

**Village of Ann Arbor - Mixed-Fuel vs. All-Electric Cost and CO2 Analysis
16ft Townhouse Layout**

ANNUAL UTILITY COSTS*	Mixed Fuel	All Electric	All Electric + enhanced envelope
Middle Unit			
Gas @ .836/CCF	\$ 602	\$ 0	\$ 0
Electric @ average of .165/kWh	\$ 995	\$ 1,846	\$ 1,673
Total Annual Utility Cost (Middle Unit)	\$ 1,597	\$ 1,846	\$ 1,673
Annual difference from mixed-fuel		\$ 249	\$ 76
Per month		\$ 21	\$ 6
End Unit			
Gas @ .836/CCF	\$ 718	\$ 0	\$ 0
Electric @ average of .165/kWh	\$ 1,040	\$ 2,093	\$ 1,925
Total Annual Utility Cost (End Unit)	\$ 1,758	\$ 2,093	\$ 1,925
Annual difference from mixed-fuel		\$ 335	\$ 167
Per month		\$ 28	\$ 14

ANNUAL CO2 EMISSIONS (CO2 lbs)**			
Middle Unit	12,053	9,339	8,402
End Unit	14,350	10,697	9,784
Annual difference from mixed-fuel apt. (CO2 lbs)		(3,653)	(4,566)

UPFRONT COST DIFFERENCES - INFRASTRUCTURE, APPLIANCES & INSTALLATION***	Mixed Fuel	All Electric	All Electric + enhanced envelope
Infrastructure differences (see below)***	\$ 2,867	\$ 628	\$ 628
Appliances and Installation***			
Heat	\$ 3,291	\$ 5,435	\$ 5,435
A/C	\$ 2,855		
Hot Water	\$ 950	\$ 1,850	\$ 1,850
Total Appliance Material & Installation	\$ 7,096	\$ 7,285	\$ 7,285
Envelope Upgrades - Includes 3ACH reduced to 2ACH, add ERV, attic insulation increased from 30R to 49R			1,761
Tot. Upfront Cost Differences (Infrastructure, appliances & labor)	\$ 9,963	\$ 7,913	\$ 9,674
Difference from Mixed-Fuel		\$ (2,050)	\$ (289)

Infrastructure - Natural Gas***	
Gas line to unit	\$ 1,000
Gas meter	\$ 200
Labor	\$ 200
Gas regulator	\$ 50
Labor	\$ 60
Venting	\$ 212
Labor	\$ 145
Gas lines - furnace & H.Water	
\$40/ft	\$ 1,000
Total Gas Infrastructure	\$ 2,867

Infrastructure - Electrical**	
Elec. Upgrade 100W to 200W	\$ 628
Total Electric Infrastructure Diff.	\$ 628

* Calculated using Building Energy Optimization Tool (BEOpt) - U.S. Dept of Energy & National Renewable Energy Lab

**Used USDOE CO2 Calculator File - Zone RFCM representing Michigan's averaged fuel mix for electricity generation.

*** Estimates are from multiple sources. These need to be confirmed, but it is expected that construction costs for mixed-fuel will exceed that for all-electric, as demonstrated in the Rocky Mountain Institute 9-city study "The Economics of Electrifying Buildings."