

# Climate Risks and Resilience at Dickinson College: Strategies for Continuity of Operations

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# 1. Introduction

This report is part of the Baird Sustainability Fellowship Initiative, which is a multi-year long process that involves student research and action in sustainability efforts at Dickinson. In 2022, President John E. Jones signed the Resilience Commitment of Second Nature to increase Dickinson's climate resiliency, and the Baird Sustainability Fellows of this year and last year have been working to aid this commitment. Previous Baird Sustainability Fellows have focused on identifying Dickinson's vulnerability in relation to climate change and what areas or departments are most at-risk. The research team's work this semester aims to look at these previously identified risks to Dickinson that come from the changing climate of Cumberland County. We then took those risks, looked at them through a topical lens, and used a few different methods to research these topics and ultimately suggest strategies that Dickinson should consider when revising its Climate Action Plan. After this year, future groups of students, faculty, and staff will work on implementing these strategies and updating Dickinson's Climate Action Plan to be more resilient in the warming world of Cumberland County.

This particular report will discuss continuity of operations at Dickinson. Continuity of operations planning means the planning an institution or business does to ensure it can continue its essential operations in the case of a disruption, whether it be a day-long power outage or a weeks-long heatwave. It puts preventative measures in place to ensure a smooth transition if there needs to be a shift in how things are happening (for example, having to conduct all classes online). These plans also detail how the institution will recover from these challenges and should cover a wide range of options as to prepare for multiple types of disasters, whether they be climate-related or otherwise.

By assessing Dickinson's current continuity efforts, we can determine what areas need the most work and where we are left most vulnerable. Then we can see what Dickinson can do to improve these at-risk areas. This report will elaborate on both the risks Dickinson faces in the realm of continuity of operations as well as specific suggestions for initiatives that would improve our continuity planning. Supplemental research here serves to support these suggestions by showing what other institutions or businesses have done, as well as companies that analyze other institutions' continuity plans and have assessed what has been proven to work.

## 2. Climate Risks

Central Pennsylvania deals with several effects of climate change now, and many of these effects are predicted to worsen in the near future, which will impact quality of life for those living in this region. The number of days above 90 degrees

Fahrenheit has risen and is expected to rise more. Heavy rain events, flash floods, and extreme rain and windstorms have also increased and are expected to continue rising (Leary, 2023). The increased precipitation will have multiple negative consequences, including erosion of soils, flooding, washing of sediments and pollutants into surface waters, and erosion of the limestone bedrock much of Cumberland County sits on, but also increased mold presence and faster deterioration of older buildings. The Carlisle-Harrisburg metropolitan area also has the second-worst air quality in the state of Pennsylvania, with extreme heat worsening this in the coming years. This in turn causes a wide variety of health issues such as respiratory and heart illnesses (Cumberland County, 2022). These risks absolutely will pose a threat to Dickinson's ability to continue its daily operations and keep students safe. The increased rain will lead to more instances of flooding and more damage to academic buildings as well as residence halls (which are already worsening in condition). Increased extreme weather events could cause massive issues with transportation, which will not only affect the ability of staff to commute to work, but supply chains will be disrupted. This will have effects on dining, maintenance, facilities work, technology, and even more. In fact, 54% of business report being disrupted by severe weather in 2012, and it had been the number one cause of business disruption for four years in a row (BSI Group, n.d.). These changing conditions are absolutely an important force to plan around.

### 2.1. Loss of Electric Power

One of the most common and looming threats in the face of extreme weather events is the loss of electric power. The 2023 Pennsylvania Electric Reliability Report shows a steady upward climb in the number of reportable outages in the last 30 years, and these incidents are expected to increase in number following the predicted increase of extreme weather events in PA in the next few years (PA PUC, 2024). This is something that has been of concern to the Dickinson community in the last year, with there being several power outages that impacted the daily lives of staff and students. These outages were mainly caused by thunderstorms and heavy rain, which are expected to increase in Cumberland County in the near future. Power affects almost every aspect of life on campus: housing, dining, and academics, so this is truly at the heart of continuity planning. When the power is out for an extended period of time, every part of one's day is affected. This could send students home for lack of an ability to house and feed them as well as provide other essential services such as medical care through the Wellness Center.

### 2.2. Risks to Dining

Dining services is crucial to life at Dickinson. Students need to be fed, and many don't have any other option besides eating Dickinson's food. This is why it is incredibly important to ensure that in case of an emergency, no matter how long- or short-lasting it may be, the dining hall is well-equipped to feed students that are in need. The kitchen

area currently does have a backup generator, but this generator is only useful for emergency light and does not provide extra power for cooking or refrigeration. In the case of an outage, the dining hall has enough cold food on hand for a couple days, but after 72 hours, all that will be available is dry food such as cereal and bread (Continuity Focus Group, 2024).

On a larger scale, outages and severe weather events may affect transportation and supply chains. This would prevent dining from receiving the food it needs to feed students. The College Farm may be of help in a situation like this, but it does not have the capacity to completely feed all 2500 Dickinson students. These scenarios, while unlikely, are important to prepare for.

### 2.3. Risks to Residence Halls

Outages and extreme weather events pose a threat to housing on campus. There is, in Pennsylvania, a “warranty of habitability” that states that tenants, even college students in college-owned buildings, have the right to a decent place to live. This involves keeping homes within a certain temperature range, having access to hot water, being free of pests, and being sealed off from the elements (Yeban, 2023). An outage could create unsafe conditions in a building; if a residence hall without a backup generator experiences an outage, its heating or AC may cease to function. Dorm buildings with only automatic flushing toilets will soon have unusable bathrooms, creating sanitary issues. Severe weather could also damage the infrastructure of a building, which can cause a number of issues, one of those being moisture infiltration in resident halls. Indoor air quality concerns have been an issue at Dickinson, with students needing to be temporarily moved due to mold presence. This interrupts students’ physical wellbeing as well as their mental wellbeing having to move housing and readjust. All of these potential harms mean there must be a plan in place for rehousing students and for fixing these issues to get students back in their housing as soon as possible.

### 2.4. Loss of Internet

The internet is quite essential to Dickinson’s daily operations and is a must for everyone living or working on campus. Staff members need to be able to call and email others and access different webpages to perform their jobs. Faculty and students need to be able to access Moodle and other sites for studying, grading, and accessing readings. In the case of an emergency, losing phone services is detrimental as students will not be able to contact their families. Though internet outages are something Dickinson has struggled with in recent years, luckily, the school recently purchased a backup provider so we will not completely lose internet access should one power line go down (Continuity Focus Group, 2024). This purchase was made in the fall of 2024 after several outages in spring 2024 that interrupted campus operations for multiple days.

This means if one provider goes down, students and staff can still access the internet and complete their daily tasks. Additional issues, though, are that Moodle is stored locally and not in the cloud. If something were to happen to this or other local files, Dickinson could lose quite a bit of important data. This is something to consider as we look at updating our continuity processes.

## **2.5. Academic Issues**

Extreme heat, increased precipitation, and extreme weather events, all expected to rise in the coming years, all could have a big impact on academics. This impact can range from student athletes performing poorer in the classroom due to extreme heat-related health concerns to the cancelling of all in-person classes for the unforeseeable future.

As of now, Dickinson does not have a formal academic continuity plan to deal with such scenarios. What we currently have is a webpage on academic technology that teaches professors and students how to utilize the features of Moodle. There is no information on this page about how grading, exams, communication, or classes would look like in the case of a shutdown. If an emergency arises that pushes classes online for a day or even weeks, the lack of plan means that faculty scramble to reorient their classes, no clear lines of communication are established, and important tasks get forgotten about as no one is assigned to them. This is a huge stressor on faculty and staff, but also on students who need as much support as possible to adjust to these new circumstances.

# **3. Continuity Planning in Higher Education**

## **3.1. Business Continuity**

Many higher education institutions have department-specific continuity of operations plans. These plans are put in place so institutions can continue business operations in times of emergency. This includes how departments should handle emergencies, what departments should stay open, how and if certain employees will be compensated, and more.

The goal of business continuity is to ensure the welfare of the stakeholders. A swift response is necessary to ensure the damage is mitigated. What is incredibly important to establish is a communication plan with all stakeholders to quickly relay information and reassure them in times of uncertainty. It is also incredibly important to plan for potential financial consequences (Jackson, 2020). In widespread emergencies, things like supplies become more expensive. Even in the case of COVID-19, Dickinson

still paid workers even when they were unable to come in (Continuity Focus Group, 2024). These risks must be accounted for.

Departments should also be able to communicate with each other about plans and offer input (Infotech, n.d.). Every department and office in the College is part of a huge web of systems that keep the College running; no one person or group is an island unaffected by anyone else. This is why cross-departmental communication is essential to proper continuity planning.

Harvard's plan provides a good frame of reference for business continuity planning. It documents how compensation, higher-ups' responsibilities, and communication will be handled in the case of an emergency. The plan states that is the responsibility of higher-ups to make decision within their own departments, and essential employees "may receive compensatory time off" if they have worked during a closure (Harvard University, n.d.). It is recommended that educational institutions account for potential financial issues, work with other universities, and prioritize the health and wellbeing of students and staff, especially the most vulnerable. Accounting for students or staff who might not have access to technology to be able to work from home is important as well, or for those who face other roadblocks to going home (i.e., if they are international), so it might be a useful part of a continuity plan to allocate funds to accommodate this (Jackson, 2020). Many higher institutions seem to also divide up independent continuity plans, and each department has its own business continuity plan.

Energy resiliency is an important concept to include in a business continuity plan, because the changing weather has a large direct effect on our energy systems, which are at the center of the functions of a college or any business. Installing backup generators is a helpful tactic to use to prepare for any kind of outage Duke Energy One, 2023). It is important to regularly test and maintain these systems, however, so one can be sure they are in good shape for when they are truly needed. Implementing energy-efficient technologies and renewable energy sources also generally improves energy security and can help mitigate risk before it even arises. Consistent communication, both with those relying on these energy sources and with providers, proves to be extremely important in energy resilience. Those who use a company's energy should have open access to the energy resilience plan (Utility Box, 2024).

It is also important to come up with a plan for managing technology. Academic continuity plans often rely on technology to be able to continue teaching during a disruption. Ensuring in business continuity plans that everyone has access to technology and that platforms are running as they should is essential. It is also good to make sure data stays protected, especially as Dickinson has a lot of local copies of data not stored in the cloud, so if something happens to those files, a lot of information is

lost. Considering technology, safety, and data storage is another important aspect of energy resilience and continuity planning in higher education (Jackson, 2020).

### 3.2. Academic Continuity

Academic continuity plans are arguably the most important type of emergency planning at a college. There are many things to take into consideration when planning for the continuing of classes and other academic facilities during an emergency. For example, if a class gets interrupted, how will it be graded? Will exams be online, or even cancelled? Most importantly, a good plan should manage crisis, not react to it. It prepares people to address issues as they arise and handle problems in real time, not after the fact. There are quite a few resources that can help a school form a plan from scratch.

UMass Amherst has a robust academic continuity plan that other institutions can model after. According to them, the most important aspect of continuity planning is a solid framework for communication. University leaders need to be able to communicate clearly with each other, different departments need to be able to communicate amongst themselves, and schools need to be able to communicate with their students (University of Massachusetts Amherst, n.d.). A formalized internal communication structure and an emergency communication system are very helpful in achieving this. Some plans have a specific order in which information trickles down – first to the president, then provost, then deans, then professors, and onward. They also outline specific individuals whose job it is to ensure this information will reach the right people. As for emergency communication, a lot of universities use an emergency alert system, so this should be further utilized during an ongoing crisis. Some schools believe that as part of thorough communication, the academic continuity plan should be available to all faculty, staff, and students, and they should all scan the document occasionally to be prepared in case the plan does have to be put into effect (Wrynn, 2021).

The O'Sullivan et al report, which analyzes over 100 academic continuity plans from institutions across the country, states that there are quite a few helpful components that make a good academic continuity plan. For one, good plans clarify the lines of authority. They lay out who will do what in the case of emergencies and say who will reallocate budgets for hotels and who will take on new sections of online courses. Identifying who makes the decisions in certain contexts and how that will trickle down through the school is important and avoids unnecessary strife. These plans also should identify resources for faculty to use to adapt to new teaching styles, such as access to new platforms to upload material onto or tutorials on online teaching. Having access to these resources without needing to ask is a huge help for those unfamiliar with different classroom circumstances.

Academic continuity plans should also minimize trauma. Just the shutting down of classes can be difficult for students, let alone also dealing with the disaster that caused the shutdown in the first place. Many students may be losing loved ones or their homes. The disaster may be a school shooting over which the entire community is grieving. Whatever it may be, academic continuity plans need to account for this factor and need to have structures in place to help students work through the trauma and support them through their academics. Affected students should receive help from the institution as well.

Lastly, a good academic continuity plan considers and centers equity, because the main “focus should be on caring for ... all students, in times of crisis.” (Forgette, 2023). Not every student has the same access to technology or has a sound home environment in which they can properly focus on academics. Students in poverty and minoritized students will face disproportionate negative effects in many different types of disasters and may have a more difficult time with adjusting to new circumstances, especially if they do not have adequate access.

## **4. Methods for evaluating strategies**

The research team used a variety of methods to come up with and analyze potential strategies. In order to gather background information, I facilitated a focus group on continuity of operations in which several Dickinson employees from very different departments, such as admissions, printing services, facilities, and dining services, were able to weigh in on what Dickinson is already doing in this area, what plans the College has in place, and what we could be doing better. These Dickinson employees helped me understand what many people’s biggest concerns were (which was overwhelmingly technology usage and power outages and how this affects daily operations) and what they wanted to see from the College.

I also conducted a literature review, seeking out other information on continuity of operations and seeing what other institutions and companies are doing. Comparing continuity plans and strategies of other institutions with ours helped me gain important insight on what we are doing well but also what we are missing in our plans. Specifically in the realm of academic continuity planning, seeing what other institutions of a similar caliber to Dickinson are doing and comparing it to what we are doing was very eye-opening and helpful in developing these recommendations.

Finally, the multicriteria analysis scores the effectiveness and cost of implementing these chosen strategies. This will provide data on what the best potential strategies for continuity of operations are and will allow me to make recommendations for what I believe Dickinson should prioritize in updating its Climate Action Plan.



### 5.1. Effectiveness

A strategy's effectiveness is how well it works in practice to avoid or limit negative impacts such as disruption. So, for any potential plan, there may be some co-benefits and it may be easy to create the plan, but this criterion addresses how well the plan would work in practice should a situation arise that warrants it; meaning it has real positive consequences and works as it should on paper. Since the whole point of a plan is for it to be effective in dealing with a crisis or situation, I gave this criterion the most weight at 30%.

### 5.2. Affordability

Cost is quite a big factor to consider, because a strategy may be proven very effective, but there might be financial blocks to implementing it. While Dickinson has a steady endowment, that money can only stretch so many ways. Departments have set budgets, and it is difficult to move around a large sum of money. Dickinson employees across all four focus groups brought up initiatives they would like to see happen, but time and time again they mentioned cost as the biggest factor in preventing these initiatives from happening. I gave this criterion a weight of 25% because of this.

### 5.3. Ease of Implementation

It is important when giving these recommendations to consider how easy these are to implement and add to the climate action plan or Dickinson's general emergency planning. If something would take a long time to plan and implement, or if it would take a lot of resources (people to plan the details, different materials, etc.), the College may not like to expend its energy on said strategy. Something that takes considerably less effort and time, however, can be prioritized and carried out with ease. I gave this criterion a weight of 15%, because while it is very important to consider, it is not the most pertinent.

### 5.4. Co-Benefits

If a strategy has a co-benefit, it has a secondary benefit from the one it was meant to have. For example, one suggested strategy may be to enhance Dickinson's tree canopy. While this has helpful environmental effects, such as cooling the area, there is also the other intended benefit of beautifying the campus, which in turn may encourage more students to apply and will be an asset to the admissions office. So, if this is the case, the College may be more inclined (and it would generally be more helpful) to enhance the tree canopy, as this makes the time and money put into developing this strategy more worthwhile. This would increase the overall effectiveness of the strategy. This, however, is not the most relevant criterion to consider when discussing continuity of operations, so this has a lower weight at 15%.

### 5.5. Flexibility

Flexibility scores how easy it is to update this strategy over time as new technologies arise and others age and need to be replaced. It asks if the strategy can be adapted to multiple scenarios. This ensures that the strategy is flexible, since we will not be able to predict the next major situation that shuts institutions down, just as no one was able to predict COVID-19 and what the best response would have been. While this criterion is helpful to consider, it is not the most important, as new plans can be developed over time if need be, so I gave this a 15% weight.

## 6. Analysis of Strategies

### 6.1. Develop a Formal Academic Continuity Plan

Academic continuity plans put institutions in a “stronger position to manage times of crisis and disruption” (O’Sullivan et al., 2021). Dickinson does not currently have an academic continuity plan. What we do have is an academic technology resource guide and only offers specifics on using Moodle to deliver course instruction, communicate with students, issue exams or tests, and give final grades. This page makes no specific mention of how teaching itself should adjust, how professors should accommodate students directly impacted by the larger events happening, or how the curriculum itself could or should change to adapt to the situation.

The benefit of coming up with such a plan is increasing Dickinson’s ability to bounce back quickly and ensuring faculty and staff do not have to deal with the chaos of coming up with multiple last-minute solutions in the wake of having no formalized plan. It ensures students are able to adapt well to a new learning environment and should eliminate some of the stress that comes with making this change by providing extra support. The transition to online or alternate learning would be much smoother, and faculty and students would be able to consult the plan in case an unsure situation arises.

The resources needed to create this plan are small. A committee focused on developing this plan with faculty from many different departments would be essential, and potentially a committee of other faculty/students to give feedback could be beneficial as well. The O’Sullivan et al report would be a good guideline for the drafting committee to base the new plan off of. The only financial cost to this solution would be paying faculty and students for their efforts. It would take some time to fully develop a plan, but this is a small cost for something so helpful. This would also likely be the only real potential challenge, as it takes some time to create this plan from nothing, and disagreement on what to include may hold up the process. But considering how helpful

this strategy has been for other institutions in the past, it seems well worth the potential costs (O’Sullivan et al., 2021).

## 6.2. Perform a Study on Other Continuity Plans at Dickinson

Every office or department on campus is required to create and update their own continuity plans annually as well as distribute these plans throughout the department. These plans are considered internal documents, so they are not open for viewing outside of that department and DPS, who oversees all departmental plans. Though everyone theoretically is supposed to be familiar with their department’s continuity plan and their role in an emergency, through interviews and our focus group, I gained some valuable insight into how little many people knew about their department’s plans. Some knew it was to be updated yearly but had no idea what was in it. Some had a vague idea on the contents of the plan but did not know what their specific responsibilities were. Some remarked that they did not think they had seen an updated plan in multiple years.

This begs the question: does the current system work the way it’s meant to? What are some better strategies not just for communicating these plans across departments, but in creating the plans themselves? Are they thorough enough to be effective in times of emergency? I am proposing that a small task force made up of members from multiple departments can come together to assess continuity plans at Dickinson and see if they are effective, and they should draw on other institutions’ plans to serve as a framework, such as Harvard’s and Princeton’s.

## 6.3. Conduct a Power Study

Many buildings on campus are equipped with backup generators in case there are power issues, which may well increase with the predicted increase of extreme weather events and heavy rain in Cumberland County (Leary, 2023). There are, however, many key buildings still missing such backup generators; most of these buildings are residence halls and apartments. However, most of the generators Dickinson does have just supply enough power for emergency lighting and key card access. This may be enough for many buildings, such as academic buildings that are not entirely essential in the case of an emergency since classes can move online, but for buildings with multiple resources and uses, there is a need for power for more than just lights. For example, in Drayer hall, toilets only flush automatically; this means in a power outage, toilets cannot be flushed manually or at all. Another example is the dining hall, which only has enough backup power for emergency lighting, and not enough to cook or power refrigerators. This means that in times of extended crisis, Dickinson loses the ability to feed its students, which could be quite detrimental for students who are unable to go home. It is incredibly important not to just plan for recovery, but to plan for

energy resilience and make sure we are as well-equipped as possible if such a crisis does arise (Duke Energy, 2023).

Because installing these generators would be extremely costly, it would be important to properly consider what buildings are in the most need of additional power. So, I propose that Dickinson conducts a study on which buildings would be most in need of this backup power. Paying the closest attention to the HUB would be beneficial, especially with the upcoming renovations. As it is the student center for pretty much everything, it warrants extra attention. The residence halls would likely be next in line for more power. Dickinson can perform this study on its own or bring in an outside company to do this work, though that would be the more expensive option.

#### 6.4. Encourage Use of LMS

Dickinson is an institution highly values academic freedom, which has several benefits and enhances intellectual capabilities. However, this means that not every professor utilizes the same platforms, which can be confusing if a student has to go back and forth onto multiple different sites. This is especially confusing in times of emergency, as students already have lost the sense of organization that comes with their daily routine, so it is important for them to feel as structured as possible for the sake of their mental health and their academics. The utilization of Moodle by every class would aid with this. If professors use Moodle during normal times, they will become familiar with its features and would have an easier time transitioning to all online classes should the occasion arise. Additionally, research shows that faculty feel the quality of their teaching improved and that students had greater control over their work. The same research shows that students feel more comfortable learning with an LMS and that using an LMS increases their ability to actually complete their work (Alumona and Akinseinde, 2023).

Though it is not possible to require all professors to use Moodle all in the exact same way, encouraging them to use it at all is a start, so at least a student only has to go on one site for their class information. While the uniform use of an LMS, or structuring all class pages the exact same way, is impossible to enforce (different types of classes have very different organizations, such as labs differing from humanities classes), offering a number of templates or guides for faculty to structure their class pages with can help with organization and efficiency.

It is also being taken into consideration that Dickinson is most likely going to switch LMS platforms. This new platform may be favorable to faculty who had problems with Moodle, so this recommendation may fulfill itself if enough professors choose to use this platform. This, however, is why this recommendation is useful now more than ever: at this critical time of transition, it is important to give faculty all the tools and

tutorials and templates they need to be successful with this new LMS and feel confident that they can learn and become comfortable with using it.

### 6.5. Multicriteria Analysis Table

	affordability	ease of implementation	co-benefits	effectiveness	flexibility	final
weight	25%	15%	15%	30%	15%	100%
develop a formal academic continuity plan	5	4	4	5	4	4.6
conduct a study of other continuity plans	5	4	3	4	3	3.95
conduct a study on backup power for key buildings (HUB, etc.)	4	3	4	4	3	3.7
encourage use of Moodle, limit other platforms	5	3	4	3	3	3.65

## 7. Recommendations

It is my recommendation that Dickinson College creates a formal academic continuity plan and conduct a review of departmental plans. While I would still recommend encouraging the use of Moodle as well as conducting a study to add more backup power in buildings that provide essential services, I believe the former two recommendations should be prioritized based on the lack of barriers to instituting them and the increased effectiveness.

I believe that forming a well-rounded academic continuity plan should be the top priority and would be the strongest solution to increasing Dickinson's climate resilience in the realm of continuity. This initiative should be carried out in the near term (within the

next 1-2 years) as extreme weather events become more of a threat to continuity at colleges. This also is not something that needs a multi-year process; there will be a few stages of drafting and editing, but this can be achieved within two years. The first step would be to form a committee composed of both faculty and students in different departments interested in drafting an initial plan. This plan will go under review and will be revised as necessary.

I believe conducting a study on Dickinson's continuity planning could be extremely valuable in increasing our climate resilience. This initiative is similarly low-cost and can be carried out in the short term (the next 1-2 years). This may involve creating a new system of planning with new requirements on what these plans must include or how they are communicated to departments, or it may just involve modifying the current system, but either way, taking a step back to reassess how this is being done will be of service to the College.

Overall, any of these initiatives would be helpful for Dickinson to take up. But the creation of a whole, well-rounded academic continuity plan has the best cost-to-benefit ratio and is the initiative that I believe Dickinson should prioritize the most. This would do wonders for Dickinson's climate resilience and ability to face adversity, and it would help us serve as a model to other schools of what it means to be sustainable and forward-thinking.

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