Zero-Carbon Future



South Landing is a transformative new development spurring the construction industry to eradicate waste and address climate change. The project is an audacious statement to prove zero-energy and zero-carbon buildings are possible in any market at zero cost premium.





## A Bold Vision for Change

South Landing began with a bold vision. Avista Chairman Scott Morris saw an opportunity to turn five acres of under-developed land into the five smartest blocks in the world, creating a model for the rest of the world to follow. His vision quickly captured the imagination of McKinstry CEO Dean Allen. Together, the two companies charted a path to forever change how buildings are designed, constructed and operated.

### A BUILT ENVIRONMENT OUT OF BALANCE

Buildings cost too much to design, build, operate and maintain. Needless inefficiency is the biggest issue, and that issue is growing.

The U.S. is home to more than 5 million commercial buildings and 88 billion square feet of physical space. Those buildings consume 40 percent of all energy produced in the U.S. and generate 40 percent of our carbon emissions. That footprint is unacceptable considering that half of all building energy is wasted, or close to 20 quadrillion Btus each year.

Inefficiency is also impacting our ability to meet skyrocketing demand

for more buildings, more physical space and more energy. Half of all construction costs are wasted due to lagging productivity within the construction industry. Construction productivity has remained stagnant for more than 60 years while every other major industry has made tremendous strides. Because of this, it takes the same amount of money (adjusted for inflation) and time to construct a building in 2019 as it did in 1959.

South Landing is a call to action to accelerate real change within our industry and our built environment.

**5 million**  
Commercial buildings

**88 billion**  
Square feet of space

**40%**  
of all energy consumed

**40%**  
of all carbon emissions



## Reinventing Buildings to Restore Balance

Everything about South Landing challenges the construction industry to think differently and take real action to accelerate innovation and eradicate waste.

The Catalyst building and the Scott Morris Center for Energy Innovation, formerly known as the Hub facility, are the first two buildings under construction as part of the South Landing development. When complete, Catalyst and the Morris Center will demonstrate how buildings can eradicate waste and operate in harmony with the grid.

### Morris Center

- Four floors/40,000 square feet
- South Landing shared-energy eco district
- All-electric central energy plant
- Thermal and electrical storage
- Full-service restaurant

Developer: **McKinstry**  
General contractor: **Bouten Construction**  
MEP contractor: **McKinstry**  
Engineering: **McKinstry & Avista**  
Architect: **Bernardo Wills Architects**



### Catalyst Building

- Five floors/159,000 square feet
- Cross-laminated timber construction
- Targeted zero-energy certification
- Targeted zero-carbon certification

Developer: **McKinstry**  
General contractor: **Katerra**  
MEP contractor: **McKinstry**  
Engineering: **McKinstry & Avista**  
Architect: **Michael Green Architects**  
Lead tenant: **Eastern Washington University**  
Certifying body: **International Living Future Institute**

Utilities and building designers must partner to transform buildings into valuable assets that serve the grid.

Leases and behavior change programs should engage tenants and occupants to meet energy benchmarks.

Typical silos prevent utilities from working with building owners, construction companies and tenants.

IoT sensors can pull utilities beyond the meter to balance on-site energy demand and generation with overarching grid operations.



## UNIFYING THE ENERGY VALUE CHAIN

The current energy value chain is fragmented and broken. Limited visibility isolates utilities from building owners and operators from tenants. Avista and other utilities struggle to see beyond the meter and work with building owners to balance grid energy supply with building energy demand. Lease agreements limit tenant engagement, leaving efficiency and demand management efforts ineffective.

The fragmented energy value chain is a major problem that threatens utility grid stability. Tenants are demanding on-site renewable energy systems, urging building owners to install solar photovoltaics (PV) and other renewable energy systems that push energy generation to the grid's edge. This distribution makes it extremely difficult for utilities to forecast and manage energy generation. It also compromises utility investments in grid maintenance and modernization.

South Landing elevates buildings from blind energy consumers into valuable assets that serve the grid. The central

energy plant within the Morris Center transforms the development into a shared-energy eco district. McKinstry engineers performed more than 40,000 energy models to design the eco district and deliver grid-optimal operations across South Landing. That may seem like an excessive amount of engineering work, but investing time and resources up front is critical when challenging the status quo to ensure systems perform as needed when installed.

Thousands of IoT sensors backed by machine learning algorithms pull Avista beyond the meter, providing the visibility needed to balance on-site energy generation and demand with overarching grid operations. If the grid needs more supply, energy consumption within Catalyst will decrease, freeing up any renewable energy generation and stored electrical and thermal energy supply within South Landing. If the grid can't absorb more supply, excess energy from the grid will be moved to the on-site electrical and thermal storage systems.

## Leases will ensure Catalyst meets its targeted zero-energy operations.

Instead of providing energy by the kilowatt hour (kWh), service-level agreements will stipulate temperature and plug load ranges. Behavior change efforts like McKinstry's powerED program will engage tenants to manage plug load variations and meet pre-set energy consumption benchmarks. The result, along with extensive engineering and energy modeling, ensures Catalyst reaches an energy use intensity (EUI) in the low-20s compared to the mid-40s expected with similar building types. EUI is the energy use in kBtus per square foot of the building.



## Zero Energy and Zero Carbon at Zero Premium

McKinstry set ambitious goals for South Landing. The Catalyst building is pursuing both zero-energy and zero-carbon certifications administered by the International Living Future Institute (ILFI). These certifications establish the most rigorous performance standards currently available.

### ZERO-ENERGY OPERATIONS

Zero-energy certification is recognized worldwide as one of the highest aspirations in building performance. The rigorous international standard certifies that the building generates enough renewable energy to meet net annual energy demand. Certification is based on actual, not modeled, performance. Documentation is required followed by an independent third-party audit.

Every Catalyst engineering and design decision focused on exceeding zero-energy operating and certification requirements. For example, the building is oriented east-to-west to

minimize uncontrolled afternoon glare and overheating. Shielding the building from direct sunlight makes it easier to control temperatures and minimizes cooling needs. The ceiling height is 13.5 feet with floor-to-ceiling windows to enhance daylighting strategies. When lighting is needed, LEDs that require lower-than-code power are used and controlled with occupancy sensors.

The Catalyst building envelope is tested at very low air leakage, reaching the Passive House Institute United States standard. Insulation ratings are also well beyond industry standard, ranging from R-35 to R-71.

Triple-paned exterior windows are used throughout the building.

Mechanical heating and cooling are designed to an aggregate coefficient of performance of 5.5. The system combines air source heat pumps, chillers, heat recovery, thermal storage and peaking cold temperature boilers. Catalyst uses a combination of active chilled beams and four-pipe units. A dedicated outdoor air system (DOAS) includes a highly efficient heat recovery ventilator (HRV). The building also includes an HRV bypass to allow direct outdoor air and a night flush algorithm to take advantage of optimal diurnal temperature swings.



Catalyst will have a substantial rooftop solar PV array. The building will generate approximately 300,000 kWh/year. The remaining renewable energy needs will be provided via rooftop solar on top of the neighboring Morris Center and additional off-site solar PV arrays using McKinstry's renewable energy grant programs, which install renewable energy on partner properties while providing the energy attributes for Catalyst.



**ILFI zero-carbon certification is the first international third-party standard. The certification involves several requirements, including:**

- 100 percent of embodied carbon emissions associated with construction and materials must be calculated, disclosed and offset based on a standard 50-year lifespan.
- New projects must demonstrate a 10 percent reduction in the embodied carbon of the primary materials of the foundation, structure and enclosure compared to an equivalent baseline. Total embodied emissions of the project are also capped.
- 100 percent of operational energy use must be offset by renewable energy on a net annual basis. New projects may not utilize on-site combustion as an energy source.
- Projects must demonstrate actual net-zero carbon operations based on a 12-month performance period, during which time the project must be occupied consistently with its stated use.
- During the 12-month performance period, projects must perform at an established efficiency target. Office and institutional buildings in Spokane must not exceed an EUI of 28.
- Detailed documentation is required along with a third-party audit prior to certification.



## **ZERO-CARBON CONSTRUCTION AND OPERATIONS**

Catalyst will be the largest zero-energy building ever certified by ILFI and one of the first to receive both zero-energy and zero-carbon certification. Through these ILFI certifications, McKinstry will not only validate that zero-energy and zero-carbon buildings are possible, but that they can be delivered and operated in any market at zero cost premium.



# 4,000

cubic meters of CLT

# 3,713

metric tons of carbon stored

# 1,437

metric tons of carbon avoided

# 11

minutes to regrow



## CLT CHANGES THE SUSTAINABILITY CONVERSATION

Catalyst is being constructed using cross-laminated timber (CLT) panels locally manufactured by Katerra. Using timber as structural building material offers large-scale, long-term carbon sequestration. The more than 4,000 cubic meters of CLT within Catalyst is enough to store the equivalent of 3,713 metric tons of carbon dioxide. It also eliminates enough steel and concrete to avoid 1,437 metric tons of carbon. That roughly 5,000 metric tons of carbon equates to 1,100 cars off the road for a year.

Cross-laminated timber does not rely on old-growth timber. U.S. and Canadian forests can grow that 4,000 cubic meters of CLT in just 11 minutes.

The CLT used within Catalyst makes ILFI zero-carbon certification possible and delivers benefits beyond sustainability. The modular panels generate less waste by optimizing cut lists to ensure no part of the panel is wasted. Just as important, CLT improves the construction industry's productivity problem. Each modular panel is manufactured and prepared in a controlled factory. Once delivered, each panel can be installed quickly with all fittings in place and ready for mechanical and other trades.

Catalyst is not a prototype or proof of concept. The building is a replicable product. Similar Catalyst projects can be rolled out across the country with similar energy performance and cost savings.



Cross-laminated timber helps Catalyst achieve a high-performing building envelope reaching the Passive House Institute United States standard.

## LEAN CONSTRUCTION ERADICATES WASTE

South Landing will deliver the smartest and most efficient energy systems ever seen. That's not enough. Catalyst and the Morris Center embrace lean manufacturing and supply chain practices to deliver zero energy and zero carbon at code-minimum market costs.

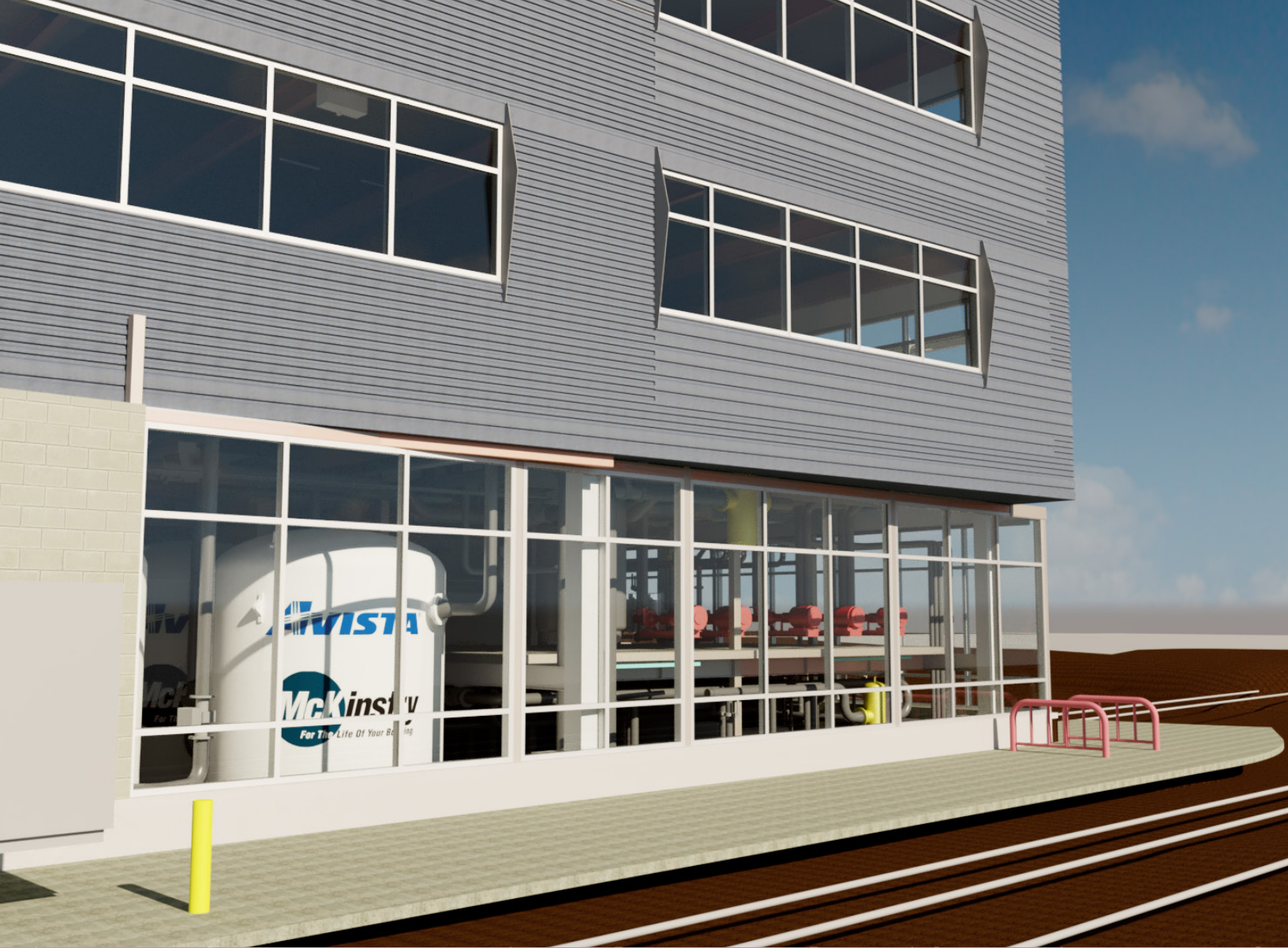


## OVERCAST INNOVATIONS

One of the biggest innovations happens above the ceiling. Overcast Innovations is crushing costs through factory-manufactured plug-and-play appliances that house mechanical, electrical, plumbing, fire protection, lighting, data and wireless networking systems, among others. Each appliance is fabricated in controlled factory environments, improving product quality, labor efficiency, material management and worker safety.

Cloud appliances from Overcast Innovations speed above-ceiling system design, installation and maintenance, reducing labor and equipment costs at the same time.





## INCUBATING COLLABORATION AND INNOVATION

The innovations within South Landing will make it a magnet for top energy companies, creating a collaboration center focused on solving major energy and societal issues. Eastern Washington University (EWU) will be the anchor tenant within Catalyst, bringing more than 1,000 students and 50 faculty from its College of Science, Technology, Engineering and Mathematics.

Avista and McKinstry will also occupy space within Catalyst. Other energy leaders will follow to conduct research within the living laboratory. The development is already attracting outside research dollars from the

Washington State Clean Energy Fund to examine and rethink utility rate structures surrounding distributed generation.

Intersecting industry and academia is a great public/private model to advance education and research capabilities while minimizing university capital and operating expenditures. Occupants will interact with advanced energy systems and operations to create a living laboratory that delivers an education and innovation experience unlike any other.

Catalyst and the Morris Center will complete construction in time to host EWU classes in the fall of 2020.



