Understanding the Effects of Data Quality on Market Functions
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1. Project objective

The main objective of the proposed research is to investigate how data quality affects market functions of current and future grid. The goals are to (i) develop analytical measures of data quality and quantify risks of bad and malicious data; (ii) develop processing techniques for control center to isolate and mitigate effects of bad and malicious data.

2. Major technical accomplishments that will be completed this year

(i) We demonstrate that nonlinear state estimation offers improved robustness on (analog) bad and malicious data.

(ii) We show that bad and malicious (digital) data on topology coupled with small amount of bad (analog) meter data can evade bad data detection and causing significant perturbation in real-time locational marginal price.

3. Deliverables and schedule for activities to be completed under FY2012 funding

A conference and a journal submission.

4. Risk factors affecting timely completion of planned activities

No significant risk factors are expected.

5. Early thoughts on follow-on work that should be considered for funding in FY2013

Bad topology data represent a new type of malicious data that are difficult to detect by conventional bad data detection technique and potentially have significant impact on real-time operation. Further investigation into impacts of bad "digital" data and develop techniques to ensure the quality of such data is of significant value.