

“Some believe that the paperless office is not that far off.”

- BusinessWeek, “The Office of the Future”, June 30, 1975

“The point is, whenever a transition to new ways of working takes place, it takes time and money. And for some people, the new ways may never be seen to be as good as the old ways of working.”

- The Myth of the Paperless Office¹

“Given the advantages of a paperless office, why is society not yet there? ... Rest assured that the advantages of going paperless will largely outweigh paper-based work practices.”

- Paperless Joy²

¹ Sellen, Abigail J. and Harper, Richard H.R. *The Myth of the Paperless Office*, Massachusetts Institute of Technology, Copyright 2002.

² Dimopoulos, George, *Paperless Joy: paperless Business & Lifestyle Design with Information & Communication Technology*, Published by Digital Life Artist, Inc., Baltimore, M.D., Copyright 2008

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I. History and Groundwork

A. *Going Paperless – a slow trip*

A 1975 Business Week article is believed to be the first known reference to the idea of the “paperless” office. The article goes on to discuss how the personal computer revolution would put an end to paper records and book keeping.³

From 1990 to 2000, however, consumption of paper in the United States on a per-worker basis increased by more than 50% and global consumption of paper *doubled* between 1980 and 2000.⁴ Sociologist Richard York, in an article published in 2006, actually goes so far as to develop the *Paperless Office Paradox* principle, which suggests that “the development of a substitute for a natural resource is sometimes associated with an increase in consumption of that resource”.⁵

It turns out, though, that while visions of a “paperless revolution” might have been a bit premature, advances in digital storage, digital screens and an explosion of smart devices are beginning to have a huge impact. Since the year 2000, the use of office paper in the U.S. has dropped 40% and the use of news print has dropped 60%.⁶ European countries have seen similar declines.

Closer to home, data for state regulatory commissions indicates that about 70% of state public utility commissions have some type of “e-filing” system, although many still require some type of paper to be filed in addition to the e-documents. This wide-spread adoption of e-filing technologies shows the desire to make processes more efficient as well as environmentally friendly.

B. *Electronic Regulatory Filing in Wisconsin*

At the Public Service Commission of Wisconsin (PSCW), we began consideration of electronic filing slightly after the turn of the century, but our plans to purchase a top-of-the line electronic document management (EDM) system fell far short. In 2002, severe budget cutbacks totally removed the allocated funds from the agency’s budget, forcing us to go back and reassess how to get started. Discussions began with our IT applications team, who concluded that they might be able to create *part* of the necessary components using a web-based application they could develop.

Thus, the effort to convert to the use of electronic documents was split into two phases. The first phase would create a system to receive official documents from outside customers in electronic form. The second phase would be to create a

³ BusinessWeek, [The Office of the Future](#), June 30, 1975.

⁴ Adams, Cecil, [Whatever happened to the "paperless office"?](#), The Straight Dope, July 14, 2011.

⁵ York, Richard, [Ecological Paradoxes: William Stanley Jevons and the Paperless Office](#), Human Ecology Review, Vol. 13, No 2, Copyright Society for Human Ecology, 2006

⁶ The Economist, [“Not Dead, Just Resting”](#), October 9, 2008

repository for internal workflow processes and documents. The goal was to manage these documents electronically from inception to archival.

The first phase of our project was called the *Electronic Regulatory Filing* system or ERF. Our IT staff worked with business staff to set up the standards and parameters for its use. It was designed to receive both public and confidential documents and to sort them by the *docket number* or *case number* in which they belonged. This would first require a login system and then a series of individual and corporate accounts for managing the users of the ERF system. However, the system needed to remain open as much as possible so that anyone with a web browser could access public documents at any time. Standards were developed for the format of documents (largely PDF) and the document types (Correspondence, Memorandum, Report, Comment, etc.) that could be selected to label each document filed. Criteria were also developed for the size and number of documents that could be filed at one time.

One of the most crucial issues to be determined was which version would be the “official” version of the document – the electronic or the paper version? After a great deal of debate (and consultation with our attorneys), the **key decision** of our electronic filing project was made: The **electronic** version would be **the official version** of the document. This would apply to all filings of any kind and all document types.

This determination was critical in beginning to reduce the use of paper documents. Even though Commission staff could still request paper for certain applications, and utilities might be requested to file a certain number of copies for distribution to the Commissioners, the PSCW began to reduce the number of paper filings required from around twenty to fifteen to ten and eventually to one or none.

The ERF system went online on January 1, 2004 for nearly all utilities and, within a year, became the only way to file documents with the PSCW. While it primarily requires users to file PDF documents, the system also allows utilities and consultants to file Excel spreadsheets. Over the years, it has been enhanced to allow for other file formats, including .WAV files for audio recordings of Commission hearings.

Another important step in the adoption of our Phase I - electronic filing was the decision to make some real and impactful changes to our business processes. At each step of the development of the ERF system (and later, our EDM system), the basic question was raised: Why are we doing this? Or why is this required? Through a fresh analysis, certain extraneous documents (like affidavits of filing or cover letters) and unnecessary actions (like signing of certain documents) were modified to eliminate several steps in the process. This made our electronic filing requirements easier to understand and less onerous with which to comply.

And finally, a decision had to be made whether or not to allow scanned documents. Many document management programs emphasize scanning and

capturing in order to convert massive amounts of existing documentation to electronic form. *This can be an incredibly expensive undertaking.* We chose to start from 1/1/2004 to require electronically filed documents only – any cases which began prior to that date would continue to their conclusion on paper. At the beginning, scanning of documents was allowed from outside parties, but heavily discouraged, as clientele were often unfamiliar with optical character recognition (OCR) or capture software, hence documents that were scanned could not be indexed for searching. As time and technology progressed, the need for scanning has reduced dramatically.

C. *Partitioning the Project – The two-phase implementation*

While the filing system (ERF) was relatively straightforward to build, we knew at the time that we could not expect to create an *entire* document management (EDM) system from scratch – there are just too many components. The PSCW also wanted to pursue client-server applications, because web applications were just beginning to take off. Moreover, we anticipated that any sudden change to a paperless environment would be an awkward paradigm shift for Commission staff. Mindful that we were already asking people to store and treat their documents in a different way than that to which they were accustomed, suggesting that all of their file access and operations would be done through a web browser would have put some users right over the edge. Thus, our decision to introduce web functionality later in the process. As it was, we met a fair amount of internal resistance, which will be addressed in a later section.

We also determined at the outset of our ERF system that we would deal almost exclusively with final-form PDF documents. This initially avoided all the steps involved in dealing with the document creation process and also steered clear of the wide variety of file types that can and are created in an office setting. We later allowed the filing of other file formats (like Excel, WAV files, MOV files, etc.), but with such a basic system of electronic filing, we initially didn't want to make it any more complex than was already required.

IT staff had planned all along to create a two-tiered system: in Phase I, for *external* filings, the repository for official commission documents in electronic form (ERF), and in Phase II, the *internal* workflow process and repository for commission documents in an electronic document management system (EDM). Because the ERF project in Phase I turned out to be universally accepted and acclaimed,⁷ this helped prepare both management and staff for the more daunting task of Phase II -- adopting and implementing a full-featured EDM system, complete with custom-designed workflow processes, templates, and custom application “add-ons”. However, implementing a customizable system would prove more challenging.

⁷ In fact, the PSCW's ERF system was awarded a Digital Government Achievement Award in the Government to Business Category in 2005.

The ERF system primarily benefited outside parties (utilities, public interest groups, attorneys, consultants, etc.) by giving them access to all of the official documents of the PSCW *and* by saving them time and money in not having to produce these documents on paper. However, other than support staff and records management, ERF didn't significantly affect the lives of most Commission staff in the daily preparation of their own documents (memos, letters, orders, notices, testimony, exhibits, etc.). Precisely because it would involve every staff person at the PSCW, and need to meet the needs of each division, selecting and rolling out a feasible EDM system for Phase II would be the more arduous task. And implementation of the EDM system at the PSCW changed everything.

D. The PSCW's Changing Environment

As with many, many government agencies, in an era of shrinking budgets and reduced staff the PSCW has also found itself with fewer and fewer staff positions. For example, the agency's Records Management Unit (RMU) once consisted of *nine* full-time staff. They handled receipt of paper documents, distribution of all mail, recording and indexing of all documents received, copying and printing for all documents distributed by the agency and a host of other tasks. When a letter was received at the PSCW, it might have taken as much as three days from the time the letter was received in RMU to the time it actually made it to the desk of the intended recipient.

Today, with the implementation of the ERF system and, subsequently, our internal EDM system, the PSCW's RMU unit consists of only *three people* – who handle nearly all of the same tasks that previously required nine people. Nearly everything today is done electronically – including the mailing of many documents through e-mail. Similar reductions have occurred among the secretarial staff. The PSCW itself has been reduced from 175 staff in 2001 to about 140 full-time staff today – yet we continue to process nearly as many cases and documents as before.

On average, the PSCW handles 500-600 new cases each year (although this number is starting to decline after passage of legislation in 2011 that mostly deregulated telecommunications providers in Wisconsin). Through the various dockets and other activities, we process 15,000-16,000 documents into the ERF system every year. Currently, there are over 200,000 documents in our online ERF system. The figures below show the progress of our ERF system since its inception (Figures 1 and 2 – next page).

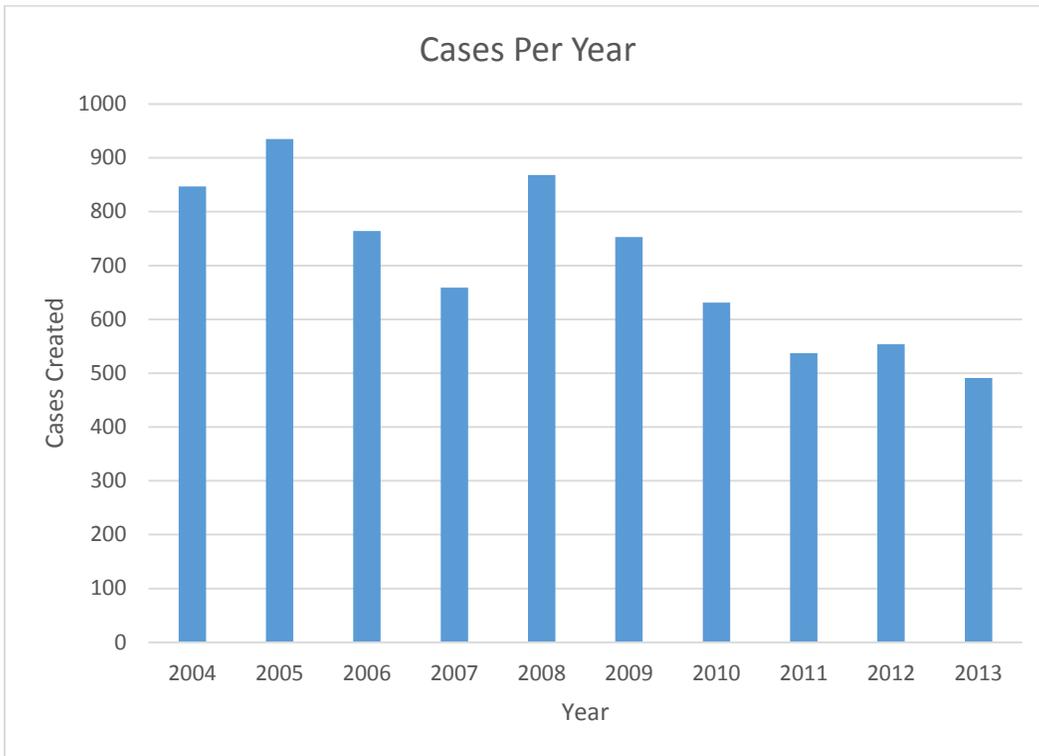


Figure 1

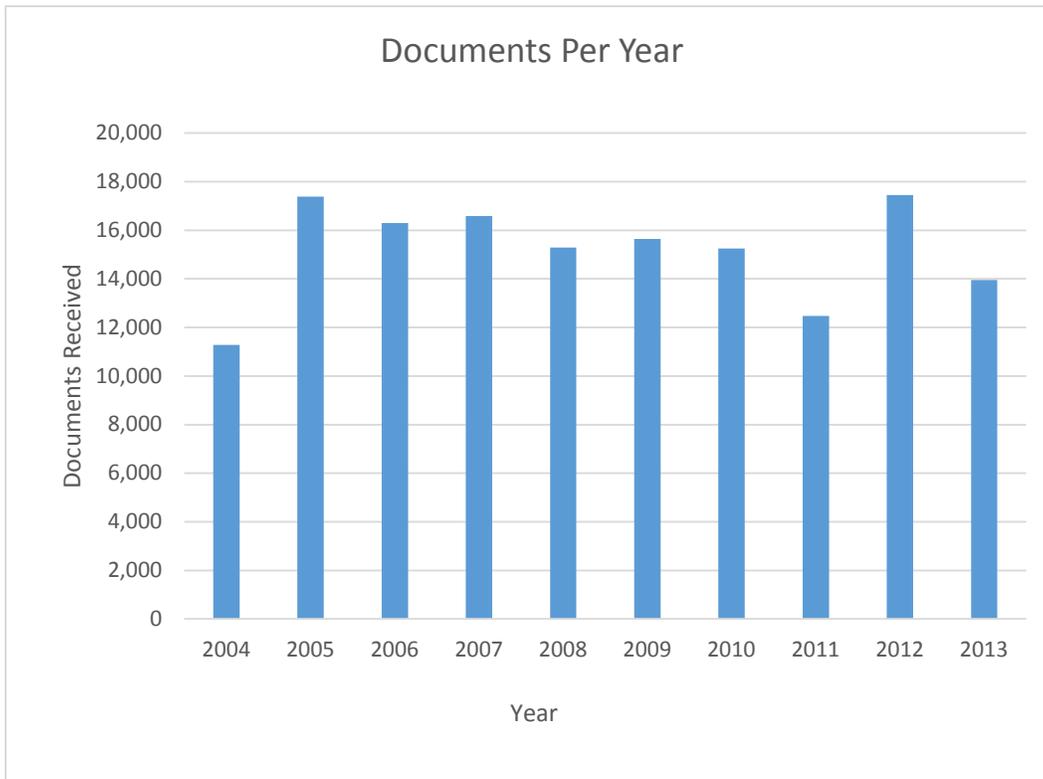


Figure 2

II. Basic Mission of State Commissions

For years and years, state regulatory commissions around the country have carried out their mission: to balance the interest of ratepayers and shareholders and assure that reliable utility service is provided at rates that are fair, just and reasonable. In order to accomplish these key tasks, state utility commissions have always needed to collect and store enormous amounts of research and data to analyze utility company applications for construction, rate adjustment, stock issuance and other actions. Some of these actions require detailed examinations of environmental impacts, line routes or constructions sites, consideration of alternatives to these actions, and so forth – all in all, a lot of paper and a lot of trees went missing to satisfy the requirements every state commission has to review and act upon various utility applications.

At the heart of all this paper is the myriad of processes necessary to collect and review massive amounts of information, hold hearings on the issues to allow all participants to be heard, make decisions after reviewing all of the information and then issue orders from the agency outlining the information considered and the thought process behind the decision. To oversimplify the mission of state commissions: Applications come in and Orders go out. Along the way, a mountain of documents are produced, digested, sifted and winnowed before the final product is created and completed.

A. Sub-processes occur along the way

Not unlike Wisconsin, other state commissions will have a series of *sub-processes* performed from the time an application is received to the time an order is issued by the Commission. These sub-processes usually have a distinct beginning, middle and end which often follow very similar procedures. Examining these sub-processes is the first step in creating a made-to-order idea of what your EDM system should include. The following is a sample of sub-processes used by the PSCW:

1. *Notice of Investigation/Proceeding*
A notice issued by the PSCW to inform interested persons and groups that an application has been filed by the utility and that the Commission intends to investigate the request – sometimes without hearing (investigation) and sometimes with a hearing (proceeding).
2. *Notice of Hearing*
A notice issued by the PSCW to inform the public and other interested parties of the time and place for the public and technical hearings on the case.
3. *Testimony and Exhibits*
The documents prepared by the parties and Commission staff to present evidence for the Commission's consideration in making its decision.

4. *Hearings (and transcripts)*

A process of holding public hearings is conducted, complete with either a transcript of the entire proceeding or, more recently for some cases, an audio recording of the process.

5. *Decision-Making (Memoranda and Decision Matrices)*

The PSCW meets in open session with a specified agenda and discusses the various cases that have reached the stage where all the evidence has been collected and the matter is ready for the Commissioner's decision. Usually, the Commission staff prepares a memorandum summarizing the issues to be decided by the Commissioners and (sometimes) prepares a decision "matrix" of each issue to be decided and each party's position on the issue.

6. *Briefs and Reply Briefs*

In very contentious cases, attorneys for various sides of the issue may want to file briefs in support of their positions and reply briefs in opposition to the beliefs of opposing parties.

7. *Agendas / Minutes*

The Commission itself as well as various groups associated with the Commission and its staff have numerous meetings which require the preparation and posting of agendas and minutes of the meetings. These meetings are generally open to the public as defined by Wisconsin's Open Meeting laws.

8. *Orders and Final Decisions*

After its deliberations, the Commission staff prepares a draft of a written statement which reflects the decisions made on the issues by the Commissioners, which after approval is signed and issued by the Commissioner's office.

When we examined all of the sub-processes involved in processing a single utility application, we noted that all of this information was being bound into *several* three-ring binders of paper for the Commissioners, their executive assistants, the chief counsel and the administrators of each division. In addition, a separate set of binders is assembled for each Commission Agenda, as well as each contested case to be decided by the Commissioners.

*Essentially what we discovered is that the **Commission Binder Process is an amalgamation of all the other sub-processes** involved with each case. (See Figure 3 – next page) This was a significant entry point to allow us to break down the work of the agency into its various component processes.*

PSCW Formal Case Process

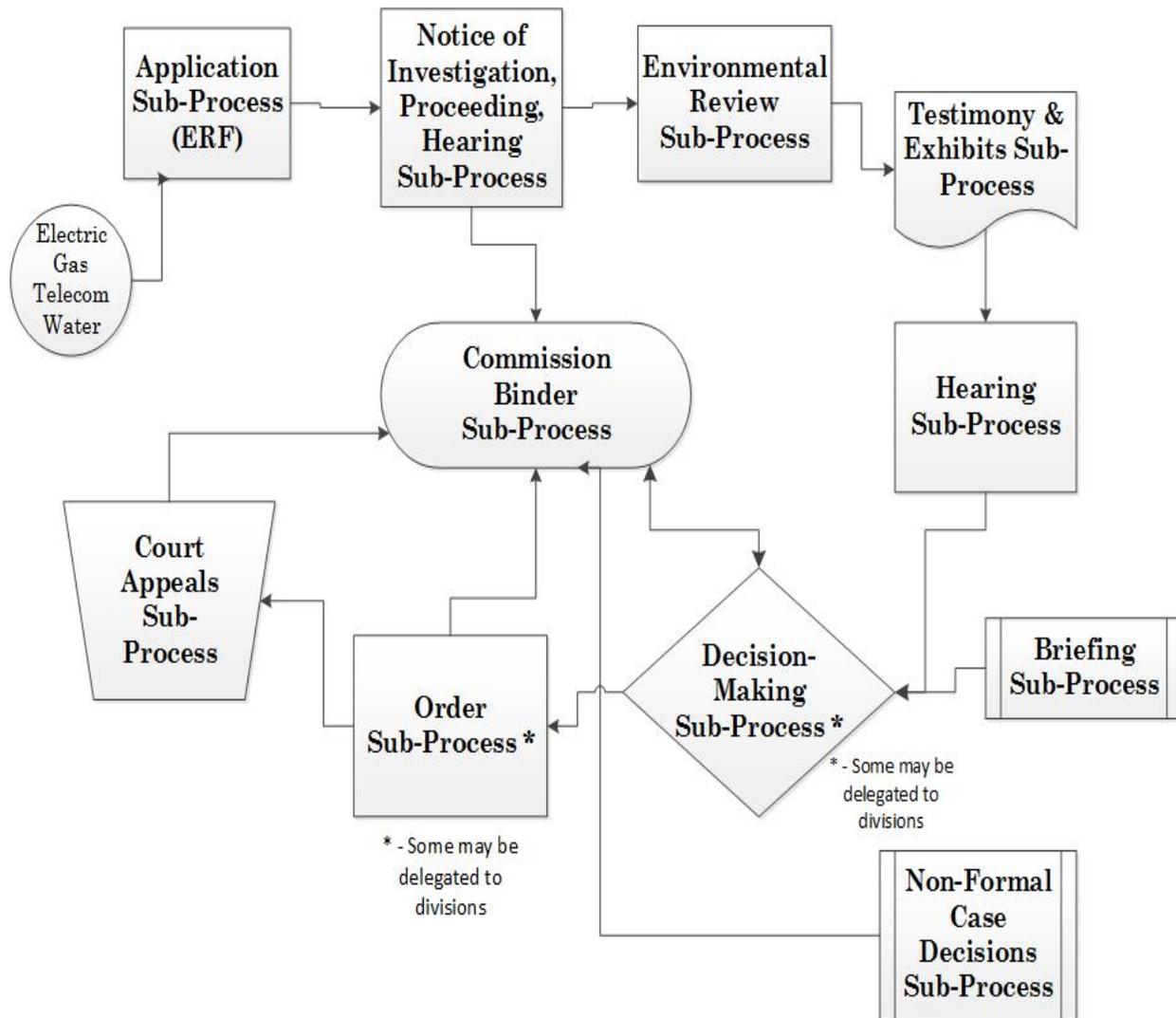


Figure 3

III. Electronic Document Management – Software & Standards

A. *What is EDM and what features should it have?*

For purposes of this paper, we will define the purpose of an electronic document management (EDM) system as “to minimize or eliminate paper documents by employing information technology systems to create, distribute, review, revise and manage documents in electronic form throughout their lifecycle”. Such systems can have many different feature sets. At last count, there were hundreds of commercially-available, off-the-shelf software packages that purport to provide EDM feature sets. On certain websites, you can select from nearly 400 different packages based on their features. ^{8,9}

What characteristics do EDM systems typically have that you should look for? The list can be quite long, but the common areas are these:

- Systems can be either client-server based, web-based or both but in most all instances, all documents and metadata are stored in a database, not in a typical file server environment.
- Check-out and check-in process with version control to allow collaboration without losing any changes or edits and to allow prior versions to be promoted to the current version.
- Integration with the most common office software, including Windows, Microsoft Office, Adobe Acrobat and other customary office software applications. Those EDM products that tend to stay current with the other technologies will allow the organization to grow along with other technology trends.
- Profile and/or metadata tagging for easy search and retrieval of documents and for workflow customization.
- Full-text indexing to allow all documents to be searched for keywords and other properties.
- Drag-and-drop, copy-and-paste or save directly to the document repository from within familiar business applications.
- Automated, rules-based workflow with document routing, review, approval and accountability which can be customized to specific business operations and workflow management tools to maintain the workflows.
- Remote access to the documents in the repository through a secure web browser while the information is maintained on site at your location.
- Records management functions to allow identification, storage and disposal of business records according to specifically-defined records disposal authority.
- An Open SDK (Software Developer’s Kit) or API (Application Programming Interface) which allows customized add-ons to be developed to more fully integrate the organization’s existing operations with the document management system.

⁸ See <http://www.capterra.com/document-management-software/> or

⁹ See <http://document-management.findthebest.com/> .

- A document “log” or audit trail that enables the complete tracking of all actions taken on a particular document, including workflow tasks, to promote accountability (sometimes known as “apportioning blame”).
- Security capability to limit access to certain areas of the repository the same as you would with a file server, preferably linked to Active Directory for consistency with Windows system security.
- Optional scanning and imaging components to allow easy capture and automation of paper documents, if desired.

These are the primary features that most of the offerings will have in today’s commercial software market. Those that are designed for larger businesses will be more robust and scalable, but the product chosen by the PSCW is a good fit for even mid-size companies (up to 15,000-20,000 employees), so it will certainly do the job for all state public utility commissions.

B. How do I pick a system?

The features we have found to be the most critical and useful in creating a paperless environment are the document versioning and audit log, the Check-out/Check-in process, using the metadata with ODBC dynamic properties, the seamless integration with Windows and Microsoft Office (including timely updates to newer versions as they become available) and the accessibility of an Open SDK/API, which allowed our programmers to customize not only the workflows, but to develop several other critical components for the paperless process.

The Check-out and Check-in process, together with the document versioning and audit log ensures that changes and edits to documents are *never* lost. Figuring out what happened to a document at any point in time, when it was changed and by whom are quickly and easily determined. This also helps in correcting user errors in the process, resulting in consistently improved documentation and user training.

Seamless integration with the systems already in place, like Windows and MS Office, also allows for an easier learning and adoption path. This lets users adapt to the new system more readily. They can still use familiar steps like drag and drop to move their documents into the system or to move them around within the system. When they work with a Word, Excel or PowerPoint document, they can check-out the document and check it back in without leaving the Microsoft application or they can double-click on it, like in a file server system, and have it open up in the application, ready for editing.

The ability to have metadata associated with each document and the capability to include ODBC dynamic properties in that metadata allows documents in the system to be tied to other applications and databases *which already exist* in the organization. For example, we were able to develop a Docket Profile which included custom properties from our ERF system, our Case Management System (CMS) our Utility Name File (UNF) database and our Employee Information System (EIS). This automates the creation of documents and automatically associates

them with the proper metadata for the case AND puts them in the appropriate folder structure in the repository, which we will discuss in Section V.

The availability to access the EDM system API or SDK allows an organization with clever programmers to develop separate custom applications that access documents from within the repository and serve them up at appropriate times to the required client. It also allows custom applications to be developed to reduce the steps required to get a document into the system, resulting in fewer mistakes (more consistency) along the way.

C. The Selection: ColumbiaSoft's Document Locator EDM

After a fair amount of research and some careful consideration, in 2006 the PSCW selected ColumbiaSoft's Document Locator (DL) software as its choice for an EDM system. One of the key factors in our selection of DL (or DocLoc, as it's sometimes referred to by staff) was that it was much more affordable than the earlier systems we had considered back in 2001. In fact, it was so reasonable from a cost standpoint that we were able to procure the system without having to go through the time and expense of an RFP process. This process can drag on for quite some time in Wisconsin. We will discuss cost considerations later in this paper.

Once obtained, the PSCW set about the task of trying to develop the best way to "roll-out" or implement the new system. There are two major recommended methods: 1) Start a small pilot project with one division and then gradually move everyone else in the agency over to the new system; or 2) Move everyone in the agency at once. The theory behind the "slower-first" option is that it is a good time to use this major overhaul of your operations to better organize the information in a more logical manner. Also, you can use the opportunity to "clean house" -- getting rid of once-useful documents that are simply taking up space and can now be deleted -- rather than moving them to the new system. Other factors to consider are staff training, for both the business staff using the system and the IT staff who will be supporting them. Further, there is the basic "paradigm shift" which requires all staff to think about files and documents in a very different way from what they are used to, which for some is the most difficult adaptation of all.

The PSCW ended up choosing a somewhat hybrid approach. We gathered together business users from every division to help develop some of the standards and guidelines for the basic use of the EDM system. Not surprisingly, these volunteers were some of the more advanced computer users in the agency, so we were able to get some insight into what was needed to more fully integrate the system with the agency's existing applications. We were also able to discover the features that might prove to be the most cumbersome for staff and subsequently develop "assistive technologies" to make the process more akin to their everyday work activities. The initial implementation standards group (which we called our **e-Paper Project** team) helped create the overall folder structure, the list of prescribed document types, the standards for naming of documents as well as workflows, and the standardized templates for each type of document. Our **E-**

Paper team provided bi-weekly input on the development of all custom applications developed in-house.

After meeting with the internal team for quite some time, we finally had one division (our Telecommunications division) volunteer to be the first division to begin using the document management system for all of their work. In late 2007, nearly 18 months after purchasing the software, we moved the division's entire file share off of the file servers and into DL's repository. From that point on, documents for that division were created and stored in the DL database.

However, the initial versions of the software were not as full-featured as they are today. Consequently, adapting and learning how to use the new system was not as easy for staff back then as it is for new users of the system who join our organization now. Because of this, (and because of the very large paradigm shift), the use of the document management system languished and it started to get a bad reputation among some staff members - remarkably so, since many of them had never even seen or used it yet. Nevertheless, it wasn't until 2009 that we started to switch more divisions over to using the document management system. After two years of preparations, the perception of a paperless office was **SO** foreign that, although first-trained, even some of our own IT staff had not invested the time to fully understand and use the system. For all our labors, we had underestimated the power of the familiar. In 2009, all of the IT division and administrative staff were *required* to switch over, but the real momentum began in 2010 when a new chairperson was appointed to the PSCW.

D. Getting "Buy-In" - Or Not...

"There is surely nothing quite as useless as doing with great efficiency what should not be done at all." --Peter Drucker

One of the most fundamental steps to implementing an EDM system is to get user support, *starting with top management*. Our EDM project languished for a couple of years until our new chairperson made it one of *his* top priorities. It is not only vital to have the *support* of top management, but also their *active participation*, if you can secure it. Then, select as many staff as you can, especially power users and support staff (program assistants, secretaries), to participate in the planning, design and standards development for the software. Some of the support staff are also skilled technologists and some of the "power users" have a good understanding of the processes, but together, they will make up your "subject matter experts" (SMEs). Having representation from every business unit is also critical, as these staff will be your liaisons with the rest of the staff in their respective divisions. They will not only be your biggest advocates, teaching by example, but also individual mentors and cheerleaders later in the process. Make sure to seek out people who can embrace the adjustment - as some will feel (and tell you daily) that they've never had to deal with as much change in their lives as they have from implementing document management. Your e-team must be able to transform their perceptions,

learn to use the new software and understand how to cope with a foreign environment -- simultaneously.¹⁰

Once you have your e-team in place the real work begins. The changes involved are not just about becoming paperless – they require re-engineering the way that all of your processes work. Or, at the very least, active consideration of every step in the process to determine whether it is still needed in an electronic world. For instance, when we started electronic filing, we didn't try to go back and "capture" all of the older paper documents. We just started doing things electronically, then looked for ways to do more and more electronic processes. With document management, we started with a pilot program and just a few users so that we could make adjustments to the system standards and the software. When it came time for everyone to convert, though, we migrated all of the documents from all the file servers and placed them in the document repository database. (The only exceptions were for MS Access and MS OneNote files, which are not handled well by our EDM system). We reduced our number of file servers from eight down to just one small file share.

We also tried to avoid scanning as much as possible – it's not that there aren't good capture programs and optical character recognition software out in the marketplace -- we just found that it becomes an easy "fall back" for people who are trying to avoid following the paperless processes. Given the immense resistance to change factor already in place, we simply didn't want to encourage users to continue old office protocols. On the practical side, scanning can cause larger file sizes and, unless the text is captured as part of the process, these files cannot be indexed for searching. Our experience suggests one should minimize scanning wherever possible.

The last word on getting "buy-in" is that you also need management support via a team leader and executive sponsor that won't take "no" for an answer. These 'partners' need to be open to suggestions and willing to bend to meet the overall objectives, since the vision of a paperless process needs to always be foremost in their minds. At least one of them needs to continuously be asking the tough questions: "Why do we do it that way? Can we stop doing that? Is there another, better way to do it, especially in an electronic world?"... and so forth. And when push comes to shove, they need to find a way to keep moving forward toward the paperless process objective, regardless of whether complete "buy-in" exists or not.

E. Do NOT accept paper as an option for ANYTHING

Without fail there will be times in your discussions where people will try to go back to using paper for some small part of the process, or at least suggest it. Don't let them. While we didn't want to get bogged down in creating workflows and processes for every possible situation, we did take the time to analyze the situation and develop some sort of solution if we could eliminate any paper part of the

¹⁰ Anthony, Joseph, "6 tips for a 'paperless' office", Microsoft Small Business blog, Copyright 2011, Microsoft Corporation.

process. In some cases, we added additional automation steps; in others, we tried to completely eliminate the step when it made sense. In extreme cases, we created whole separate workflows or web applications to avoid the printing of the document at any stage of the process.

F. Planning and Strategy

Once we had formed our team, we began examining processes and developing standards. Some of our first considerations were **repository folder structure and naming standards**. EDM systems are renowned for having detailed searching and indexing capabilities – so much so that you might be led to believe that folder structure is irrelevant, but it isn't. Our EDM system is closely tied to Windows and the File Explorer tree view and we discovered that this was a convention with which our users were very familiar and did not want to lose. Hence, we developed a very basic folder structure for the entire Commission that consists of three top-level folders: Agency, Divisions, and Utilities.

The Agency folder deals with subject matter of interest to the whole organization: our library and various publications, agency-wide team folders, our interactions with other agencies (which often involve staff from several divisions) such as FERC, NRC, FCC, etc. and administrative matters, like performance evaluations, procedures manuals, travel authorizations, travel vouchers and so forth.

The Divisions folder has a second-tier folder for each of our divisions. Within their folders, we specified certain standard folders each division must have at that level: one for management, one for division teams, one for individual staff folders and at least one for other division documents.

The third top-level folder is our biggest area. During our planning process, we discovered that about 75% of all documents created at our Commission were related to one of our many cases or to a specific utility outside of a case. We are fortunate enough to have a Case Management System where all of our dockets have a three-part case number. The first part identifies the utility or utilities involved by their utility ID number. The second part is a two-letter case type and the final part is a chronological sequence number. So 3270-UR-120 would be a Utility Rate (UR) case for Madison Gas & Electric Company (Utility ID: 3270) and is the 21st such rate case since we began this numbering system (starting with 100).

When it came time to set-up sub folders for our Utility folder, we organized them by the Utility ID number and then the Docket Number of each case and then by the Document Type (Correspondence, Memo, Notice, Order) for each docket number. At the same time, for those who want to use the power of the EDM Search capability, we also added a sequential reference number (called the EDM Reference #) to each and every document in the system. This allows us to label and quickly find any document we need by simply searching for its reference number.

Our team also adopted a naming standard for all documents, which consisted of at least the docket number, the document type, and then any other pertinent information needed. So the Notice of Investigation document in our example rate case would be: “3270-UR-120 Notice of Investigation.docx.”

In order to specify document types, the team had to select and consolidate categories from a wide range of existing documents. To make things easier for staff, we attempted to limit the number of document types as much as possible, but we soon found we had to add a few others to meet workflow requirements or auto-upload processes. *The one constant in all of our document type selections was to avoid a category called “Other” or “Miscellaneous”.* Providing this type of category, especially when dealing with a large number of people, allows for a lot of confusion and misplaced documents. We also tried to consolidate similar document types – again, to avoid confusion as to how to categorize the document type.

After the team developed the folder structure and some system standards, they set about working with us to standardize our document templates. Before we started, we had at least 19 different templates within four categories. We also found a lot of “boilerplate” language that was applied inconsistently, and in some cases, outright incorrectly. These templates totaled several dozen separate files, necessitating one IT person dedicated nearly full time to maintaining all the different forms and templates.

As a team, we condensed those 19 templates down to one standard template for each document category (memoranda, letters, notices and orders). Macros in the template allow the user to select the type of document and enter most of the pertinent information (such as docket number, name and address, date, etc.). When the macro is completed, the template formats the entire document, inserts any necessary auto-text and then leaves the user in the part of the document that needs to be completed by the user. Figure 4 on the next page shows the opening Macro screen for the Commission’s Memo Template.

PSC - Memo ✕

Memo Type:

Agenda
 Briefing
 Information
 Internal
 Confidential

From
Type name(s), and title(s) then division on separate line.

Send memo to: (Internal only)
Type name(s), and title(s) then division on separate line.

Docket ID (1): **Docket ID (2):** Consumer Complaint

Added

Subject / Suggested Minute:

Type Enclosure(s) or Attachments(s), if any. If none, press

Optionally, type individual enclosure titles on separate lines in the format:

Enclosures:
1. (4 spaces) Item Title One
2. (4 spaces) Item Title Two

Names of anyone receiving copies: (Do NOT type

Initials - Author:

Figure 4

Standardizing these templates was key to reducing errors and saving time in document preparation. For example, in examining our Notice of Investigation/Proceeding documents, we discovered that in any standard notice, 90% of the text is standardized, with different sections for different kinds of notices. We discovered we could use the AutoText feature along with a lot of “boilerplate” language to standardize our notices. Using the standard notice template, a user can call up the notice macro, fill-in the blanks, run the macro, type one paragraph (or two, in a few instances) and then start the notice in its workflow. From beginning to end it seldom takes more than 5-10 minutes to prepare a notice document and it is rarely altered after it starts routing. Not all documents and workflows are as easy as notices, but the principles are the same.

Once we were ready to start introducing staff to the standards and templates we had developed, we then began the laborious process of moving all of our documents from the file servers to the prescribed folders in the EDM system. To every extent possible, we attempted to match the types of folders on the file servers to the folder names and structures created in the EDM system. Division staff aided greatly in this effort by taking time prior to the migration weekends to remove unnecessary files and delete duplicate files. As one might expect, however, when moving to a more standardized folder structure, not everything in the file share would easily match the new folder structure, nor were all the divisions equally successful at deleting unneeded files. Materials which did not match were placed within generic folders in each division's home folder for them to sort out at a later date. This did not prove to create any problems, as most of the new files created follow the prescribed folder structure and hardly any of the older files are ever examined again. More on this in Section VII (Document Lifecycle / Records Management).

G. Workflow – the key to it all.

“You need a good workflow process – you can’t automate chaos”.¹¹

To become truly paperless, your organization needs automated workflow processes that allow the system to circulate electronic documents to the proper people in the proper order for processing along the way to a final document. The workflow should be customizable to allow it to vary based on which type of document is being routed. It should also allow you to call upon other processes to automatically perform certain tasks along the way.

Our EDM system has a powerful workflow management module which allows us to create custom workflows for each of our major processes. It also permits us to monitor those workflows over the life of the process to investigate bottlenecks, re-route stalled processes, and re-assign tasks as needed. This workflow system has its limitations and requires some training and practice, but once we became well-versed in its nuances, we found it very capable at helping us create electronic processes to replace our former paper routing processes.

It was important for us to start with stable, defined processes – procedures that had been in place for some time in the paper world. Our goal was to follow most of the same steps in the existing workflow process, only to perform the assigned tasks electronically, rather than on paper.

Whether or not to develop a workflow for a particular process in your organization depends in large measure on how many people have to create, edit, review and approve something before it is finalized and whether these steps generally occur sequentially or not. Keep in mind that one of the characteristics of most EDM systems is a check-out feature that only allows one person at a time to actually edit a particular document. We found this to be a difficult transition for

¹¹ Heckman, John, “Why Document Management: A White Paper”, November, 2008, Heckman Consulting.

most of our staff, as they tend to create some documents (like orders) in a sort of collaborative process in which several different staff are assigned part of the document and are tasked with writing only their own section. A case coordinator is ultimately charged with pulling the pieces together into a comprehensive document. For this way of working, we recommended to staff that they perform their collaboration prior to the start of the workflow process. When they are ready to begin the formal review and editing of the full document, then they can start the document in the workflow process. However, because the document is headed for a workflow process and the pieces are put together from separate MS Word documents using a standardized template, it is imperative that all participants work electronically, rather than preparing their sections on paper. We use the “Track Changes” feature in MS Word as part of the workflow editing and review steps of the process.

We also found that certain practices (e.g., the annual filing of certain financial disclosure information by staff or updating of a staff person’s emergency contact information) were not something that required an entire workflow process. For these processes we prepared web applications for our Intranet site. When it is determined that the information should be re-submitted, an e-mail is sent from our HR department with a link to the application and the information is linked to that staff person’s user ID, so they only see and file their own information. Once they complete the form, the process is over. This would have been a very short workflow process if we had entered it into the system. We do have some reasonably short workflows, where a person fills out a form, it is routed to their supervisor and, if approved, then routed to their division administrator and perhaps to one other entity. But the ultimate goal of these workflows is to have all the documents end up in the same folder for easy retrieval at a later date.

H. Start Small - Diagram EVERYTHING you do

We started with our two most stable processes – for years we have used a form for each process – the Notice Routing sheet and the Order Routing sheet (sample in figure 5 – next page). One of these sheets was attached to the particular case file so that it could be circulated, together with the draft document, to each of the staff people who were deemed as needing to see it. All of this was performed on paper and carried around to each division by our RMU staff in a large cart. A table of blanks on the form defined who needed to see it and provided a blank for each person’s signature and the date they signed off on it. This turned out to be a perfect analog for an electronic workflow process. The trouble was trying to get everyone to see it that way.

The first step in developing a workflow is determining the inputs and outputs of the process and, who each contributor is along the way. Another chief consideration is how long a period of time is needed to perform each task in question, because this is as critical for electronic workflow as it is for the paper processes.

It is extremely useful to do some initial *process mapping*, in which you literally draw each step of the process: what work needs to be completed in each step, who performs each task, and how long each stage will take. This enables the team to examine the whole process at once and look for tasks or entire steps that can be eliminated or streamlined. Process mapping creates a perfect analog for the electronic workflow process. With a solid diagram it's easy to use the workflow manager to layout the electronic workflow.



2067 (6/11/2001)

Ensure Mailing List is Complete

Notice Routing

Public Service Commission
P.O. Box 7854
Madison, WI 53707-7854

Applicant (Utility) MULTIPLE UTILITIES		Docket Number 5-CE-140	
Caption Joint Application of Wisconsin Power and Light Company, Wisconsin Public Service Corporation, and Madison Gas and Electric Company for a Certificate of Authority to Install New Cooling Towers at Columbia Energy Center Units 1 and 2		Docketed Date	
		Application Date	
		Supp/Amended Date	
Calendar Date If Known		Associated Dockets	
	Signature (Do not use Initials)	Date	Comment
Lead Division: Docket Coordinator Staff			
2nd Division Staff: (circle one) None GED DWCCA TEL Administrator / Assistant Administrator			
3rd Division Staff: (circle one) None GED DWCCA TEL Administrator / Assistant Administrator			
Office of General Counsel			
Proof: <input type="checkbox"/> g:\notice\pending\...			
Docket Coordinator (final draft)			
Assistant Administrator			
Administrator			
Commissioners' Office: General Counsel			
Executive Assistant to Chairperson			
Administrative Law Judge			
Records Management (file remains)			
Commissioners' Office			
Records Management			

Check mailing list; add names and addresses of known interested parties. RM is not responsible for this.

I. Determine Metadata and link to other IS systems

Another important step in our process was to examine how we could take advantage of integrating the EDM system with our existing applications and data. Our database administrator was supremely helpful in this regard, as he was able to draw connections between certain steps of the process and data that already existed in our Case Management System, Electronic Filing System, and some of our other existing databases. Because most EDM systems depend on assigning metadata properties to every document, this allowed us to assign properties based on the case number and the document type, which enabled us to link the EDM system and its workflow processes to already existing data. This saved staff considerable time in connecting the information. Likewise, it saved processing time through our ability to automate numerous steps in the workflow process based on the properties assigned to each document.

For example, in our Notice workflow, we use a “Status” property on the document to assign a value which is either “pending”, “on calendar” or “complete”. This value allows the Commission Secretary to use a search function to determine which workflow documents are pending for the Commission agenda but have not yet been scheduled, which are currently on the next calendar and which items have been completed.

Wisconsin PSC Process Workflows

ALJ Order Routing
Confidential Memo
Decision Matrix Routing
DWCCA Order for Consumer
Interconnection Agreement Routing
Letter Routing
Memo Routing
Notice of Hearing/Prehearing
Notice of Investigation/Proceeding
Order/Final Decision Routing
Rulemaking – Statement of Scope Routing
Testimony Routing
VIP letter Routing

Figure 6

Another property keeps track of when the document is ready to be processed for uploading to the official records repository in our ERF system. This property kicks off an automated process that examines the case number and document type properties, automatically uploads the document, labels it with the case number *and* the proper document type and then notifies the original submitter that the document filing is complete. Other workflows have even more complex automation features, *largely based on the metadata assigned to a particular document at the time it is entered into the system.*

A list of all of our Commission process workflows is shown in Figure 6. But these were not the only processes for which we created workflows.

J. Administrative Processes Included

In addition to developing the workflows shown in Figure 6, we also developed workflow processes for several of our administrative processes. Although we still have a few currently finishing, we've implemented workflows for our Travel and Training Authorization process, Purchase Requisition process, an IT Work Request process, and the Vacation Carryover procedure. Each of these workflow processes uses a prepared form template for staff to fill out and instructions on how to attach ancillary documents, if necessary. These are generally fillable PDF forms. The staff applicant then starts the filled-out document in a workflow process to collect the necessary approvals.

For other administrative processes, our programmers created web applications from what had previously been PDF forms. These were either printed forms that were filled in by hand and handed in or forms that were filled out electronically, then printed and handed in. These applications are now found on our intranet. Filling out the information online can then send the form in an e-mail to the proper review and approval location. Web-based applications have been created for: Emergency Contact Information, Financial Disclosure, Requesting a New Case Number, Reasonable Accommodation Request, Workstation Ergonomic Assessment, Travel Reimbursement Voucher, and Performance Evaluation. Figure 7 is an example of one of our web-based applications.



Employee Financial Disclosure Form

PUBLIC SERVICE COMMISSION OF WISCONSIN
P.O. Box 7854
Madison, WI 53707-7854

2009 (4-2-2014)

No Public Service Commission employee, members of his/her immediate family or organization with which the employee is associated may have a financial interest in any company regulated by the Commission, or its affiliate. The terms *financial interest, immediate family, company regulated by the Commission, organization, and affiliated interest* are defined in the "Financial Interest In Regulated Companies" subsection of the [PSC Employee Manual, pp.1-4 – 1-6](#). The Commission will make available a list of companies regulated by the Commission, to the extent possible, upon request.

All employees must complete this form

The PSC interprets the Code of Ethics definition of immediate family to mean: spouse and any relative or any other person who receives more than one-half of his or her support from you or from whom you receive more than one-half of your support.

Do you or any member of your immediate family or organization with which you are associated have a financial interest in any entity regulated by the Commission or a financial interest of \$5,000 or more in any entity not regulated by the Commission in the electric, natural gas, nuclear, energy, telecommunications, railroad, water, or cable television industries?

Yes No *If yes, please explain below:*

Are any members of your immediate family employed by companies regulated by the Commission or by any telecommunications and electric cooperatives?

Yes No *If yes, please explain below:*

CERTIFICATION. By checking this box and pressing the "Submit" button, I am electronically affixing my signature and swear or affirm that the above information is true and correct.

Employee Name: *Paul C Newman*

Submit

Figure 7 - A Web-based application

As often as possible we attempted to do away with signatures, initials, or other forms of sign-off whenever it was determined that the electronic work process could take the place of such actions. Audit trails in both document logs and workflow histories helped soothe staff's worry that they wouldn't know what happened in the process without the signatures. For the most part we were able to reduce the need for signatures to managers and executive staff. When statute or protocol required signatures, we provided electronic signature pads, which we will discuss in Section IV.

K. What about e-mail and faxing?

In today's business environment, e-mail is a compulsory element - Faxing...not so much. E-mail can be an electronic advantage and, if viewed as such, should be integrated into any document management process - fortunately, the EDM system we chose allows for saving and cataloguing of e-mails within the system. It also allows staff to share documents through e-mail by simply "referencing" a document with a link attachment. In the e-mail, this represents a very small overhead (roughly 120 *bytes*) - simply a pointer to the actual file in the database repository. This makes e-mail much more efficient. The EDM system also allows staff to establish rules for saving certain e-mails directly to the EDM system. This helps ensure that valuable information received in e-mails is properly stored and saved in the repository.

Faxing is another matter entirely. Faxes are images and, as such, cannot easily be indexed. Their resolution is not as clear as a native document or a PDF equivalent (even a scanned document is usually more readable than a fax). We have generally discouraged faxing as a way of doing business in our Commission. To aid in this effort, we purchased several multi-function printers that also serve as scanners. In most cases, we were able to link the scanning function through software so that documents could be scanned directly to a person's e-mail or, better still, directly into the EDM system with OCR of the text occurring while the document is being scanned. This has helped nearly eliminate faxing for our staff, as most prefer to scan and send documents through e-mail, when these documents are not already in an electronic format.

L. Working Remotely

Many EDM system solutions have both client-server and web-based ways of accessing their processes, while others are simply web-based and a few are only client-server systems. For our implementation, a key criteria was that there be a web-based component so that people could work remotely from any PC that had MS Office installed. So we have purchased licenses for the capability to use a supplemental product called WebTools, which allows a user to login to our repository using a Web browser (because the latest version is based on HTML5, all the latest browsers are supported - IE, Firefox, Chrome and Safari). Figure 8 (next page) shows a sample screen of a web-based repository. With this tool, users can perform nearly all the same actions remotely that they can conduct in the office - view, check-out and edit documents, handle workflows, move or delete documents,

update profiles or properties, get document logs, send notifications about documents, perform searches, etc.

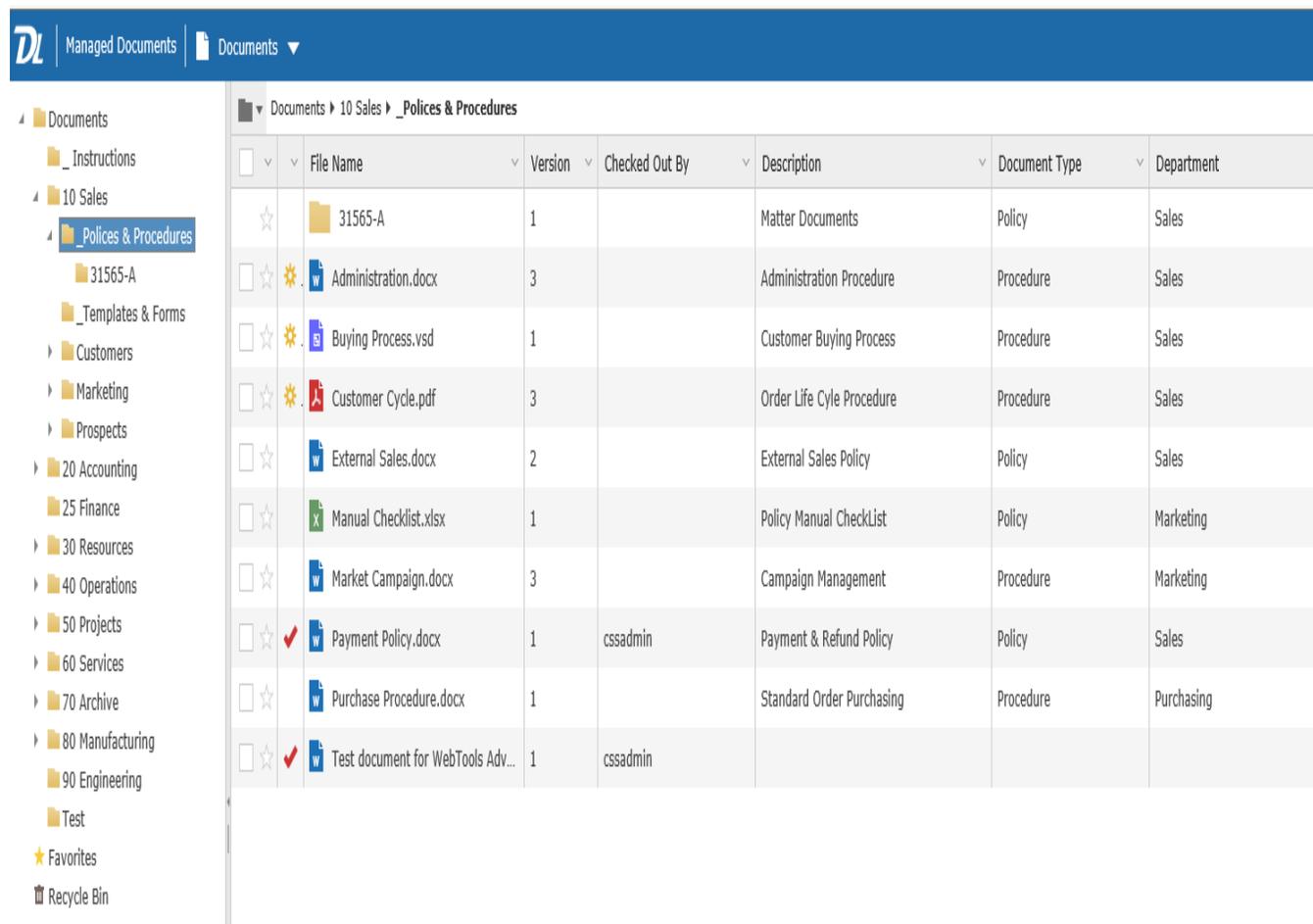


Figure 8

We also provide all of our laptop and tablet users with complete access to our network through Microsoft’s DirectAccess software, which is built-in to Windows Server 2008 and above. More recently, we have begun using VPN software that comes with our firewall. This allows those users with Commission-owned equipment to automatically get full and complete access to the repository, and other Commission resources, from anywhere in the world with a high-speed Internet connection. All documents can be accessed remotely as though the user was in the office.

On those occasions when Commissioners and their assistants cannot connect at high-speed (or at all) we have adapted our tools and processes to allow them to take certain documents with them through a synchronization tool we created. This tool will be described in more detail in the next section.

M. Logs and Audit Trails – Apportioning Blame or Promoting Accountability?

A feature we were not initially concerned with, but have found to be most useful, is the document log and other audit trails built into many EDM applications, including the one we purchased. Often such logs are created to provide an audit trail of document access. Likewise for monitoring procedures for organizations such as health and medical facilities or public accounting firms. These organizations often need to comply with stringent regulations regarding document creation, secure access, and file destruction -- to reduce the risk of errors or the possibility of fraud. In the case of state Commissions, this level of accountability is often unnecessary. However, as we began to use our EDM system, we found that we often consulted the document logs and the version histories. The document log is a table associated with each and every document which tracks all actions ever performed on that document, including all of the various steps involved in a workflow. We frequently examine the document log to determine what might have gone wrong with a workflow (accountability) and, to some extent, who might have been responsible for it going awry (apportioning responsibility). But primarily, this has provided us with information about what tips, instructions or additional training we may need to provide to staff if they are not able to perform the required task according to the instructions.

These logs, the version histories, and other audit information can also be accessed in the database and transformed into regular reports. At a glance, managers can see which workflows have been completed, which have been delayed, at what steps in the process workflows have been delayed and which have been cancelled and/or restarted and when.

N. A Word about Collaboration and Communication

We have had to consistently remind our staff that the ways in which we collaborate; and move documents through our processes, have dramatically changed from how we did things in the past. However, these new methods should not and cannot substitute for open and honest communication with each other.

In the past, when paper was circulated, a lot more verbal communication might have occurred during the course of other actions: the mail cart coming around, people wandering from office to office looking for a case folder, people simultaneously reading and marking up a paper draft, etc. In each of these instances, communications occurred and may have been an occasion to impart information about some aspect of the process (Examples: “As long as you’re taking that file, can you give this note to Jim” or “Can you insert this section from the attorney after section three of the draft?”)

So the reminder is: do not hesitate to e-mail or phone the staff who need to know something about the document that is circulating electronically. This can be done through the electronic notification feature in the EDM software, by e-mail, instant message, or phone, or by simply getting up and walking over to the other person’s desk. No matter how the communication occurs, it is more vital than ever

for staff to communicate with each other to insure the paperless process functions properly from beginning to end. This could also be said about many other processes as well.

Moreover, it is only through communication and a willingness to consider additional changes that an organization can foster and promote progress in making more efficient systems. The PSCW is continually making “modifications” to our existing processes as we gain experience and become more comfortable with doing things electronically. As the process becomes more accepted, so too will the changes within it.

0. Don't forget Training!

One of the factors in any successful implementation is to make sure everyone involved has the proper training. This meant that we trained the administrators of the system, then the power users, and eventually, the entire staff. And because EDM systems seem so different from the paper methods most people are familiar with, we hold additional training sessions every time new employees come on board. We also offer numerous remedial sessions for those staff who wish to advance their skills, as well for those who require more time to adjust.

We issue regular system reports, so staff can be comfortable that their projects are progressing. We also publish workflow charts and tables so that people can know “what comes next” in any given process. Frequent Q&A sessions serve to answer ongoing questions, as staff broaden their EDM skills, as well as to encourage suggestions for improvements in the software, the custom systems or the workflow processes. We also collect constant feedback from our help desk on the need for additional training methods or resources and more recently, have conducted a user-survey to measure our progress as an agency.

IV. Custom Tools and Services along the way

A. *Many ways to customize purchased software*

The selection of our EDM system was very important and the support we have received from our vendor is as responsive as any other vendor we have ever had. However, commercial, off-the-shelf (COTS) EDM software has to be fairly generic in order to appeal to the widest array of organizations. In order to get the most out of it and still be able to resolve smaller procedural issues (which may prevent an organization from removing paper from some of its processes,) some capability to customize the product is often needed and, in some cases, required.

Some EDM applications address customization in two primary ways: 1) they provide flexible tools in modules, like their workflow section, so that individual workflows can be customized to a particular organization's processes; and 2) the vendors may provide access and documentation to the Application Programming Interface (API) so that skilled programmers can directly call certain functions in the EDM software to automatically perform these functions without the assistance of human interaction.

In our case, we customized the system in several different ways. Major customizations came first in the form of applications and tools we created to make interaction with the EDM system easier for our staff. We will revisit some of these later in this section.

The second manner of customization was to closely *link* our existing systems to the EDM system through our custom profiles and properties (the metadata). Building on that, we created custom workflows which depend on those profiles and properties for determining what happens to a document, automatically, at various stages of the workflow process.

Third, we developed a workflow and process for handling responses to letters from Very Important Persons (VIP), like legislators and members of congress. For our VIP letter response process, we created an automated folder structure which enables our staff to create a new sub-folder in a particular location, select the folder structure and enter basic initial information about the document. This information then gets automatically stored in the profile for that document, which automatically launches the workflow with all of the proper information already tied to the document.

The last form of customization we developed was for various custom reports. Our EDM system uses SQL Server, which gives us easy access to the SQL Server Report Manager. With some assistance from the vendor, this has enabled us to produce custom reports for our users and managers to allow them to track workflows. It also provides managers with data on how long it takes various documents and processes to wind their way through our system. This data will subsequently be analyzed to inform future decisions of how we can best change and improve these processes for our staff

A. Create a New Electronic Document Application

The first application created to ease the transition to the EDM system was our Create a New Electronic Document application (shown below in Figure 9). This program allows the user to specify the particular kind of document in the tabs across the top, fill-in the information required for the document profile, then click on “**Create**” and the document will be inserted in the proper folder structure in the EDM system. It will then be assigned the correct metadata, and will be checked out to the individual working on the document. Lastly, it will run its template macro so the staff person can begin working to prepare the draft document, no matter what it is.

This application has simplified the input of the metadata associated with many EDM system implementations. *It also enforces a uniformity to the folder structure for anyone who uses it to start their new documents.* Further, through document logs, we can detect whether staff has used this application to create new documents in the system – if they have not used this application, their document may fail to pass consistency tests further along in the process – which could make their documents unnecessarily delayed.

EDM - Create New Document

PROCESS: Docket . . . Hello, Paul Newman

*** NOTE: All fields are required except note**

Docket Non-Docket Other Agencies Staff Division Rulemaking

Docket ID:

Document Type:
-- Choose Document Type --

Choose Template Type & Name:

Word -- Blank Template --

Excel -- Blank Excel --

PDF -- Select PDF --

Document Name: **Confidential ?**

Note: Document Auto Name
If selected Docket or Utility Tab, Docket / Utility ID + Document type
Please add text in the box for additional name. Do not add file extension (.doc, .docx,...)

Create **Cancel**

Figure 9

This application also was critical for our staff to “buy-in” to the EDM process. One of the major hurdles in implementing an EDM system is that most systems will have some sort of metadata association with each and every document, which allows easier cataloging and searching for that document throughout its life. However, linking this metadata requires some effort on the part of *the users* to create new documents, to enter the required information, and get the documents in their proper folders. This is not work they have been required to do in the past. Therefore, to some it seems unnecessarily cumbersome to carry out such tasks simply for a faceless EDM system. The action of getting a new document *into* the system can also seem substantially awkward compared to simply opening a Microsoft Office application and starting to enter information. Again, this application has helped ease that perceived “burden”.

“During my eighty-seven years I have witnessed a whole succession of technological revolutions. But none of them has done away with the need for character in the individual or the ability to think.”¹²

B. Templates

As mentioned earlier, we spent a great deal of time consolidating various types of templates. This also allowed us to customize fields, standardize text and make consistent formatting for nearly all Commission documents. Below is an example of the Notice macro (Figure 10):

Figure 10

¹² Baruch, Bernard M., “From My Own Story”, 1957, p. 320

C. MS Office Ribbon Macro

In addition to the Create a New Electronic Document application and custom templates, *we had to modify certain conventions we had previously used in the paper world*. One of these was the location of the document – in the world of paper documents and file servers, it was common to list the name of the document and its location at the bottom of each document. For example, a Notice of Proceeding (NOP) for the MG&E rate case (utility ID: 3270) prepared by the Energy Division might have been found at:

G:\Energy\Rate Cases\3270-UR-120\MG&E Rate Case NOP.docx.

This long “label” would be placed at the bottom of the paper copy of the Notice or any other document. However, with an EDM system, every document is assigned its own reference number or Bates number. The Bates number is a consecutive integer assigned at the time each document is *created/imported* into the database. We have named this the EDM Reference Number. Because every document in the system has this unique assignment and as these properties are easily searchable, we determined that we could replace the long UNC location above with a simpler moniker:

DL: 00903752

Searching for this 6 or 7 digit value in the database will yield one *and only one* document – the precise document listed on the page. Therefore, in the Create a New Electronic Document application, we included in the macro template the insertion of the reference number at the bottom of every document. But for those who fail to follow the process exactly, we created an entry in an MS Office Ribbon Macro to allow support staff to insert the DL number at a later date.

The Ribbon also includes buttons to **Remove Watermark**, as this was sometimes difficult for documents with multiple sections. The Ribbon allows adding a Mail Stamp by our Records Management Unit (RMU) to electronically place the “Date Mailed” date on documents in the same way it was physically stamped on paper documents. Figure 11 shows the PSC DL Add-In Macro Ribbon:

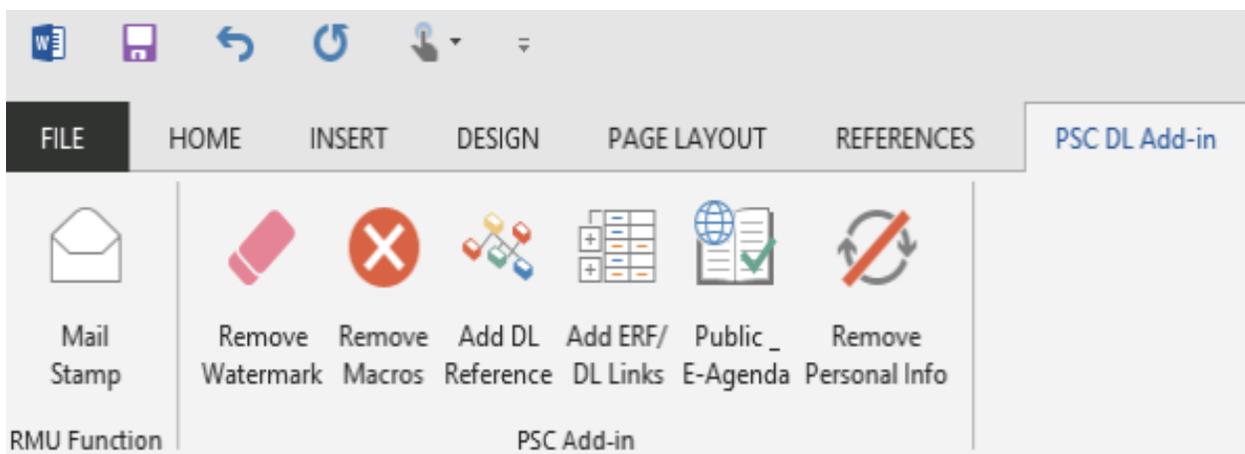


Figure 11

The most important feature on the PSC DL Add-In Ribbon is the button to **Add ERF/DL Links**. This feature allows our staff to insert hyperlinks in any document to any other document in *either* of our document repositories – the ERF system for official documents and the EDM system of internal documents. It enables other key background materials or reference documents to be linked directly to the main document. This linkage is similar to the way they were attached to the original document when this was all done on paper. Now, whole attachments and other key references can be passed on to others and all they have to do (assuming an Internet link) is click on the hyperlink to access these other documents. Moreover, when it comes time to share certain documents with, say, the public, the Public E-Agenda *button converts the internal links to external readable links for those same documents*, saving the time and effort often associated with creating a Commission agenda for posting on the web. The same agenda can be used and links can be converted in place with this macro.

D. ERF Extract application to pull documents and links from database

Because we have all of our official documents in the ERF database, a staff member raised the issue of how to access all of the documents needed for such things as building case binders, return of record to the courts in the event of lawsuits and things like legal discovery and public records requests. So it seemed natural for us to create what we call the ERF Extract program. For entities like the courts, who still often need actual documents and often haven't yet converted to a paperless system, the ERF extract software will isolate all of the documents associated with a particular search and place copies of them in a particular location: a person's hard drive, a flash drive, a CD or DVD. They can then be printed all at once, if need be, or forwarded as a group on the media of choice.

However, for internal purposes, we found it much more useful that once the particular search was performed, the application could then create a Word document. In that Word document, the application produces a list of hyperlinks, (sorted by document type,) of all the documents that matched the person's query. This was the second piece of the puzzle in being able to build our ultimate goal: the electronic (and paperless!) Commission Open Meeting agenda and electronic case binders. A screenshot of the ERF extract program is shown in Figure 12 (next page):

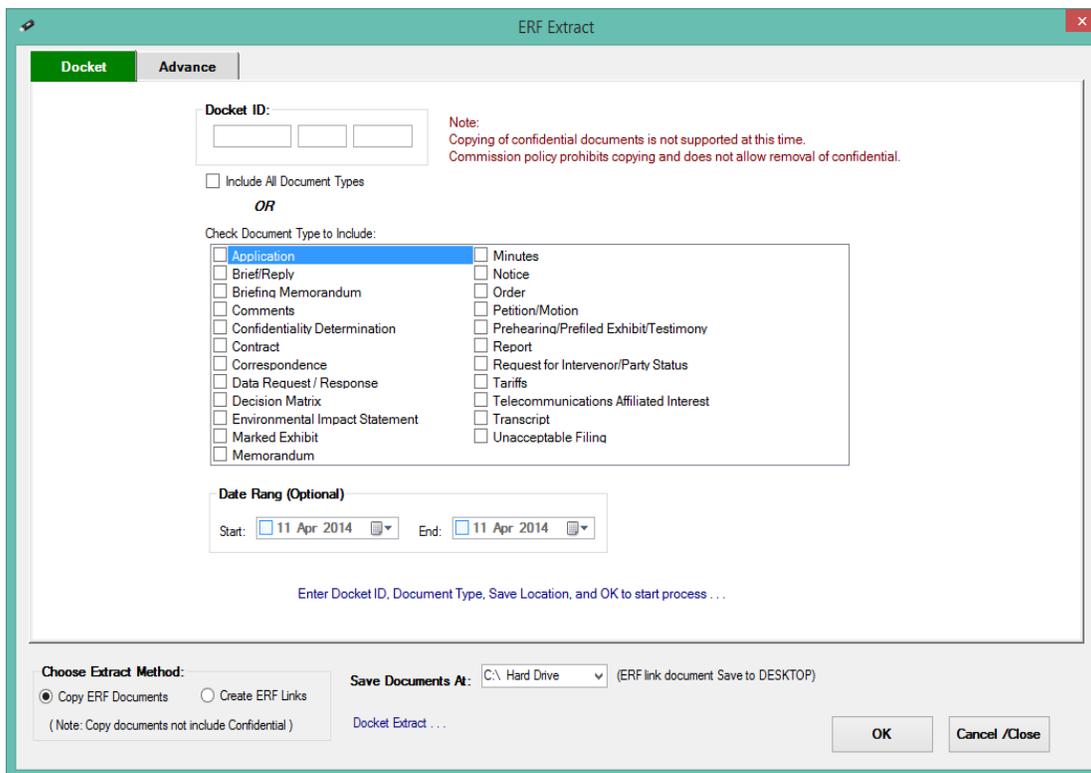


Figure 12

E. *Post-It Application for uploading of E-Agenda and E-Binders*

The next step in creating a truly paperless Commission was to address the issue of getting the electronic materials into the hands of the Commissioners and executive staff prior to the meetings and in a way that would allow them to *read* and *mark-up* the material electronically. Because of travel situations, there were likely to be circumstances in which they did not have an Internet or network connection. Therefore they would be unable to access documents unless they were stored locally on their devices.

After some research and considerable discussion from a technical standpoint, we developed a functional solution which involved several different elements in its implementation. The first was an application that could examine a Word document with links to various other documents in both the ERF and EDM systems. This application then *extracts* those documents from the database and *posts them* in a particular central network location to which Commissioners and executive staff have access. Our programmers developed an application, similar to the ERF extract program that could scan a Word document full of hyperlinks to database objects and *extract and download* the documents associated with those links. The application would then convert the links to “local links” so that a copy of the original Word document became the “index” file. The program needed to also examine each of the extracted documents and find any links *inside those documents*. The application would then extract and download the secondary and tertiary documents as well, so that the final product would be a complete agenda or binder with all of the relevant documents available to the user at any time. For

this, our programmers created the “Post to PSC E-Docs” application, known as the Post-It program, shown below (Figure 13):

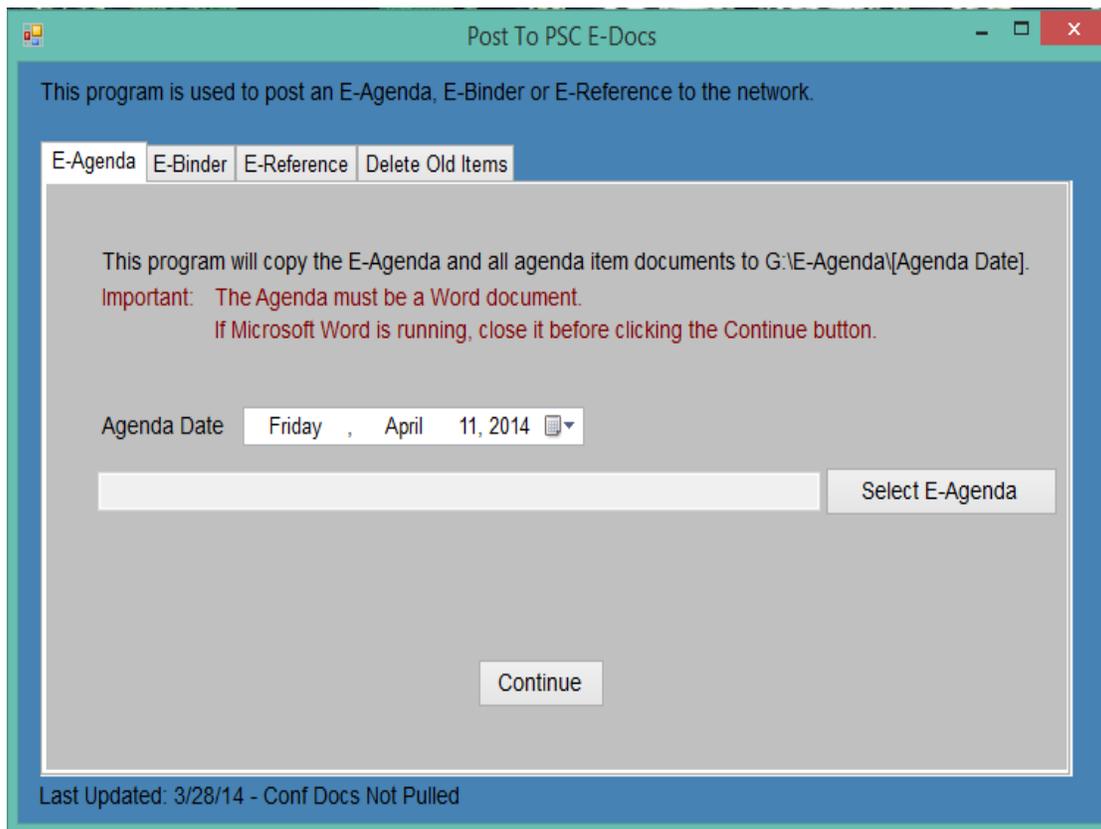


Figure 13

F. PSC E-Docs - E-Agenda and E-Binder application and Tablets

The final pieces of the puzzle were to find hardware devices that would allow the Commissioners and executive staff to easily carry these document files with them and access them whenever they needed. Then we needed to determine a way to get the relevant information to these devices and keep them current. The devices needed to be easy to maintain and have a familiar interface for our programmers, so they could easily create custom applications.

We rejected non-Windows tablets as they were not as easy to maintain. They also did not have easy access to MS Office compatible files, nor did they have an interface with which our developers were familiar. After trying several sample tablets, the Commissioners and executive staff selected Microsoft Surface Pro tablets as the best option. Equipment was obtained for each Commissioner, their executive staff and division administrators. We also used the earlier, non-Surface tablets as “loaner” devices for Commission staff to use when traveling.

Now we were ready to determine how to get information on these devices in a timely and updated manner. For this purpose, our staff was able to create two versions of the same application –a Windows 8.1 Metro/Modern interface version and a Windows 7/8 desktop version, each shown below (Figures 14) and on the next page (Figure 15):

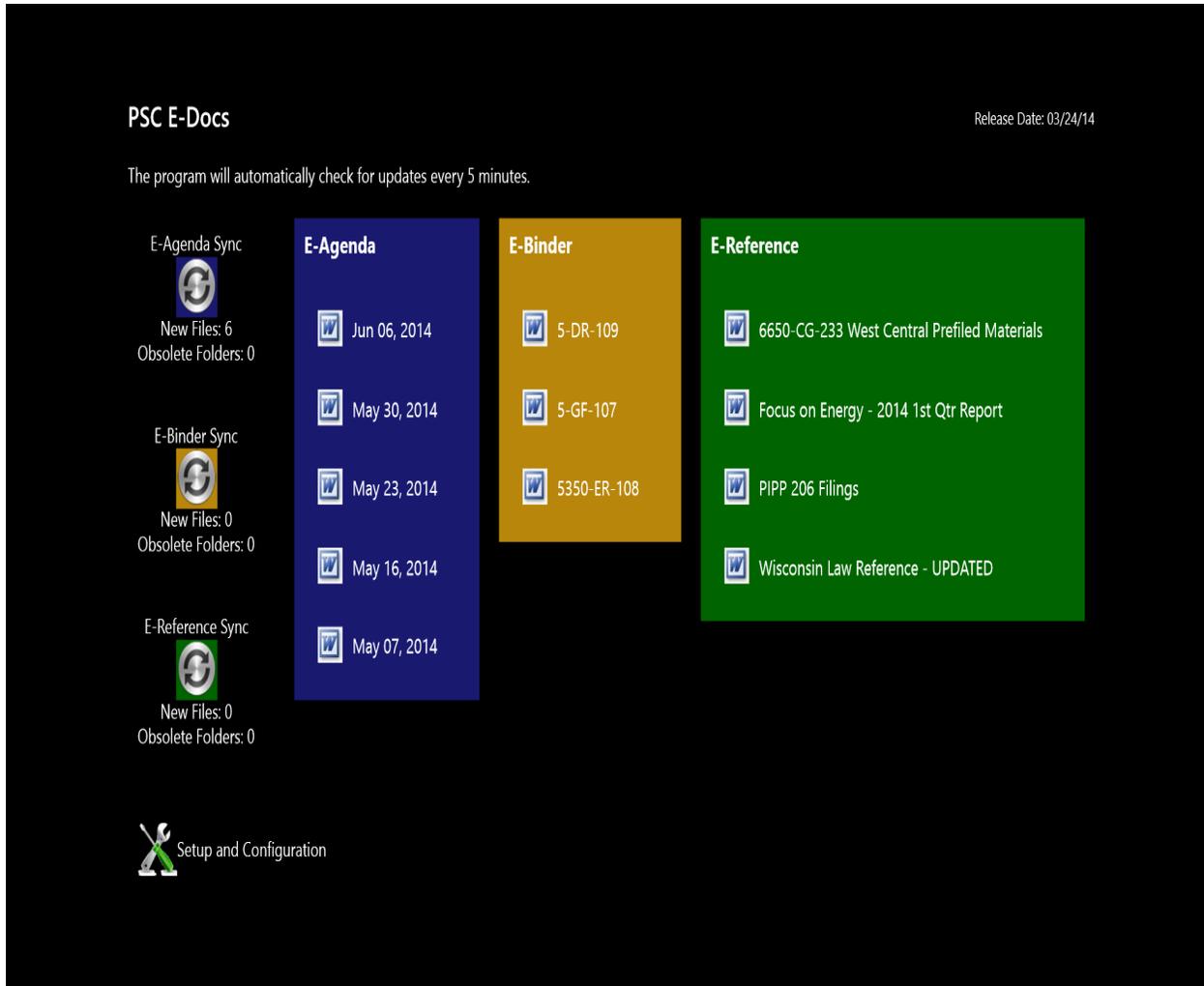


Figure 14 - Windows 8.1 Version

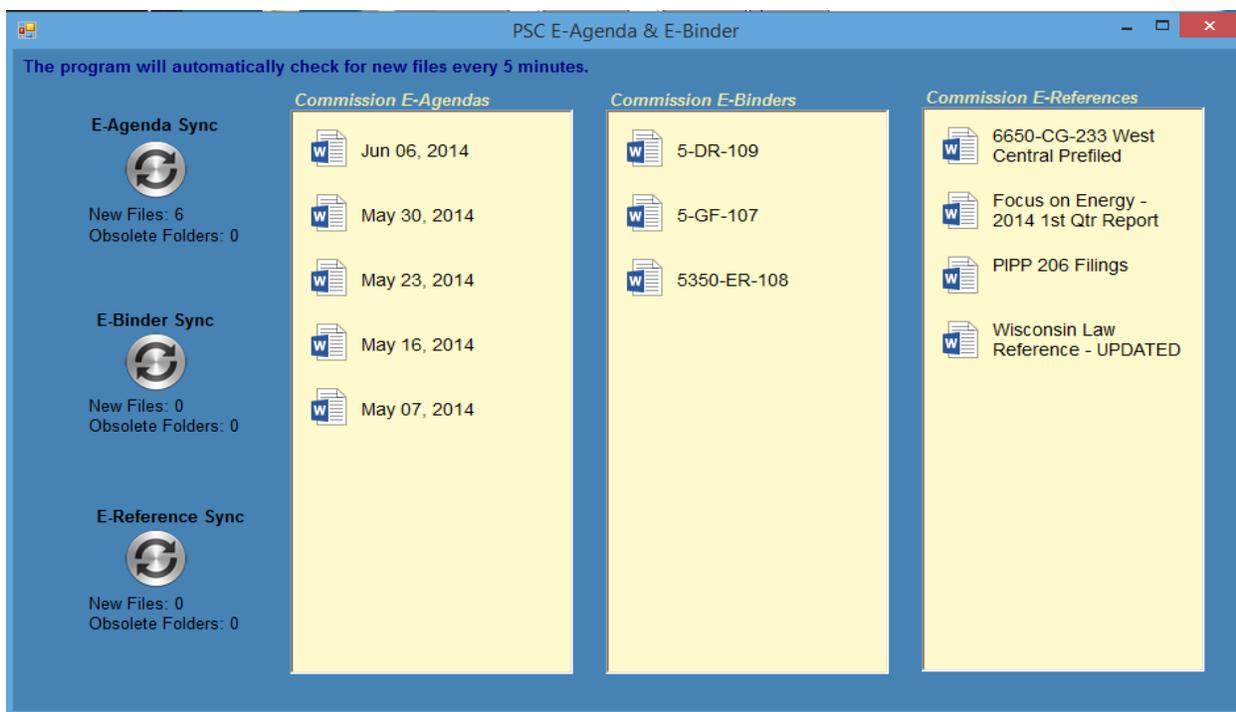


Figure 15 - Windows 7/8 Desktop Version

This client application, installed on each device, searches the network location in the three folders we created for this purpose. The first folder holds the Commission’s Open Meeting E-Agendas, complete with all associated documents. A separate sub-folder is created for each calendar date (Column 1). The second folder is for Commission Docket E-Binders. These are complete records of particularly large cases with many issues to be decided by the Commission. These are divided by sub-folders for each large docketed case (Column 2). Each case file contains links to all of the transcripts, exhibits, briefs/reply briefs and the decision matrix prepared by staff to help summarize the issues before the Commission. The final section is reserved for Commission and Chief Counsel and is used for various E-Reference materials, such as Statutes and Codes or court materials or other documents for meetings out of the office (Column 3).

Once the application searches the network location for each of these three folders, it then *compares* the time/date and version numbers of the documents on the network to the documents on each person’s device. In the example above, we can see that while the E-Binder and E-Reference folders are “in sync” (meaning there are zero new files and zero obsolete folders), the E-Agenda folder has six new files in it that this device does not currently have. Clicking on the circular icon will synchronize the device, so that all of the files currently located at the central repository are copied onto the device. When everything is up-to-date, the person simply clicks (or touches!) the particular Word icon for the set of files they wish to review and a Word E-Agenda or other folder document will be launched. From these, the user can proceed to click on the link to each item, knowing that all resources are collected locally on the device and will launch exceptionally quickly. Below is a sample e-agenda, complete with hyperlinks (Figure 16 – next page):

Public Service Commission of Wisconsin
Public Service Commission of Wisconsin Building*
Flambeau River Conference Room, 3rd Floor
610 North Whitney Way
Madison, Wisconsin

*This building is accessible to people using wheelchairs.

Open Meeting Agenda for Friday, June 6, 2014, at 9:00 a.m.

1. Minutes of the open meeting of Friday, May 30, 2014
[140530mn.docx - DL: 927570](#)
2. 5-GF-251 – Joint Application of Northern States Power Company-Wisconsin and Riverland Energy Cooperative for the Approval of a Territory Agreement of May 19, 2014, Pursuant to Wis. Admin. Code § PSC 112.08(2) and Transfer of a Three-Phase Customer from Riverland Energy Cooperative to Northern States Power Company-Wisconsin in the Town of Dodge, Trempealeau County, Wisconsin (proposed notice of investigation)
[5-GF-251 Notice.docx - DL: 925183](#)
3. 6690-EA-173 – Application of Wisconsin Public Service Corporation for Authority to Remove an Overhead Electric Line Located at 619 Neitzel Road in the Town of Utica, Winnebago County, Wisconsin (proposed notice of investigation)
[6690-EA-173 Notice.docx - DL: 925163](#)
4. 30-WR-101 – Application of Adell Municipal Sewer and Water Utility, Sheboygan County, Wisconsin, for Authority to Increase Water Rates (proposed notice of proceeding)
[30-WR-101 NOP.docx - DL: 925800](#)
5. 5-BS-199 – Joint Application of Prairie du Chien Municipal Water Utility and Bridgeport Sanitary District for Authority to Transfer Ownership of a Portion of a Water Main from Bridgeport Sanitary District to Prairie du Chien Municipal Water Utility, Formerly Located

in the Town of Bridgeport, Crawford County, Wisconsin (draft amended final decision)
[5-BS-199 Draft Order.docx - DL: 923827](#)
[City of Prairie du Chien's Response to May 22, 2014 PSC Draft Order - PSC REF#: 205133](#)

6. 1-AC-227 – Retention of Meters and Meter Reading Records
Clearinghouse Rule 13-033
Additional Information Regarding Utility Meter Testing Practices Upon Retirement, and Decision on Rule and Legislative Packet (suggested minute) (RDN/JR/JS/CT memorandum of 5/28/14)
[1-AC-227 Cmemo-supplemental.docx - DL: 911355](#)
[1-AC-227 Cmemo 9.25.13.docx - DL: 869394](#)
[155-PSC 113 134 185-Meter Retention-Order Adopting Proposed Rules.docx - DL: 852417](#)
7. 6680-UR-119 – Application of Wisconsin Power and Light Company Regarding the 2015 Test Year Electric and Natural Gas Base Rates (suggested minute) (RDN/JR/CS memorandum of 5/27/14)
[6680-UR-119 Comm'n Agenda Memorandum.docx - DL: 923746](#)
8. 5-GF-107 – Administration of the Universal Service Fund Grant Program for Access Programs or Projects by Non-Profit Groups
Fiscal Year 2014 Funding Proposals (suggested minute) (SEK/JJR memorandum of 5/27/14)
[5-GF-107 Nonprofit Grants 2014 CMemo.docx - DL: 925851](#)
[5-GF-107 2014 USF Grants E-Binder.docx - DL: 926451](#)

Figure 16

The Windows 8.1 version allows for a more flexible touch interface. It also allows for asynchronous file transfers, so it is considerably faster for synching the device. Finally, as it is a Windows 8.1 application, it allow for touch re-sizing of the screen, rotating of the screen to a different orientation and a split-screen view to look at multiple documents and view simultaneously. The Windows 8.1 application was a totally new programming environment for our developers, so it was not fully developed until the entire process was up and running with the Windows desktop version. To date, not many users have availed themselves of the Windows 8.1 version, but more will start using it when they observe its download/synch speed.

Having created the Post-It application, the ERF Extract application and the PSC E-Docs application, it was then only a short leap to create the last piece of this solution – making the documents accessible to the public. Our programmers were able to add an additional tab to the Office Ribbon which allows the users to convert the hyperlinks in the documents on the electronic agenda to links that could be accessed on our public web site. Links to confidential documents are removed before this conversion takes place. This new Public E-Agenda allows anyone with a broadband connection to tune-in to our live audio broadcast of our Commission Open Meetings while calling up the Word version of the Public E-Agenda and accessing (read-only) the actual notices, memos and orders that the Commission is discussing in real-time.

G. Linking metadata in document management to existing databases and applications

Earlier we alluded to the effectiveness of connecting the EDM system to other in-house applications and databases. For our Docket profile and properties, we associated all docketed case documents to our Case Management System (CMS) database. This linkage in turn allowed us to associate the Docket Profile to documents in our ERF database. For staff folders, we have used metadata from our Employee Information System database. For the utilities themselves, we connect to data in our Utility Name File database system. Finally, for customer complaints, we link to metadata in our Customer Contact (complaint) System (CCS). Linking the EDM system metadata in this manner allows the organization to integrate their work into the EDM system *without* duplicative data entry and multiple references to the same information. For example, Utility ID Number and Name are in the database and are entered only once. Case numbers and descriptions of each case are entered in the CMS database and are entered only once. When documents are created, by selecting the case number, we automatically associate the utility name, utility number, case description and a number of other items with the document. Then we automatically create the appropriate folders for storing these documents if they don't already exist. Having this metadata automatically associated with each document also helps us down the road if we are searching for a document.

H. Purchased and implemented Signature Pads for all Supervisors

We attempted to eliminate signatures from processes wherever possible. Memoranda for commission agendas used to require the division administrator to initial before forwarding the memo to the Commission board. This was eliminated, since the workflow required the division administrator to “approve” the memo in the workflow. Applicant signatures were eliminated from Travel and Training Authorizations, since the names of the people traveling were required on the form. But in some instances, certain processes required signatures from the Secretary to the Commission (Notices, Orders) or supervisors and administrators on certain forms (like the aforementioned Travel Authorizations).

The PSCW first obtained signature pads for the Secretary to the Commission and division administrators. Then, when we started making paperless processes for certain administrative processes, we also obtained signature pads for all supervisors. The models we obtained have add-in software to allow them to function well with Microsoft Office applications and Adobe Acrobat. The vendor was also working on trial software that would allow the system to function with touch pad tablets and notebooks with signature capabilities, so that eventually, the necessary signature could be captured without a signature pad. A photo of the signature pad we use is shown in Figure 17 (next page). The cost is around \$200 each.

V. Security and Confidentiality

A. *Personal Documents*

One of the topics which was raised early on by our users was the question of security in the new EDM system. Prior to EDM implementation, each division had its own file server share. With Windows security, access to each file share could be controlled through Active Directory (AD) security groups.

With our EDM system, similar granular control over security exists; in fact, the EDM system synchronizes its groups with Windows' AD groups so that similar security groups can be applied. One of the advantages of the security in our EDM system, however is that files and folders that are restricted are not only inaccessible to users. Instead, in the EDM system files and whole folders are actually *invisible* to users who do not have at least read access to them. For most circumstances, this is an *improvement* over Windows security functionality. The security of particular files and folders can be inherited from those above *or* it can be blocked from inheritance of those above it in the folder structure. This functionality mirrors the manner in which Active Directory functions in Windows.

The other concern we faced is that now with virtually every document in the agency in one big database, users were concerned with their personal and private documents. Since the file structures were standardized, it was fairly easy to locate the staff folder for each of our staff members and look through their files. So we created personal sub-folders for those who wished to have an area that only they could see and use and these folders are not accessible by anyone else, including the IT staff. This level of granularity was possible with the EDM system security settings.

B. *Taking Files with you*

Just as with paper documents, our Commission has work rules which prohibit staff from copying and taking confidential materials with them out of the office. These rules apply to both documents and data filed in our ERF system, but also now in our EDM system. However, we *do* allow staff to check-out documents from the repository while they are out of the office, but only provided they check the document back in before closing out of their work. In general, we find that it is not really necessary for staff to copy the documents and data for work at another location. We also restricted access in our E-Docs binder application so that a Commissioner or executive staff member can only access confidential documents on their laptop or tablet provided that they have a secure connection to our network.

VI. Statutory / Rule Changes

A. *Requirements for paper copies*

Throughout the transition to a paperless PUC, we have continued to ask parties and staff for a certain number of convenience paper copies for certain of the executive staff in major cases. It should be noted that these are *copies* of the original filing, which is exclusively filed in our ERF system. The number of copies has varied depending on the case.

Until the last few years, we have also had statutory limitations which *required* us to use paper mailing of notices and orders to a wide variety of statutorily-required entities, including county and town clerks, libraries and the media. Although Wisconsin had earlier adopted laws to recognize electronic signatures, the PSCW's laws had not been changed to reflect the possibility of *e-mail*.

Wisconsin Act 155, enacted in the spring of 2012, changed all of that and allowed the agency to deliver or serve official documents to *anyone* through electronic means. In some proceedings, parties have agreed that submitting their filing to the PSC's ERF system will constitute service on the other parties, although this is not the practice in all cases -- yet.

Since adoption of the new law, the Commission staff has put an emphasis on capturing primary e-mail addresses for as many interested entities as possible. Starting with the utility service providers, the staff has obtained primary e-mail addresses for 96% of the 1,458 utilities in the state. Subsequent efforts are being made to gather secondary e-mails for utility billing departments and primary e-mails from clerks, libraries and media groups. For large cases, utilities are required to gather names and addresses for persons affected by construction of a utility facility. In the near future, we expect to encourage utilities to also attempt to gather e-mail addresses for these persons. In many cases, e-mail addresses may be unavailable for this type of mailing list, but for everyone that can be obtained, we will reduce the amount of paper required to meet our statutory obligations for notification.

Because of the electronic signature legislation passed many years ago, we also no longer need to worry about signatures and affidavits as we did in the past. While some instances still require affidavits, several of these have no particular statutory obligation to do so. Therefore, we expect to reduce more of these requirements in the future. While in most cases, it may not save paper, it will reduce the amount of effort and time required to do business at the PSCW.

VII. Document Lifecycle / Records Management

A. *Documents eventually outlive their usefulness*

Whether on paper or in electronic form, documents eventually are just taking up space. One of the major benefits of going paperless is that large, bulky file cabinets are no longer needed for saving archived documents. Instead, electronic documents are stored on hard disks or optical media – indeed, thousands and thousands of documents can be stored on a single DVD. The entire database of over 800,000 documents in our EDM system can be copied and stored on a *1* (one) Terabyte hard drive.

However, databases get noticeably slower with the increasing number of files and folders they have to track and keep indexed, especially with full-text searches. There also comes a time when certain documents are no longer needed, even for historical purposes. Standards for archival of documents are useful to keep databases manageable and also to establish consistent records management practices. Because the standards deal with electronic documents, an electronic method of archival and deletion will be needed.

B. *Many organizations have standards for Records Disposal*

The Wisconsin PSC, like many other organizations, developed standards for records disposal back in the 1980's and 1990's, when all official documents were on paper. For today's circumstances, those standards no longer are applicable or necessary in their current form. Our attorneys pointed out that our Records Disposal Authority (RDAs) were guidelines for when we are able to dispose of certain public records, but that these guidelines are not requirements for us to do so. Therefore, with the onset of our paperless revolution, we set about revising our standards for disposal to reflect our electronic records, rather than the paper records of the past.

C. *Case closing date is important*

In order to determine when the documents associated with a case are no longer needed, we had to first set a date on which the “archival clock” would start ticking. The logical date would seem to be when the case had actually been closed. However, this became a point of contention, since some cases have follow-up order points that occur 60, 90, or 120 days after the order date, up to as much as 1-3 *years* after the order date for some construction cases. So the first thing we had to develop was an automated system for auto-closing cases that would provide notification to case managers and allow them to extend the case file closing date if work had not been completed. This also became a good reminder to do forgotten follow-ups, if necessary.

D. New standards should reflect new realities of paperless operation

Our ERF system was the first database for us to address in terms of records disposal because it is the repository of our official documents. It has also been in place for over ten years. The new records disposal standard needed to recognize that we no longer have any serious limitations of space and time in dealing with paper documents. On the other hand, the processes need to reflect the realities of paperless operation.

The first standard we developed was that case files would be archived to a separate database at the Commission ten years *after* the official case closing date. We determined this to be a reasonable time after which official documents of a more than 10-year old case would not likely be consulted on any but the rarest of occasions. In Wisconsin, we have a classification known as Landmark Cases, which are cases of particular significance from a policy or legal perspective. Our staff also tends to consult past Commission Orders for particular utilities, sometimes dating back over more than ten years.

Therefore, we developed a disposal criteria for case files that after the case closing date, case file documents older than ten years will be archived to a separate database. Another procedure is run on the archive database such that after 30 years, all case files are *deleted*, with the exception of Landmark Cases and all Commission orders. This means that after 30 years of saving these materials, all filings, exhibits, testimony, memos, and transcripts will be purged, leaving only the Commission's order(s). For Landmark cases and Commission orders, these documents will all be preserved for 75 years, after which time the documents will be transferred to the State Historical Society (SHS), on a media *to be determined later*. Since none of the current staff will be working at the PSCW when we reach the 75-year mark, it will be up to them to determine what media is used to transfer the documents to SHS. Most likely, it will be some descendant of Blu-Ray optical disks, a cloud-based service or some media that has not yet been invented.

Our ERF system also receives non-case related documents for reports, complaints and similar documents. Our standard for non-case-related documents is that they will be archived after a period of five years from the date they are received and then purged after a period of 15 years from when they are received. This is exactly half of the time for case-related materials.

In order to implement these standards, our database administrator developed stored procedures in SQL Server which scan the database once per month. If this process locates case files that meet the criteria, a notification is sent to the case managers (or their successors) that in three weeks, these listed cases will be automatically closed, unless the case manager files an extension request with our Records Management Unit (RMU), together with an explanation of why there is a need for extension. If RMU grants the request, the case will not be closed and it will come up for closing again after a specified period of time.

A second stored procedure in SQL Server will run once per month and will scan all of the case files in the ERF system to determine if any of them have been closed for more than 10 years (or any documents that were received more than five years ago, in the case of non-case-related documents). Any case files or documents that are found which meet the criteria will automatically be moved to the ERF archive database. A separate Intranet search function was created so that Commission staff could still search and find archived documents if needed.

A third stored procedure was created in SQL Server and it runs once per month to scan all of the documents in the archive database. If it finds case files closed for more than 30 years or non-case related materials received more than 15 years ago, it will run a routine which checks whether the case is a Landmark case and whether the document in question is a Commission Order. Anything which does not meet one of these two criteria, but *does* meet the criteria for purging will then be deleted. Since our system has only been electronic for ten years, we would not expect to see a lot of documents come up for deletion any time soon. However, we did have a few older documents that were scanned and uploaded into the system from past cases, dating back to the 1980s, so for those cases, we would expect to see a few purge notices sometime in the next year or two.

As for the EDM system, even though it is the larger of the two databases, we have not yet reached the point where we have developed an archival plan for the internal electronic documents. For this database, we have begun to consider whether day-to-day operations would be significantly expedited if we were to establish a separate archival repository for documents that had not been viewed, modified or accessed for a period of some time, say five years. Since most of the documents in the system were imported less than four years ago, this type of standard would not have an immediate impact, but it could eventually reduce the size of the primary database and speed up processing of other queries.

VIII. Benefits / Costs

A. *Factors affecting return on investment (ROI)*

We did not perform a rigorous cost/benefit analysis to determine whether to proceed with implementing a paperless process, or for purchasing an EDM system. Nor did we execute a detailed calculation because the factors involved are incredibly complex and require an unforgiving amount of speculation and estimation. That said, *if we knew then what we know now...* such an assessment would have to include several factors for consideration.

A good resource for developing such an analysis was prepared by a content management vendor located in Pennsylvania that specializes in helping organizations select EDM systems.¹³ While there is a lot of other research material on the subject and sample “calculators” that attempt to quantify the costs and benefits, it is very difficult to actually capture the potential business savings from a merely quantitative analysis. As this resource points out, there are intangible benefits in terms of increased customer satisfaction, quicker response times, higher flexibility, and improved work morale that are not captured in purely quantitative calculations.

The material goes on to discuss the selection of the best EDM system and how to deal with estimating costs and benefits. They note that in terms of cost, many organizations tend to focus on the hardware and software costs to the exclusion of the time to implement. Often these initial costs will only be a fraction of the costs of staff time required to learn and implement the EDM system, especially if the organization has tried to save money by limiting the amount spent on hardware and software. Further, this paper notes that deployment times and costs tend to be higher for software products being rolled out to “an aging desktop population” (and by this they mean the hardware, not the people). When initially reading this article, we found ourselves wondering whether they were discussing the PCs *or the people*. From our experience, both may increase deployment time and costs. Fortunately, we are usually fairly current on hardware and software, so that was not the bigger issue for the PSCW.

Another factor noted in the material, which produced particular concern, was that companies who cut costs on training see increased costs for deployment time and therefore take more time to realize benefits. These organizations suffer lost time on system administration, Help Desk calls, and mistakes which are cause for re-doing work products.

¹³ DataCore Technology, Inc., “EDM Return on Investment White Paper”, Exton, PA., Copyright 2004.

The ways in which an EDM system can help **reduce costs or increase revenue** include:

- *Overhead labor*
- *Direct labor*
- *Material and energy consumption*
- *Purchased designs and parts*
- *Quality*
- *Information storage*
- *Communication*
- *Increase the number of customers*
- *Increase the product price paid by customers*
- *Increase the range of products that customers can buy*
- *Increase the volume of business from customers*
- *Increase repeat business due to an increase in quality*
- *Increase how often customers buy*
- *Increase the price of your services*
- *Increase the time available for value-added activities*

Many of the factors for increasing revenues do not apply to state Commissions, but the concepts of increased ability to provide a wider range of services certainly applies, with the added advantage that such systems provide for more open and accessible government.

There are a variety of other factors *beyond costs and benefits* that will affect your return on investment in an EDM system. These include such items as:

1. The degree of integration with other legacy applications
2. The number of business units included
3. The size and scale of the project
4. The amount of business process re-engineering (BPR) done as part of the implementation
5. The stability of the existing IT infrastructure
6. Users' transition and acceptance of new systems

For our implementation, we chose to heavily integrate our EDM system with other legacy applications, since the data in those applications was strongly connected to the documents and related to the processes in our EDM system. While we started a pilot project with one division, it was always our intention to include all of our divisions in the project. This helped us determine how big the project was overall and how much time and IT support would be required to implement it. We set out to perform a good deal of re-engineering of processes for every process integrated into the workflow and we will continually re-visit these processes to try and improve them further.

Our IT infrastructure has been extremely stable for several years and we are continually looking for ways to improve it. We have planned for IT facilities a number of years in the future and have anticipated changes in technology, storage needs, processing power, and other factors as time has passed.

Our biggest unanticipated cost and challenge was users' transition and acceptance of new systems. Even to this day, challenges are still being faced and issues overcome on a daily basis. But we have surpassed our wildest expectations in making the transition as quickly, thoroughly, and efficiently as we have (so far) accomplished since the major migration began a little more than three years ago.

B. Benefits

In addition to the potential benefits enumerated above, our experience has shown us a number of *intangible* benefits from our ERF and EDM systems. First, we have received rave reviews from customers for the additional services and ease of access now provided, both with our ERF system starting in 2004 and, more recently, from the Commission agenda materials we offer through our EDM system in advance of the meetings. The EDM public E-Agenda allows our customers to browse our web site and call up electronic documents for each agenda item in real-time, while the Commission is discussing them.

The system also allows staff *unrivaled accessibility* to virtually every document with which the Commission is involved, (both internal and external -- except for confidential documents), and they can gain this access at any time and from anywhere in the world with a high-speed Internet connection. This permits staff to fully perform their work at remote locations, as well as during work-at-home situations. It also provides us with a simplified *disaster recovery solution*, since all documents needed to continue work are readily available at any alternate location.

C. A word or two about Costs

Based on some fairly sketchy estimates and research at a couple of Internet sites that purport to have estimated costs per user, we would estimate that for large organizations (more than 20,000 employees), the initial costs for a full-featured EDM system can range from \$500-\$600 per user. For medium organizations of between 3,000-20,000 employees, EDM systems are available with initial costs ranging from as little as \$250-\$400 per user. Small organizations can get started with relatively full-featured EDM systems for as little as an initial cost of \$50-\$200 per user. Costs vary based on whether the application is client-server based or web-based and on-going costs can also vary accordingly. On-going annual maintenance is fairly similar throughout the industry, with annual costs typically between 15-30% of initial purchase costs. Please note that these are estimates based on a minimal amount of research and "your mileage may vary".

Another factor to consider is licensing of the EDM software. Some packages have no upfront cost, but have healthy on-going costs. Other packages have an initial payment for purchasing licenses for clients and/or servers, but then monthly maintenance costs are more reasonable. *One item that can make a big difference is whether the software is licensed by seat or by user.* In our case, we discovered after using the software for some time that although our entire staff of 140-150 users are "using" the system, the number of staff using the system *at any*

one moment in time is quite a bit *lower* than we would have imagined. Based on our usage data, we were able to convert a large number of users over to concurrent licensing, thus saving a great deal on our annual maintenance costs. Our vendor was extremely helpful in assisting us to figure out the best combination of licenses for our particular needs, even though it ultimately reduced our annual payment to the vendor.

In the course of developing this whitepaper, I was asked to recommend an EDM system for use by an organization with staff scattered among several states and with only 35-40 users. I recommended that the organization explore a cloud-based solution and my research gave them 5-6 vendors to investigate. Cloud-based solutions are often web-based tools only and costs can be fairly reasonable, ranging from \$25 per user per month up to more than \$200 per user per month, depending on the available features. There is usually an additional charge if the agency wants the vendor to “manage” the installation and operation, like user setup, security, upgrades, etc. Some of these products vary in the robustness of their web interface and some may not have all the features that some EDM systems include.

Whether or not new or additional hardware is required will be very specific to each organization. Our system required an additional database server license and creation of an additional virtual server. We also added additional storage space to our SAN (Storage Area Network) and added some firmware to our multi-function printer/scanners to allow them to directly scan and OCR into the EDM system. As mentioned earlier, we purchased a number of tablet and laptop computers and signature pads, but these were for taking greater advantage of the utility provided by the EDM system. We did not, however, need to buy any new PCs, as all were current enough to function well with the EDM system.

The PSCW’s initial cost for EDM software was less than \$45,000, not including discounts, and our annual maintenance on this investment is about \$65 per user license, or about \$9,000 per year. This includes an EDM system with all of the major features, including customizable workflow, web interface, access through mobile devices, access to the API/SDK for customization, and many more features – a relative steal at twice the price for all the benefits that we have realized.

IX. Results

A. *Universal electronic access to all case filings*

The first tangible result when we implemented electronic filing was the nearly universal access to official Commission documents in case filings. We have since extended this access to internal Commission documents that are on the Commission's Open Meeting Agenda (except the confidential ones). EDM systems allow you to create all kinds of granularity to give certain users the ability to view all documents or give all users the ability to view certain documents. We are also exploring the use of our EDM system to collaborate with staff from other state agencies using the web interface portion of the software.

B. *Utility Savings are ENORMOUS*

After the first year's implementation of the ERF system, a survey of the largest utilities told us that *in Wisconsin alone*, utilities had already saved over one million dollars simply from reducing the amount of paper use and handling. This included reductions in the number of copies, reductions in the amount of shipping and reductions in postage. And this was just for the first year of the program. Savings over the last ten years, including the implementation of the EDM system, have been at least ten times over the first year savings and probably much, much more than that.

C. *Pallets of Paper*

At the PSCW, we knew that we had significantly reduced our use of paper, but it wasn't until preparation of this whitepaper that we understood just how much. While a limited number of actual data points are still available, we know that in 2002, the agency purchased 15 pallets of paper. A pallet typically consists of 40 boxes of paper, with 10 reams (500 sheets each) to a box. So a pallet of paper represents 200,000 sheets of paper, not to mention all of the toner and ink required to create a printed page and the cost of the equipment required to print it.

Starting in 2004 with the implementation of the ERF system, the amount of paper used by the PSCW began to drop dramatically. By 2008, the next year for which data exists, the PSCW purchased 8 pallets of paper – a reduction of nearly half in total paper use! Then in late 2010, we began fully implementing our project to become as paperless as possible and paper use continued to drop. While our paper use appears to have plateaued (for now), we will continue to make improvements in our process to further reduce our use of paper. The historical use of paper at the PSCW can be seen graphically in Figure 19 on the next page.

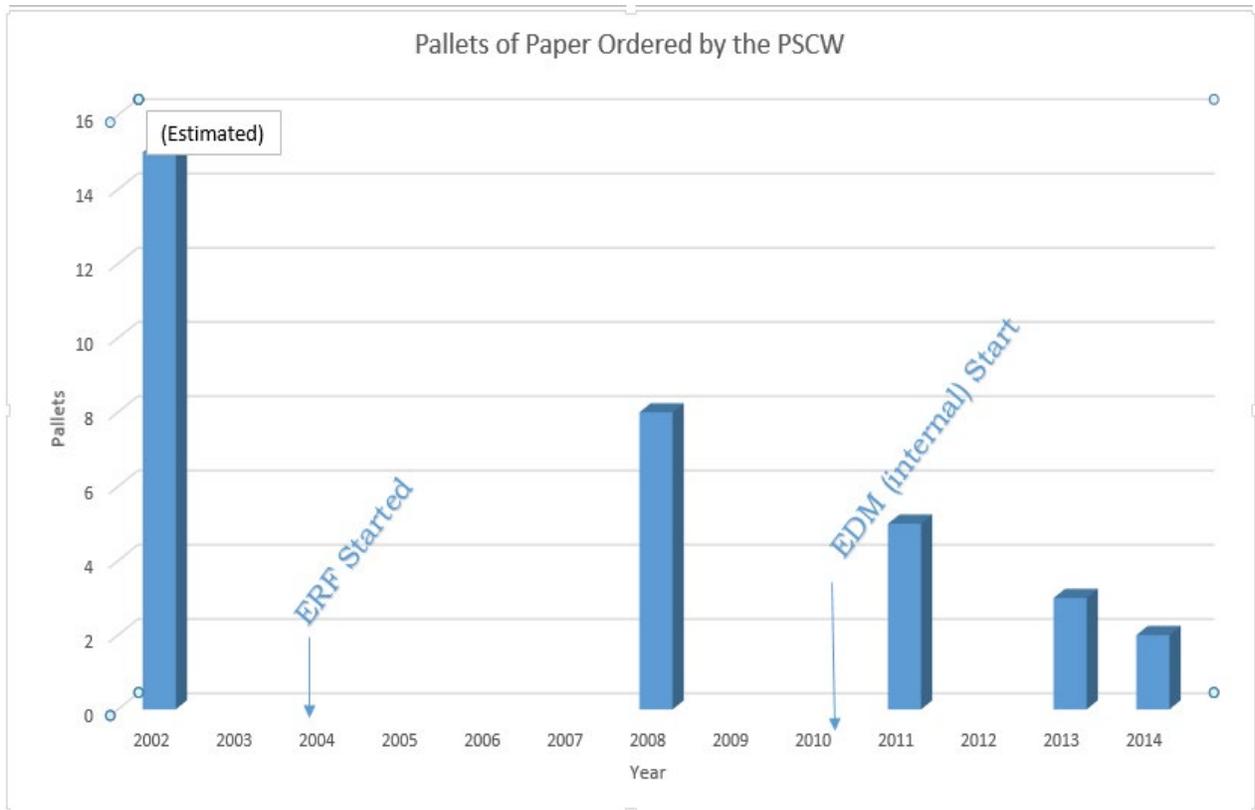


Figure 19

D. Being “Green”

Reducing an agency’s paper use saves a lot of money – not just in paper, but in a variety of other tangible ways:

- 1) Purchase of Ink and Toner Cartridges
- 2) Maintenance Required for Equipment
- 3) Footprint for storage of paper
- 4) Postage, shipping and handling
- 5) Transportation costs
- 6) Energy consumption

IDC estimates that organizations that implement EDM systems save \$21,555 per 100 users from increased worker productivity and lower IT support costs, in addition to the other cost savings and environmental savings. They estimate these other savings are:

- Annual reductions of 58,800 pages of paper per 100 users
- Toner and Ink savings of \$3,230 per 100 users
- A reduced energy cost of \$5,600 per 100 users.
- Reduced carbon emissions of 23 metric tons per 100 users.¹⁴

¹⁴ Kmetz, Hatcher and Glaz, IDC Information and Data, “The Business Value of ‘Green’ Document Management”, Copyright 2010.

In actual practice, the PSCW appears to have substantially *exceeded* these savings, based on the reduction in our paper use. Just from our EDM implementation alone, we appear to have reduced our paper consumption by a *minimum* of two pallets per year, or 400,000 sheets. This is approximately 4.5 *times* the figures from the IDC whitepaper estimates. Extending IDC's other estimates by our conservative results would infer that the PSCW has saved a great deal of toner, energy and carbon emissions from this project, although exact estimates are not available.

E. Speed of processing

One of the finest *intangible* benefits we have seen from making most of our processes paperless is the speed with which we can process notices, Commission memoranda and orders. In many cases, a notice can be written, edited, reviewed, approved, and ready for Commission action in less than one or two days, instead of the 3-4 weeks it previously required to get a notice issued. These type of savings result from a number of factors, not simply the EDM system. Such things as custom-designed templates, elimination of workflow steps, automation of uploading and mailing, together with the automated workflow and paperless processing have all combined to allow a significant reduction in time required to process documents. Not only has the time to circulate these documents fallen, but the actual time spent preparing them and editing them has also been reduced.

Because of the standardized templates and workflow processes, we also believe we have seen a reduction in the number of errors made in processing some of these documents. However, we also seem to have an *increase* in other kinds of errors that we didn't have before – like placement and formatting of electronic signatures – but we expect to address these issues in future process improvement projects.

The reporting feature available in our EDM system has allowed us to compile some data from the first few years of implementation. For example, the charts below show us the number of documents in the system and the number of workflows by year through 2013 and 2014, respectively. The number of documents chart shows that after a number of years where the pilot division worked with the EDM system, in late 2010 we began to import the majority of our documents into the EDM system. This process was completed in 2012. (Figure 20) The workflow chart shows a steady rise in the number of workflows executed overall, but we are on track to start a much larger number of workflows in 2014 than in 2013 (Figure 21). The number of cases appears to be about the same, but we are using workflows on just about every process in 2014, even for travel authorizations and purchase requests.

On the other hand, we seem to be slowly leveling off in terms of disk space used for the database. We expect some continual rise in the amount of space used, but not nearly as sharply as when we first migrated all of our existing files into the EDM system (Figure 22).

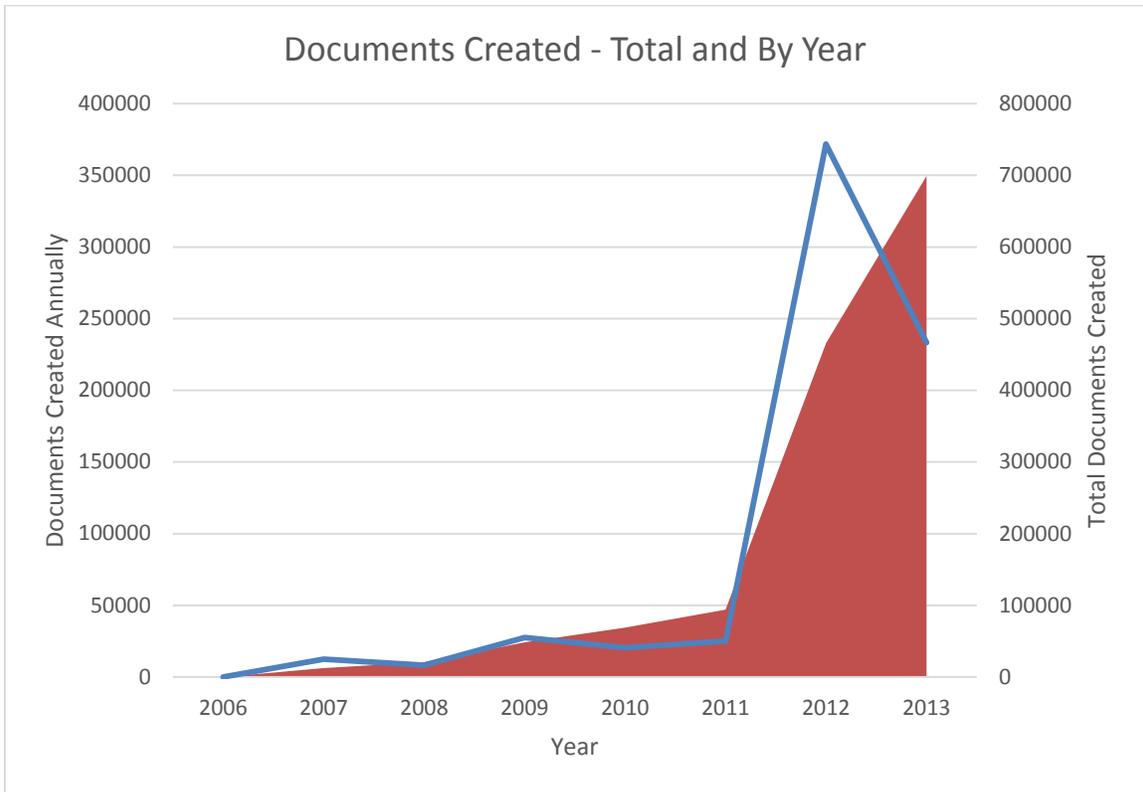


Figure 20

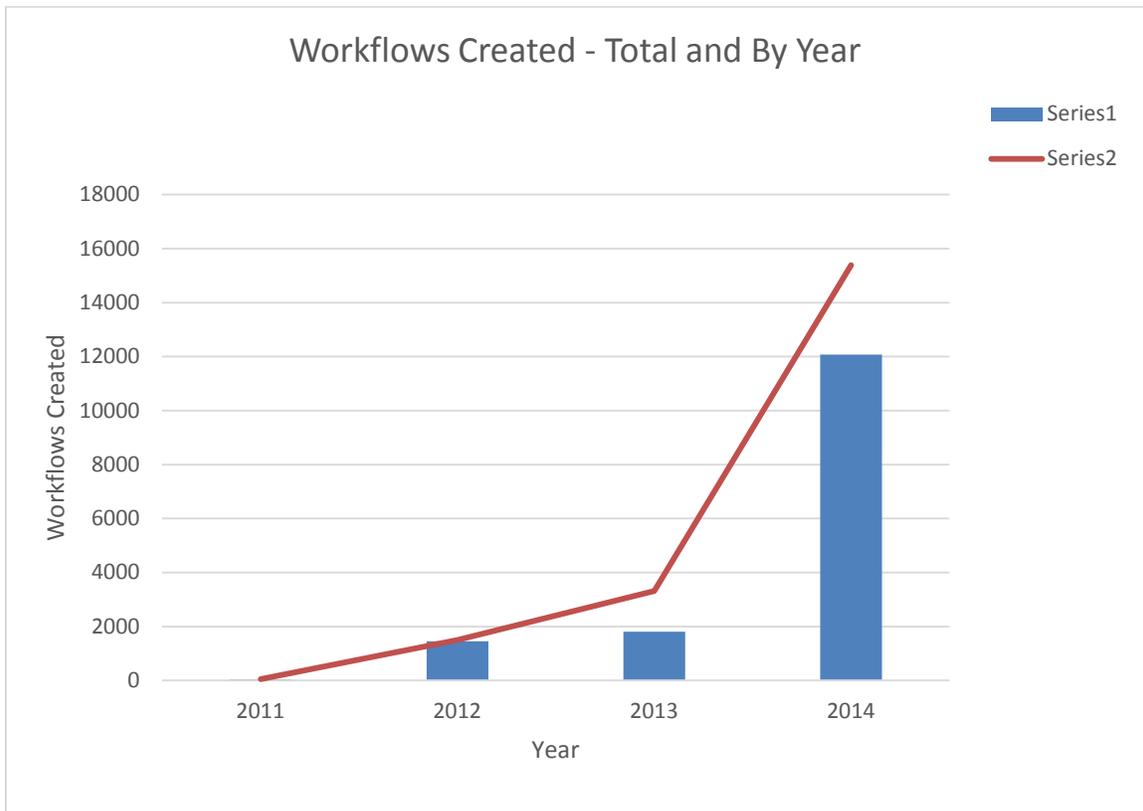


Figure 21

Figure 23 shows that while the initial use of the system was limited to the one division, once all divisions had files imported into the system, the number of documents being checked out of the system has increased almost exponentially. So the reports available help us determine all aspects regarding the use of our EDM system. Today, disk space use appears to be leveling off.

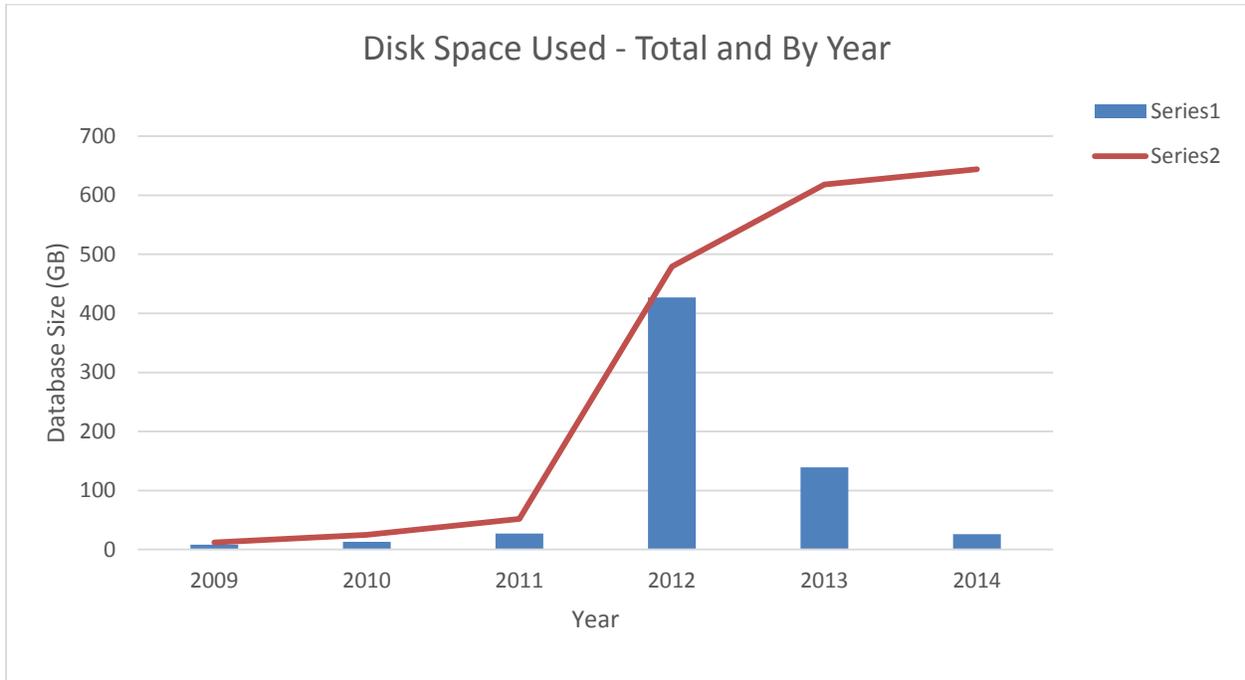


Figure 22

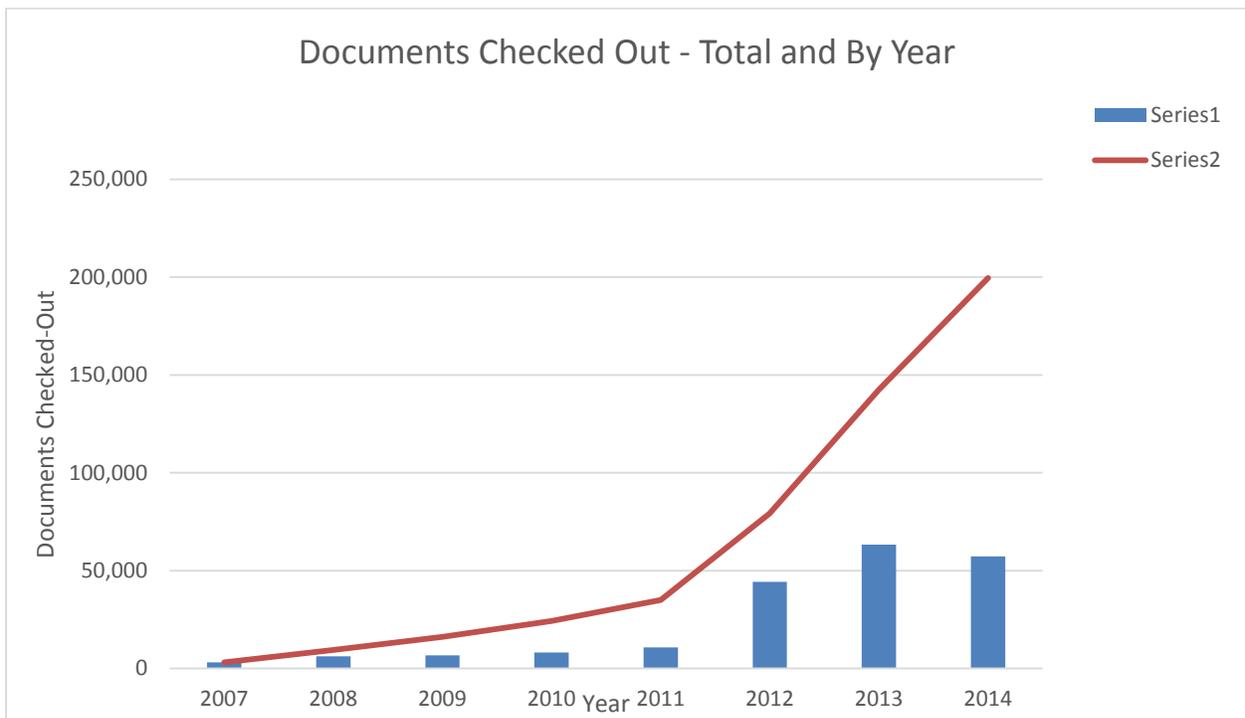


Figure 23

X. Useful Prerequisites

Although we believe that many of the changes we have made at the PSCW could be made by many of the other state regulatory commissions, or other state government agencies, we are aware that we have been fortunate to have some prerequisites in place that have helped make it possible to accomplish all that we have done. This chapter discusses some of those advantages.

A. Management w/vision and direction to succeed

As mentioned earlier, we have been blessed with some top management with the desire to see us move forward in this area, most importantly our chairperson. This project was stalled out for a couple of years until Chairperson Montgomery came on board and made it one of his top priorities. We also have some top executive staff whose direction to some of their employees was clear – get with the paperless movement or get out of the way. This project languished for several years earlier, waiting for top management to indicate it was a high priority and allow the resources to be devoted to it. When our current chairman came on board, he indicated that going paperless was one of his top priorities. Also, a number of long-time staff members who had become entrenched in doing things a particular way eventually retired during this period. This also helped ease the transition to this new paradigm - but it all was kick-started with strong support from top management.

B. Applications Development staff

It was important for us to have in-house programmers whom we could call upon to create custom tools for us to solve a variety of process problems without going back to using paper. This work was largely the effort of two programmers, neither of which was devoted full-time to supporting the paperless effort. These staff were able to grasp the concepts on which we were working, understand what piece of the puzzle needed to be created and, just as importantly, where and when that piece would be used and by whom. Then, they produced a tool that enabled the process to remain paperless all the way to the end. We have discussed those tools in this whitepaper.

We understand that not every state commission has applications development programmers or database people on their current staff. We also recognize that an EDM system can be implemented without the level of customization that our programmers were able to construct. However, many of these customizations allowed our staff to continue to perform those steps or functions that they had previously performed without significantly affecting their work pattern. This significantly eased staff's fears that they would not be able to efficiently or accurately perform their jobs as expected. The same customizations could be accomplished through the use of a vendor's professional services (our current vendor has some exceptional staff). This would require you to specify what tool was needed, how it was required to function and then the vendor would give

an estimate of what it might cost to create such a tool. Having applications development staff available at all times certainly makes the process smoother and allows you to more spontaneously create new applications as needed.

C. Enterprise Database and a DBA

Having an on-site database administrator and an enterprise level database (like SQL Server 2012 R2) also proved to be valuable, in that we were already familiar with writing applications and stored procedures in the database. This allowed our DBA and our programmers to automate many tasks outside of the workflow steps included in the EDM system. It also allowed us to recognize the value of highly integrating our existing databases with the EDM system database. Because DBAs understand the data you have, they are best equipped to tell you how to integrate it with your workflow processes. It also helped that our DBA was an excellent communicator (not all of them are) and was able to assist us in the process analysis when we broke down each process into its component parts. Again, this is something that a vendor's professional service folks should be able to perform, but they will not be as familiar with your data or your processes as your own staff.

*D. EDM software (and a vendor who *listens*)*

Because we had “experimented” with a number of different EDM packages, we were confident that when we selected the Document Locator software from ColumbiaSoft it was a very full-featured EDM application. Moreover, we knew that the system was deeply integrated with the Windows operating system and MS Office. More importantly for us, our vendor also appears to stay relatively current with the latest releases of those key products. The current version works well with Windows 8.1 update 1 and Office 2013, as well as with Windows Server 2012 R2. As of November 2014, these are all the most recent versions of Microsoft applications. We have tested the software with the preview version of Windows 10 Technical Preview and it still functions well.

As we moved along in our implementation, we also found that we had selected a vendor who *listens* really well – they quickly responded to our support calls when we found bugs in the software and they also responded promptly when the bugs were in us (user errors). More importantly, when we explained to them how we thought the software *ought* to work, they not only listened, but added our suggestions to their development path and *improved* the product consistent with some of our specifications. Many improvements have been made to the workflow module and other features because the vendor responded promptly to our enhancement requests. It is rare to have a software vendor as responsive as the folks at ColumbiaSoft have been for the PSCW.

E. Case Management System

Before we began implementation of the ERF system and, subsequently, the EDM system roll-out, we already had in place a well-functioning Case Management System (CMS). This system allows us to track the creation and progress of all of the active cases in our system at any time. It was the major contributing database to the metadata used in the document indexing and workflow processes of our EDM system.

We have made significant improvements to our CMS application over many years, but a great deal of improvement has occurred in the last 3-4 years. Not only was this the result of our EDM implementation, but also because of people wanting more detailed tracking information, easier ways of posting information to the agency's web site and easier methods of following up on order points after the Commission's decision is rendered. Again, we could have implemented our EDM system without having a CMS already in place, but having it provided us with some direction of where to go with our development.

F. Possible Statute changes to allow electronic delivery

We were also fortunate that we were able to get legislation passed and into law that allowed the agency to take advantage of some of the newer technologies to come along – particularly the paperless electronic signature pads and the ability to use e-mail for delivery and service of documents. If a government organization wants to start down the road toward being paperless, it needs to at least *review* the existing statutes to determine whether any of them stand in the way of getting rid of paper in the process, no matter what that process may be.

*G. A *clever* Apps Staff who can (and will) do whatever you need*

Did I mention the value of having an applications development staff? It also helps if these developers are open to new ideas, if they are willing to “explore strange new worlds and seek out new life forms” ^{TM 15} (like the Windows 8 Metro/Modern interface), and it **really** helps if they are exceptionally clever. These two people on our IT staff were/are *extremely* valuable at making the adjustments needed *when the changes were needed* and in a very timely manner – and all without a whole lot of grumbling or complaint. And it didn't hurt to have an agency staff that are mostly computer-savvy and know how to make good suggestions for making applications work better.

The tools and applications that were developed were very creative, however, they did not require an exceptional amount of *time* to produce. If an organization has creative business users who know and can describe what they need to facilitate a paperless process, a vendor's skilled professional service staff could likely develop similar tools and applications for a reasonable cost.

¹⁵ Trademark of Paramount Pictures, a subsidiary of Viacom.

XI. Conclusions / Lessons learned

A. *The RC Factor: Resistance to Change can stymie everything.*

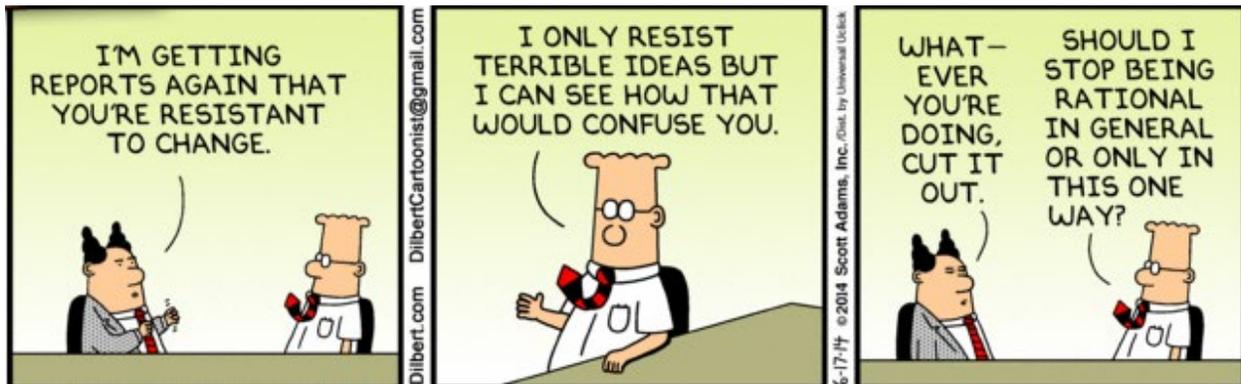


Figure 24 - Resisting Change

Looking back, the primary reason that it took from 2007 until late 2010 to even get serious about starting our EDM/paperless migration was the heavy resistance to change from Commission staff. Many were not as computer literate as they should have been, given how long some technologies had been around. Other very savvy users expressed an unwillingness to read and work with documents electronically rather than printing them out. Most were not familiar with the methods of performing electronic mark-up of documents. Staff formerly followed procedures where each person wrote their own section of a document and some coordinator or support staff then had to copy and mark-up changes from as many as 10-12 different paper copies of the document in order to create a new draft. Most staff had to learn a whole new way of creating, storing, retrieving, saving and collaborating on documents. Many were frustrated by early user errors and lacked confidence in the new processes and how they fit into them.

In order to overcome this resistance, you need top management to give its full support and direction. You also need “champions” to keep pushing and teaching those around them to work on learning the new ways of doing things. And if those champions can share the vision of where things are going, that would help immensely as well. Further, if some of the team are good at pushing the IT folks to get needed tools and changes made quickly, the team members can show their colleagues bold evidence that this project has a high priority and that tasks are quickly being accomplished. Stir in a lot of training, communication, and frequent team meetings to keep everyone informed and to announce fixes and achievements. This is a recipe for beginning to overcome a lot of the resistance.

An organization can do its best to set the vision, then move in that direction, assemble a team to help provide input on each aspect of the implementation and devote a significant portion of IT resources to the project. But when all is said and done, such an undertaking sometimes requires someone to make decisions and determine “this is the way it’s going to be”. That person needs to listen, to re-think the situation when necessary, but the leader also needs to be firm in the vision. They need to be vigorous in their commitment at times (Ex. “What part of

paperless don't you understand?"), yet equally calm and persuasive as the situation calls for it. Above all, they need *patience* and confidence enough to instill in the team that all great adventures start with the first step. And then, another. And then, another.

B. *Whatever EDM software you choose*

There are many, many good EDM systems to choose from with multiple features your organization may find valuable – maybe even some that our system doesn't currently have. But, first and foremost, you need to *be sure that you select a system that is easy to use for the staff of your organization*. If you select software that is highly complex and difficult to grasp, that people already don't envision a need for -- the RC factor (resistance to change) will skyrocket and you may never get the program off the ground. If possible, have your team put together and solicit input on ease of use, from as many staff as possible, throughout the process – it will pay huge dividends later.

Having a system that integrates with all of the major commercial software you're already using is also invaluable. Our system works exceptionally well with the Windows Explorer interface and with the major applications in Microsoft Office (we're currently on Office 2013) – Word, Excel, Outlook, PowerPoint, Visio, Project. It also functions well with Adobe Acrobat. Acrobat is essential for getting our documents from one repository to the other and for allowing universal access to our official documents.

It also helps if the EDM software can adapt and integrate with some of the existing organization-specific applications that have already been created. This allows for a smoother transition. Moreover, it provides a key transitional component – *it is now possible to adapt the system to the way that people work, rather than making people change the way they work to conform to the new system*. There will be times, however, in order to build consistency into your business processes, when you may have to require the work be modified in small ways to fit the system. This is an inevitable side effect of going completely paperless, but need not dominate your choices.

Any practical EDM system should have some customization flexibility to meet your organization's needs and goals. Systems that depend on rigid rules and strict adherence to those rules should be rejected. One of the ways to insure flexibility is for the vendor to provide easy access to its application programming interface (API) or to an SDK (Software development kit) which can be used for customization. *Such flexibility also allows for close links to the way your current systems function*. Another approach is for the vendor to offer professional services for customization in which certain tools or modifications to the system can be made for your organization for the price of the professional time required to create and implement a particular customization.

In any implementation of an EDM system, users *and* management are going to want assurances that the system will be *reliable and can be secured*. They will

want a granularity of control over the system to allow fine-tuning of file and folder security. Most systems will have this, but if you want to go as far as possible toward a paperless PUC, you will need to be sure that the product you select has very well developed features in this area.

The last essential universal feature to look for is Web access. Several good products today are only Web-accessible and have no client alternative. These products are very good, but it is much harder for them to simulate the Windows File Explorer look and feel, especially when copying files from a desktop or network location to the EDM system repository. *We chose the client-server approach to preserve this paradigm of access*, while also purchasing the module that allowed our users to access the same repository over the Web – to us, it provides the best of both worlds – speed, ease of use *and* remote access.

C. Going paperless is, itself, a process

We didn't develop all of this overnight - it took us 3-4 years to even get started in earnest. Then, after the ball got rolling, it has taken us another 2-3 years to almost reach our goal. The truth is, we still have a few things left to address and then it will be time to go back and refine the existing processes and try to make them better. When are you done? If you are like most organizations, you will *always* be looking for ways to improve your processes.

Further, we approached this project in a piece-by-piece fashion. We didn't do every process at once – we started first with the process that seemed the easiest to address, the Notice process. We knew that in order to have a completely paperless system we would have to automate nearly every part of the Commission's Binder process. The next process we addressed was the Order Process and as we moved along in our efforts, we found that more and more steps could be removed from the process that had previously been carried out in the paper world. We also discovered that there were several occasions when we would "hit the proverbial paper wall". People would say "and then we take the electronic version and print it" and we would have to develop a more automated way for the task to be accomplished without using paper.

Within a fairly reasonable amount of time, the team managed to work its way through all of the major sub-processes that make up the Commission Binder process. At that point, we faced the crucial decision of how to make *all* of these efforts come together into a paperless solution. Somewhere in the wee hours of the morning, in the hearts and minds of our "champions" and our programmers, the goal began to gel. We conceived of and developed the applications and tools to "post" the E-Agenda for the Binder Process, and then, to sync the materials to the laptops and tablets of the Commissioners, their executive assistants and the division administrators.

We still have a few administrative processes to accomplish, some of which are waiting on the statewide implementation of a new budgeting and payroll ERP system. The goal of perpetually trying to improve the processes will require us to

go back and re-examine what we have done to make all of the processes function together better. The Wisconsin PSC will continue to refine its work to reduce costs, and increase savings of paper, toner and ink, and equipment maintenance. And we will continue our efforts to reduce the environmental impacts of excess paper use.

At all times, keep in mind that going paperless is a complete departure from the paper paradigm people have used for hundreds of years. Yet for each step in the paper process, there will be a paperless equivalent that you can implement to eliminate paper. Try not to start or end your processes with paper of any kind – keep documents in their electronic form wherever possible.

The table below shows the simplified steps in the lifecycle of a document, the methods used to handle the document in a paper-based process and how the same document is treated in a paperless fashion:

The Paper versus Paperless Paradigm

Process Step	Paper Process	Paperless Process
Creation	Pencil and Paper	EDM, MS Office, Templates
Location/Storage	Physical file share	Reference Numbers, Searching
Transport	Postal Mail, “Sneaker Net”	Workflow, Synchronization, E-Mail
Editing/Markup & Approval	Pencil mark-up, many, MANY copies	Track Changes, Versioning, Signatures, E-Comments, E-Ink
Access	Paper attachments, Paper copies, Backpack overload	Hyperlinks, VPN, Web interface, Security, mobile apps

D. Why have there not been more successful paperless projects to date?

So why haven't more organizations decided to go paperless, particularly government agencies? Up until fairly recently, a number of impediments stood in the way of a completely paperless process.

First, going paperless was far more expensive as little as 10-12 years ago than it is today. Prior to creating the ERF system, we were investigating the possible acquisition of an EDM system that had the potential to serve as both parts of our ultimately paperless EDM implementation. The rough estimate for the cost of that system in 2002 was \$275,000 and annual maintenance was likely to be about \$75,000. When we purchased our current system in 2006, we paid less than \$45,000 and annual maintenance on this system is only about \$9,000 – quite a reduction in the cost threshold to start such an endeavor.

Second, it has taken PCs and interfaces a long time to develop well-enough for people to read, edit and share documents electronically. In the early days of computing, there were often times when there was no real access to networking. Word-processing capability in PCs allowed them to develop electronic documents, but the only way to share those documents was to print them – so the paper and the people carrying it became the “network”. Plus, when networks developed further, some organizations installed different types of PCs (Apple, IBM, and Compaq) that would not actually talk the same language or would not produce documents in the same formats, not to mention that the early interfaces were very primitive and usually proprietary.

As digital interfaces in operating systems like Macintosh and Windows developed further, these digital technologies still had more complicated interfaces than most physical objects in everyday life. Even the development and widespread use of the World Wide Web didn't answer all of the remaining questions about connectivity and compatibility across different platforms and (at least initially) using the Web was anything but cheap. Put simply, technology simply didn't offer all the features needed to make people comfortable with being paperless.

E. Better technology and EDM software make the paperless office possible!

But everything has dramatically changed in technology over the last four years. Lightweight tablet computers are now available for reasonable prices that allow organizations to work with an operating system they know and understand (Windows) and to manage these devices with the same tools that they use for desktop and laptop PCs. These devices have remarkable touch screen displays which allow the development of applications that can be sized and customized for the individual user. They also have the processing power to perform all of the same tasks that the user can perform on their desktop machine. And they have incredible battery technologies which allow these devices to be made almost paper thin, yet run almost the whole day or more on a single battery charge.

The Wisconsin PSC tends to keep our technology fairly current. Depending on budget resources, this may be more difficult to do at a larger organization. Most recently, within the last four years, we have made sure that every staff member has at least one 23"-24" high-definition flat screen monitor (many have two) to be able to place more than one document on the screen at one time and view them in approximately full-size. Add to this computers with fairly fast processors, decent graphics, fonts, and memory, a modern Windows OS and Office applications and you now have the formula for being able to work with and collaborate on documents completely in electronic form.

Displays and fonts on tablets and laptops, as well as desktop monitors, are brighter and higher resolution than ever before, making the concepts of e-paper and e-ink a reality. Programming tools are available for reasonable cost to allow programmers to rapidly develop supplemental applications for most any process – even for developing touch screen applications and applications for mobile devices. And many of our devices allow for pen input to further simulate the electronic paper experience by allowing direct mark-ups of electronic documents.

What still needs to catch up and move forward are the people involved in the process. The focus needs to be on sociological factors, not just technological ones. Some type of sociological shift can oftentimes make the difference between a successful project and a failure. Technologies that failed in the past can sometimes be revived by what *The Economist* calls an *external shock*, as in the instance of the electric car. With growing concerns about climate change and a spike in oil prices, the market for hybrids and electric vehicles is now booming.¹⁶ The paperless office can also be successful, if people are willing to accept change and modify some of their old, entrenched habits.

Trying to go paperless all at once is a recipe for failure. Pick a component or sub-process where you can get the biggest "bang for the buck" and prove to your staff that going paperless is not only possible, but an easier way to get their work done. Achieve the buy-in that you will need to take the next, more difficult steps. Rinse and repeat.

Going paperless is now cheaper and easier than ever before – there are more EDM systems for storing the documents and they are less expensive than ever before. There are more and better ways to display documents, faster processors to create and edit, improved networks and connections to access the materials and enhanced programming tools for bringing it all together. Add in the availability of lightweight devices to electronically carry whatever information you need, wherever you go, and you have the perfect formula for successfully implementing a paperless project in your PUC or other government organization.

*Clarke's Third Law: Any sufficiently advanced technology is indistinguishable from magic.*¹⁷

DL: 00924843

¹⁶ *The Economist*, "Technological Comebacks: Not dead, just resting", October 9th, 2008.

¹⁷ Clarke, Arthur C., "Profiles of the Future: An Enquiry into the Limits of the Possible" (1982)