Sustainability & the Campus Project

Language Houses & Sustainability

Masataka Yui, Minju Kim, Wynonna Ardiansyah
Macalester College
Fall 2014

table of contents

introduction

EXECUTIVE SUMMARY

Though the language houses make up an important part of Macalester's missions of academic excellence, multiculturalism and academic excellence, the language houses are not as well monitored as some of the other residence halls. Statistics on energy and water usage is minimal and there has not yet been any set programs to raise awareness for its environmental sustainability. After consulting with the sustainability department, facilities staff, and student organizations on this issue, we recommend that promoting sustainable behavior within the residents of the language houses supported by the inclusion of supportive structures will act as an effective foundation for increasing energy efficiency.

Our solutions are divided into two components: behavioral and physical. For the former, we seek to raise awareness and promote sustainable behavior by including education on sustainable cooking, multi-language posters encouraging sustainable practices and piloting an eco-challenge between the language houses to foster greater incentives. As for physical changes, we suggest minor yet effective structural modifications such as adding a clothesline and laundry hanger as well as installing insulating curtains.

the problem

**ENERGY AND WATER USAGE IN THE LANGUAGE HOUSES**

Despite the fact that the Eco-House -- the most energy efficient residency on-campus and one of the most meticulously monitored and studied-- is located right in the midst of the Language Houses, not much is known about the energy efficiency of the Language Houses themselves. Through correspondence with Macalester's facilities department however, we were able to find data on the language houses as shown in the table below:

Total Annual Use	Electricity	Natural gas	Water	Total
Language houses / Res buildings	32.7%	27.6%	3.4%	13.8%
Language houses/All buildings	0.8%	2.1%	1.5%	1.2%

Figure 1. Table of total electricity, natural gas and water use of the language houses as compared to the residential and all the buildings on campus[1].

Although the language houses' energy and water use make up only 0.8% and 1.5% respectively of the total amount of all Macalester's buildings, it is notable that for electricity and natural gas, it makes up about 30% of all residence buildings. This is a huge discrepancy considering that the six language houses are significantly smaller in terms of both size and residents than the 10 residence halls that house about 500 students combined[2]. Therefore, decreasing electricity, natural or water use use in the

language houses will certainly have a large impact on the energy use of the college as a whole.
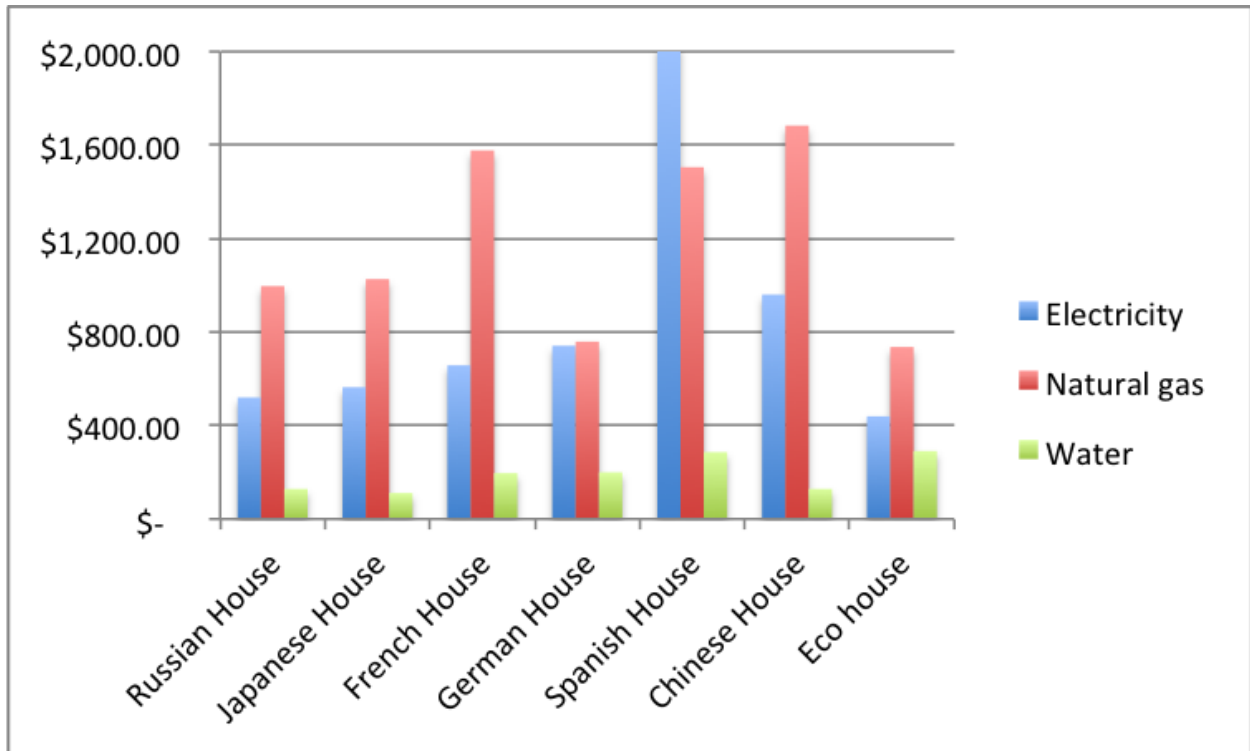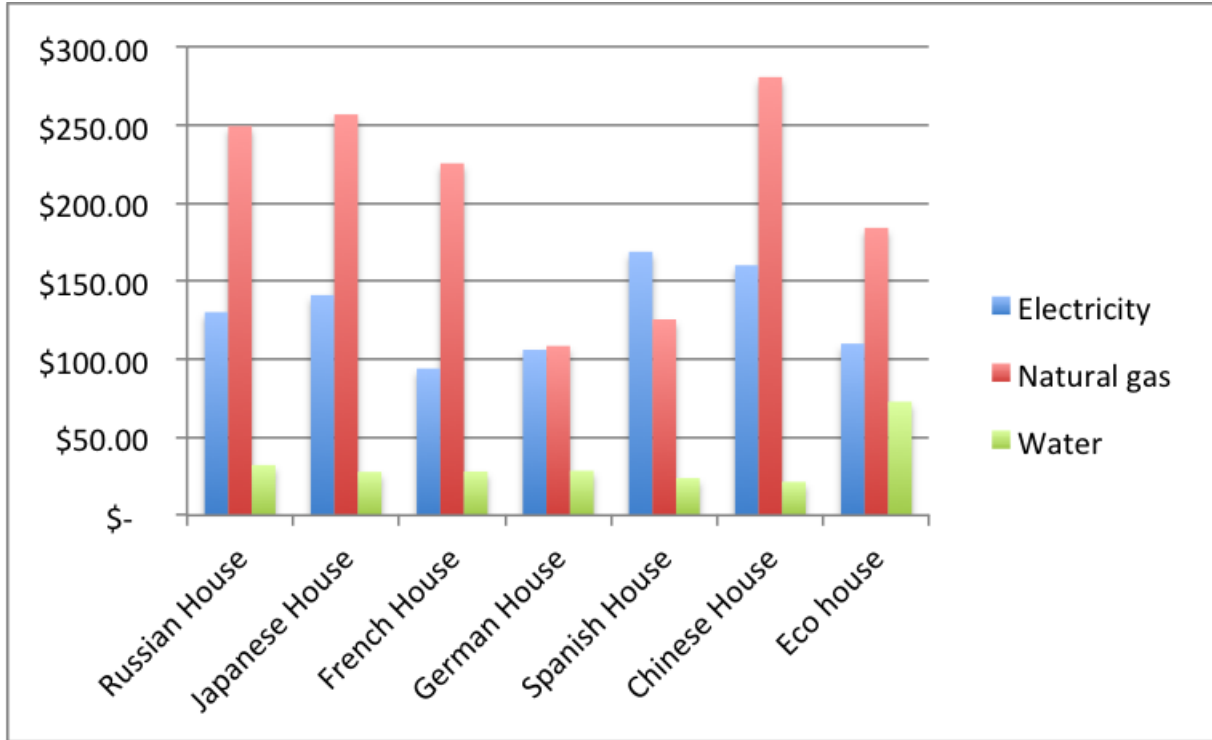

Figure 2. Energy use of language houses and the Eco-house in the 2013-14 academic year.

The graph (Figure 2) from the previous page covers the expenditures of each house from September until April of the 2013-14 academic year. This data was collected by interpreting the bills provided by Macalester's Facilities department, although it is important to note that information from the January and Summer terms have not been included. Data for May has also been excluded due to incomplete information and data unavailability as the Spring semester and thus, on-campus residency, ends in mid-May

with Commencement.

Analyzing the energy and water data from each house, it can be seen that the usage fluctuates between houses. This is not surprising, considering that the language houses vary in terms of size, capacity and facilities. In fact, according to Kurt Miller, the staff member of the Program Assistant at the Sustainability office, the Spanish and French houses are among the least eco-friendly ones. This is shown to be the case from the graph although it must be noted that the Spanish house's clear utilization of the most energy may be due in part to the fact that it is one of the largest houses with a capacity of 10 students and 2 native speakers. This dwarfs the much smaller 4-resident homes such as the Russian and Japanese houses which are shown to have the least amount of energy and water consumption in the graph.

In addition, the fluctuations in terms of energy and water usage may also be due in part to the language houses' unique capacity to bring residents of different backgrounds and thus, different degrees of sustainable behavior, together. These behaviors are in turn affected by the houses' own facilities with the Chinese house boasting water-intensive appliances such as dishwashers while others such as the Russian house does not. As a result, more studies and also more awareness needs to be raised as to water and energy consumption within the language houses.

Figure 3. Energy/water use per residents of language houses and the Eco-house in the 2013-14 academic year.

Russian	Japanese	French	German	Spanish	Chinese	Eco
$379.33	$397.72	$319.3	**$214.41**	$294.26	$440.73	$294.0

Figure 4. Sum of Electricity and natural gas use per residents of language houses and the Eco-house in the 2013-14 academic year.

Figure 3 in the previous page illustrates the energy and water use of language houses divided by number of people who lived in the house including native speakers in 2013-14 academic year. Surprisingly, electricity bills for German and French house were as low as that of eco house. On the other hand, Chinese and Spanish houses electricity bills per person were relatively higher than other houses. With regard to natural gas, German and Spanish houses used the least amount of bills whereas the Chinese, Russian and Japanese houses used about twice as much. Unfortunately we were not provided with enough data for water, but we can conclude that German house residents used the least amount of energy and that Chinese house residents used the most which is also clear from the figure 4 above. In summary, we argue that reducing energy use in the language houses with relatively higher bills is necessary, especially of the following houses: Chinese, Russian and Japanese since higher bills indicate the room for greater improvement.

the solutions
raising resident awareness

Taking a behavioral approach in tackling the issue of resident awareness is certainly more challenging than implementing physical changes to the language houses. However, if the solutions we suggest here are continuously pursued, they may considerably reduce energy and water consumption much more effectively in the long run.

COOKING DEMONSTRATION AND TIPS

Students who live in the language houses are sophomores, juniors, and seniors. Since they mostly do not have a full meal plan, they often need to cook by themselves in the kitchen to have meals. In the processing of preparing food, lots of food waste are produced however, the waste can be significantly reduced if one knows how to cook efficiently and sustainably. Thus, one method to boost sustainable behavior in the language houses is through cooking demonstrations by student organizations for the occupants of these houses every semester.

We have contacted MacCares, a student organization at Macalester that promotes conservation and renewable energy, to potentially conduct demonstrations starting either next semester or next academic year focusing on how to cook more sustainably and reduce energy and waste. This of course, will require continuous collaboration with

not only MacCares itself, but the RAs and RHDs in charge of the Language Houses as well as the native speakers of each house [3].

MULTI-LANGUAGE POSTERS

In order to encourage sustainable behavior, we first need to promote the basic idea within the occupants of the Language Houses themselves. For that, we have determined that posters placed in strategic places throughout the different houses will be able to achieve this goal. Keeping in tune with the concept of cultural immersion that these Language Houses constitute, the posters we propose will be in the language of their respective houses. For this, we have collaborated with native speakers, language tutors and students within the Macalester community to help translate the messages we wish to convey. We believe that using languages specific to each house works better than simply using English because the students would feel more obligated to stick to the message written since the language is the one they are currently trying to acquire.

We created two different types of posters regarding energy/water use. The first one attracts awareness to saving electricity by saying "plugs off/turn off the lights when you leave" in each language. Clearly the purpose of this poster is for residents to refrain from unnecessary energy use such as leaving the house without turning off the lights. Another poster encourages washing dishes by hands rather than running dishwashers by saying "wash the dishes, don't use the dishwasher until it's full". Although washing dishes by hand may take more time for the individual, it is by far, more energy and water efficient

than utilizing a dishwasher. The dishwasher also costs electricity, so it is important that we make sure residents do not use dish washers as much as possible. To incentivize people to wash dishes by hand, we put in pretty startling statistics as to a dishwashers' water usage and how small changes in behaviour could save a significant amount of money and energy. For instance the experiment run by an Eco-House resident recently proved that a dishwasher uses 4 gallons (about 15 Liters) when they choose power scrub as opposed to the 9.5 ounces of water used to wash a single dish by hand [4]. It is not hard to imagine how the machine uses so much more detergent than hand-washing manually as well.

LANGUAGE HOUSE ECO-CHALLENGE

We also suggest running an Eco-Challenge competition, a semester-long competition between the Language Houses in order to save energy and water usage and incentivize sustainable behavior. The winning house should be awarded for their hard work by the end of the semester, the prize of which, should be determined in consultation with the RAs, RHDs, and occupants of the Language Houses themselves.

Logistics as to the planning of this competition include measuring the amount of energy and water each consumed in comparison to the other. The rank of each house by would be determined by how much they reduced their bill in percentage. In other words, we calculate the energy and water use per person using bills provided by the Facilities department and compare those bills at the end of a semester.

However if one considers the economies of scale,, the larger houses would be relatively harder to reduce the bill so the relationship between the size of a house and its number of occupants we should definitely be taken into account when determining an individual's impact. By providing hard, statistical dollar amounts, we believe that the residents will become more aware of their sustainable behaviour by knowing how much money, energy and water they these particular pieces of information for the residents as well as the RAs and RHDs.

We would also love to include a midterm report that charts the progress of each house in the middle of the semester. We hope that with this event we can create sustainable-focused events such as "electricity saving week", a week that gives you bonus point for reducing energy consumption. In fact, hosting these events with more established, national movements such as "Campus Conservation Nationals" and "Recyclemania" from February-April would also be beneficial in raising awareness [5]. It is our hopes that being part of a nationwide competition would motivate the students to further improve. Another idea is that along with the event we might be able to do cooking competitions as well to enhance communication across different houses. This improves overall community of Macalester College because interaction across different language houses may not have not been as active as it could be. Hopefully, proper implementation of these projects and competitions would be able to not only promote sustainable behavior, but also result in a better sense of community between the different language houses.
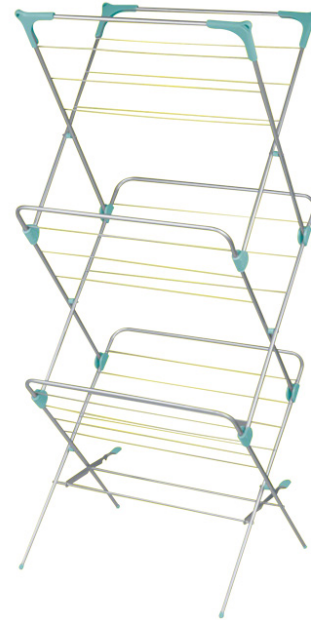
the solutions
implementing physical changes

To complement our solutions in increasing sustainable behavior, we also suggest some minor changes that can be made to the language houses. It is important to note however, that these physical changes alone will not greatly impact the energy and water consumption of residents in the language houses if they are not backed up by sustainable resident behavior.

CLOTHESLINE AND LAUNDRY HANGER

Using a clothesline instead of a dryer to dry clothes is another simple way to save energy. Similarly, installing clotheslines in the laundry room does not cost much money and therefore is easy to implement in the basement of the language houses that possess a laundry room. Also, if the clothesline cannot be installed because of the damage of the wall, laundry hangers can be a good alternative. Laundry hangers do not damage the walls, and can be used by many students at the same time. We suggest these two options to be pursued in the future because of their low cost and high benefits in promoting sustainable behavior and

decreasing water and energy use.

INSULATING CURTAINS

Windows can be greatly energy inefficient depending on their insulating R-value. The higher the insulating R-value, the more energy efficient they are with the recommended amount being 20 and the best at least 50. However, the standard window normally has an R-value of about 1 or 2 and the language houses are no different. Applying insulating curtains-- such as the one above done by the Psychology Department's Lee Olson on the Eco-House-- can add up to 7 units to the insulating R-value. Lee Olson has had over 20 years of experience in installing insulating curtains and has gladly stepped up should the rest of the Language Houses be done in the same manner. Depending on the size of the windows, the cost may vary. However, for a 3' x 2' window, she quoted that the cost would be $30. The insulating curtains could also be made with any fabric a resident wanted so Language Houses' respective departments should definitely be consulted before a fabric choice is made. Additionally, the insulating curtains have a great capacity for blocking out light, making it an ideal addition to a bedroom if residents wish to

darken their room at night.

During the winter, conserving heat is crucial in energy efficiency. The picture shown is a insulating curtain from the eco-house, which is designed to keep the heat from escaping from the house and to keep the cold from penetrating the window.

next steps

ENSURING SUSTAINABILITY OF PROJECT

In order to ensure the sustainability of this project, it is important that there be continuous collaboration amongst the different departments, organizations and students involved in promoting sustainable behavior within the language houses.

RAs and RHDs

For one, the RAs and RHDs should be contacted and kept informed for sustainability-minded events such as the potential cooking demonstration classes conducted by MacCares. They will also be a great asset in ensuring that the posters advocating for sustainable behavior and raising awareness to excessive amounts of energy and water consumption are in good shape. They will also potentially be the first-line of contact in implementing the Language House Eco-Challenge and ensuring participation. One challenge that may arise however in maintaining the sustainability of this project is that the RA of the language house may change every year. Therefore, clear and continuous communication is crucial with Residential Life in order to ensure that sustainable behavior is continuously promoted.

Students

Student organizations such as MacCares and MULCH are also crucial in ensuring the project's sustainability since these students will be involved in promoting sustainable

behavior in the long-run, especially in terms of organizing events. Sustainability student workers may also prove decisive in the maintenance of this project in future semesters or academic years as they would play a role in the implementation of projects such as these.

Departments

Departments such as Facilities and the different Language departments should definitely be contacted in regards to the project's progress as well. Facilities in particular has expressed a desire to be kept informed of whether energy and water usage changes or fluctuates as the project is implemented. The Language departments may also be curious to know about the state of their own respective Language Houses, especially in terms of where they lie in comparison to the other houses. In addition, the Native Speakers of each house will also play a key role in how well the message of better sustainable behavior is communicated to the students living in their house. They essentially act similar to a role model, so the manner in which they approach and implement this project may very well be the catalyst to whether or not we see reduced energy and water consumption or not.

Eco Challenge Competition

This event will not be able to happen without the help of residents as well as RAs who can in charge of measuring and following the event. In fact facilities is in charge of bills,

so their cooperation is necessary. Also it is efficient if the language instructors of each house can be responsible for the event, since they actually live in the house.

Insulating Curtains

Lee Olson, the Department Coordinator for Macalester College's Psychology Department is more than happy to be contacted on account of implementing insulating curtains. She has had over 20 years of experience in sewing and installing these curtains and will gladly provide a price quote if given the specific dimensions of the windows in question. She is definitely someone to contact if the project is to go through in installing these curtains in the language houses.

appendix a:
multi-language posters

Don't forget to turn
off the light!

Thank you!

随手关灯！

谢谢

出かけるとき電気
は消しましょう！

ありがとう

Apague la luz cuando salga!

Gracias!

appendix b: cooking demonstration manual

Garlic-Ginger Pumpkin Seed Sauce

Ingredients

1 cup/150g pumpkin seeds
3 cloves garlic
knob of fresh ginger
1 Tbsp. maple syrup
3 Tbsp. olive oil
1 Tbsp. apple cider vinegar
3 Tbsp. lemon juice
¾ -1 cup /175- 250 ml water
½ tsp. fine grain sea salt
¼ tsp. cracked black pepper
cayenne pepper to taste

Directions

1. In a dry skillet over medium heat, toast pumpkin seeds, stirring every so often, until they begin to pop. Remove from heat and set aside to cool. (I skipped this step and it turned out fine.)

2. In a food processor, pulse to mince garlic and ginger. Add cooled pumpkin seeds and blend on high until sand-textured. Add remaining ingredients (start with ¾ cup water) and blend, scraping down the sides periodically. Add remaining water as needed to suit your desired consistency. Season to taste. Store in an airtight glass container in the refrigerator for up to five days.

"Nectarine" Topped Oatmeal Cake

Ingredients

¾ apple juice
¼ cup cashews
¼ cup maple syrup
1 tbsp flax meal
¾ cup unsweetened applesauce
¼ pinch of grated nutmeg
3 peaches or nectarines, pitted and sliced
2 tbsp brown sugar

Directions

1. Preheat oven to 350F. Grease an 8-inch round cake pan.

2. Combine the apple juice, cashews, maple syrup, and flax meal in a blender/food processor. Process until completely smooth. Add the applesauce, oil, and vanilla. Process until blended.

3. Whisk together 1 cup of oats, the flours, baking powder, baking soda, cinnamon, salt, and nutmeg in a medium-sized bowl. Pour the cashew mixture into the oat mixture and stir to combine in the pan and arrange the fruit slices on top.

4. Combine the remaining 2 tbsp oat and brown sugar in a small bowl. Sprinkle over the top of the cake. Bake for 35-40 minutes, or until a toothpick inserted into the center comes out clean. Let cool before slicing.

8 TIPS FOR ECO-FRIENDLY COOKING

1. Buy Local
2. Sustainable Seafood Choices
3. Save those Scraps
4. Changing the Lighting
5. Use Natural Cleaning Products
6. Use Energy Efficient Appliances
7. Check your Range Hood
8. Use the Right Size Pan for the Job

works cited

[1] Macalester College Facilities. (2012). Total energy use of academic buildings and residence halls.

[2] Macalester College Residential Life. (2012). Residence Halls. Retrieved on 12/8/14 from: http://www.macalester.edu/reslife/residencehalls/

[3, 4] Macalester College Eco-House. (2013). Student Projects. Retrieved on 12/8/14 from: http://www.macalester.edu/ecohouse/studentprojects/projectshome.htm

[5] RecycleMania Tournament. (2014). RecycleMania . Retrieved on 12/8/14 from: http://recyclemaniacs.org/about