The basic business of distribution utilities has not changed. All utilities must plan, design, construct, operate and maintain their networks. However, utilities are under extreme pressure, due to the deregulation process, to perform these functions efficiently and cost effectively. Utilities are scrambling to put together the tools, processes and training required to meet and exceed customer expectations.

The purpose of this paper is to introduce a model or idea that should help distribution utility managers and engineers to evaluate future investments regarding modern secondary systems and other equipment that enable implementation of functions gather under globally accepted term Distribution Automation. Electric utilities must shift their focus from conservative «reliability at all costs» emphasis to a more efficient and economic emphasis. That means that future decisions or calculations regarding investments should be based on both technical and economic studies.

Authors suggest that Distribution Automation should be strategic option of distribution utility established in such a way that supports utility’s generic strategy. Automation will help distribution utility to achieve the parameters required in the performance-based rates that will be required by the regulatory bodies.

Thinking about Distribution Automation (DA), utility managers raise some basic questions: What DA functions should be implemented, how quickly can DA be integrated into utility operation, at what costs, and which is the best vendor? The best way to answer those questions is to define generic strategy, because it is a starting point for developing strategic options for utility, like technical functions implementation, etc.

We suggest conceptual framework (model), shown on Fig.1 that will help utility managers to define optimal strategy. Input variables are deregulated power industry, customers expectations and DA technology (functions). Based on this, some analysis should be done, using modem management tools presented later, resulting with the parameters with major impact on decisions about electric utility generic strategy.

We suggest a “Five Forces” model, developed by M. Porter (1), as a toll for deregulated power industry analysis. Five Forces model displays the major sources of competition. These five forces of competition include power of competitors, substitute products/services power, supplier’s power, power of customers and new entrants into the marketplace. Successful use of the M. Porter Model includes identifying the sources of competition, the strength and like hood of the competition existing, and strategic recommendations for the action a company should take to develop barriers to the various forms of competitors.
Five Forces model concept is shown on Figure 2.

The difference between the Five Forces Analysis and SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis is in the classification of “driving” and “restraining” forces into “internal” and “external” ones.

Based on mentioned analysis results and conclusions, parameters with major impact on decision about generic strategy should be defined. There are two basic types of competitive advantage a company can possess (1): low cost or differentiation. Two basic types of competitive advantage combined with the scope of activities for which the utility seeks to achieve them, lead to three generic strategies for achieving above-average performance in any kind of industry: cost leadership, differentiation, and focus. These generic strategies, shown on Figure 3, are supported by the following functional strategies:

- Efficiency,
- Innovation,
- Quality,
- Customer Responsiveness.
Now, that we define a generic strategy, we should on top of it, developed some strategic options defining actions to be done in order to meet a requirements of proposed generic strategy. So, we should do as follows:

- **Define Key Success Factors (KSF)** related to the defined generic strategy and gap between KSF and utility performances gain through SWOT analysis, and then
- **Develop Strategic Options** to be considered in order to bridge over this gap.

### DISTRIBUTION AUTOMATION AS A STRATEGIC OPTION

As shown on Figure 1, we are assessing Distribution Automation as one of the strategic options, which should support determined generic strategy. The aim is to define Distribution Automation functions, which support generic strategy. So, DA technology should be considered as well as customers expectations – important driver in open market environment.

Electric utilities must shift their focus from conservative «reliability at all costs» emphasis to a more efficient and economic emphasis. That means that future decisions or calculations regarding investments should be based on both technical and economic studies. Therefore, additional “filter” in assessing DA function process is cost-benefit analysis that should be done resulting with DA functions which should be adopted by distribution utility.

Here, we are talking about “general model”, so we are not able to go into detail analysis (with real numbers) regarding DA functions, but some general suggestions are given, in terms of DA functions and related generic strategies, as follows:

- Substation & Feeder SCADA, Fault Location, Isolation & Service Restoration, Feeder Reconfiguration & Transformer Balancing, Recloser/Breaker Monitoring and Control, Volt/VAR Control, Distribution System Monitoring and Automated Meter Reading (AMR) directly reduce technical losses, thereby, supporting the lowering cost strategy.

- Substation & Feeder SCADA, Fault Location, Isolation & Service Restoration, Volt/VAR Control, Distribution System Monitoring and AMR supports also the enhancing differentiation strategy. Moreover, AMR supports the spawning of new businesses and it can change the competitive scope by making integration with customer system achievable.

Although Fault Location, Isolation and Service Restoration has a very significant impact to customer satisfaction, it is Feeder Reconfiguration & Load Balancing that provides the more significant savings to the distribution utility.

Distribution Automation functions implementation should be done step by step. We think that the best approach is shown on Figure 4.

### Competitiveness

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<table>
<thead>
<tr>
<th>POWER QUALITY</th>
<th>EFFICIENCY</th>
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<tr>
<td>Fault Location Isolation &amp; Service Restoration</td>
<td>Volt/VAR Control &amp; Transformer Balancing</td>
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<tr>
<td>Volt/VAR Control</td>
<td>Feeder Reconfiguration &amp; Transformer Balancing</td>
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<td>Reliability-Centered Maintenance</td>
<td>Automated Meter Reading</td>
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#### SUBSTATION SCADA
Substation Control System/Remote Terminal Unit/Voltage Regulator/Load Tap Changer

#### FEEDER SCADA
Remote Controlled Line Switch, Remote Controlled Recloser, Remote Controlled Line Capacitor, Remote Controlled Line Regulator

### SCADA / DA MASTER STATION

### TELECOMMUNICATION INFRASTRUCTURE

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**Figure 3: Generic strategies**

**Figure 4: Distribution Automation implementation - step by step approach**
COMPETITIVE ADVANTAGE GAIN THROUGH DISTRIBUTION AUTOMATION

The competitive advantage stems from the enhancement in system efficiency and power quality that benefits and increases satisfaction of all customers within the distribution area covered by electric utility. Automation will help distribution utility to achieve the parameters required in the performance-based rates that will be required by the regulatory bodies. A Company who meets requirements will be more profitable than the utility who does not meet it. Moreover, Distribution Automation, because of superb system efficiency and power quality, will attract companies who are deciding where to locate their businesses. Considering no much price difference in electricity, a company will definitely locate its business to a utility with Distribution Automation than to a utility without it.

DA cannot be copied and implemented easily by competitors because of its high barrier to entry (see Figure.4), it builds switching cost for customers and it changes the basis of competition. High barrier to entry is made possible by the significant investment costs and high technical expertise requirement. Switching cost is made possible by the actual benefits that customer derived from Distribution Automation. In addition, the Distribution Automation infrastructure cannot be built and implemented in a short period of time. It also changes the basic of competition because it raises customer expectation. Customers will not be contented anymore with the mere presence of power but will demand it with definite parameters on costs, reliability and tolerance. Efficiency and better power quality gained through Distribution Automation functions will provide «good positionings» in the mind of the customer. Distribution Automation builds the infrastructure between distribution utility and customer automation systems. The link can be used as a vehicle for the new services and products in the future.

CONCLUSION

Distribution Automation can provide electric utilities with long-term competitive advantage over other distribution companies under restructured and deregulated Electric Power Industry. It cannot be copied and implemented easily by competitors because of its high barrier to entry, it builds switching cost for customers and it changes the basis of competition because it raises customer expectation. Whatever utility generic strategy is, a number of Distribution Automation functions, as a strategic options, can support one. Therefore, Distribution Automation must be considered as one of the business strategies sanctioned by distribution utilities. The key for Distribution Automation success is to target highest value results and not choose the wrong technology.

The main massage here is that Distribution Automation is not only technical issue, rather commercial approach – valuing what to do, where and in what scope.

REFERENCES

[3] Per Jenster, David Hussey, Company Analysis