



## APPLICATION INFORMATION

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## I. Detailed Project Description:

### Project goals.

This proposal aims to create a sustainable design studio that provides knowledge and services, establishing sustainable print, digital, and systemic design solutions for the University of Illinois campus and eventually for the community. This studio will begin in a phased approach. The first phase begins within a mixed graduate and undergraduate art and design classroom setting that investigates the practice of true sustainability of current design studio models that will lead to a pragmatic structure, ensuring a triple bottom line approach to design and business.

The second phase would be a physical manifestation of the design studio. Connected within the discourse of a sustainable design studio, is the modeling of a paper production studio that focuses on use, re-use and manufacture of paper. Consequently, we aim create prototypes of various materials that address issues of office waste paper by integrating locally grown renewable agri-fibers and blended variants (wood-pulp and cotton). The initial explorations of this paper market will focus on artist's papers, model making and packaging materials as well as related greener options including such products as seed mats that can be placed in areas on campus that would encourage the growth of indigenous plants. It is our desire to use this initial phase as a stepping stone toward creating a signature paper that can be used by not only the print designer but also by office printers of the University of Illinois to aid in their daily job functions (syllabi,

University letterhead, envelopes, posters, etc.) and to offset the consumption of traditional paper sources.

The third phase of this project to develop a model for a regional sustainable paper product source derived from locally grown agricultural product to create a regional commodity from agricultural fiber waste. This investigation should establish a platform to invite undergraduate and graduate students and faculty from areas including, but not limited to ACES, Engineering, GSLIS and well as FAA to pursue future research surrounding recycled paper product and agri-fiber materials and associated sustainable uses. Relationships with industry leaders will be sought as a source for support for the continuation of research projects relating to sustainable materials developed from agri-fiber sources.

### **What is Sustainability?**

Sustainability is not just “being green” and is moreover not easy to achieve. It is interconnected with everything we do, consume and make. Sustainability is defined by finding a balance between the financial, social, cultural and ecological (commonly called the Triple Bottom Line). This balance must allow for the needs of all of us currently alive on the planet to be met without preventing those same needs from being met by future generations (Brundtland Commission, 1987). It means simply to not engage in actions that make things worse for our children, grandchildren, great-grandchildren, and beyond (Seven Generations).

With this definition in mind, our project aims to create a design studio and connected agri-fiber materials lab that contributes to improving quality of life for our local people, wildlife, water, air, and land on campus and community. Our goals are to create University of Illinois printed and digital material more responsibly and empower others in the community, campus and beyond to do so as well. We intend to develop agri-papers made from local crops (corn stover, wheat, straw, soybean waste, and, miscanthus etc.) that will provide a model toward prevention of more carbon absorbing trees from being cut down. When agri-fiber waste papers are constructed they create an additional source of revenue for local farmers, reduce transportation carbon emissions, and prevent needless burning of crop residues that contribute to global warming. Furthermore, in our investigation of papermaking will develop a model for on campus paper reclamation and redistribution?

Out of this initial study, a model for developing and implementing regional paper product from agri-fiber and agri-fiber waste materials that, in their harvest, will decrease carbon emissions immediately. Compared to wood-pulp fiber typically harvested in Northwestern Canada and shipped South, regional agri-fiber and consumer waste paper will emit significantly less carbon emissions since the transport of raw materials will be localized. Additionally, we intend to institute an office-paper reclamation project that will reclaim waste paper and overrun printed matter from across campus to re-make into artist papers and other paper products.

Additional goals include finding ways to:

- Reduce overall water use in manufacture
- Reuse water in manufacture, develop rain water and grey water sources
- Develop and employ energy saving techniques
- Seek additional funding for renewable energy sources
- Employ student workers via a co-op model or through self-sustaining funding.

### **Feasibility evaluation.**

We have already begun the initial investigation into the correct operating model and outcomes of a sustainable print design lab within the ARTD 445 course taught by Eric Benson. In detail, we are exploring the triple bottom line within a design studio as well as the correct studio legal structure, its consulting and design offerings, and marketing plan. This foundational work is currently being funded by the Academy for Entrepreneurial Leadership and will be successful without Student Sustainability Committee funds. Beyond this initial investigation the feasibility of an agri-fiber art paper seems extremely likely, however funds from the SSC are necessary.

There is already precedence for success in the creation of an agri-fiber paper demonstrated by the 2009 MacArthur Fellow Tim Barrett (University of Iowa) As the founding director of the papermaking facilities at the University of Iowa Center for the Book — the only academic program in the United States that focuses on producing traditional Western- and Japanese-style papers, dedicated to create conservation-sound paper from locally grown mulberry bark.

The Women's Studio Workshop in Kingston, NY have created a self sustainable papermaking farm with renewed funding by the Student Conservation Association (SCA), part of Hudson Valley AmeriCorps. The Women's Studio Workshop has also been creating paper since 1979 from over 100 native plant fibers in Kingston, NY.

Our project also has received a good amount of press prior to even launching, which should help spread the word to regional farmers and other collaborators who are interested in helping this proposal become a success. On November 7, 2010 Kay Shipman wrote an article entitled "Designer plants seed to develop homegrown 'agri-paper'" in *FarmWeek* and in the upcoming February 2011 edition of the *Cook County Farm Bureau*, Steve Dwyer is completing his article entitled "Agri-Paper: A 'Tree-mendous' Concept to Be Harvested."

### **Longevity and/or permanence of project results on campus.**

This project is by design intended to be sustainable and a permanent fixture on the University of Illinois campus. We have already received funding from the Academy for Entrepreneurial Leadership to fund the longevity of the art and design course where the initial planning and research will begin and continue each year as required curriculum within the design program. There is an initiative within Soybean Press, (a multi-disciplinary group of faculty, staff and students who share a common goal of promoting the significance of print, paper and the book) to establish a permanent location within the existing University Printing Services building. With a tentative commitment in equipment and space, Soybean Press will house the studio for sustainable print and paper within its operations, allowing for regular student access and community outreach programs, ideally lead by students partnered with faculty sponsors.

### **Project governance structure.**

The School of Art and Design will be the designated area responsible for the physical space and staffing of the facility. Principle investigators will continue seeking funding for student employment, curricular ties and cross-disciplinary relationships to further increase campus and community involvement as well as pursue quantifiable outcomes. Principle Investigators report directly to the Director of the School of Art and Design. Facilities will be under the oversight of the School of Art and Design's Director of Facilities.

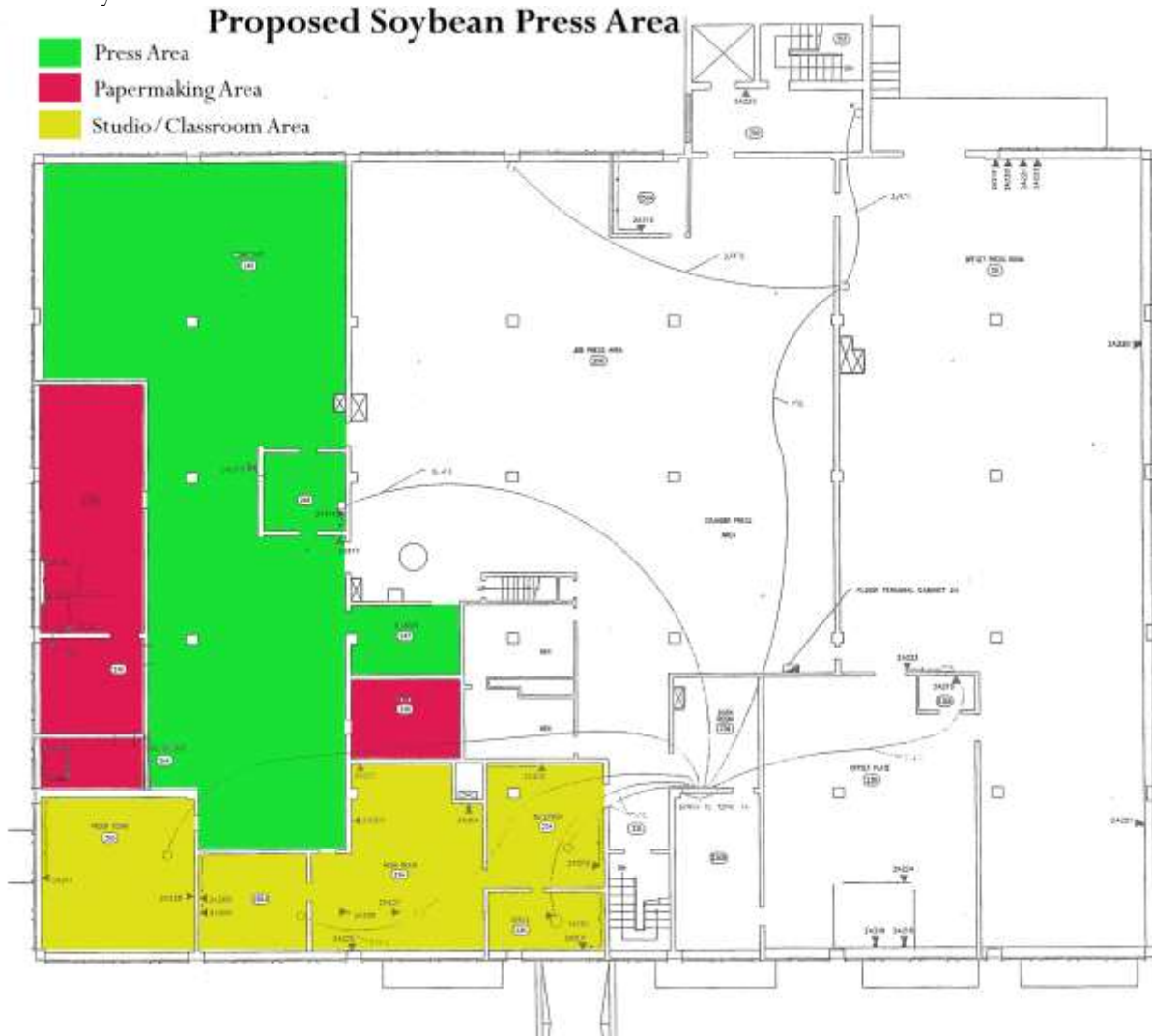
### **A summary of communications with relevant campus administrative entities and Facilities & Services personnel.**

This project has touched many parts of campus already. We have been already collaborating with faculty in Crop Sciences, GSLIS, and Business as well have had high level discussions about the longevity and strategic positioning of these labs within FAA and Art + Design Administration. This

proposal will also have a positive impact on Facilities and Services on campus, so in part of our initial planning for this proposal, we have been engaged with F&S.

**Location, including any concerns that may arise from the chosen site**

With support from Soybean Press, the studio will be able to operate with no overhead for rent or utilities. Soybean is looking for a 10-year commitment from F&S to allow for GSLIS fundraising to secure an endowment for its continuation. Soybean Press has identified a generous portion of their requested space to house the studio for sustainable print and paper, allowing for curricular and community access.



If applicable, comparisons to similar projects at other campuses.

<http://book.grad.uiowa.edu/facilities/papermaking/oakdale>

SCAD sells its artisan paper.

<http://www.allbusiness.com/environment-natural-resources/ecology-environmental/15306904-1.html>

**II. Budget & Fundraising:**

1. Detailed budget for papermaking studio equipment
  - 2-lb. Reina Beater \$8,100, Crating \$200
  - Digital Height Indicator \$235
  - Casters \$140

- Full Size Safety Shield for Tub \$175
- Roll Safety Switch \$700
- 20 amp in-line GFI. \$120
- 50-Ton Hydraulic Press w/ 34" x 26" platen: \$11,250, Crating \$325
- 34" x 26" Rolling Cart and Tray: \$1,150, Crating \$125
- Paper Drying Box \$3950, crating \$200
- Cardboard and blotters \$1400
- Ground Freight shipping costs \$2500
- 119 gallon solar water heater \$7742
- **Total \$36,837 <http://www.davidreinadesigns.com/>**

The maintenance of the paper making equipment is minimal (\$15 a year for blade sharpening) with a life span of minimum 50 years. The solar water heater will require regular maintenance to ensure proper functionality. Its life span will run between 10 and 20 years.

#### Detailed Budget for digital studio equipment

- Apple MobileMe 40GB file storage \$149/year subscription x 2 years = \$300
- (2) 27" 2.8GHz iMac workstations \$4,000
- (2) Adobe Creative Suite Design Premium software \$3,900
- Microsoft Office for Mac, \$149
- AppleCare protection plan, \$169
- Final Cut Studio, \$1,000
- BasecampHQ project management software \$49/month subscription x 2 years= \$1176
- Epson Stylus Pro 7900, \$4,000
- Refillable Ink cartridges, \$1000
- **Total \$15,694**

The maintenance of digital studio will require ink for continued testing of printing on agri-fiber paper. These costs are \$1000 per each full refill, which should be once a year. We hope to minimize this cost by working with local soy ink distributors to refill the cartridges. The Apple products and Epson printers have a life cycle of around 5-6 years, while the software will be in need of update every three years for a price of around \$500 for Adobe software. This upgrade becomes necessary as programs on campus and vendors increase their technological needs.

#### Detailed budget for renewable energy production and water conservation

- 1.88kW Online Solar Grid Tie System, \$7,665.00
- Estimated installation of Solar Grid Tie System by F&S \$6000
- (5) 55 gallon (closed) Prairie Harvester Rain Barrels \$750
- (4) Rain barrel overflow diverters \$120
- **Total \$14,535**

As we are incorporating more energy use into the University of Illinois grid, we plan to offset that energy needed for the sustainable design studio (computers, printing, task lights, and scanning). We are committed to seeking additional funding to provide 100% renewable energy for our papermaking equipment and to replace the current fluorescent lighting at the proposed Soybean Press space with more energy efficient low-voltage fluorescent bulbs.

The water use for the production of paper will also require water from University of Illinois sources. As we work toward being as sustainable as possible, we intend to harness rainwater as a means to

supplement the paper making process. We will also seek future funding as we ramp up our paper production to create a greywater reclamation system to minimize water use.

The solar panels will require minimal maintenance (nine months out of the year), outside of the monthly inspection to remove bird droppings, leaves, and clean off any other dirt and grime. In the winter months there could be a need for more frequent inspections to remove snow and ice. The rain barrels are very easy to maintain year round as they do not have a removable top and require no additional financial upkeep.

- **Total funds requested: \$67,066**

If the Student Sustainability Committee does not fund the requested funds, we will continue to seek monies from internal and external grant sources, however this is obviously not the ideal situation. The course where the Studio will begin has the foundation to continue without the funding, however the results may or may not be realized.

## 2. Fundraising

- Obtained Grants
  - Academy for Entrepreneurial Leadership, \$7,100
  - Annie E. Casey Foundation, \$10,000
- Other sources of potential funding
  - University of Illinois Research Board, (\$30,000)
  - University of Illinois College of Fine and Applied Arts Creative Research Award, (\$500)
  - United States Department of Agriculture Small Business Innovation Research Program, (\$70,000 – 100,000)
  - Illinois Sustainable Technology Center, (\$10,000)
  - VentureLab Green Living, (TBD)

## III. Timeline

Phase 1:

The Sustainable Design Lab research has already begun its work in the ARTD 445 (Spring 2011) course taught by Eric Benson. This class is composed of senior undergraduate and graduate students in economics, and both graphic and industrial design. This interdisciplinary classroom includes faculty guidance from the University of Illinois Business School to augment the discussion and provide expertise in areas of business models and marketing plans. The class will create a sustainable studio model of operation that will go into practice with campus clients at the end of the semester and continue beyond.

Phase 2:

In March of 2011, we will begin the investigation of agri-fiber paper production with soybean and miscanthus moving towards other agri-fibers (including waste) once the growing season begins in the late spring early summer months. We will be utilizing the expertise of Dr. Charles Wisseman who will be visiting the course towards the end of March to help with the set-up and manufacture of agri-fiber papers.

Phase 3:

We aim to have a functioning design lab in use during the Fall of 2011 or Spring 2012 (dependant on funding) with a completion date of Fall 2013 where we will be operating not only a sustainable design studio for campus, but also the production of regional agri-fiber paper.

## IV. Energy, Environmental, Social and Economic Impact

A. Renewable Energy Projects

Not applicable.

## B. Energy Efficiency Projects

Not applicable.

## C. All Projects

### *Greenhouse Gas Impact*

There are four distinct positive impacts this proposal can have on minimizing greenhouse gas emissions.

The first immediate regional impact is the prevention of agricultural residue burning from regional farmers, as the possibility for plant fiber reclamation increases as our project matures. The exact numbers for this greenhouse gas reduction cannot be forecast at this point in the project however, in the United States 1,239,000 ha of croplands burn each year releasing 6.1 Tg of CO<sub>2</sub> into our atmosphere. (McCarty, Korontzi, and Justice, 1) There is currently no carbon- offset incentives in place to encourage farmers to find alternative ways of disposing excess agricultural residue. Creating a market for agri-fiber waste artisan paper will provide one incentive to reduce the burning of waste crops, and in turn reducing carbon emissions.

Secondly, as our intentions are to empower the creation of an agri-fiber and agri-fiber waste artisan paper market through our work on campus, we can significantly impact the greenhouse gas emissions from the transport of wood-pulp paper from forest to pulping mill to paper distributor. Much of the wood-pulp fiber paper used in the United States comes from the forests of Canada and the Southeast portion of the USA (Figure 1). The timber is trucked from the forest to pulping mills, to the paper mills, and then to the distributors who sell the final product to printers and private companies. These pulping and paper mills are scattered across North America (Figure 2) and in many cases thousands of miles from the forest the timber originated.

A quick calculation from the relatively nearby Boreal Forest in Northwest Ontario to the Stora Enso paper mill in Des Plaines, IL shows that in the approximately 800 mile journey will use 133 gallons of diesel producing 2,960 pounds of CO<sub>2</sub>. It is clear that agri-fibers from a regional source will significantly reduce greenhouse gas emissions from shipping.

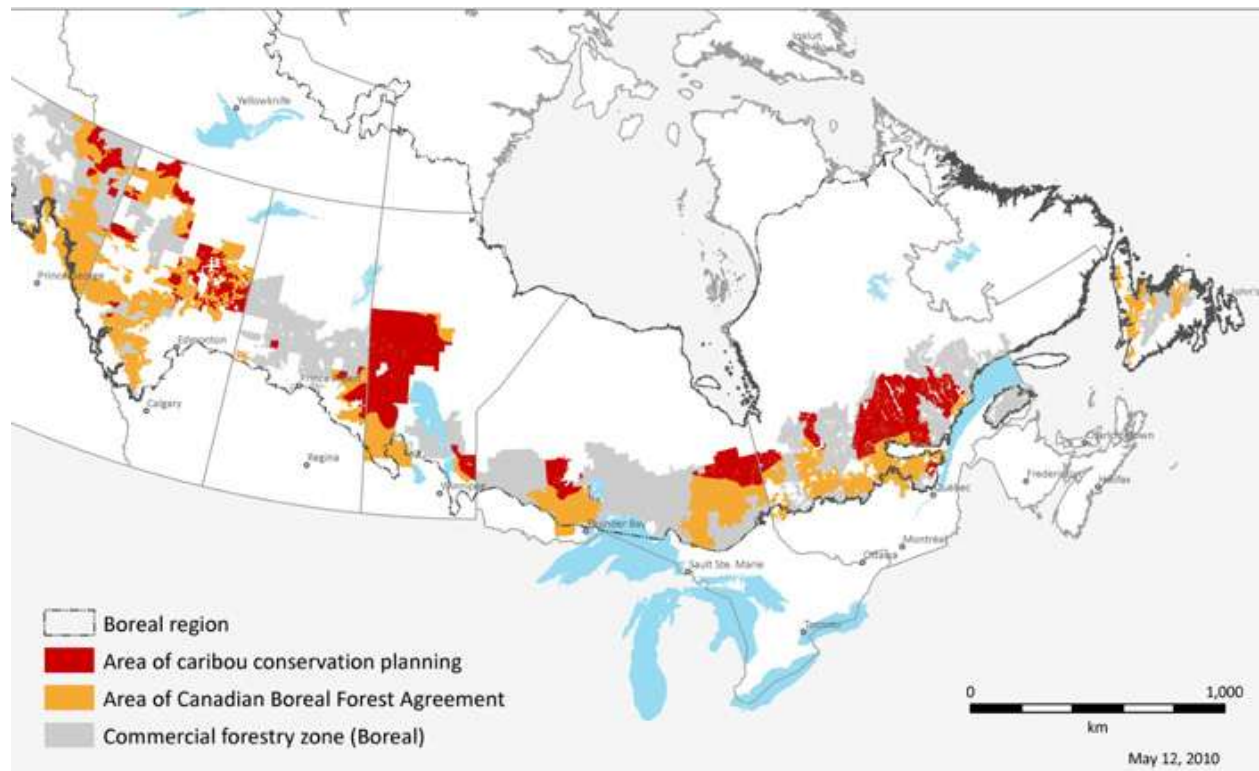


Figure 1: Map of commercial forests in Canada



Figure 2: North American Pulp & Paper Mill Locations



Thirdly, as we help to begin a viable agri-fiber and agri-fiber waste artisan paper market in the region for campus and community use, the demand for wood-pulp artist papers can diminish. Trees are integral to the absorption of existing CO<sub>2</sub> in the atmosphere. It is difficult for us to calculate an exact metric to demonstrate the positive campus and community impacts from reduction of greenhouse gases due to an introductory shift towards tree-less paper. However these metrics can be obtained through the international “Sustainable Design Auditing Project” (<http://re-nourish.com/?l=SDAP-signup>) started by Eric Benson. This project (not connected to this proposal) hopes to create open-source metrics for measuring the environmental, social and economic impacts of the print design supply chain.

Finally, as we also intend to create agri-fiber and wood-pulp fiber blends from the reclamation and reuse of campus office paper waste, we will also negate around 47% of the CO<sub>2</sub> emissions typically produce from virgin wood-pulp fiber paper (Alliance for Environmental Innovation).

## *Other Environmental Impact and Metrics*

### *Social Impact*

Of the social impacts we feel is most critical for us to address in this proposal is the awareness of sustainable design to our students, faculty and staff. The more responsible agri-fiber print materials we create for the University will include an educational component educating students, faculty and staff about the project. Through the design lab itself, we plan to create and execute a marketing plan that not only creates awareness about the lab, but also the sustainable intentions of its services to the University. This marketing will include information about the Student Sustainability Committee and its commitment to funding innovative sustainable projects on campus. This is incredibly important to not only our students (who fund the committee) to see, but also parents and those interested in joining the Illinois community.

Typically social metrics are difficult to measure, however some potential indicators for success could be:

- Increased student fees to the SSC – based on campus elections/voting
- Increased enrollment in environmentally and sustainably-related courses
- Better satisfaction with the quality of printed materials on campus
- Positive regional and community public relations based on visible sustainable leadership shown by the University

### *Economic Impact*

The most important economic impact we aim to improve through this project is to create, not only income for the University of Illinois through design consulting services and agri-fiber paper products, a regional economy. As we do not plan to “corner the market” for agri-fiber and agri-fiber waste papers with this proposal, we hope that its existence will encourage competition from other social entrepreneurs and push the print industry towards a sustainable path.

The success of this metric is the overall sustainability of the project in general based on revenues provided by the lab to University and consequent community organizations. As we aim to empower an increase in the agri-fiber and agri-fiber waste market regionally, an added metric of success can be not only the number of similar endeavors but their financial success as well.

## **V. Outreach and Education**

This component of our proposal is integral for our success. As our ultimate goals are to not only create awareness about the viability of agri-fiber and agri-fiber waste papers regionally, we also hope to empower students and faculty/staff on campus to become social entrepreneurs and further explore this concept in their careers post graduation.

The relationship with Soybean Press will work toward an expanded awareness and access to students and the community. Soybean Press is an important part of the curriculum of the Midwest Book & Manuscript Studies program at GSLIS, which trains special collections librarians from around the country. It also offers public programming events for the Rare Book & Manuscript Library. Curriculum connections to the School of Art + Design have been made and there are plans to develop a more formal sequence in printing and the book arts. We are taking the traditional art of printing in new directions by bringing art, design, printing, and creative writing together in synergistic ways.

- Visibility of the project to students:
  - An open call for participation will go out through the Sustainability Council Newsletter
  - Feature article in the Daily Illini
  - Participation with Earth Day activities on campus
  - Student initiated projects at Figure One Exhibition Space

- Role that students will play in the project:

Students will be involved in developing the model for identifying campus waste paper sources, reclaiming material and creating new paper.

Initial papers will be used to subsidize students in the School of Art and Design in order to offset the amount of new paper consumption.

- Opportunities for involvement in classroom curriculum

- ARTD445
- ARTS499
- ARTD299
- LIS590S
- Development of a cross-listed ART/LIS course on papermaking
- Development of a Discovery course on papermaking
- Development of an online course comparable to ARTD445

- On-site publicity of SSC funding

Permanent plaque of support located in the studio for sustainable print and paper within Soybean Press.

- Media opportunities

- Continued outreach to media channels to draw awareness to events and outcomes
- Documentary of the paper reclamation project to be broadcast through local media channels, Art and Design website, Soybean Press website, GSLIS website
- Article in *Inside Illinois*
- Press releases through *Illinois News Bureau*
- Article in *This Week - ACES*