FIVE-PART UW ENERGY TRANSFORMATION STRATEGY

Currently the Seattle campus burns fossil fuels to create steam to heat 200+ buildings on campus. This is a five-part energy strategy to transition the Seattle campus off of fossil fuels to 100% clean energy.

ENERGY SYSTEM ISSUES

GREENHOUSE GAS EMISSIONS

93% of GHG emissions on campus come from the power plant. This is an opportunity to reduce those dramatically.

ENERGY CONSUMPTION

Our mild climate and low energy costs have made it less expensive to waste energy than to save it. That is changing.

ELECTRICAL CAPACITY CONSTRAINT

All of the electricity for the main Seattle campus comes through one location, and that location can carry a limited amount of electricity.

AGING INFRASTRUCTURE

Our aging energy infrastructure puts us at risk of service disruptions failure perform as expected for a major research powerhouse university.

1 ENERGY EFFICIENCY

Implement projects that reduce energy consumption while maintaining or improving performance.

Expand metering, upgrade controls, data analytics and green revolving fund.

15% reduction in GHGs	Less waste means burning less fossil fuel
30% energy reduction	Efficiency reduces consumption
2% more capacity	Lower consumption means lower peaks in consumption
✓	Efficiency measure will replace aging components

2 CONVERT TO HOT WATER

A first step to shift off fossil fuels is to move to a lower temperature system. This enables us to electrify with heat pumps.

Convert from steam to hot water heating.

20% reduction in GHGs	At lower temperature, less heat is lost from pipes that carry heat to buildings
20% energy reduction	Less loss means less energy consumption
2% **less** capacity	We'll need to add electric pumps to move hot water to buildings
✓	This conversion will replace aging boilers, pipes, valves, pumps, expansion tanks, and steam traps

3 CENTRAL COOLING

Cooling is energy intensive: a more efficient system will free up electrical capacity for decarbonizing.

Replace inefficient chillers, use lake water for cooling, and add thermal storage.

no additional reduction	**No direct impact on GHGs, but this enables waste heat recovery**
15% energy reduction	**District scale chillers optimized with AI and machine learning will consume less energy**
25% more capacity	**More efficient cooling will substantially reduce peak demand**
✓	**This transformation will replace or eliminate aging chillers and facilitate maintenance**

4 ELECTRIFY HEATING

We can electrify the system by installing heat pumps to recover waste heat from multiple sources.

Use heat pumps to extract heat from cooling towers, sewer and lake water.

45% reduction in GHGs	**Our electricity comes from low- or zero-emission sources**
15% energy **increase**	**Heat pumps will create new electrical demand while reducing overall energy consumption**
30% less capacity	**Using heat pumps to re-use waste heat will create a new demand for electricity**
✓	**Electrification will allow us to retire aging boilers**

5 FINAL PUSH (FULL DECARBONIZATION)

We will need an alternate way to produce steam needed to sterilize research and medical equipment.

Continuously evaluate emerging technologies for full decarbonization.

20% reduction in GHGs	**This step will remove the carbon emissions from our energy system**
?	**unknown impact**
?	**unknown impact**
?	**unknown impact**

GOAL 100% CLEAN ENERGY

ZERO GREENHOUSE GAS EMISSIONS

We have contributed to the climate crisis both by reducing our emissions as well as by blazing a path others can follow. We are no longer required to purchase expensive carbon emission allowances.

HIGH ENERGY EFFICIENCY

We have substantially reduced our energy demand, which means we are less reliant on energy infrastrucutre and less exposed to the risk of rising utility costs.

SUFFICIENT ELECTRICAL CAPACITY

This is one goal our current plan does not yet achieve, given campus growth requirements.

RESILIENT INFRASTRUCTURE

Our energy infrastructure is efficient, reliable and flexible setting us up well to take advantage of new developments in energy technology.