Go Green with Laundry Machines

Making Laundry More Eco-Friendly at Rutgers University by Switching to Cold Water, Reducing Dryer Time and Implementing Drying Racks

Tag Words: laundry; green; eco-friendly; environmentally-friendly; energy; conservation; cold water; drying racks; Rutgers University

Authors: Emily Fu-Sum, Vanessa L. Freire with Julie M. Fagan, Ph.D.

Summary: Machine washers and dryers on the Rutgers University campuses are wasteful in terms of energy and water consumption. There is an eco-friendly manner to approach this problem, which can ultimately cut down on Rutgers University’s costs. Using cold water instead of warm and hot water and utilizing drying racks instead of machine drying will not only help the environment, but it will save money too. Currently, the university has close to 1,000 energy star washers and dryers that promote an efficient method to wash and dry clothes. However, the implementation of drying racks in dorm and laundry rooms as well as altering the price of hot and cold water use within the Rutgers laundry rooms will be essential to reducing the university’s expenditure on water, natural gas, and electricity, while at the same time, promoting a healthier environment.

Video Link: https://www.youtube.com/watch?v=YuMAN2MvElc

The Issue: Rutgers Laundry System Wastes Energy (VF)
Everyone contributes to the pollution that exists today, whether it is consciously or unconsciously. It is important to know that we have the ability to change the amount of pollution we contribute to the environment every day. We go about our everyday lives thinking that, “it’s okay if I don’t recycle this particular plastic today.” However, it is with days like those where we cause more damage than previously thought because we are not the only ones that do this. Perhaps one day we don’t recycle, another day we consume too much water, and little by little this causes a lot of harm to the environment. Every single individual contributes to the whole. It is up to the individual to save energy and strive for a cleaner environment. The problem is that people do not think they make an impact because they are just one person, but in reality they do make a significant impact. This is why a university wide change can be so impactful. Most people claim to care about the environment, but will not go out of their way to find a greener alternative. However, if an eco-friendly option is put in their path (i.e. placing a recycling bin next to a trash bin), there is a much higher likelihood of people choosing that option, especially if there are financial incentives. Laundry is one way we can be greener.

Throughout the past years, an increasing number of colleges and universities have strived to provide a more eco-friendly environment for students and staff. Rutgers has already implemented numerous practices that benefit the environment, including: standard double-sided printing, solar panels in parking lots, and the elimination of trays within the dining halls. However, there are still many other areas around campus which can be improved to eliminate the universities’ costs and promote a healthier environment. Currently, the university has close
to 1,000 washers and dryers for students living on campus (1). These washers and dryers contribute to a higher consumption of water, higher emissions of greenhouse gases, and waste energy. Small changes to the laundry system will add up to great amounts of conservation of energy.

**The Current System (VF)**
Rutgers has already implemented front-loading washing machines, which utilize gravity so that less water is used to wash clothes. The specific Energy Star Maytag washers use 10–20 gallons of water per load, compared to the 30–35 gallons used by a standard machine (2).

The current cost for laundry at Rutgers is $1.25 per wash load and $1.25 per dry load (1). For the washing machines, there are six different settings that vary on the type of fabric being washed. For the dryers, there are three different settings, which also vary on the type of fabric. Before each wash, the student must select one of these settings; currently there is currently no default setting. The time for a “colors” wash is 35 minutes and the time for a “colors and whites” load to dry is 60 minutes.

**The following information taken directly from Henderson laundry machines on Douglass Campus (EF)**

**Washing Machines:**

**6 different settings:**

<table>
<thead>
<tr>
<th>Fabric Settings</th>
<th>Water Temperature</th>
<th>Spin Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whites</td>
<td>Hot</td>
<td>High</td>
</tr>
<tr>
<td>Colors</td>
<td>Warm</td>
<td>High</td>
</tr>
<tr>
<td>Bright Colors</td>
<td>Cold</td>
<td>High</td>
</tr>
<tr>
<td>Permanent Press</td>
<td>Warm</td>
<td>Medium</td>
</tr>
<tr>
<td>Woolens</td>
<td>Cold</td>
<td>Gentle</td>
</tr>
<tr>
<td>Delicates &amp; Knits</td>
<td>Warm</td>
<td>Gentle</td>
</tr>
</tbody>
</table>

**Dryers:**

**3 different settings:**

<table>
<thead>
<tr>
<th>Fabric Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whites and Colors</td>
</tr>
<tr>
<td>Permanent Press</td>
</tr>
<tr>
<td>Delicates</td>
</tr>
</tbody>
</table>
How Much Energy (and Money) is Being Wasted? (EF)

Currently, if someone using a machine washer washes using hot water and rinses using warm water, they are using an average of 4.5 kWh per load (3). This is at an average cost of $0.15 per kWh that would come to $0.68 spent on electricity per load. However, if the same load was done with only cold water, it would use an average of 0.3 kWh per load. At an average cost of $0.15 per kWh that would be only $0.04 per load (3). If all of the washers at Rutgers were used for one load at least once a week for a whole year, the average cost for the electricity used for hot water would be $16,725.28. The same scenario for cold water would only cost on average $983.84.

The equations: (VF)

**Hot Water:** $0.68 (avg cost of electricity per load) X 473 Washers X 52 Weeks = **$16,725.28**

**Cold Water:** $0.04 (avg cost of electricity per load) X 473 Washers X 52 Weeks = **$983.84**

Making the change to use primarily cold water will potentially save Rutgers close to $16,000 per year on electricity costs for operating the Maytag washers. The problem is not just how much energy is wasted with the washers, but also the Maytag dryers here on campus. Dryers cause clothes to become full of static due to the intense heat used during the drying process (4). Trying to wear clothes full of static becomes a pain, as the clothes will stick to your skin and hair (4). In order to solve this problem, people spend more money and purchase anti-static dryer sheets. Rutgers students have to spend money on purchasing countless numbers of dryer sheets, which will create further garbage for our environment.

Another problem with dryers is that they consume a great amount of energy. The energy use of a dryer varies between 1800 watts and 5000 watts, a typical dryer will use around 3000 watts. (5). Considering that there are 477 Maytag dryers on campus and if each dryer was used for at least one hour per day for 365 days a year, it would consume 522,315 kWh per year and cost the university $52,231.50 per year.

**Equations:**

**Amount of Energy Consumed:**
1 (hour per day) X 477 (Dryers) X 3.0 (kWh) X 365 (Days per year) = **522,315 kWh per year**

**Cost in Dollars**
1 (hour per day) X 477 (Dryers) X 3.0 (kWh) X 365 (Days per year) X $0.10 (per kWh) = **$52,231.50 per year**

Community Action: What Can We Do To Improve on the Current Laundry Issues? (VF & EF)

The majority of energy spent in all washing machines goes towards simply heating the water. Although hot water is important to sanitize clothes in order to eliminate certain illnesses and kill off bacteria, it is not essential for every wash load. What we are proposing is that for students that want to wash their clothes with cold water, they can continue to pay $1.25 per load. However, for the students that want to use warm/hot water for their loads, they can be charged...
$2.50 per load. By implementing this change in price for the use of warm/hot water, we predict that more students will choose to pay for using cold water and only use warm/hot water when it is really needed. Simply washing the load with cold water can decrease the energy consumption up to 90%. The clothes will still be thoroughly washed because laundry detergents and softeners will still be used. This incentive will be implemented using settings features on current university washing machines. Cold water will be the default setting and warm/hot water will be a selectable feature that will require the additional charge.

It will also be emphasized to students that hot water is much more damaging to clothes than cold water. It causes them to shrink, wrinkle and fade at a higher rate than other temperatures. It is best to reserve hot water for soiled articles of clothing. The majority of everyday clothing is sufficiently cleaned using cold water, which is a gentler option that will save energy and money.

In order to reduce the energy use from the Maytag Dryers on campus, large drying racks would be installed within the laundry rooms. These large drying racks can be used for larger or bulky items such as bed sheets, jackets, and pants. For smaller articles of clothing and for privacy purposes, smaller drying racks can be installed inside dorms and apartments. With the increase in use of air drying clothes, extra electricity will not be used because the dryers will not be used. By installing drying racks, this gives Rutgers students more options on how they would like their clothes dried. They could either air dry their clothes which will save them money and will be more eco-friendly or they would still have to dry their clothes in the dryer which will cost them money with purchasing drying time and also with buying drying sheets.

Austral Slenderline 20 drying racks cost on average $199.99 (6). Rutgers University currently has 66 laundry rooms spread throughout the five campuses (7). The estimate cost of installing this particular rack would be: $13,199.34.

**Equation: Cost for Laundry Room Drying Racks:**

$199.99 (avg cost of Austral Slenderline 20 drying racks) X 66 (Laundry rooms) = $13,199.34

For more personal items, small, foldable racks can be installed within the dorm rooms and apartments. They would lie flat along the wall and prop up when in use, so they would not take up space when not needed.
Austral Slenderline 15 drying racks cost on average $154.99 (6). There are over 50 residence halls at Rutgers University which house over 16,000 undergraduate students (8).

**Cost of Implementing One small drying rack in all of the Dorm Rooms and Apartments:**

($154.99 (cost of smaller drying racks) X 5,809 (Estimated number of dorm rooms and apartments for undergraduates)) = **$900,336.91**

Implementing these drying racks will promote eco-friendly habits throughout all of the campuses.

Drying racks will be a one-time investment for the university which will be establish a greener environment for the students. In addition, these drying racks require little to no maintenance, are foldable so they will not take up space when not in use, use no electricity, and are cost-free for students to use when compared to always using the Maytag Dryers. These factors will greatly reduce the amount of electricity used on campus.

In order to pay for the large laundry drying racks that will be installed in 66 laundry rooms throughout the different campuses, a small raise in the room and board fee could be implemented.

**Equations:** (Information taken from Rutgers Facilities 2015) (VF)

**Increase in Room and Board Fee for Students (Laundry Rooms)**

$13,199.34 (cost of installing 66 large drying racks) / 16,000 (average number of undergraduate students living on campus) = **$0.84** increase in room and board fee per student

**Increase in Room and Board Fee for Students (Dorm Rooms and Apartments)**

($154.99 (cost of smaller drying racks) X 5,809 (Estimate of number of dorm rooms and apartment for undergraduates)) / 16,000 (average number of undergraduate students living on campus) = **$56.27** increase in room and board fee per undergraduate student

**Total Increase in Room and Board Fee for Undergraduate Students**

$56.27 + $0.84 = **$57.11**
**Personal Drying Racks and Clotheslines (EF)**

Financially speaking, the university may not have space in the budget to fund drying racks as we’ve proposed. An alternative option will be to place this expense to students, but instead of increasing room and board, have students purchase their own racks for them to use throughout college and keep afterwards. A standard wooden rack can be purchased for $14.95 on Amazon.com. If two roommates shared the cost of the rack, it would pay for itself after 6 loads of laundry per person.

![Figure 3: A standard wooden rack](image)

Air drying clothes will reduce the need for the students to buy anti-static dryer sheets for the dryers. These anti-static dryer sheets reduce, but do not always entirely eliminate the static cling (9). The extra costs of these dryer sheets will add up, costing an average of $30.00 - $50.00 per year (9). On the contrary, a drying rack produces no static cling and will be more cost-effective and comfortable for the students on campus.

The reason behind why many people waste more of the available resources than they typically should is because there is a lack of knowledge regarding how to implement eco-friendly practices within the laundry room. We propose to implement helpful posters within the campuses’ laundry rooms on how to be eco-friendly when it comes to washing and drying clothes. These helpful posters will offer students tips on how to reduce over-consuming energy by air drying clothes, which will then promote a healthier environment. Studies show that students who air dry their clothes in college will be more likely to purchase and use a drying rack after they graduate (10). This will then, create life-long eco-friendly behaviors.
Conclusion
Currently there are over 16,000 undergraduate students living on campus at Rutgers University, the majority of which utilize Rutgers laundry services. If the changes we suggested were implemented, the amount of savings will be astronomical. Creating environmentally-friendly options is the key, if students have the option to wash green, many will do so because it benefits them and the environment they live in.

The implementation of drying racks (either personal or university-purchased) on campus will prove to be an innovative approach to saving the university money on costs of electricity, creating a “greener” university, and establishing sustainable behavior patterns among the students for future years. We will be sending a letter to University Facilities (see draft below) to request that they enact at least some of the changes that we have proposed.
Dear Department of Facilities, Rutgers University:

We commend Rutgers University’s current efforts to help the environment, and would like to further help by suggesting a few simple changes in the laundry rooms on campus.

To start off, we propose that warm/hot water machine washes be increased to $2.50 per load, while cold water washes become standard and remain at a cost of $1.25. The majority of energy machine washers use is spent on heating up water, using cold water saves 4.2 kWh per load, which adds up to $16,000 of electricity if every machine were to be used just once each week. We expect the price change to encourage more students to wash using cold water, saving the university money and energy.

In addition, we propose the addition of drying racks in laundry rooms and dorms/apartments, to give students the option of hang drying instead of machine drying. If each dryer on campus ran for 1 hour per day, 522,315 kWh would be spent each year. At a cost of $0.10 per kWh, that translates to $52,231.50 per year. These figures could be greatly decreased if drying racks were installed. To further encourage the use of drying racks, the price of drying could be increased to $2.50 per drying load. A better solution would be to reduce the drying time. The current drying time per load is 60 minutes, an excessive amount of time and a waste of energy and money. We propose a dry time of 8 minutes, at a cost of $0.25. This would make the student check their clothes every 8 minutes so they would only continue to dry as long as necessary.

We have priced out the cost of commercial drying racks to discourage the use of dryers and provide an alternative that would be more energy efficient. Installing small drying racks in all of
the Dorm Rooms and Apartments would cost $900,336.91 ($154.99, cost of smaller Austral Slenderline 15 drying racks X 5,809 - the estimated number of dorm rooms and apartments for undergraduates). Commercial drying racks (Austral Slenderline 20 drying racks cost on average $199.99) installed in each of the 66 laundry rooms would cost $13,199.34. Financially speaking, the university may not have space in the budget to fund drying racks as we’ve proposed. An alternative option would be to place this expense to students, but instead of increasing room and board, have students purchase their own racks for them to use throughout college and keep afterwards. A standard wooden rack can be purchased for $14.95 on Amazon.com. If two roommates shared the cost of the rack, it would pay for itself after 6 loads of laundry per person.

We hope that you, at the very least, change the cost basis for the washers and dryers as we think that this would be an easy fix to saving energy and money.

Thank you for your consideration

Replies to Our Letter

Antonio Calcado: “Thank you for your analysis and recommendations. We will review these and if appropriate implement.”

Michael D. Kornitas: “I will pass this on to housing.”

Joseph Witkowski: “I have retired after 27 years of service at the university and will not be able to respond to this email. If you need assistance please contact Zoraida Rios at 848-445-3722 or by email at ‘zrios@facilities.rutgers.edu.’”

*Zoraida Rios was contacted and sent the letter above, but has not responded as of May 13, 2015

**Introduction**
- Rutgers has close to 1,000 washers and dryers on the New Brunswick campus.
- Although these machine washers and dryers are rated as “energy star”, the way we use them wastes both energy and money.
- Washers use 10-20 gallons of water per wash load.
- When hot water is used to wash a load of clothes, it uses on average 4.5 kWh.
- When cold water is used to wash a load of clothes it uses on average 0.3 kWh.
- It costs $1.25 to wash clothes regardless of water temperature.
- It costs $1.25 to use the dryer. The dryer then operates for 60 minutes.
- By making a few simple changes, we can reduce Rutgers University’s energy usage.

**Proposed Solutions**
- Increase the cost of a warm/hot water wash to $2.50 while maintaining the $1.25 rate for cold water.
- Shorten the dry time to 8 minutes per $0.25.
- Implement foldable drying racks within the Rutgers dorm rooms.
- Permanently display helpful laundry tips in the laundry rooms to promote eco-friendly habits.

**Our Approach**

**Savings Amount**

- **Washers**
  - Hot Water: $0.66 (avg cost of electricity per load) x 473 washers x 2x weeks = $14,725.28
  - Cold Water: $0.24 (avg cost of electricity per load) x 473 washers x 2 weeks = $983.64

- **Dryers**
  - Current Cost in Energy: $22,315 per year
  - Current Cost in Dollars: $22,315 x 365 (Days per year) = $8,123,150

- **Discussion/Conclusion**
  - Using primarily cold water will potentially save Rutgers close to $16,400 per year or electricity costs for operating the washing machines.
  - Decreasing the amount of drying time can save Rutgers close to $446,000 per year in energy and around $446,000.00 in electrical costs.
  - Drying racks on campus will be an innovative approach to using the university money on costs of electricity, creating a “greener” university, and establishing sustainable behavior patterns among the students for future years.
  - We have sent a letter to University Facilities to request that they enact at least some of the changes that we have proposed.

**Selected References**

- Our Project Video
  - [https://youtube.be/FRUAMvltRl](https://youtube.be/FRUAMvltRl)

**Pictured (left to right):**
- Dr. Julie M. Fagan, Vanessa Freire, Emily Fu-Sum
References:


Machine washers and dryers on the Rutgers University campuses are wasteful in terms of energy and water consumption. There is an eco-friendly manner to approach this problem, which can ultimately cut down on University costs. Using cold water instead of warm and hot water and utilizing drying racks instead of machine drying will not only help the environment, but it will save money too. Currently, the University has close to 1,000 energy star washers and dryers that promote an efficient method to wash and dry clothes. However, the implementation of drying racks in dorm and laundry rooms as well as altering the price of hot and cold water use within the University laundry rooms will be essential to reducing the University’s expenditure on water, natural gas and electricity, while at the same time, promoting a healthier environment.

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The current drying time per load is an excessive amount of time and a waste of energy and money. I propose a dry time of eight minutes, at a cost of $0.25. This would make the student check their clothes every eight minutes so they would only continue to dry as long as necessary.

In addition, I propose the addition of drying racks in laundry rooms and residence halls/apartments, to give students the option of air-drying instead of machine drying. If each dryer on campus ran for one hour per day, 522,315 kWh would be spent each year. At a cost of $0.10 per kWh, that translates to $52,231.50 per year. These figures could be greatly decreased if drying racks were installed.

Small changes to the laundry system will add up to great amounts of conservation of energy throughout the five campuses at the University.

Vanessa Freire is a senior at the School of Environmental and Biological Sciences and is majoring in Biological Sciences.
Dear Online Editor of the Observer,

Please consider my post – see submission below and attached, for publication in your newsletter. This matter is very important to me and the Rutgers community. If you have any questions, feel free to contact me at xxx-xxx-xxxx.

Recently, Rutgers University New Brunswick has strived to be a greener place by implementing double-sided printing, adding solar panels in parking lots, and eliminating trays from the dining halls. However, there is one area where an excessive amount of energy is being wasted daily, and that is laundry. Machine washers and dryers waste not only energy, but time and money as well.

Among the 5 campuses, there are over 400 washers and 400 dryers. Currently, it costs $1.25 per washing load and $1.25 for a 60 minute dryer load. A standard “colors” wash is 35 minutes and uses warm water. However, up to 90% of the energy a washing machine uses goes towards heating up the water, while only 10% goes towards running the motor. If students chose to wash with cold instead of warm water, 10 cold loads could be performed with the same energy of 1 warm/hot load. I propose to increase the cost of a warm/hot water wash to $2.50 while maintaining the $1.25 rate for a cold water wash.

In addition, drying clothes on campus can be greener as well. The current dryer time of 60 minutes is unnecessarily long. Most loads do not need that much time, and over-drying causes clothes to fade, wrinkle and shrink at a faster rate. I propose that the price of machine drying change from $1.25 per 60 min to $0.25 per 8 min; allowing as much drying time as needed – reducing energy and cost. Also, instead of machine drying, students can use drying racks to air dry their clothes.

Simple changes to the laundry system can add up to great amounts of conservation.