



Battelle

The Business of Innovation

Post-Tuning Phase and Energy Savings Analysis

Six Primary Steps of Re-Tuning

- Collecting initial building information: Basic building information
- Pre-Re-Tuning Phase: Trend-data collection and analysis
- Building Walk Down: Getting to know the building
- Re-Tuning: Identifying and correcting operations problems
- **Post-Re-Tuning: Reporting re-tuning findings**
- **Savings Analysis: Determining and reporting the impacts**

Post-Re-Tuning: Reporting Re-Tuning Findings

- Three reports
 - Post-re-tuning report
 - Quality assurance evaluation
 - Final report for each building
- Post-re-tuning report
 - prepared by service provider using template provided by Battelle and information from the re-tuning log sheets
 - service provider also sends copies of the re-tuning log sheets to Battelle and retains the originals
 - re-tuning log sheets will include
 - observations made during re-tuning
 - results of measurements
 - actions taken to correct problems
 - improvement opportunities identified that could not be implemented during re-tuning

Post-Re-Tuning: Reporting Re-Tuning Findings (continued)

- Post-re-tuning report (continued)
 - service providers use this log information to fill in the template—filled in template is the *post-re-tuning report* on the building
 - one *post-re-tuning report* is prepared for each building
 - the report will contain
 - summary of overall re-tuning process
 - list of problems identified
 - list of problems corrected during re-tuning and how
 - list of potential additional actions recommended
 - the service provider provides this report to the building owner/client (better to review the report with the client in person) and sends a copy to Battelle
 - should be completed within 2 weeks of completing re-tuning of the building

Post-Re-Tuning: Reporting Re-Tuning Findings (continued)

- Quality assurance evaluation
 - Report prepared by Battelle
 - Battelle will visit each building with the service provider to spot check
 - condition of building systems and controls
 - quality of re-tuning work done
 - Battelle will prepare a brief report for each building
 - results of the spot check
 - suggestions for improving re-tuning
 - Report will be provided to the service provider
 - Technicians are encouraged to contact Battelle with questions

Post-Re-Tuning: Reporting Re-Tuning Findings (continued)

- Final report for each building
 - Battelle will prepare this report
 - 13 to 14 months after re-tuning
 - Will provide energy savings
 - based on 12-months of utility data before re-tuning and 12-months after re-tuning
 - service provider will help Battelle get the utility data
 - Battelle will calculate the savings
 - Report will also include:
 - summary of the re-tuning process
 - information on energy use pre- and post-re-tuning
 - Energy Star ratings of the building before and after re-tuning
 - Battelle will provide this report to the service provider
 - Service provider will deliver the report to the building owner/client

Post-Re-Tuning: Reporting Re-Tuning Findings (continued)

- Final report for each building (continued)
 - At conclusion of the project, Battelle will provide templates and easy-to-use spreadsheet tools to the service provider for use in the future
 - determining energy savings
 - determining the Energy Star ratings
 - generating final reports for buildings

Post-Re-Tuning: Calculating Energy Savings – Overview of Approach

- Calculated as the difference between the actual energy use in the post-re-tuning 12 months and the energy use that would have occurred during the same 12 months if the building had not been re-tuned.

$$E_{savings,j} = E_{base,j} - E_{actual,j}$$

$E_{savings,j}$ = energy savings for a specific building (j)

$E_{actual,j}$ = actual measured energy use of the building during the 12 months after re-tuning

$E_{base,j}$ = energy consumption of the building during the 12 months after re-tuning if it had not been re-tuned

Post-Re-Tuning: Calculating Energy Savings

– Overview of Approach (continued)

- $E_{base,j}$
 - cannot be measured directly
 - must be estimated using a model of how the building performed prior to re-tuning
 - we use regression models based on monthly energy use during the 12 months prior to re-tuning and the corresponding outdoor temperatures, then apply the models to the post-re-tuning 12 months to obtain estimates of $E_{base,j}$
- Battelle will develop a spreadsheet that service providers can use in the future by simply entering the pre- and post-re-tuning energy use data, mouse click on a button, and get the energy savings as output