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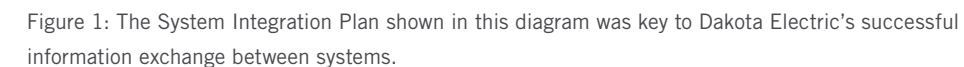
- » Can the users who are responsible for a particular piece of GIS data maintain it themselves? Can “non-GIS” users edit data stored in the GIS?
- » Is information exchanged automatically between systems? Is information only entered once and shared with the other systems?
- » Have our systems captured and documented our company’s workflow and procedures? If key personnel were to retire tomorrow, would the work continue in the same manner and with the same high quality?
- » Can everyone within the organization see where all work is currently occurring on a map? Can users access all the details about the work (e.g., estimated costs, actual costs, material, etc.) from the map in just a couple of mouse clicks?
- » Does every field crew have access to all their construction documents (e.g., design drawings, material lists, permits, etc.) on their mobile device? Do they have access to all construction standards and standard operating procedures?

**Dakota Electric: One Visionary Rural Electric Utility**  
Founded by farmers with the help of the Rural Electrification Administration (REA) in 1937, Dakota Electric Association is a member-owned, not-for-profit electric utility based in Farmington, Minn., serving over 100,000 members. It is ranked among the 25 largest electric distribution cooperatives nationally and is the second largest in Minnesota. Dakota Electric purchases wholesale electricity from Great River Energy, a generation and

Early in the planning stages of the project, Dakota Electric identified the following seven tenets that established the vision of the project:

- ## Moving Forward

While having a vision and identifying key software systems was a good start, it was simply not enough to get the backing of senior management. What was needed was a plan that was detailed enough so all involved would be confident the project could succeed, but not so detailed that the project would get stalled in planning. To help create this “Go Forward” plan, Dakota Electric partnered with POWER Engineers, and together they were able to complete the plan in a few weeks and present it for approval. Senior Management and the Board of Directors shared the vision of the project and the “Go Forward” plan helped them commit to the path outlined and the necessary funding. This commitment to the project was critical for the ultimate success of the project.



While the “Go Forward” plan provided the general direction of the project, there was still a lot of additional planning required. Rather than take the traditional approach of designing all the systems, interfaces and customizations and then start implementation, Dakota Electric with the help of POWER used an Agile Project Management approach. The idea behind this approach was to prioritize the systems to be implemented, do just enough design to guide the configuration, and then get to work.

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platform for sharing information among all the related systems was also implemented.

Once the GIS configuration was well underway, the configuration of the Designer Software, OMS software and WMS software were started, and all three efforts ran in parallel. Development of interfaces required to support the envisioned work flows and customizations necessary to fill gaps between the systems were also pursued concurrently as resources allowed.

As the main systems began to take shape along with the integration and customizations, the team then turned its focus to identifying the remaining required components. GO! Sync by TC Technology was selected as the mobile mapping platform and KorTerra was selected as locations software. Panasonic Tough Books were selected as mobile hardware, and Trimble was selected as the GPS equipment supplier.

With all the pieces in place, Dakota Electric was able to test



Figure 2: With access on mobile devices, field crews can view all construction documents and make changes to GIS attribute data (i.e., asset size, type, manufacture information) that are automatically updated in the GIS.

the envisioned work flows and verify their completeness. With all systems working, Dakota Electric developed 30 web-based user training modules with POWER's help, using the same Moodle course management software employed by many universities. The training modules were used for extensive instructor-led training, but are also available 24/7/365 to users for refresher training at their own pace.

**Go-Live**

After three years of hard work, all of the major systems were ready for production, and the users were ready for the new systems. The tenth (and final) data migration occurred over a

weekend, and finally in November 2009 all of the systems went live at the same time. (It is generally regarded as a best practice in multiple system integrations to go live simultaneously as it is more efficient than developing interfaces to older systems that will soon be replaced).

While there were minor issues identified during the first week, Dakota Electric never went back to the old systems – but that doesn't mean all the work was done. On the contrary, there were still many lower priority customizations that needed to be completed. In addition, as users began working with the new system, they identified new enhancements that could improve their productivity (and they also found that some of the customizations they thought they needed were no longer required because they did their work differently with the tools available in the new systems). Three years after Go-Live, the last of the customizations are being completed, and the remaining work groups who were not using the system are now coming online.

**Lessons Learned**

Just like no two utilities are alike, no two software projects are alike. However, there are often similarities such that lessons learned from one project can be applied to another. The following are a few of the lessons Dakota Electric learned about this type of project:

- » Start work flow discussions early. It takes time to introduce everyone to the new technology and even more time to agree on how the current work flows should be altered to take full advantage of the capabilities of the new systems. Time and again, work was transferred from one group to another because it was more efficient. Some work groups gained work, and others had less work. What was important was that, overall, the work was being accomplished in the most efficient manner for the entire utility – not just one group or department.
- » Avoid analysis paralysis. Don't try to come up with the perfect all-encompassing plan. These

projects and systems are very large and complex, with many user interactions. Dakota Electric found it was much better to release software that met many of the needs than to wait for the "complete" system. Once the users tried the software, they were able to adjust to the functionality or recommend improvements. In other words, it was much more efficient to spend time delivering solutions the users knew they wanted than working on plans for features they thought they wanted.

- » Make sure that quality control/quality assurance procedures are in place before the systems go into production. These types of systems generate a lot of data, and if the

systems are not in place from the beginning, then it is very easy to fall behind in maintaining quality data.

**Was it worth it?**

The change created by the project was revolutionary. Many problems that existed for decades were brought to the surface and resolved. While there were many improvements (and a few steps back), some of the most important changes were:

- » Vast improvement in the ease and efficiency of finding old work information. Gone are the days of looking up information in any number of different work systems, hunting through file cabinets and even searching through microfiche. Now finding out everything about any of the 10,000 work orders completed each year is simply several mouse clicks away.
- » The work management system captured the key elements of each work flow. This made training of new staff much easier and improved the overall quality of the work as each person performed the same tasks.
- » The new systems made information readily available about all aspects of the core utility business. Knowledge that once only resided with certain individuals now became available to all. These systems also made it easier to analyze information to support decisions rather than relying on anecdotal knowledge or past practices.
- » Volume of paper has been drastically reduced in all work processes. In the area of asset locations alone, the printing of over 25,000 tickets annually has been entirely eliminated.

And finally, on June 19, 2012, at approximately 4 a.m., a major storm passed through Dakota Electric's service territory, knocking out power to 20% of the utility's customers. System Control was able to use the systems to assess the situation and develop a plan for restoration. When the crews arrived, System Control was ready to execute the plan and direct the work in an orderly and efficient fashion. Every two hours throughout the day, System Control briefed Senior Management on the current situation using the information provided by the systems. By 10 a.m., all but a few hundred customers had their power restored, and by midnight, all power was restored. What is truly incredible was that all of this was accomplished electronically without any paper. Using all the systems together as they were designed was the key to the success. "We never could have gotten everyone back on as quickly as we did with the old system," said John Thurmes, Dakota Electric's System Control Manager. "Everything worked just like it was planned."

**Conclusion**

GIS is no longer a system that should reside in only one portion of a utility. Integration of GIS with all major business systems



Figure 3: Reports are accessible via a web browser allowing users to drill down quickly to the information they need.



Figure 4: The information about any work order on a typical day is easily displayed on a map—showing everyone in the organization where all work is currently occurring.

delivers a huge return on investment. While these types of projects are often difficult, the rewards are well worth the effort. People like to do good work and do it efficiently – the systems are out there to improve your utility, so all you need is a good plan to start moving forward.

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