

# Air Source Heat Pumps in Multi Family Buildings

Bruce Ledgerwood  
Action for Boston Community Development (ABCD)

- ABCD is one of 25 agencies that deliver the energy efficiency and fuel assistance programs to Massachusetts low income households.
- CEC has provided ABCD funding to install ASHPs in low income homes 2013-2017.
- Used to install “cold climate” ASHPs in state funded public housing.
- Installed 760 ASHPs at 19 different sites - low rise, garden style buildings.
- Most were mini splits in one bedroom apartments, serving elderly.
- A few family units also served with larger, multi zone equipment.
- One Variable Refrigerant Flow (central system) 23 unit project in Cambridge.
- All electric baseboard or storage heat removed except in bathrooms and hallways.











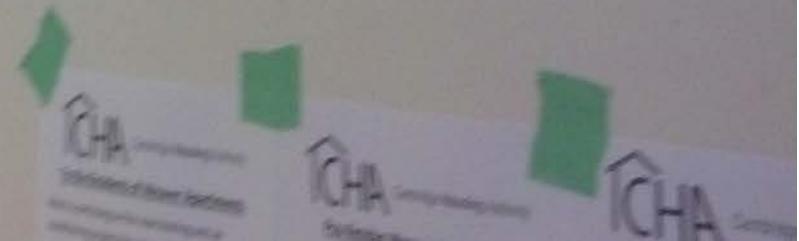
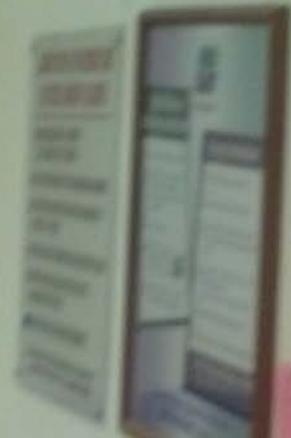








BOSTON  
AIR  
MECHANICAL SYSTEMS







Savings?

## Doggett Circle - 1

« DED - Doggett Circle

### Total energy use in kWh

Name	Full-Year Sum	<input checked="" type="checkbox"/>	Detailed data per month
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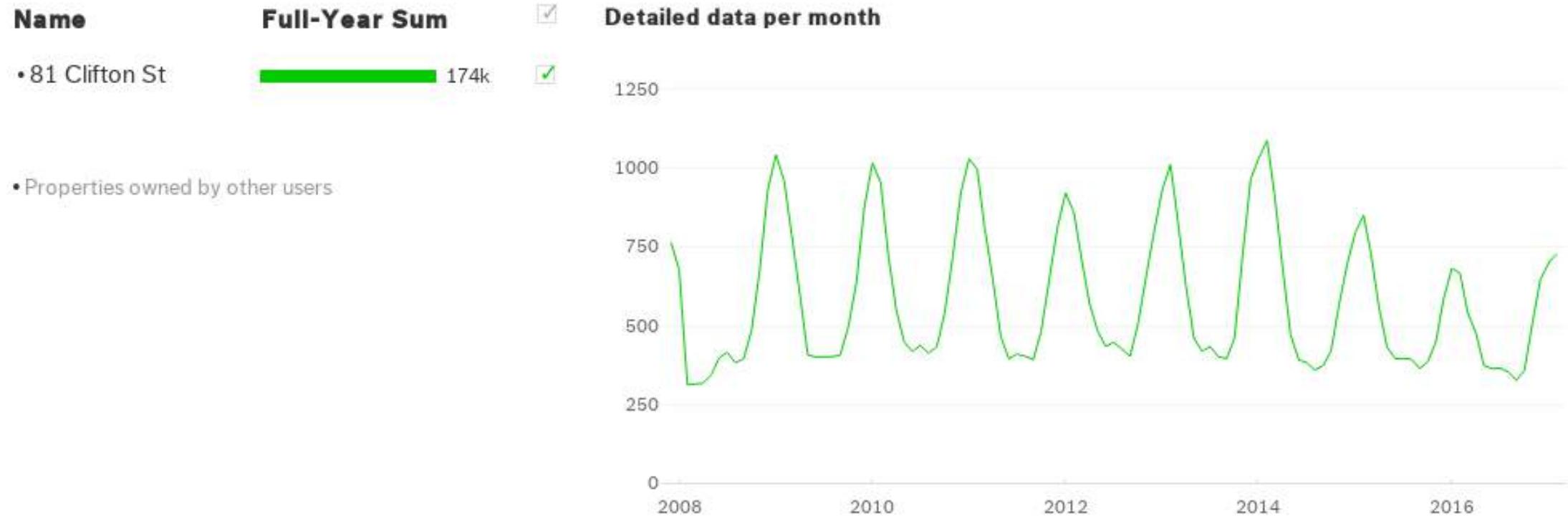
Electric #261135010..	59.3k	<input checked="" type="checkbox"/>
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Electric #261135110..	311	<input checked="" type="checkbox"/>
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## 312 - R.C. Weaver Apartment

**Total energy use in kWh showing all available data**



W 68 Windsor Avenue - 4 | X

Secure | https://www.wegowise.com/users/masscec/buildings/4813/detail

Summary View View Data WegoScore Apartments Utility Accounts Building Upgrades Share

Total energy use ▾ in kWh ▾

Graph  Table



◀ Name

▼ Full-Year Sum



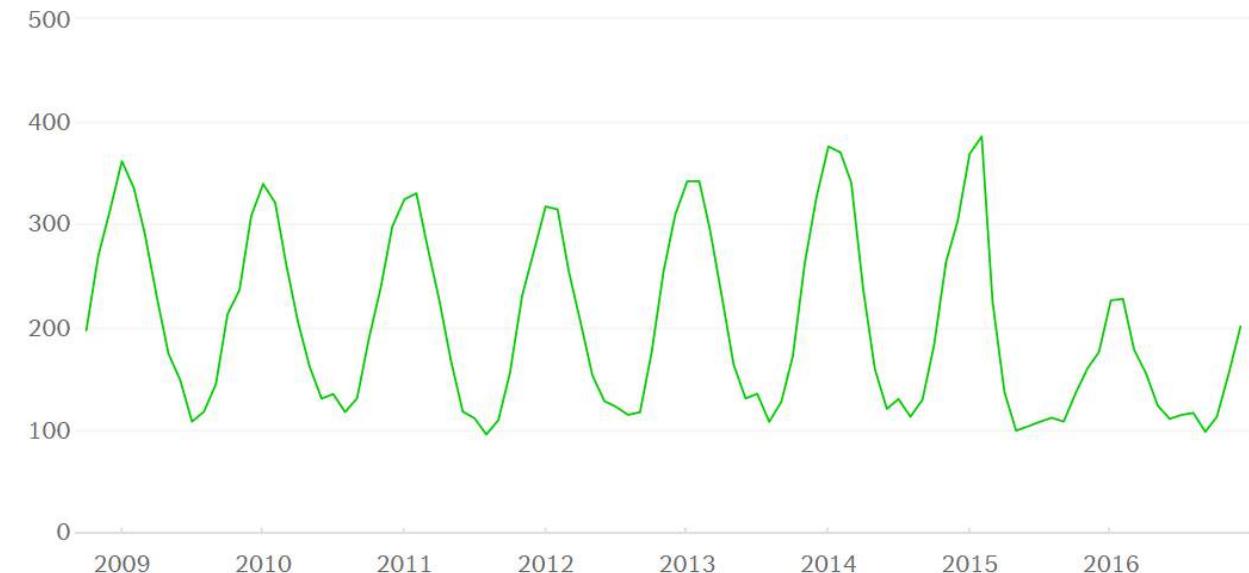
Detailed data per month

Electric #2567964100...

55.2k



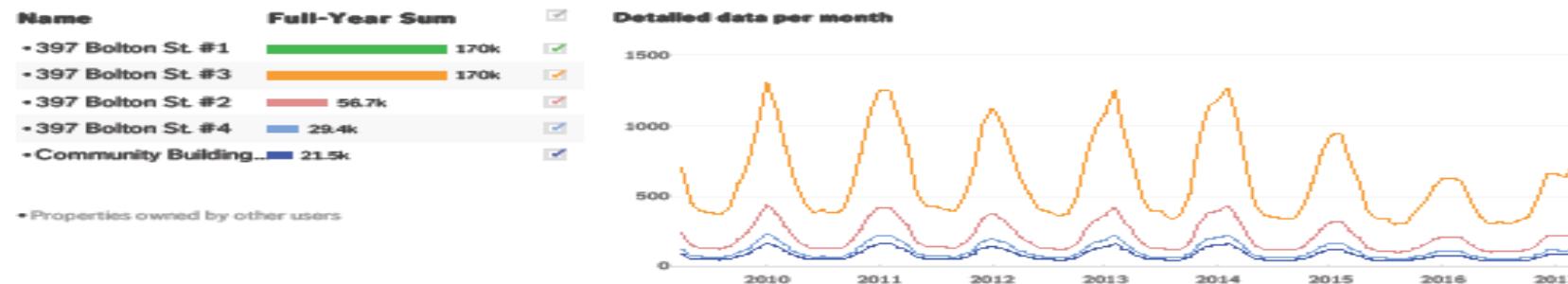
Click & drag to zoom in



## usegovoice

### MRL - Bolton Hill Apartments

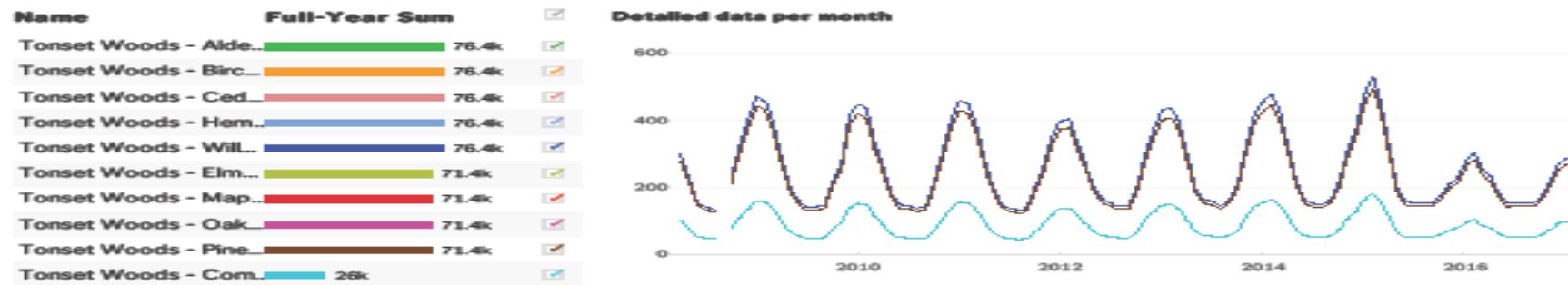
#### Electricity use-in kWh-showing all available data



## Livingston

### ORL - Tonset Woods

Electricity use-in kWh-showing all available data



Project	one bed apts.	Overall Savings	HVAC Savings	Summer KW Impact	Winter KW Impact
Acton	68	24%	45%	1 (0%)	440 (-37%)
Orleans	100	24%	51%	75 (-16%)	2508 (-59%)
Marlborough	62	32%	52%	57 (-18%)	487 (-38%)
Pittsfield	13	31%	49%	88 (-59%)	351 (-60%)
Cambridge	23	23%	53%	3 (+3%)	99 (+61%)
Weighted Average		26%	50%	somewhat reduced	significantly reduced, except Cambridge

Costs?

Cost of Installs				
type	BTU size	heads	transfer fans	average
mini split	9000	1	0	\$ 3,875
mini split	12000	1	1	\$ 5,009
mini split	15000	1	1	\$ 6,027
multi zone	18000	2	0	\$ 6,697
multi zone	24000	3	0	\$ 8,500
multi zone	36000	4	0	\$ 18,125
VRF	92000	23	6	\$ 208,250

# Benefits vs. Costs

## Pittsfield Cost Effectiveness:

KWHR saved annually	49,511
DD normalized	0.95 47,035
electric expense avoided	0.18 \$ 8,466
Lifetime years	18 \$ 152,394
cost ASHPs	\$ 79,500
simple payback in years	9.4
npv	0.7 \$ 106,676
benefit cost ratio over lifetime with npv	1.3

## Orleans Cost Effectiveness:

KWHR saved annually		226,691
DD normalized	0.95	215,357
Electric expense avoided annually	0.18	\$ 38,764
lifetime years	18	\$ 697,755
cost ASHPs	\$ 465,500	
simple payback in years		12.0
npv	0.7	\$ 488,429
benefit cost ratio over lifetime with npv		1.05

# Thank You.

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