**SWATeam Recommendation**

Name of SWATeam: Energy SWATeam

SWATeam Chair: Andrew Stumpf and Bill Rose Date Submitted to iWG: April 3, 2020

Specific Actions/Policy Recommended (a few sentences): We recommend that Building Envelope Inspection, Testing and Maintenance be performed as a method to improve building energy conservation to support the iCap 2050 goal of zero GHG emissions. Building Envelopes should be commissioned for all new construction projects. Existing Buildings should be inspected, tested, deficiencies addressed and maintained to achieve the best energy conservation possible for the building envelope.

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| Team Member Name | Team Member’s Comments |
| Andrew Stumpf | I wholeheartedly support this recommendation. Improving building envelopes on campus is an integral part of the retrocommissioning effort to improve the campus’ energy efficiency. This also follows in lock-step with the Energy Master Plan recommendation. Without having an infrastructure that is optimized for its energy usage, it will be difficult to develop a plan that maximizes the available operational and financial resources. The proposed Pilot Program provides a baseline for future air-tightening efforts. |
| Bill Rose | This proposed work has my highest recommendation. Its achievement would have positive effects 1) on its own, 2) in the pursuit of even deeper savings once techniques are perfected, 3) on mechanical system upgrades which may operate with lower loads, and 4) on new building design. It has a strong multiplier effect. |
| Tugce Baser | Unavailable for comment |
| Yun Kyu Yi | This recommendation should be implemented parallel with retro-commissioning. Improving the envelope reduces the energy load that will eventually reduce the system load.  |
| Dave Boehm | Building envelope improvements are needed. This project will help us develop our best planning and work to support and achieve iCAP goals. |
| Karl Helmink | Building envelope improvements are needed. The campus standards and new projects need to address this item ASAP. A pilot project for a team will highlight issues. Known problems of the past need to be fixed. Good item to move forward with. |
| Mike Larson | Of the four recommendations the Energy SWATeam is proposing at this time, this recommendation is #2 from my perspective. There are certainly energy savings that can be achieved with building envelope improvements, however the amount of savings are not clearly known. This pilot study will help better quantify the actual savings and help us to prioritize this type of work going forward. |
| Tim Mies | I fully support this in ensuring the best use of our investment in current and existing physical buildings to lowest energy costs and carbon footprint in alignment with the iCAP goals. |
| Jayce Carlson | I highly support this recommendation due to the "bank for its buck" and its overall pros and cons ratio. I believe this will help reduce our energy impact at a much lower cost than other recommendations, as well as it is fairly constant/includes less unknown variables.  |
| David Rivera-Kohr | Ensuring building envelopes meet energy conservation standards is crucial to reduce campus energy expenditure and will decrease both GHG emissions and fossil fuel spending. I support this recommendation. |
| Marcela Vega | This recommendation is well aligned with the iCAP goals, as it will for sure increase energy efficiency in buildings. Moreover, doing this test will indicate how much that increment in efficiency will be. In terms of budget, it seems important to support it considering buildings account for a large percentage of the energy use in the U.S. |

Comments from Consultation Group (if any; these can be anonymous):

**Objective 1: By 2025, fund a Pilot project to address Building Envelope airtightness which supports the iCAP target of zero GHG emissions.**

Based upon building energy modelling and actual results from residential projects we believe a 20-30% reduction in energy usage is achievable when the building envelope is properly installed and verified. We have many buildings on campus where the envelope should be inspected, tested and appropriately improved to address the energy lost through improper installation and or maintenance.

The university currently has teams from Facilities & Services inspect, test and improve the HVAC systems in buildings. They have teams who also are scheduled to inspect and calibrate buildings keeping the mechanical systems operating as efficiently as possible.

Building envelopes should be maintained in the same manner. And they should be inspected, tested and maintained prior to the system work for each building. Similar to making sure your roof does not leak before you invest and remodel the inside of the building the envelope should be verified it performs properly before you spend on the HVAC. It has been proven in residential buildings that many buildings leak and use more energy due to having to over ventilate, heat or cool the building due to lack of appropriate air tightness.

Recommendation:

This sub-committee recommends funding be provided for a pilot project to demonstrate the savings through modelling are achieved through inspection, testing and installation for existing buildings.

Pilot project outline:

1. Research, Discovery and Analysis
2. Planned improvements/repairs
3. Retesting as needed
4. Study energy consumption before and after

An ASHRAE grade building envelope energy audit should be performed. Basically this is an inspection and testing to assess the airtightness of the building. A team should be established for this pilot project using area contractors. The team will perform the research, discover and analysis via building drawing review, segmented pressure testing, thermographic scanning, smoke testing and overall building pressure testing to assess the as found conditions of the building envelope. Appropriate corrections to the envelope will then be implemented using either a contractor or F&S staff based upon scope and timing. Testing will be performed to validate the corrective measures were successful. Energy consumption will then be compared over time to assess the results.

 A typical team will be comprised of:

2 Sheet Metal workers

1 Carpenter

1 Architect

1 Supervisor

The following buildings are suggested for this pilot project:

1. Bruce Nesbit African American Cultural Center is a new building suggested to be inspected, tested and validated. BNAACC Building number (1528) is 7,149 gross square feet and was completed in 2019.
2. The Computing Applications Building (CAB) Building number (0108) built in 1950 is 36,280gsf
3. The Ceramics Building, Building number (0055) is 46,330 GSF was built in 1915

Budget and Funding:

The estimated budget for this pilot project should be funded at $180,000. This budget will support team training as well as the envelope inspection, testing, corrections when needed and reporting.

The source of Funding to be determined by others.