

CONTROL SYSTEM USAGE VARIES CONSIDERABLY AMONG NORTH AMERICAN ELECTRIC UTILITIES

By Charles W. Newton

During the period March through May 2003, the Newton Evans Research Company of Ellicott City, Maryland, conducted the company's seventh survey of control systems usage patterns among the world's electric utilities. This exclusive article provides highlights of the findings from the North American portion of the company's global study.

CURRENT USE OF EMS, SCADA AND DMS SYSTEMS

Based on this large sample of 252 North American electric power utilities serving about 35 per cent of the population and industrial base, 73 per cent currently use an energy management system (EMS), supervisory control and data acquisition (SCADA) system, or distribution management system (DMS), or a combination thereof. Only seven of the current 68 "non using" utilities had plans to install a system over the next few years.

Among the investor-owned [IOU] subgroup representing the great majority of customers served by IOUs, usage of one or more transmission and distribution control systems (EMS, SCADA, DMS) was nearly universal. Among public power agencies and municipal utilities, the rate of use was 85 per cent and 78 per cent, and for electric cooperatives, the rate was 62 per cent. More than three fourths of the participating Canadian utilities had one or more control systems implemented.

CURRENT/PLANNED USE OF SYSTEM

More than one third of the respondents indicated that their utilities had already installed an outage management system [OMS] separate from the SCADA System. Another 21 per cent were planning to install a separate OMS. Twenty sites indicated that OMS is integral to DMS/SCADA and would therefore remain "joined."

Municipals and cooperatives were somewhat more likely to plan on implementing separate OMS, while 70 per cent of the investor owned utilities had already done so. See Figure 1.

Fifteen respondents noted having a separate generation management system (GMS), and seven others indicated plans to implement a separate GMS. More than 80 per cent of the respondents suggested that automatic generation control soft-

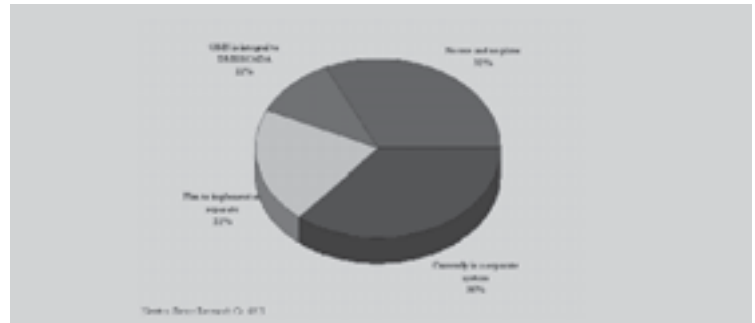


Figure 1: Current/Planned Use of Separate Outage Management Systems [OMS].

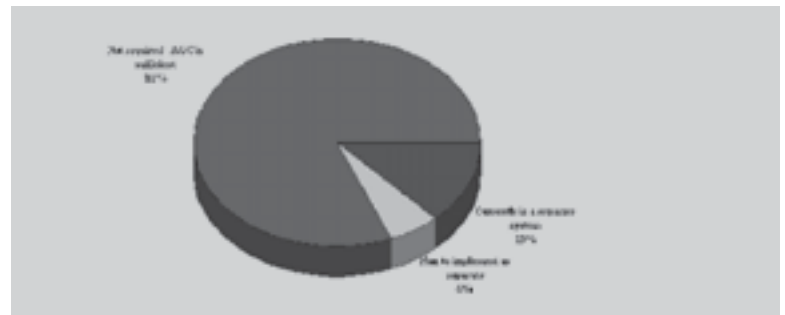


Figure 2: Current/Planned Use of Separate Generation Management Systems [GMS].

ware, operating as part of an EMS or SCADA system, was sufficient for their information needs. More than one-third of the investor owned utilities noted having a GMS, the highest percentage among the subgroups of utility types. See Figure 2.

Continued from page 13**REQUIREMENTS FOR WARRANTY AND SERVICE AGREEMENTS**

Buyers do want at least a one-year warranty, and a sizable percentage (31 per cent for central site hardware, 23 per cent for remote site hardware, and 26 per cent for applications software) want multi-year warranties. Buyers are adamant about having multi-year contractual service agreements available, with two thirds indicating multiple year contracts are required or desirable.

Investor owned utilities were somewhat more likely to favor multi-year warranties and long term contractual service agreements for central site hardware. Cooperatives were more apt to favor longer term warranties and service agreements than were municipal respondents.

LEVEL OF IMPORTANCE OF SUPPLIER USER GROUPS

Eighty four percent of responding utilities indicated that user groups would be considered as very or somewhat important for their next EMS/SCADA/DMS procurement.

Investor owned utilities and other public power agencies placed somewhat higher importance on the role of user groups than did municipals or cooperatives, but the vast majority of each subgroup rated the importance of these groups highly. See Figure 3.

CURRENT LINKAGES AND PLANS FOR ADDITIONAL LINKS BETWEEN SYSTEMS

One hundred and seventy five responding utilities provided their "linkage" status and plans from their control center based systems to other, external systems used or planned for use by the utility.

Currently, links to historical records and other utilities (control center to control center) lead the mentions of current connections. Links to load management systems and to operations planning systems were also well underway in more than one third of the sites surveyed.

Plans for future links from the control center based EMS, SCADA and DMS systems are focused once again on GIS (geographical information systems) links and on ties to outage management. These have been the listed link plans since the late 1990s.

Investor owned utilities are far more likely to have more links in place than their counterparts in either public power or cooperative utilities. The municipal,

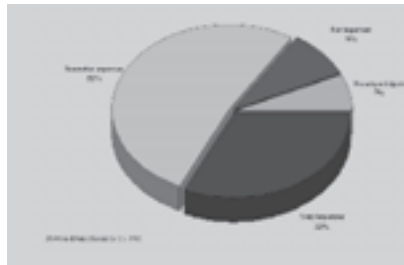


Figure 3: Level of Importance of Supplier User Groups for Next EMS/SCADA/DMS Procurement.

cooperative and Canadian sectors were focusing their plans to link control systems with AM/FM/GIS systems and with outage management subsystems. See Figure 4.

CHOICES OF OPERATING SYSTEMS

Windows leads in mentions on a summary basis as an acceptable operating system on all three levels master station, substation RTUs/controllers and IEDs/process devices.

On the master station level, UNIX was a close second, retaining a viable position, especially with strong support from the investor owned utility sector and other public power agencies (74 per cent and 79 per cent, respectively). Relative newcomer LINUX garnered mentions from 22 utilities; interesting, but still lagging behind is Open VMS. However, more than 25 per cent of the "other public power" and "investor owned" communities did cite LINUX.

In the field (substation RTUs/controllers and IEDs/process devices), Windows held a commanding lead (74 per cent and 71 per cent, respectively). UNIX was a distant second in mention rate (16 per cent) for operating systems at the substation level, while Open VMS was a distant second in mention rate (16 per cent) for operating systems at the IED level.

USE OF PROTOCOLS TO EXTERNAL HOST/NETWORKS

This survey found DNP 3.0 Serial to be the most important (53 per cent citing use) protocol currently used within the substation. Modbus (Serial) was also quite important, as noted by 23 per cent mention rate. It appears that many users are migrating (or planning to do so) from DNP 3.0 serial to a LAN-based version of this popular protocol. Twenty-nine sites reported plans to implement the DNP 3.0 LAN version.

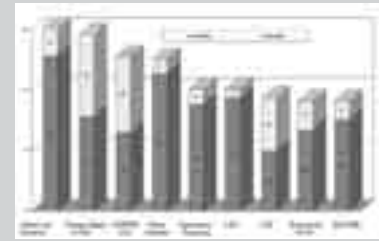


Figure 4: Current/Future Plans for Connecting EMS/SCADA/DMS to Other Systems

When considering how to move communications from the "local, intra substation level, to the external environment", again, DNP 3.0 is clearly the choice for today. However, it appears that not only will users move to a LAN-based version of DNP, but they are also using and expecting to increase use of TCP/IP and, to a lesser extent, DNP serial in their protocol plans.

CURRENT AND PLANNED USAGE OF INTERNET AND INTRANET TECHNOLOGIES

Officials were presented with a list of eight specific functions. Current and planned use of the Internet, while limited to 77 utilities, was strongest for substation one-line diagrams, outage information and real time dynamic updates. Plans for additional utilities to use the Internet centered on outage information (34 per cent), substation one line diagrams (27 per cent), real time snapshots and real time dynamic update (both at 26 per cent).

Use of Intranet technology was being made by a significantly higher percent of utilities that was observed in the 2001 study. Substation one-line diagrams (52 per cent), engineering drawings (48 per cent), and outage information (43 per cent) led in mentions. Future plans centered on using Intranet technology for providing outage information (35 per cent), substation one-line diagrams (24 per cent), and supervisory control (24 per cent). By 2005, a majority will be using intranet technologies for most of the listed applications.

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