**SWATeam Recommendation**

Name of SWATeam: Energy

SWATeam chair(s): Bill Rose, Andy Stumpf Date submitted to iWG: 2/11/21

Recommendation title: Modeling for energy code compliance

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*For internal use only*: Date reviewed by iCAP Working Group:

Specific actions/policy recommendation:

The aim of this recommendation is to ensure compliance of current and recent projects with State of Illinois Energy Codes and Facilities Standards

1. F&S will identify a contractor—which may be a student group or include a student group—capable of creating 25 models of building whole energy use in campus buildings. F&S will contract to provide electronic files so they can be run on a common platform such as Trane700, Energyplus, eQuest, DOE-2 or BLAST. Preference will be given to contractors who make maximum use of student effort.
2. F&S will identify five buildings completed recently but prior to 2019 for which breakdown meter energy use data is available, and five campus buildings currently under construction. F&S may identify buildings for which the required requested model energy files are available, at a cost saving on the project.
3. The contractor – in collaboration with a student group -- will complete for each of the ten buildings
   1. a model file of the building which follows the Energy Code prescriptive requirements (baseline energy model) in use at the time of construction in order to determine an Energy Cost Budget, (10 files)
   2. a model file of the building as constructed (10 files), and
   3. a determination of the level of compliance with Energy Codes and Facilities Standards in terms of design and construction.
4. For the five already-completed buildings, the contractor will calibrate the as-constructed model to fit the measured energy consumption data, using historical weather data. The calibrated model (5 files) should replicate actual energy use for a minimum of one year within 5% on a monthly basis and within 20% on a daily basis.
5. If energy modeling files are available in project files on a common platform listed above, and may be distributed, then this may be considered one of the deliverables, and the work need not be redone, at a cost saving for the project.
6. The contractor will provide a final report that describes the level of compliance in the ten buildings with the State of Illinois Energy Code (in use at the time of design and construction, as applicable) and Facilities Standards. The energy model files will be made available publicly, and primarily to students and faculty in engineering and architecture for their study.

Suggested unit/department to address implementation:

F&S

Rationale for recommendation: Compliance is required under state law. Providing energy models on a public platform serves pedagogical purposes very strongly.

Connection to iCAP goals: Pages 40 and 41 of the iCAP 2020 Report

Perceived challenges: None, provided input information is fully provided.

Anticipated timeline of implementation: 6 months

Anticipated budget (identify if cost is up-front or continuous): Requires completion of 25 models. Estimated 80 hours per model. Cost depends on whether done at student rate or not, and on possible availability of already-completed files (which may significantly reduce the cost). Up-front cost.

The cost of this project may be borne by F&S, as provision of these models into project files is required under state law.

Individual comments are required from each SWATeam member (one or two sentences):

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| Team Member Name | Team Member’s Comments |
| Bill Rose | This will put the energy performance of campus buildings into faculty/student hands, and build their energy modeling skills, whether in fulfilling the contract or using the product. |
| Andrew Stumpf | I fully support this recommendation. The effort may provide students the opportunity to gain experience performing energy models. |
| Tim Mies | I support this recommendation to aid in verifying campus projects are meeting IL Energy Code. The aspect of student involvement will aid in the educational experience that will have potential wide-reaching benefits as our students we be better able to apply these concepts in their future endeavors. |
| Sushanth Girini | The energy conservation group at F&S works on improving energy efficiency of buildings. They have a benchmark energy utility index which is basically energy used per square feet and try to make sure the buildings match that index and are as efficient as possible. Apart from getting students and faculty involved in this conservation plan, this model/plan of work might also help them improve and add to their processes. |
| Brad Frantz | I support this recommendation! The student involvement could bring a whole new set of ideas that potentially have not been thought of to this point. Their creative ideas and willingness to think outside of the box can bring a new energy to the group. |
| Paul Foote | Building design models and construction as-builts (finished project) often look very different and perhaps stray from state energy codes and facility standards, the outcomes of the work recommended above will shed light on these variances and serve as a call to action for improved modeling and building deliverables.  In addition, the potential inclusion of students, faculty and staff make this a collaborative effort benefitting the campus community, the academic mission and preparing students with real world experiences and skillsets.  I not only support this recommendation but feel we have responsibility to ensure the buildings being delivered on campus are efficient and this project will help identify if we meet the minimum standards and if not where we need to make adjustments to get on track. |
| Yun Kyu Yi | It will be a great help to both university and students, I fully support the recommendation. |
| Tugce Baser | I support this recommendation. It is long overdue to carry out such approach. This will not only help advancing the operations of the existing and future structures but also help students to feel relevant and enter the research and workforce easily. |
| Marcela Vega Munoz | I think this is a very well thought recommendation. Comply to the State energy codes is an important issue that should be addressed, and using models is a good approach. Also, integrating faculty and students in this task will give them the opportunity to work in a very applied project. |
| Brinn McDowell | I really like this recommendation, and think it is necessary to making sure buildings are as efficient for the University as possible. I also like the possible student involvement to help with professional relationships of faculty and staff. The models will help to ensure the most accurate data, and call for a possible expansion to other buildings. Innovation is key to improvement. |
| Peter Davis | I think this is a great opportunity for student/faculty/professional relations. It may be worthwhile to set up a ‘special topics’ (--498) course or a for-credit research project to guide and encourage student participation. |
| Matthew Gold | I support this recommendation in that it’s a way to get an idea of how well campus energy codes are being met. If there is a concerning trend in our findings there may be more work to be done on other buildings on campus. In addition, this project gives valuable student experience. |
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Further explanation and background (can be supplied in an attachment):

Comments from consultation group (if any; these can be anonymous):