

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

A new procedure was proposed which is able to distribute the corporate SAIDI target to the service regions of a utility company, in a more rational manner than the present approach which is mainly based on the extrapolation of historical performance data. The numerical data and results as well as a variety of insight analysis were presented, which demonstrated that, with sufficient historical data collected for capturing the regional disparities and with the processes implemented to alleviate the disparities on subjective views during the weight acquisition process, the proposed procedure can be an effective tool for use to distribute the corporate, or even the national, reliability targets to the various utility service regions. By following the AHP, the procedure was designed by evaluating the disparities across service regions and by measuring the relative weights among these disparity factors. The most important feature of proposed procedure is that with the procedure, any specified distortion factors unwanted in the benchmarking can effectively be segmented from the remaining of benchmark data. The key is that the procedure accounts for each disparity factor and their effect on reliability performance individually, and then combines all the individual factors after segmentation into the AHP for the targets derivation. By segmenting the disparity on managerial effort and /or efficiency of regional offices from the target derivation, the corporate target can then be distributed to the regional offices on a more rational basis than utilities' conventional approach, which sets targets commonly on an equal percentage of reduction. The procedure proposed in this dissertation after slight modification can be applied to the reliability

target settings across utility companies.

6.2 Limitations and Future Research Directions

6.2.1 Delphi Process

According to the Delphi process [49], the research team should have calculated the weight vectors right after the first-run of the survey and passed the vector results individually and confidentially to each surveyed engineer, letting the engineers compare their priority order with the weight vector calculation results so to redo the second-run survey. However, due to time limitation in each survey meeting, the survey was done in one run only. Nevertheless, the research team gave detailed explanation on the meaning of disparity factors in each of the total 14 meetings (i.e., 6 for the transmission and 8 for the distribution) right before conducting the surveys. Also, to avoid misunderstanding the disparity factors enlisted in the questionnaire, the same question, for evaluating the factors of the same layer, were asked three times in different forms, i.e., asking the respondents:

- (1) to select the level of importance for each factor (e.g., extremely important, very important etc.),
- (2) to rank the factors into a priority order according to their importance, and
- (3) to do the pairwise comparison as depicted in Fig. 2.7,

to ensure the judgments from respondents are logic and without contradiction.

6.2.2 Disparate Degrees of Consensus

The weight acquisition results showed that when comparing less number of, or

relatively more objective, disparity factors, such as comparing three types of geographic conditions depicted in Figs. 3.1~3.3, the survey resulted in a higher degree of consensus, and vice versa, when comparing more number of, or more subjective, factors. For example, when comparing the 4 disparity factors of load transfer inability depicted in Fig. 3.3, the average weight vector, or [0.186 0.273 0.237 0.304] acquired from 60 substation maintenance engineers, was disparate from that, or [0.197 0.237 0.296 0.270], acquired from 30 feeder maintenance engineers [19]. More clearly, the feeder engineers took the high loading of substation main transformers (0.296) as the most important cause for load transfer inability whereas the substation engineers took the radial feeder configuration (0.273) and the lack of N-1 capability of feeders (0.304) as the two most important causes for load transfer inability. As such, how to mitigate the subjective view during the weight acquisition process requires more effort of future research.

6.2.3 Future Research Directions

In addition to the improvement on the weight acquisition process through Delphi process, the future research directions are suggested as follows:

- (1) Other existing target setting methods such as that by ignoring the historical samples whose values are out of the $\pm 3\sigma$ (or three times of standard derivation) range, to reduce the size of sample population in the Target setting, be compared with the procedure presented in this thesis;
- (2) The proposed procedure can be tested on setting the reliability targets for power utilities in the same country or in the same reliability coordination region; or be applied to benchmarking the reliability performance across utilities.