



Spy in the Sky: Aerial Thermal Imaging for Community- Based EE

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Objectives

- Overview of aerial thermal imaging
- Cedar Falls case study
 - Sample data and images
 - Outreach to high potential properties
 - Public reaction
- Lessons learned



Aerial Thermal Imaging Overview

- Detects areas of building heat loss
- Plane flies at low elevation (< 1500 ft)
 - No precipitation (no snow or rain)
 - Must be cold (< 30° F)
 - 12” ground level resolution



Cedar Falls Case Study

- Located in northeast Iowa (pop. 37,000)
 - Natural gas and electric demand-side management programs since 1973
- Aerial flyover project funded by State Energy Program (ARRA)
 - \$185,047; \$53,000 for flyover; remainder for labor



Cedar Falls Case Study

- Conducted in November 2010
- New way to engage community
- Homes with low attic insulation → Higher likelihood of needing other EE upgrades
- Estimate remaining number of properties needing attic insulation upgrades



Public Map & Address Search

Aerial Thermal Image for Cedar Falls, IA

GeoTREE | CFU | UNI | Help

Find Address 1:2,256

Results (Right Click non-bold address) ▲

Find Address ▲ X

Street or Intersection





City or Placename

State

ZIP Code


Find

Legend ▲

-  Hot. High heat loss
-  Warm. Heat loss likely
-  Warm. Potential heat loss
-  Cold. Good insulation

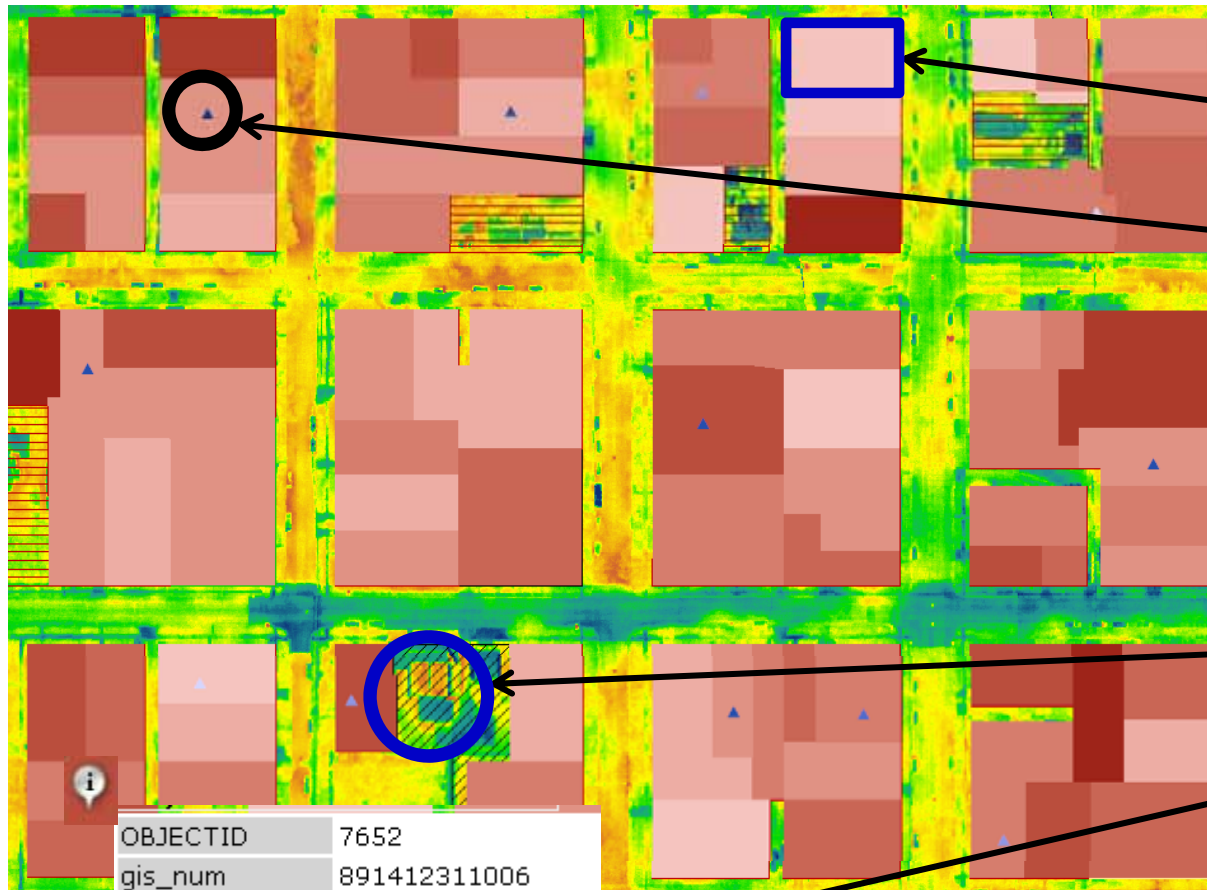
Layers ▲

- Thermal_map
 - Cedar Falls extra portions
 - Cedar Falls Thermal Imagery
- Aerial image.



CFU Internal GIS Map Data

In addition to thermal image:



2010 kBtu/ft²

R-values from
prior audits &
insulation
projects

Roof material

Year built

OBJECTID	7652
gis_num	891412311006
descr	Asph / Gable
comstoryhe	0
comyearbui	1894

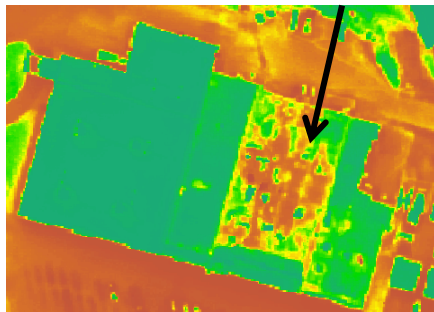


Analysis Types

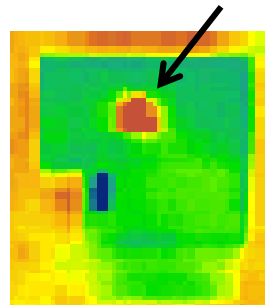
Quantitative: In-house map/model predicts 737 residences qualify for attic insulation (*4-10 years of attic insulation rebates left*)

Qualitative: Identification of several basic EE problems:

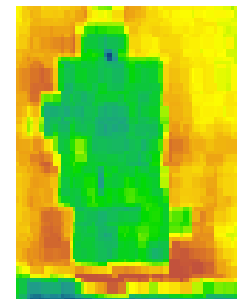
Moisture damaged roof



Uninsulated room

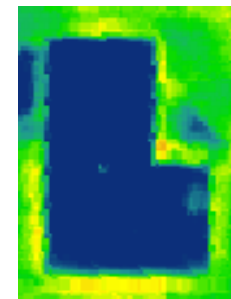


Low insulation



vs.

well insulated



Public Reaction

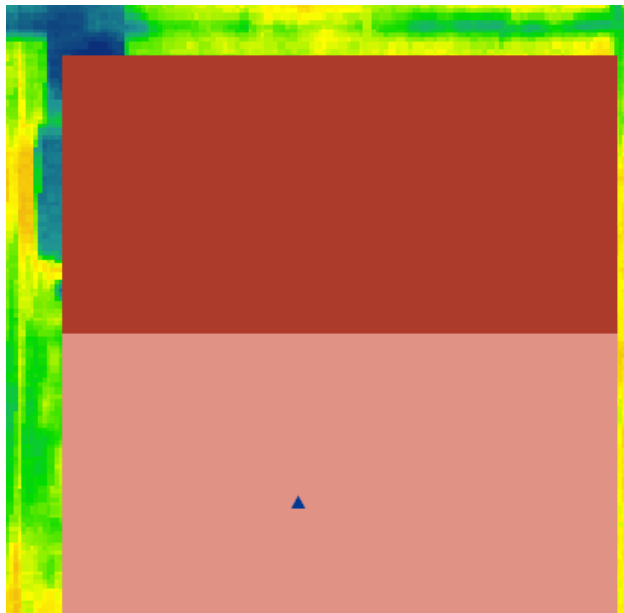
- CFU had developed process to remove specific addresses from public website
- 10 months later:
 - 0 complaints or requests for removal
 - Featured at a dozen community events
 - 70% of town has visited website
 - 148 insulation projects, 122 audits, 231 requests for specific interpretation (1/2012)



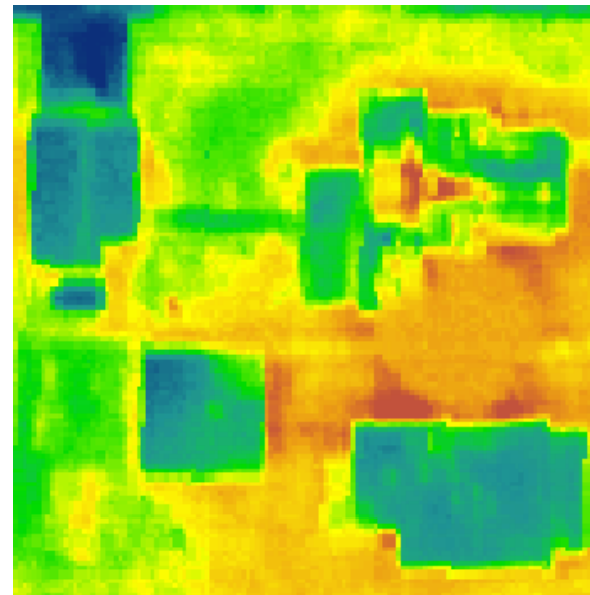
Public Reaction

Customers most interested in actual images

Supplemental info



Actual Image



Targeted Outreach

- Identified 192 of the “highest potential” homes with CFU internal thermal map
 - Contacted with letters, then follow up phone calls
 - 38% participated immediately
 - 20% declined immediately

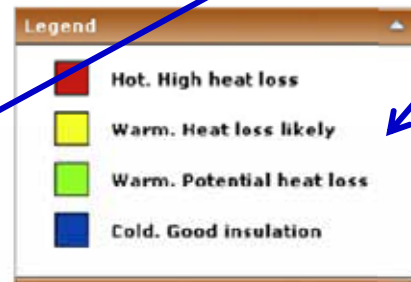
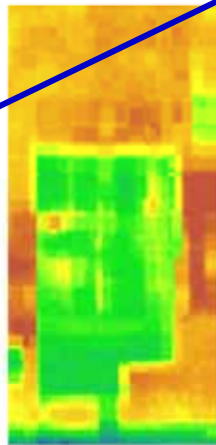


Targeted Outreach: Letter

As you may know, Cedar Falls Utilities (CFU) conducted an aerial thermal image of Cedar Falls this last November. The flyover captured thermal images of every building in town, in order to help us see heat loss through the attic. We have been working to identify homes that may have a high potential for savings through improved attic insulation.

Based on your thermal image, we feel your home could benefit from improved attic insulation. We would like to come to your home at [REDACTED] to verify attic insulation levels, determine your potential utility bill savings, and discuss cash rebates and tax credits you can qualify for.

Below is a copy of your daylight image (taken mid-2009) and thermal image (taken November 2010):



We will contact you in the following week to set up a convenient time to assess your savings opportunities. Feel free to call us before then with any questions or concerns at (319) 268-5413.

Aerial view

Thermal view

Legend

Invitation to
conduct audit or
discuss
opportunities



Targeted Outreach: Who Participated?

- 80% had never participated in a CFU program before
 - 19% qualified for low-income EE programs
- Average attic R-value observed by CFU: R-15 (2009 IECC: R-49 for climate zone)
- 2010 Median usage: 77.5 kBtu/sq ft
 - Community median is only 47.3 kBtu/sq ft



Targeted Outreach: Who Declined?

- Reasons varied:
 - Moving shortly
 - Disagree with thermal image
 - Not enough income
 - Not interested
- CFU did not work further with those who declined
- 90% of those who declined have never utilized any CFU EE program



Lessons Learned

- **CFU found the imaging very useful for:**
 - Identifying homes with very lowest amounts of attic insulation (< R-19)
 - Attracting attention of customers
 - Public most engaged with actual images
 - Privacy fears may be overstated
 - Critical to have knowledgeable staff available to answer customer questions



Lessons Learned

- **CFU found the imaging less useful for:**
 - Guaranteeing customer follow through:
 - Direct outreach & local utility staff were keys to impacting program participation
 - Areas with high level of tree cover
 - Properties with medium/high amounts of insulation (i.e., new construction)



Thank you!

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Save the Date

May 15-17, 2012

**AESP's Spring Conference
Baltimore, MD**

Oct. 15-17, 2012

**AESP's Fall Conference
Long Beach, CA**

Jan. 28-31, 2013

**AESP's 23rd National Conference
Orlando, FL**

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