Temple’s

Municipal Energy Conservation

Retrofit

How It Began

- In 2008 - **A Municipal Energy Inventory** identified three of Temple's buildings with serious energy leakage problems.

- **Professional Energy Audits** pinpointed the sources of leakage and recommended solutions.

Municipal Inventory Data

Data collected:

- Buildings – age, hrs of operation, sq. footage, number of employees and computers/machines being used
- Vehicle fleet – Highway Dept, FD, Police - travel mileage & machine usage
- Municipal employee travel (to work & on municipal business)
- Street lights and waste

For: Electricity use, heating fuel use, fuel use for vehicles & mechanical equipment, and tons of waste

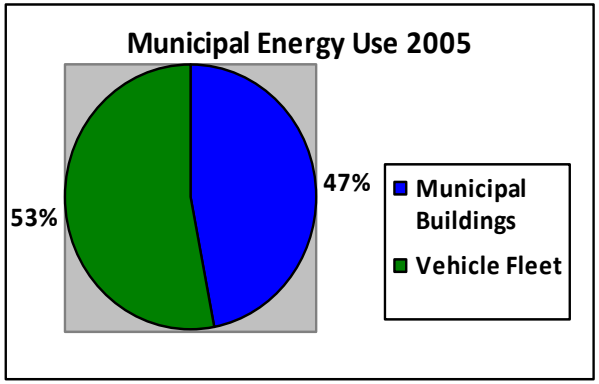
Costs for the energy sources, where available

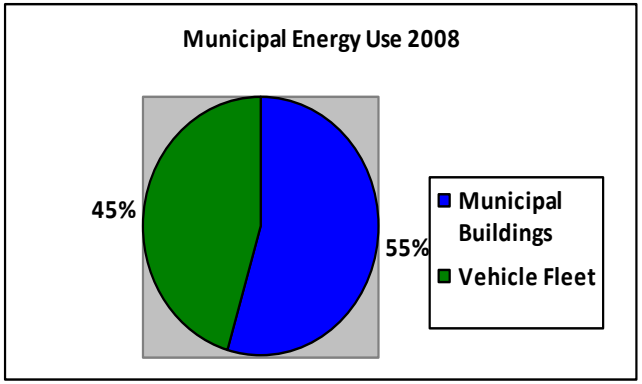
Inventory Data Analysis and Report

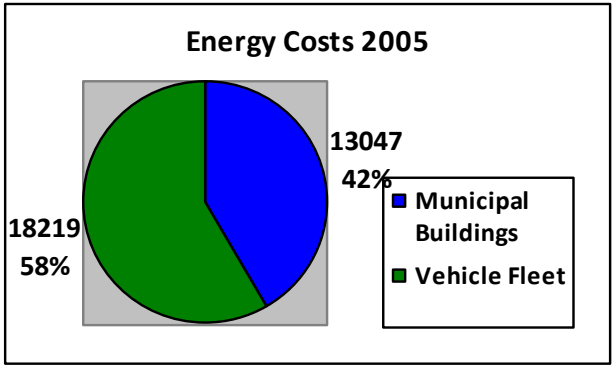
The data was analyzed using the Clean Air-Climate Protection software from ICLEI and the EPA Portfolio Manager Benchmarking software.

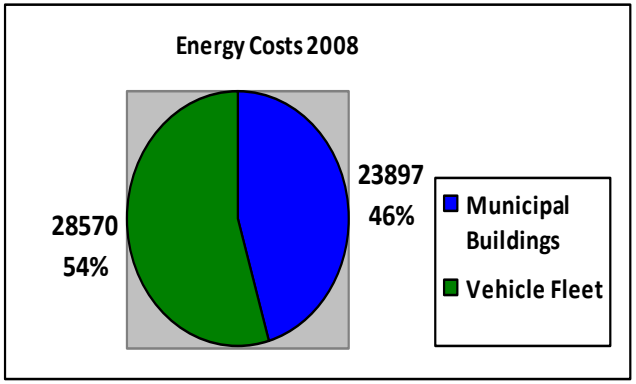
The results and analysis were compiled in a Municipal Inventory Report presented to the Select Board.

Snapshot of Increasing Energy Use and Costs for Municipal Buildings Compared with Vehicle Fleet from 2005-2008





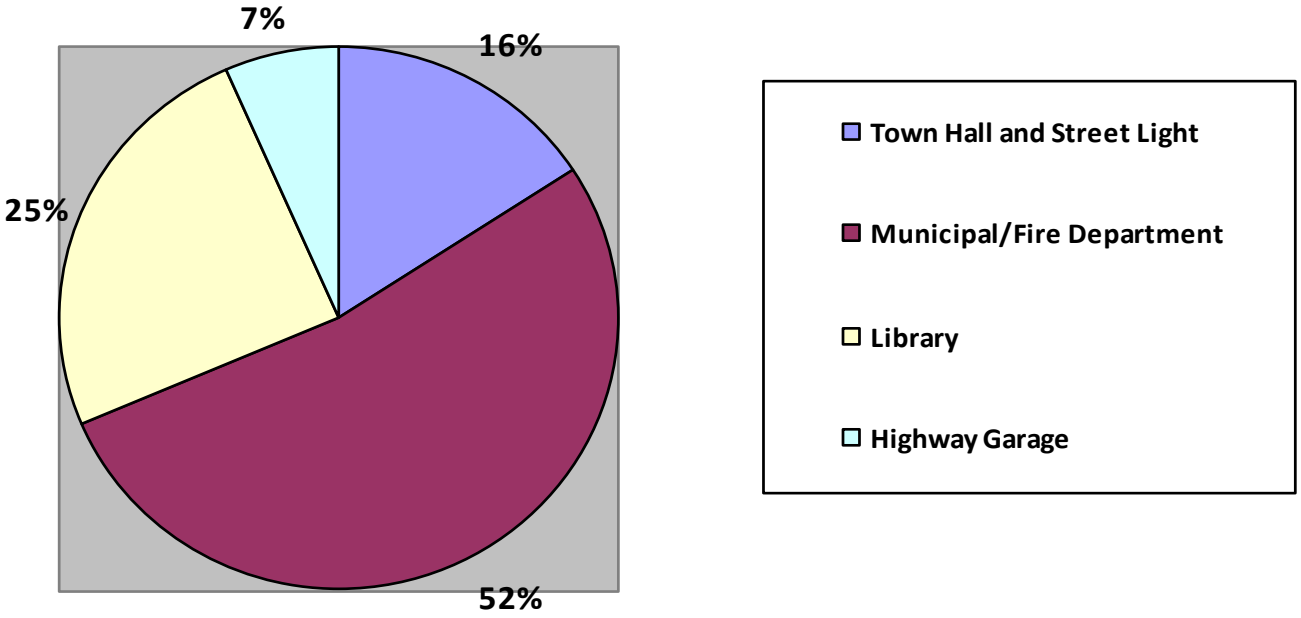




Behavioral recommendations were made to reduce vehicle fuel usage

Costs for Energy Use by Building

The most expensive energy users were the Municipal/Fire Department (52%) and the Library (25%).



Excerpts from
Inventory Report and Recommendations

- **Review existing <u>Master Plan, Zoning Ordinances</u>, and other town policies for inconsistencies with the goal to reduce energy usage**

- **Focus on the <u>Library</u> <u>and Municipal Building/FD for increased energy conservation</u> through weatherization, insulation and recommendations from <u>Energy Audit on Municipal Building/FD & Library.</u>**

- **Find <u>alternative energy sources</u> to reduce escalating fossil fuel prices and emissions**.

BUILDING STRATEGIES FOR AN AFFORDABLE FUTURE

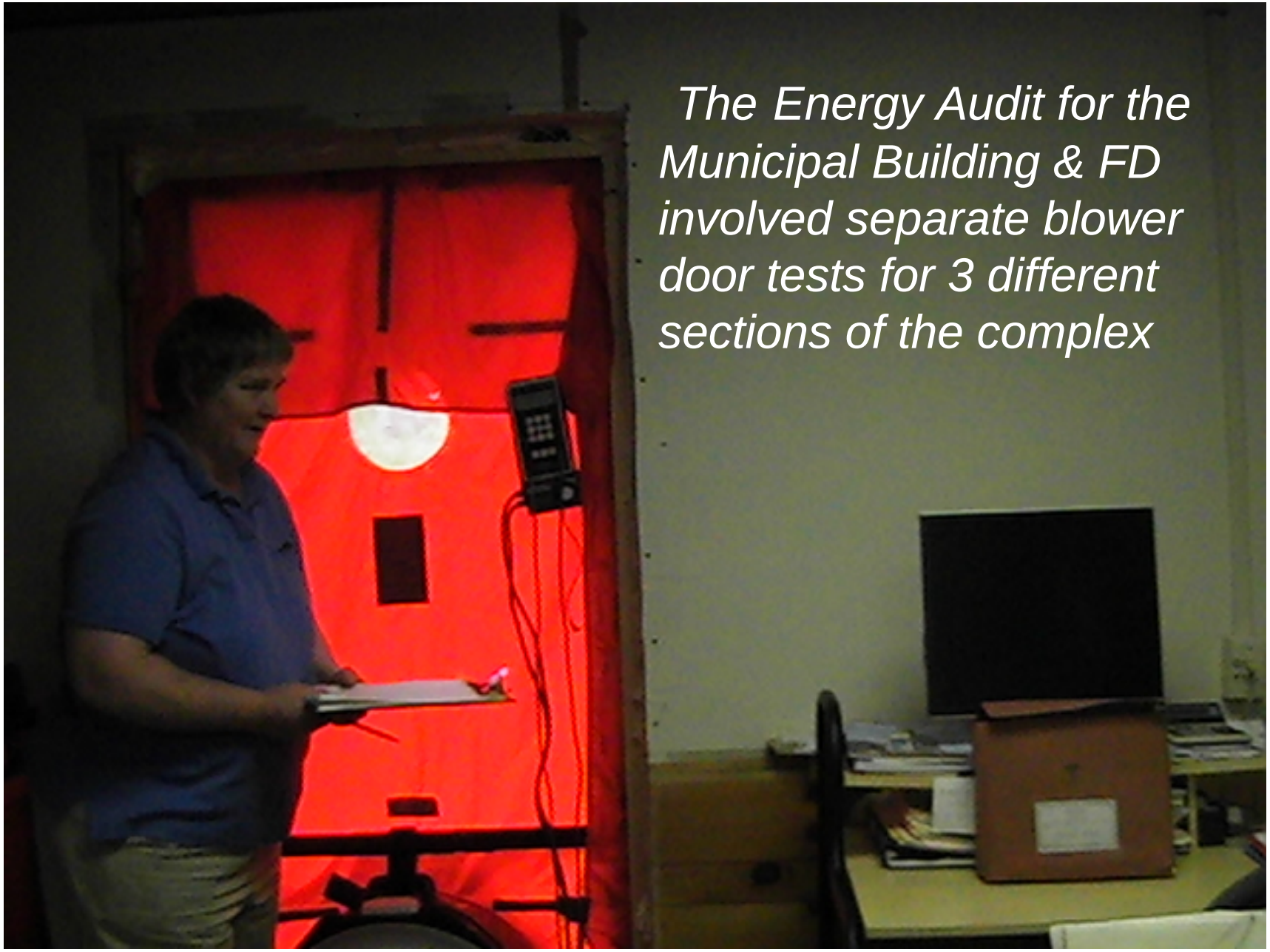
S.E.E.D.S.

SUSTAINABLE ENERGY EDUCATION DEMONSTRATION SERVICES

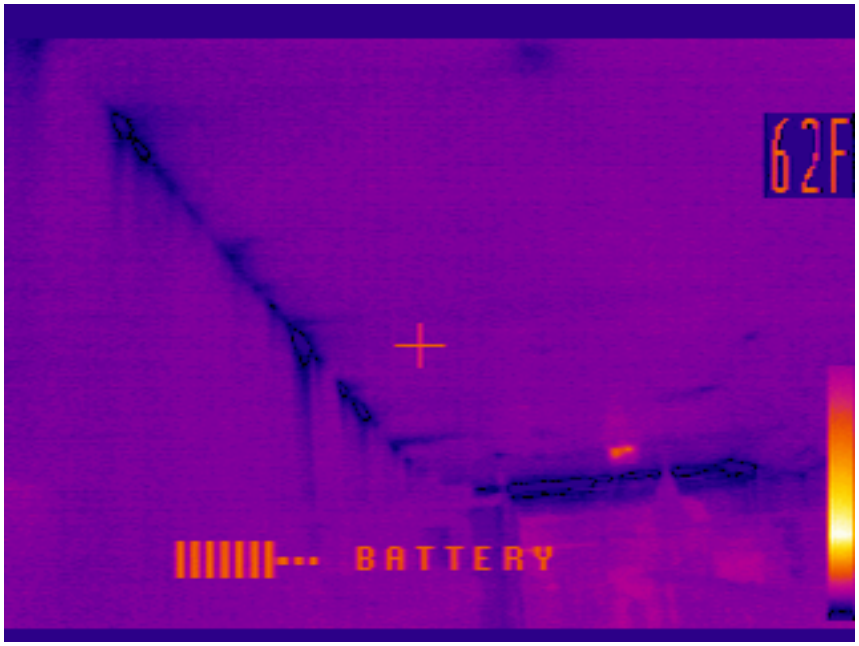
Margaret B. Dillon • Jaffrey NH • 603.532.8979 • mdillon@wildblue.net

Temple Town Offices and Fire Station Energy Performance Assessment -

Energy Audit


The Energy Audit for the Municipal Building & FD involved separate blower door tests for 3 different sections of the complex

Thermography Pinpoints Energy Leaks



The Energy Audit Reports for the three buildings (200+pages, including the thermographic photographs) were presented to the Selectboard in a live PowerPoint presentation.

Blower Door Test Results for Municipal Building & FD Complex

“Areas of air leakage are distributed throughout the buildings, the most significant from the ceiling planes, attic storage area, & garage bay doors.”

“Air Infiltration could account for between 400 and 600 gallons” (of the 2,185 gallons of oil) “used annually for space heating.”

Excerpts from Municipal Building/FD Audit Report

Recommended improvements to the envelope
would **“reduce oil consumption and carbon emissions between 50-60%**
and improve comfort in both summer and winter.”

Increasing wall insulation to R23, R4 windows & insulated doors would
“**reduce energy consumption an additional 50%”**

Removing the inefficient oil burner and **installing a “high efficiency sealed combustion, condensing propane boiler” would further reduce carbon emissions & energy consumption.**

How to Finance the Upgrades?

In 2009, Temple was awarded a RGGI grant for $332,000!

- **To conduct a comprehensive energy efficiency retrofit for the Municipal Building, FD and Library, as a model of the "road map" for municipal energy efficiency improvements.**

- **To expand the Energy Committee's educational outreach & Free Home Weatherization Program for low-income residents, plus:**

1. Work with Planning Board on eco-friendly **zoning ordinances. Write** and **work with PB to adopt an Energy Chapter into Temple's Master Plan**

2. Coordinate a residential energy reduction program, "Carbon Challenge Competition" to **help residents reduce their energy costs & emissions.**

3. Create a **School Recycling & Environmental Program**

4. Create an **environment & energy educational website –** www.teec.info

<u>Training</u> construction crew leaders in new skills for energy efficiency retrofitting prior to the start of work:

- building science concepts
- aggressive air sealing
- fog testing for air leaks
- techniques for installing new types of insulation

By the end of the retrofit, another NH construction co. was practiced in energy efficiency retrofitting and building upgrades.

Starting the retrofit!

Sub grade work with help from our Highway Department

Air sealing around the foundation of the FD

Sub grade insulation was installed surrounding the Municipal Building

2 layers of solid foam insulation wrapped around entire complex

4” of insulation added to all sides of complex

“Fog testing” to see where more air sealing was needed to tighten up the new window frames.

Fog testing from inside to see spaces where more air sealing was required--to eliminate heat loss & air infiltration

R 40 insulated cool vent roof installation

Lowering your taxes
through
energy conservation.
TEEC
www.teec.info

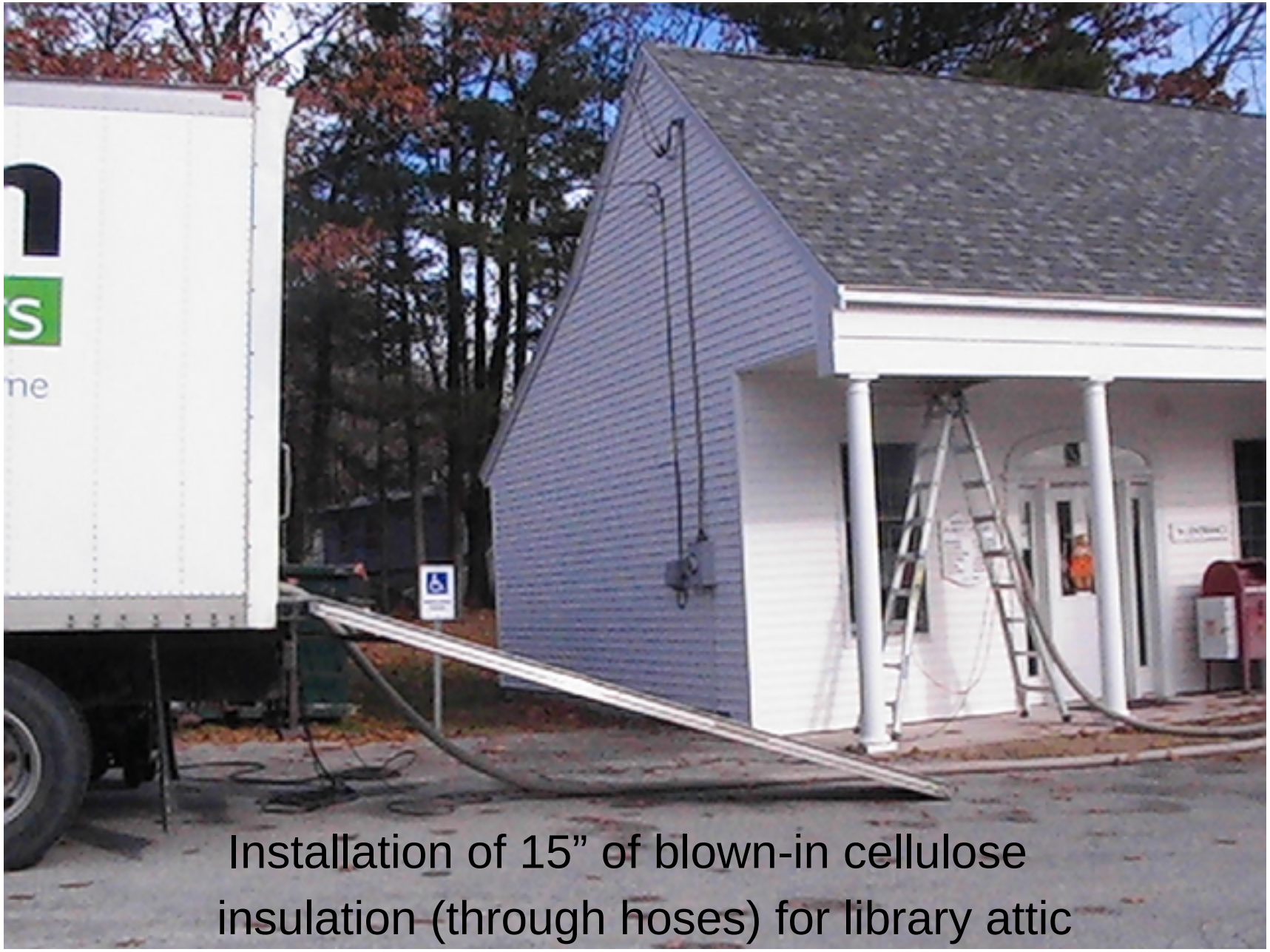
Selectman checking new high efficiency sealed combustion condensing propane boiler.

Working on knees in crawl space
to seal off air infiltration & moisture

Installing data loggers in crawl space
to keep track of moisture

Covering area after drainage
pipes were installed outside library

Air sealing new window frames in library



Installation of 15” of blown-in cellulose insulation (through hoses) for library attic

Fire trucks pulled out of FD for installation of 4 new Thermacore insulated overhead garage doors

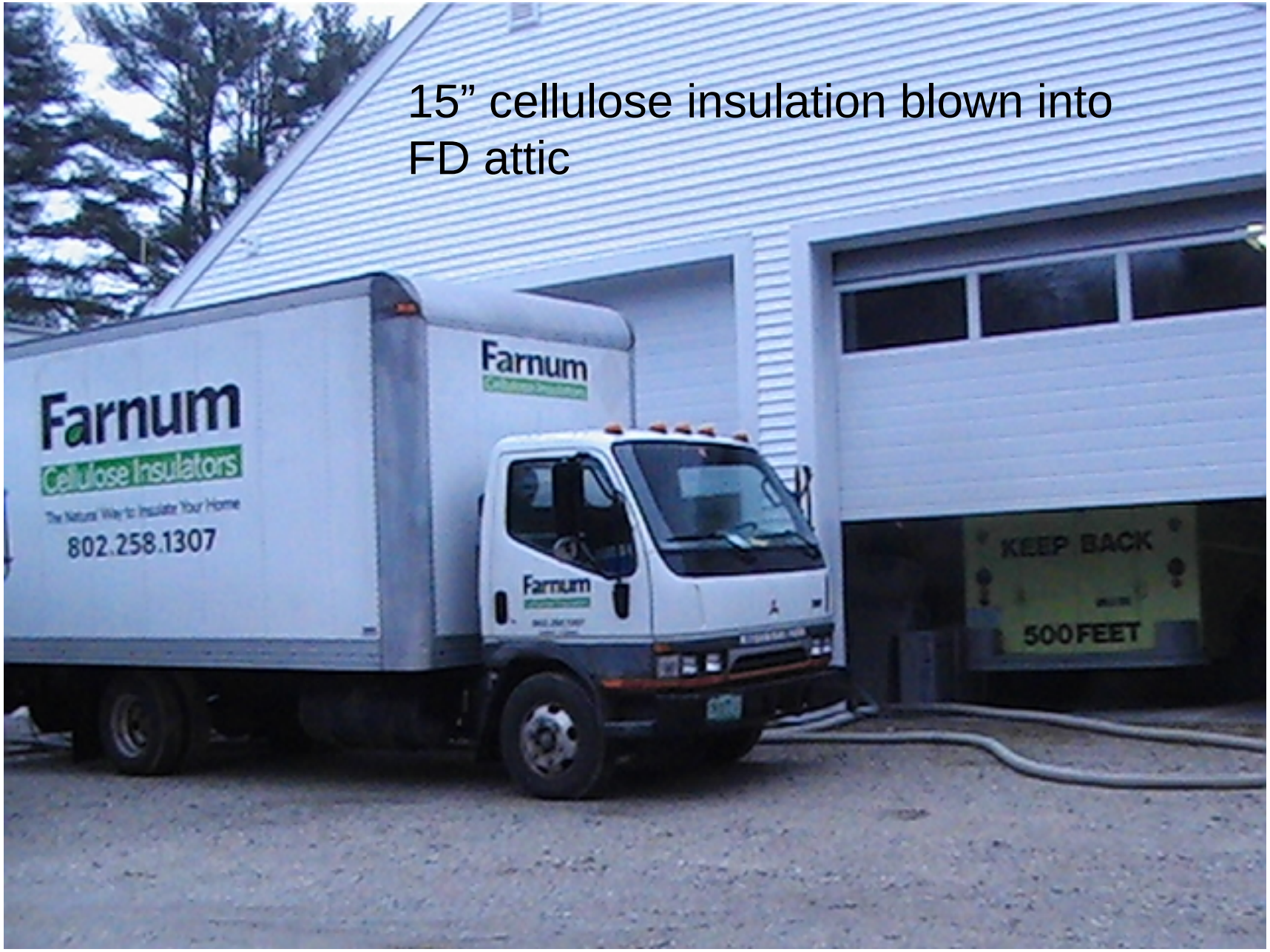
Installing new thermal overhead garage doors

THE OVER

Reinstalling FD emergency aerial after roofing work

Air sealing around new sky lights in FD meeting room

New thermal door and air sealed door frames



15” cellulose insulation blown into FD attic

Employment Data for Retrofit

48 Paid on-site workers

4,725 Hours of paid on-site work

57 Total on-site workers, including in-kind workers

6,240 Total hours of on-site work, including in-kind work

The Results

The Library :

Its moisture problems have been mitigated. Its fuel use is down 1/3, air quality & comfort "vastly improved".

The Municipal Building/FD complex is averaging:

75 - 85% savings in heating fuel
82 - 88% reductions in carbon emissions
Saving between $5,000-$6,000 annually, based on 2010 propane prices.

Temple taxpayers will reap the benefits for years to come!