MEMORANDUM

Date: September 6, 2012

To: Dane County Board Executive Committee

From: Lisa MacKinnon, Sustainability Coordinator / Audit Analyst, Office of the County Board

Re: Printing and Copying in Dane County Government: Opportunities for Reducing Costs, Conserving Resources, and Improving County Sustainability

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As the Sustainability Coordinator and Audit Analyst in the County Board Office, I am seeking opportunities to improve our efficiency in how we use resources to increase the sustainability of our operations and reduce our costs -- both on a department-wide and county operations-wide scale. One of the issues I have been exploring recently is our printing and copying practices.

The following is information I compiled during conversations I had with Pete Patten in Dane County Printing and Services (7/17/12), Steve Howard from the IT Department (8/21/12), and Carolyn Clow in Purchasing (8/31/12). I initiated the conversations to learn about Dane County's current printing and copying practices and to explore opportunities for saving money, reducing waste, and reducing the county's environmental impact, including its carbon footprint from emissions associated with printing and copying.

I. PAPER USE

The Costs of Paper Use
Our paper use has a budget impact and an environmental impact.

A. Budget Impact
Printing and Services purchases paper for most departmental printing and copying needs throughout the year.* Some paper purchases are reimbursed through separate budgets, such as through the Dane County Courthouse budget. Printing and Services currently has a paper contract with an in-state paper producer. Paper prices vary by how much volume is ordered in any given purchase.

Printing and Services manages paper purchasing as a whole system across county operations. They pay between $32 and $35 per carton of paper depending on the volume of the purchase.

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* Except for Alliant Energy Center, Airport, Job Center, and Northport, which do their own paper purchasing.

How Does the Paper We Purchase Add Up?

- 1 ream of paper (the single wrapped package that most people deal with at the copy machine or printer) = 500 sheets

- 1 carton of paper = 10 reams of paper (5,000 sheets)

- 1 skid of paper = 40 cartons (200,000 sheets)

From January through July 2012, Printing and Services purchased 1,480 cartons of paper (37 skids) at a cost of $33 per carton. This is a total of 7,400,000 sheets of paper at a total cost of $48,840.

[NOTE: Approximately 7-8 skids of paper, or about 1,500,000 sheets of paper, went to the Courthouse, which reimburses the county for paper purchases. The approximate cost of the reimbursement to the county would be $9,900.]

How are Departments Charged for Their Paper Use?

For Printing
Stand alone networked printers, fax machines, and networked multifunctional printers are purchased by departments and the department pays for their own paper, toner and outside maintenance service calls, as needed. There is no "per click" charge and there currently is no tracking of the number of prints made.

For Copying
Printing and Services makes a monthly printout for each copier, which is tracked by each department's copy code.

The monthly printout counts each printed side of a copied page, or "click," for copies (e.g., a 2-sided copy of a 2 page original = 2 clicks even though it uses one sheet of paper). Although each "click" is charged, duplexing copies still saves the county money by saving on total purchases of paper. Printing and Services charges departments $0.06 per each "click" that is recorded on the department's copier.

Each "per click" charge includes the following costs:
- Cost of paper
- Cost of lease for machine
- Cost of maintenance contract (includes toner, ink, staples, and service calls)

In contrast, for copying jobs that are performed by Printing and Services for any department, the costs can be much lower depending on the size of the project. (See "Advantages" below).

The project size threshold for where it starts to make sense to send a project to Printing and Services rather than to do it on the department's machine is around 200 "clicks".

Example project
- 2-page agenda for the June 7th County Board meeting
- 100 copies double-sided (equals 200 "clicks")
- Emailed to Printing and Services and received back within a few hours

Cost Comparison:
- Total cost to have Printing and Services do the project: $5.36 ($0.0268 per click)
- *Total cost if the County Board Office had made the copies: $12.00*
- **Savings to County Board Office** by sending the 2-page agenda project to Printing and Services: $6.64 (does not include additional savings in staff time)

This is an example of one relatively small copying job. If you multiply this by numerous similar jobs, you can begin to see the savings add up for each department and across the county operations.

The Advantages to Departments of Using Printing and Services for Larger Copy and Print Jobs vs. Using Individual Department Machines

- **Lower overall copier and printing costs for departments and agencies**
  - Printing and Services uses higher production / faster machines and the "per click" maintenance costs are lower on machines with higher levels of output than on machines with lower levels of output.

- **Speed and efficiency**
  - Printing and Services' higher production machines can complete jobs much more quickly than the average in-department devices.

- **Convenience**
  - Orders for work can be sent via email with files attached (for Fast Copy Requisition) or via DCINet print requisition form. There's no need to make the trip to the Printing and Services office.
  - Currently, around 70% of orders are made electronically. Printing and Services does three project deliveries to county facilities per day to deliver the completed orders.
  - Generally, departments can get same day service for printing or copying jobs that have fewer than 1,000 copies (Fast Copy Requisition).
  - Requests for jobs over 1,000 copies can be made through the Production Print Requisition and can be ordered electronically through the DCINet form. Production Print Requisition jobs do not charge on a "per click" basis, but they take longer to finish. Completion time depends on the size and complexity of each project.

- **Lower overall cost to Dane County for equipment and maintenance**
  - If a significant number of departments sent more of their larger volume jobs to Printing and Services, the county could downsize or eliminate machines in departments and could reduce the number of purchases, leases, and maintenance contracts.
  - Even if demand for Printing and Services increased and they needed another machine, their machine would be a higher production machine and would be a more economical and efficient investment than lower production individual machines.

- **Time saved for other work**
  - Department staff could send larger volume copying and printing jobs to Printing and Services and have more time to attend to other work.

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B.   Environmental Impact

The trees that provide our paper are a renewable resource. However, there are still numerous environmental impacts of using paper and the county should work to minimize these impacts in order to reduce its carbon footprint, reduce waste of valuable resources, and improve its overall sustainability.

- Trees provide critical ecosystem services. Trees alter the environment in which we live (locally and globally) by moderating climate, improving air quality, conserving water, reducing flooding, and harboring wildlife.
- Through the process of photosynthesis, trees remove 100 to 120 billion tons of carbon each year globally. Trees help to remove carbon dioxide from man-made sources (i.e. automobiles, manufacturing, airplanes, etc.).
- Each acre of trees used in making paper removes about 3 - 6 metric tons of carbon dioxide equivalent from the atmosphere every year depending on the age of the trees and other factors.
- When a tree is cut down, the Earth loses a "carbon sink."
- The pulp and paper industry represents around 10% of all global greenhouse gas emissions. This *does not* include the emissions from the logging industry, the shipping industry, or simply the travel of the consumer's car or delivery truck to purchase and deliver paper products.
- The U.S. EPA estimates that paper and paperboard account for almost 40 percent of our garbage nationally. There are financial and environmental costs for processing this waste.
- The average office worker uses 10,000 sheets of copy paper each year.

Sources: U.S. EPA. www.epa.gov; Greenpdf www.Greenpdf.com; Natural Resources Defense Council www.nrdc.org; Forest Stewardship Council www.fsc.org.

See the attached "Paper Calculator" for a calculation of the estimated lifecycle environmental impacts of Dane County's copier/printer paper use from January through July 2012 based on the purchase amounts given by Printing and Services.

II.   PRINTING AND COPYING DEVICES

The Benefits of Moving to Multifunctional Devices
One of the ways we can reduce our paper consumption, as well as toner, ink, energy use, maintenance, and other costs associated with printing and copying, is to use fewer, more efficient multifunctional devices (MFDs) in place of individual single function machines.

An increasing number of Dane County's multifunctional devices do printing, scanning, copying, and send and receive faxes all within one machine. Our recent practice was to have separate, stand alone copier and printer devices. The reason for this was because the HP brand printers and multifunctional devices that IT networked with were more expensive for making copies and other copier brands were not easily networked. Therefore, the county dealt with copying devices separately and those devices were neither networked to nor serviced by the IT Department. A recent change to universal drivers in the Ricoh copiers will make it possible for the county to maximize functionality of the MFDs for future replacements of devices. This should help us to improve efficiency and reduce costs.

The majority of networked printers and multifunctional printing devices serviced by the IT Department are purchased outright by the county.

Printing and Services leases most of the county's copiers and copier multifunctional devices on a 3-4 year lease contract through the State of Wisconsin purchasing contract system. Currently there are approximately 60 copiers located at numerous facilities (16 of which are newer MFDs).. The cost of leasing copiers varies depending on size and capacity, with the average lease cost around $100 per month plus the maintenance contract for each device. Some of the older machines were purchased at the end of their leases and are owned outright by Dane County.

Printer Consolidation Project
Over the last two years the Dane County IT Department has been conducting a printer consolidation project to replace outdated or broken printers with multifunctional devices that perform a number of functions and have the capacity to duplex prints. The savings from this project have been estimated at 25% of original printer costs.

The project goal is to replace older, outdated printers with new, efficient and more energy-conserving models that use less toner and cheaper inks. These devices reduce IT support costs, as well as consume less power and have the capacity to use less paper and produce less waste if duplexing is used as the default.

During this project, the IT Department has assessed the need for individual printers at various locations. At the beginning of this project, the county had approximately 750 networked printers. This was due to many devices being used by individuals at their desks. Many of these individual desk printers were inexpensive, low-production inkjet printers, which cost more money to maintain and operate because the ink is expensive and maintenance tends to be more frequent. The IT Department also has reported that people print less, and therefore use less paper overall, when they use shared devices rather than individual printers.

In the last two years, this printer consolidation project has resulted in a reduction of networked printers from 750 to approximately 500 printers and multifunctional devices. This reduction was a result of moving away from individual desk printers to more centrally located, shared printers and multifunctional devices in various departments.

However, the project is not yet complete. Of the current 500 networked printers, approximately 50%, or 250 have been upgraded to more energy efficient printers or multifunctional devices that have duplexing capability. This means that half of the county's printers still are in need of replacement or retirement in order to take advantage of the additional cost savings from waste reduction, energy efficiency, and less maintenance. The IT Department's goal is to get the total number of networked printers/multifunctional devices down to 350 shared machines. This would result in additional cost savings for the county. Again, there is even more opportunity to get increased efficiency with the remaining replacements due to the greater flexibility IT has with the new Ricoh MFDs.

III. CHALLENGES OF REDUCING COSTS AND INCREASING BENEFITS TO THE COUNTY

- **Separate systems for printers and copiers**
  Our current system of procuring, operating, and maintaining printing and copying devices separately has created inefficiencies and additional costs. With the availability of new options for universal devices this can change.

- **Duplex printing is not always possible**
  Sometimes departments are required to do single-sided copying and printing. The Court, Sheriff's Office, Child Support, and Land and Water Resources Departments all have standard materials they must print one-sided (maps, court docs, etc.) either because the of the nature of the material (maps) or because regulations require one-sided documents (some court documents).

- **People who currently have an individual desk printer are not inclined to give it up**

- **Old Habits**

IV. RECOMMENDATIONS FOR OUR PRINTING AND COPYING PRACTICES TO REDUCE COSTS, IMPROVE EFFICIENCY, AND REDUCE NEGATIVE ENVIRONMENTAL IMPACTS

Efforts to improve the efficiency of our printing and copying practices have been occurring across Dane County departments. However, there are additional opportunities to achieve cost savings, reduce our waste, and improve our efficiency and overall sustainability.

A. Policy and Practice Changes:

Printing and Copying Devices
1. Develop a formal, comprehensive policy on procurement, replacement and operation of printing and copying devices to increase efficiency of devices and reduce purchase, operation and maintenance costs that includes the following:
   a Research options for replacing the existing separate procurement, operation, and maintenance systems for printers and copiers; determine whether most multifunctional devices can include copiers and can be networked to maximize functionality and reduce current costs.
   b. Replace the remaining old, inefficient individual networked printers with centrally located, shared printers and multifunctional devices across departments (consider whether the new multifunctional devices can include copiers, per "a" above).
   c. Guidance on environmentally preferable purchasing options that address recycled toner and paper, inks, etc. and responsible device disposal policies.

Recommendations: Policy and Practice Changes (continued)

Paper Use

2. Develop a formal, comprehensive policy on printing, copying, and paper use that includes the following:
   a. Requirement to set all networked multifunctional devices to default to duplex printing and copying
   b. Guidance for departments and agencies for how to reduce paper consumption in their operations by requiring fewer printed materials. This could include going to paperless committees, but we would need to research and consider tradeoffs, including what the CO_2 footprint of this strategy is given our current coal-based power supply). (For an example, see Attachment A, *Implementing a Paperless Committee Strategy*).
   c. Guidance on good-on-one-side (GOOS) copying and printing (rather than simply putting this paper in the recycling bins, as is currently done)
   d. Guidance regarding when departments should use Printing and Services rather than in-department copying and printing
   e. Guidance on when departments can use outside printing and copying services
   f. Guidance on powering down various devices to reduce electricity consumption

B. Communication:

1. A clear message about the expectations and benefits of new policies and practices should accompany their implementation and should be reiterated on a regular basis. This message should come jointly from the County Board, County Executive, and Department heads.
2. Signage should be posted in departments and by devices to remind staff of new policies and best practices.
3. The county should consider developing incentives / rewards for departments and agencies that show a strong commitment to the new policies and practices and reduce their consumption and costs.
4. Develop and regularly disseminate information about services available to departments from Printing and Services

C. Measurement of Progress:

The county should institute a tracking system to be able to measure the actual cost savings, resource reductions, and emissions impacts of policy and practice changes.

ATTACHMENT A

Implementing a Paperless Committee Strategy:
An Example from the Dane County Public Works and Transportation Committee

August 2012

The Public Works and Transportation Committee (PWT) has been operating as an essentially paperless committee for about 18 months. Here is how they approached the decision to reduce their committee's paper use and implemented their paperless committee strategy.

1) The issue of moving to a paperless committee was put on the committee's agenda for discussion.

2) The committee discussed the issue and worked with staff to identify how transitioning away from paper committee packets and other materials would work for committee members and staff:

   a   The committee requested that PWT staff send out all documents as PDF attachments with the agenda. They normally meet on Tuesdays, so staff sends out the agenda and the attachments on the Friday before the meeting. The chair gets the draft agenda on Thursday to approve/change and then staff sends all attachments to the committee and all other recipients the next day.

   b.   Some committee members did not have portable computers, so staff (Jerry Mandli) said he would bring a projector and computer to committee meetings so the chair of the meeting could bring up and display each agenda item on the wall or screen.

   c.   Some committee members bring their own laptop computers or tablets.

   d.   Agendas and handouts are emailed to committee members in advance so that they don't have postage costs or paper costs

   e.   Some committee members still like having a hard copy of the agenda. They print it out for themselves at home if that is the case.

3) Outside Presenters: The committee asks presenters to bring information via USB drives so they can be loaded onto the laptop and displayed on the projector screen/wall.

   a.   Most presenters abide by that request. Some will re-use the paper if they feel they absolutely need to show the committee members something on paper.

4) <u>Day of the Meeting</u>: On the day of the meeting, staff will set up a laptop and projector and will display all of the PDF attachments on the screen as they are discussed by the committee.

   a. A few copies of the meeting agenda are always available for the public.

   b. Various committee members might print a particular resolution or ordinance that is on the agenda, but most view the screen and take notes on their printed agendas or on their computers/tablets. Extra paper copies of attachments are not made available at the committee meeting. Committee members either bring their own or view them on the projector screen.

<u>Pros and Cons of this approach:</u>

Pros:
- Saves paper, which saves money, trees, and reduces Dane County's contribution to greenhouse gas emissions.

- Saves postage costs when paper packets are not mailed

Cons / Considerations:

- Time of each PDF material displayed on the screen might be viewed as inadequate or as too long, depending on whether committee members have been able to review their packets prior to the meeting and decide on their actions. It is important to have adequate time for the item on the screen if committee members have detailed questions or want to make an amendment.

- It would help to have a pointer available to the committee, especially when reviewing maps or photos. Some of the maps committees receive are large files and staff usually brings hard copies of those.

- Sometimes difficult to get other department staff members to forward their attachments either to committee staff by the Friday before the meeting or at least on the Monday before. If they don't have time they could also bring a flash drive to the meeting for projecting onto the screen or wall and then email out the attachments after the meeting.

- It is important that all departments have access to and are comfortable using a laptop and a projector.
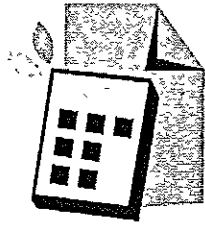
Paper Calculator
presented by environmental paper network

Lifecycle Environmental Impact

The following is a break down of the environmental impact of your choices. These impact estimates were made using the Environmental Paper Network Paper Calculator. For more information visit www.papercalculator.org.

Remember to cite Environmental Paper Network when using information provided by the Paper Calculator. A sample citation is available at www.papercalculator.org.

Wood Use	99 tons
Net Energy	1,114 million BTU's
Greenhouse Gases	189,266 pounds CO2 equiv.
Wastewater	740,540 gallons
Solid Waste	64,467 pounds
NOx	349 pounds
Purchased Energy	832 million BTU's
SO2	989 pounds
Particulates	200 pounds
Hazardous Air Pollutants (HAP)	84 pounds
Volatile Organic Compounds (VOCs)	96 pounds
Total Reduced Sulfur (TRS)	15 pounds
Total Suspended Solids (TSS)	577 pounds
Chemical Oxygen Demand (COD)	853 pounds
Biochemical Oxygen Demand (BOD)	340 pounds

Explanation of Data Values

Wood Use

Wood use measures the amount of wood required to produce a given amount of paper. The number of typical trees assumes a mix of hardwoods and softwoods 6-8" in diameter and 40' tall. Calculated collaboratively by Conservatree, Environmental Defense Fund, and Environmental Paper Network.

The Dane County Jan-July 2012 Group uses 99 tons, made from about 638 trees

Net Energy

The Paper Calculator includes an energy credit for energy that is created by burning paper – or the methane that decomposing paper creates – at the end of its life. The Net Energy takes the total amount of energy required to make the paper over its life cycle, and subtracts this energy credit. If most of the energy used to make the paper is purchased, then the energy credit might make the Net Energy lower than the Purchased Energy. The average U.S. household uses 91 million BTUs of energy in a year.
The Dane County Jan-July 2012 Group uses 1,114 million BTU's, the equivalent of about 12 homes/year

Greenhouse Gases

Greenhouse gases, including carbon dioxide (CO_2) from burning fossil fuels and methane from paper decomposing in landfills, contribute to climate change by trapping energy from the sun in the earth's atmosphere. The unit of measure is CO_2 equivalents. The average car emits 11,013 pounds of CO2 in a year.

The Dane County Jan-July 2012 Group uses 189,266 pounds CO2 equiv., the equivalent of about 17 cars/year

Water Consumption

Water Consumption measures the amount of process and cooling water that is consumed or degraded throughout the life cycle of the paper product. The largest components of water consumption come from the production of purchased electricity, and the use of process and cooling water at pulp and paper mills. Water volume indicates both the amount of fresh water needed and the potential impact of discharges on the receiving waters. 1 Olympic-sized swimming pool holds 660,430 gallons.
The Dane County Jan-July 2012 Group uses 740,540 gallons, the equivalent of about 1 swimming pools

Solid Waste

Solid Waste includes sludge and other wastes generated during pulp and paper manufacturing, and used paper disposed of in landfills and incinerators. 1 fully-loaded garbage truck weighs an average of 28,000 pounds (based on a rear-loader residential garbage truck).

The Dane County Jan-July 2012 Group uses 64,467 pounds, the equivalent of about 2 garbage trucks

Nitrogen oxides (NOx)

Nitrogen Oxides (NOx, which include NO and NO_2) are products of the combustion of fuels that contain nitrogen. NOx contribute to acid rain and can react with volatile organic compounds and sunlight in the lower atmosphere to form ozone, a key component of urban smog. The average 18-wheel truck emits 261 pounds of NOx in a year.

The Dane County Jan-July 2012 Group uses 349 pounds, the equivalent of about 1 18-wheelers/year

Purchased Energy
A subset of total energy, **purchased energy** measures how much energy comes from purchased electricity and other fuels. The unit of measure is British Thermal Units (BTUs). The average U.S. household uses 91 million BTUs of energy in a year.

The Dane County Jan-July 2012 Group uses 832 million BTU's, the equivalent of about 9 homes/year

Sulfur dioxide (SO₂)

Chemical compound produced when boilers burn fuel that contains sulfur. Of the fuels used in the paper industry, oil and coal generally contain the highest quantities of sulfur. **Sulfur dioxide** contributes to air pollution problems like acid rain and smog. The average 18-wheel truck emits 5.5 pounds of SO2 in a year.

The Dane County Jan-July 2012 Group uses *989 pounds, the equivalent of about 180 18-wheelers/year*

Particulates

Particulates are small particles generated during combustion, and pose a range of health risks, including asthma and other respiratory problems, when inhaled. The average urban bus emits 11.2 pounds of *particulate matter in a year.*

The Dane County Jan-July 2012 Group uses 200 pounds, the equivalent of about 18 buses/year

Hazardous Air Pollutants (HAP)

Hazardous Air Pollutants are any of a group of 188 substances identified in the 1990 Clean Air Act amendments because of their toxicity.

The Dane County Jan-July 2012 Group uses 84 pounds

Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOCs) are a broad class of organic gases, such as vapors from solvent and gasoline. VOCs react with nitrogen oxides (NOx) in the atmosphere to form ground-level ozone, the major component of smog and a severe lung irritant.

The Dane County Jan-July 2012 Group uses 96 pounds

Total Reduced Sulfur (TRS)

Total Reduced Sulfur compounds cause the odor associated with kraft pulp mills. Exposure to TRS emissions has been linked to symptoms including headaches, watery eyes, nasal problems, and breathing difficulties.

The Dane County Jan-July 2012 Group uses 15 pounds

Total Suspended Solids (TSS)

Total suspended solids (TSS) measure solid material suspended in mill effluent, which can adversely affect bottom-living organisms upon settling in receiving waters and can carry toxic heavy metals and organic compounds into the environment. The average home discharges 207 pounds of Total Suspended Solids (TSS) in a year.

The Dane County Jan-July 2012 Group uses 577 pounds, the equivalent of about 0 homes/year

Chemical Oxygen Demand (COD)

Chemical Oxygen Demand (COD) measures the amount of oxidizable organic matter in the mill's effluent. Since wastewater treatment removes most of the organic material that would be degraded naturally in the receiving waters, the COD of the final effluent provides information about the quantity of more persistent substances discharged into the receiving water. The average home discharges 465 pounds of Chemical Oxygen Demand (COD) in a year.

The Dane County Jan-July 2012 Group uses 853 pounds, the equivalent of about 2 homes/year

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand (BOD) measures the amount of oxygen that microorganisms consume to degrade the organic material in the wastewater. Discharging wastewater with high levels of BOD can result in oxygen depletion in the receiving waters, which can adversely affect fish and other organisms. Average home discharges 186 pounds of Biochemical Oxygen Demand (BOD) in a year.
The Dane County Jan-July 2012 Group uses 340 pounds, the equivalent of about 2 homes/year

Paper Calculator Input:

paper 1, Uncoated Freesheet, 38 tons/year, 30% recycled

The Paper Calculator is based on research done by the Paper Task Force, a peer-reviewed study of the lifecycle environmental impacts of paper production and disposal. The underlying data in the Paper Calculator are updated regularly.

Questions? Comments?
Contact Environmental Paper Network

For more information visit http://calculator.environmentalpaper.org/.