GUIDEBOOK >> ASSET MANAGEMENT

energybiz®

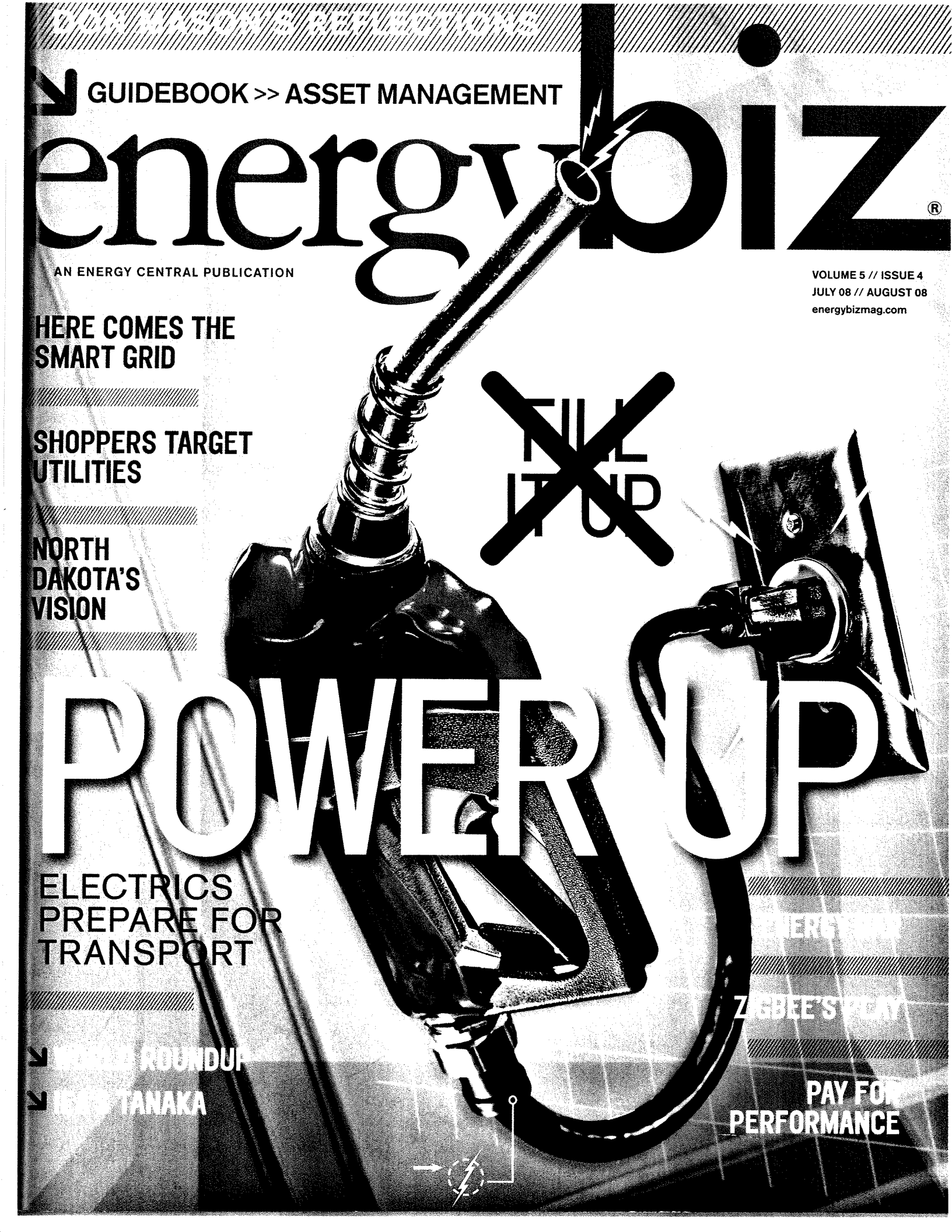
AN ENERGY CENTRAL PUBLICATION

VOLUME 5 // ISSUE 4
JULY 08 // AUGUST 08
energybizmag.com

HERE COMES THE SMART GRID

SHOPPERS TARGET UTILITIES

NORTH DAKOTA'S VISION



POWER UP

ELECTRICS PREPARE FOR TRANSPORT

ROUNDUP

TANAKA

ZIGBEE'S

PAY FOR PERFORMANCE

Intelligent Micro-Grid Research at BCIT

UTILITY COMPANIES ACROSS THE WORLD HAVE RECOGNIZED the need for a major technological evolution of their assets. As the backbone of the power network, the electricity grid is now the focus of technological innovations. Utilities need to introduce distributed intelligence into their existing infrastructure to make them more reliable, efficient and capable of exploiting and integrating alternative sources of energy.

The Intelligent Grid achieves operational efficiency thru distributed control and monitoring. This will allow optimal use of assets through demand response, fair energy pricing and customer education.

The Intelligent Grid (also known as the "Smart Grid") includes the infrastructure and the technologies required to allow distributed generation of energy. It provides for the integration of alternative sources of energy and management of system's emissions, and carbon footprint.

In addition to enabling utilities to bring renewable sources of energy into the mainstream, the Intelligent Grid's most immediate impact is to allow efficient and optimal use of utilities' existing assets through demand response and peak shaving.

Despite pressing needs to move ahead, certain impediments have slowed down the implementation process. Most notable among these are the absence of standards, regulatory challenges, funding constraints, etc. While such issues are for the utility providers to resolve, help is needed to address other obstacles which are highly technical in nature.

The problem that most utility providers face is not the absence of technology. On the contrary, mature technologies do exist (e.g. communication circuits, computing engines, sensors, algorithms, models, etc), which can potentially address utility applications and resolve issues within the Intelligent Grid.

However, such technologies have not yet been proven in the context of utility providers' desired specifications, configurations and architecture. And given the responsibility which utilities have in operating and maintaining such critical infrastructure, they cannot be expected to venture into new territories, new technologies and new solutions without adequate verification and qualification.

To address this critical issue which is slowing down the pace at which technological innovations trickle from labs to the field, the British Columbia Institute of Technology (BCIT), is rolling out a scaled-down version of the Intelligent Grid, i.e. an Intelligent Micro-Grid to enable utilities, technology providers and researchers to work together to develop architectures, protocols, configurations and models of the evolving Intelligent Grid with the view to charting a "path from lab to field" for innovative and cost-effective technologies and solutions for North America's evolving Smart Electricity Grid.

BCIT's Intelligent Micro-Grid is a test bed where communication technologies, smart metering, co-generation and distributed intelligence and control are integrated to develop different solutions, showcase the capabilities, and accelerate the commercialization of technologies and solutions for the Smart Grid.

Key deliverables of BCIT's setup are the following:

1. Construction of a smart grid test bed to verify:
   - provisioning methods for smart termination points (meters, data aggregators, appliances, sensors, controls, etc)
   - integration solutions for alternative sources of energy (co-generation using wind, solar, thermal etc) with the electricity grid
   - innovative network architecture and topology for smart grid
2. Operational analysis and qualification of grids:
   - resilience, reliability, security and scalability
   - data collection and distributed command and control methods
   - emission standards for wood waste boilers and methods for achieving such standards with optimum efficiencies
3. Qualification of interface protocols and models to ensure:
   - interface with Utility back-office tools (billing, load management, service provisioning, outage restoration, etc)
   - seamless end-to-end deployment, operation and maintenance
   - easy and intuitive human interface for operators and customers

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