

Appendix I. Step-by-Step Process of Data Collection

1. Determine whether or not a plot has potential for energy analysis (if plot center is clearly associable to nearby structure). Inventory plots identified. Analyze representative sample [Re: types of structures in the City of Golden and similar percentage] from the i-Tree Urban Forest Effects Model¹ randomly generated plots. 50 of the 115 total plots were deemed suitable for the energy analysis. Data was collected on 11 plots visited by team 3.
2. One team will visit the randomly generated plots in June-August and take measurements/observations.
3. At each plot, the structures' wall and window dimensions and placement will be estimated and recorded. These dimensions will be paced out (measuring all of a buildings windows, doors, and walls was not practical for the field team).
4. At each plot, the trees' characteristics, both inside and outside of the UFORE plot will be measured and recorded for every tree shading the building. The forester on the team first assisted with UFORE data collection and then the trees within the expanded energy data collection.
5. At each plot, opacity for each tree's shade will be measured using a pyranometer. Five readings will be taken within the tree's shade and a corresponding sun reading will also be recorded – totaling ten readings for each tree. These readings will be averaged for shade and sun respectively. The ratio of the average will be translated into an opacity value on the DesignBuilder's scale of 0-1.
6. Once all data is collected, each structure will be modeled using DesignBuilder and EnergyPlus and the project team will evaluate whether or not the data can be compared to results from i-Tree.
7. Each structure will be modeled once with trees, once without trees, and once with improved tree cover to compare energy use results.
8. Brent Griffith, NREL, will monitor the analysis to ensure accuracy and will assist with a differential sensitivity analysis as part of the experiment's quality control procedure.
9. Results will be analyzed.
10. Results will be integrated into results from the water and UFORE analyses.

Institute for Environmental Solutions
761 Newport Street
Denver, CO 80220-5554
www.I4ES.org
© 2008 All rights reserved.

¹ This program was used for the i-Tree analysis in chapter III-A.