

# Effective Ways to Save Energy and Money

Member Example: The Odd Fellows Hall, Orcas Island

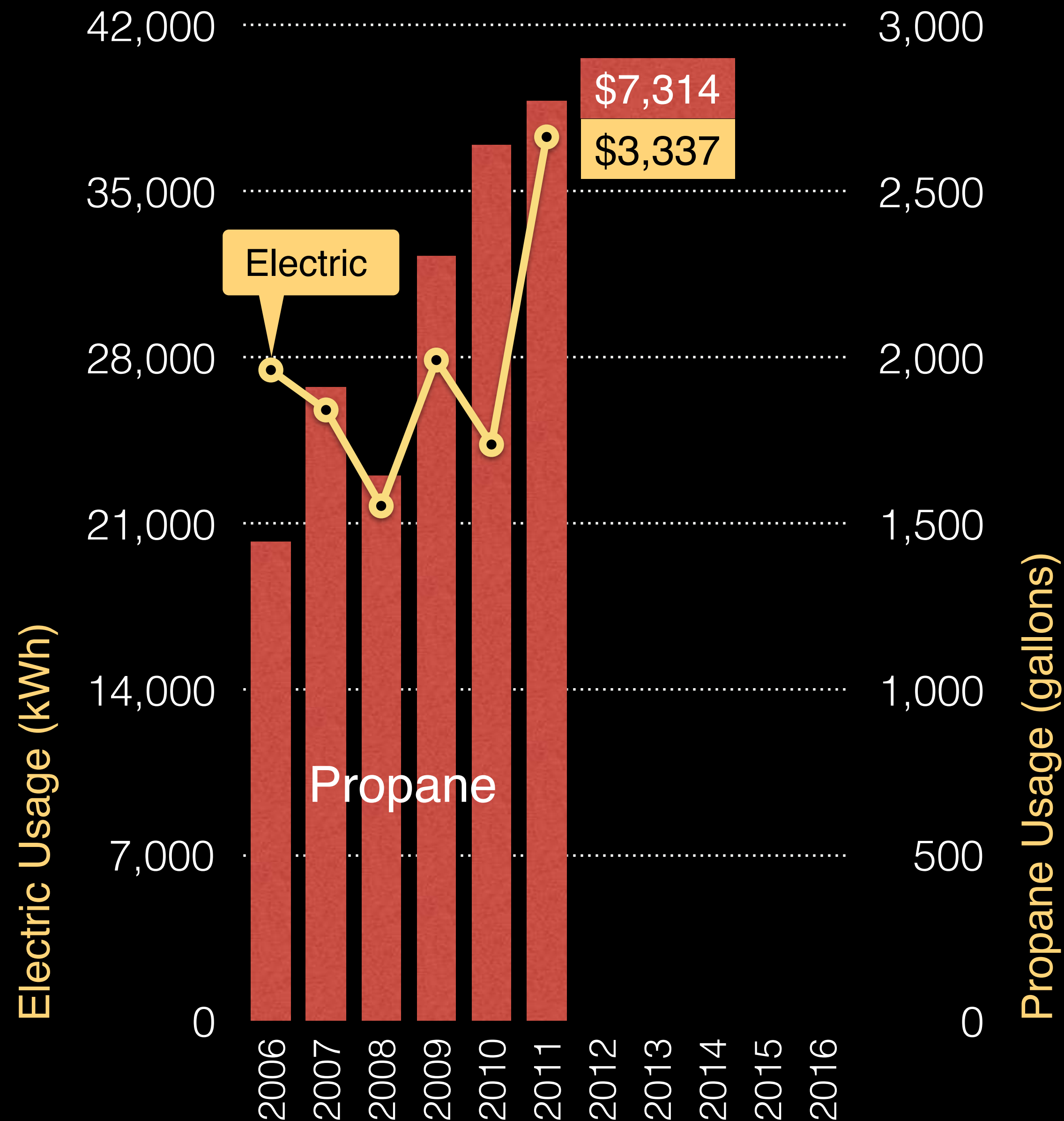
The Odd Fellows Hall, a historic building located on Orcas Island, was recently featured on the annual *Home Energy Tour*, offered by *The San Juan Islands Conservation District*, in partnership with OPALCO.

Built in 1891, it lacked most of the energy efficiency features common in modern construction.

In 2011, the Odd Fellows began a steady series of energy efficiency improvements that are now saving them more than **\$6,000 per year** in total energy bills, and reducing their **carbon footprint**.

Here's how they did it...

# Energy Efficiency Results: Odd Fellows Hall - 2011



In 2011, the Odd Fellows paid \$7,314 for propane, and \$3,337 for electricity.

From the chart at left, you can see that their energy usage was growing rapidly.

## Propane used for:

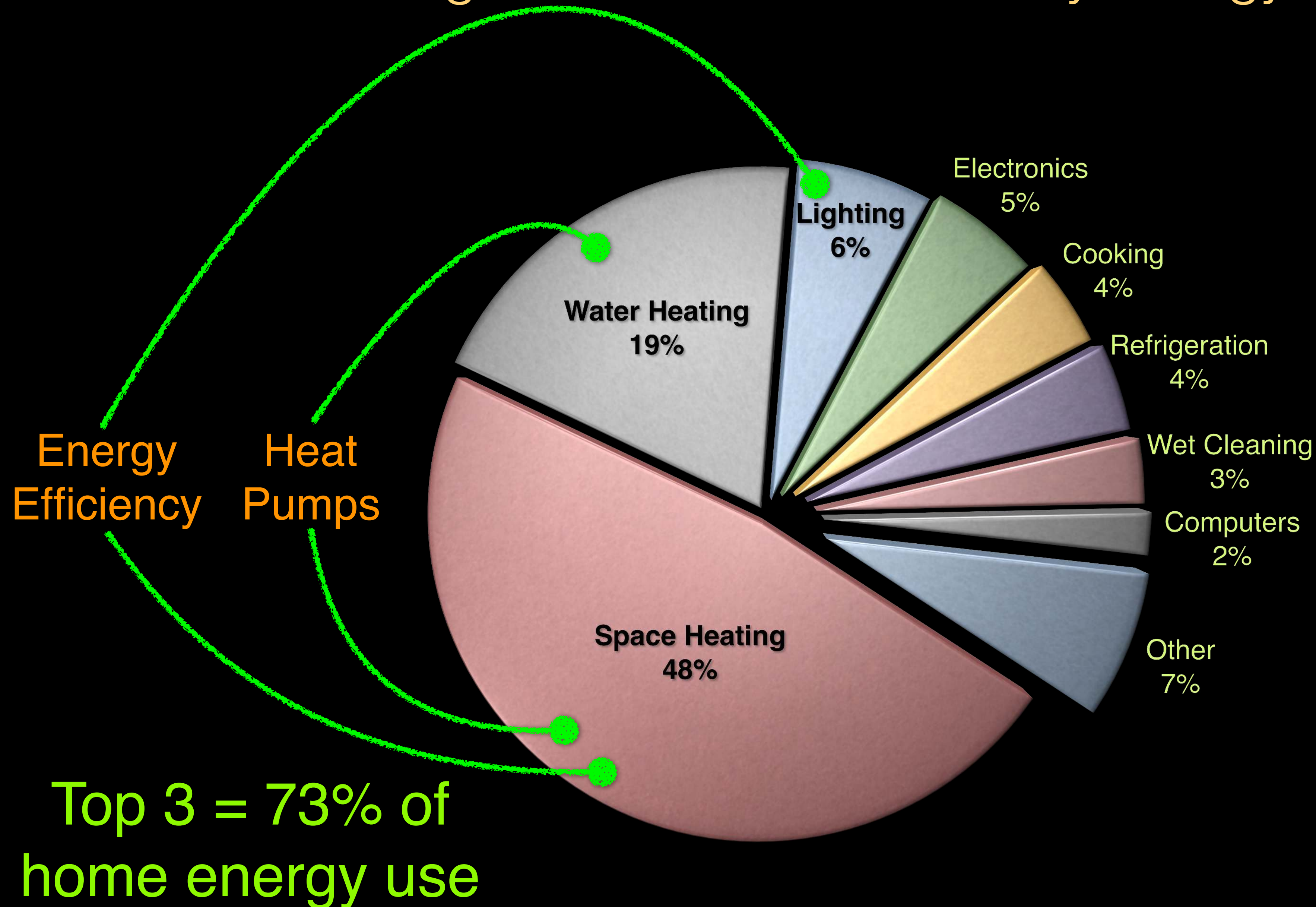
- Heating (2 furnaces)
- Cooking (commercial kitchen)

## Electricity used for:

- Lighting
- Propane furnace motors
- Fans
- 3 refrigerators
- 2 freezers



# Avg. US Residential Primary Energy End-Use



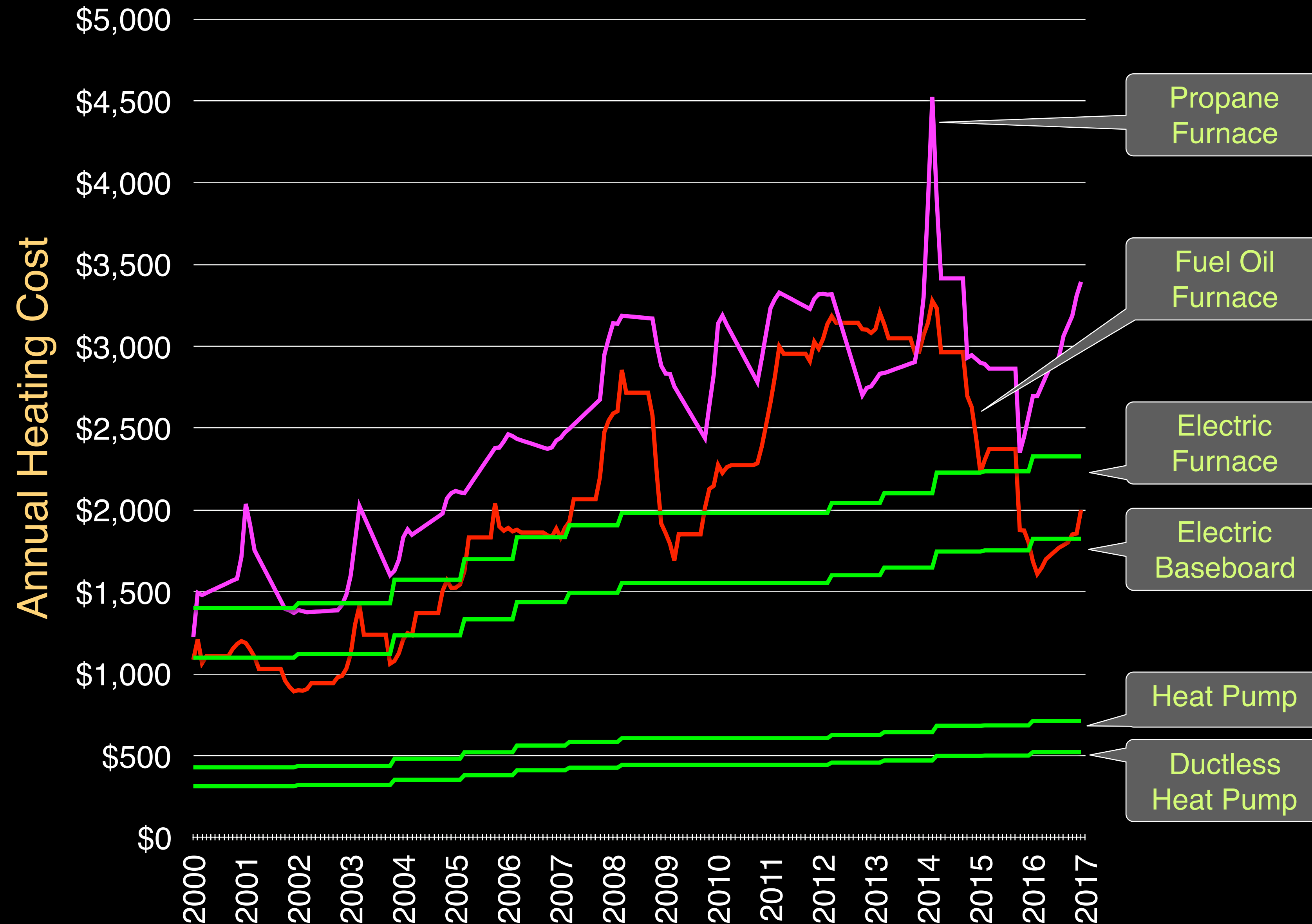
The chart at left shows typical energy use for North American homes.

As with homes, most energy use at the Odds Hall was for space heating, water heating, and lighting.

The Odds decided to use heat pumps and energy efficiency measures to have the maximum impact on savings.

# Annual Fuel Cost of Heating a Typical Home

## Comparing Various Electric, Propane and Fuel Oil Heaters (70 million BTU)



Why Heat pumps? They are the lowest cost way to heat a home or business.

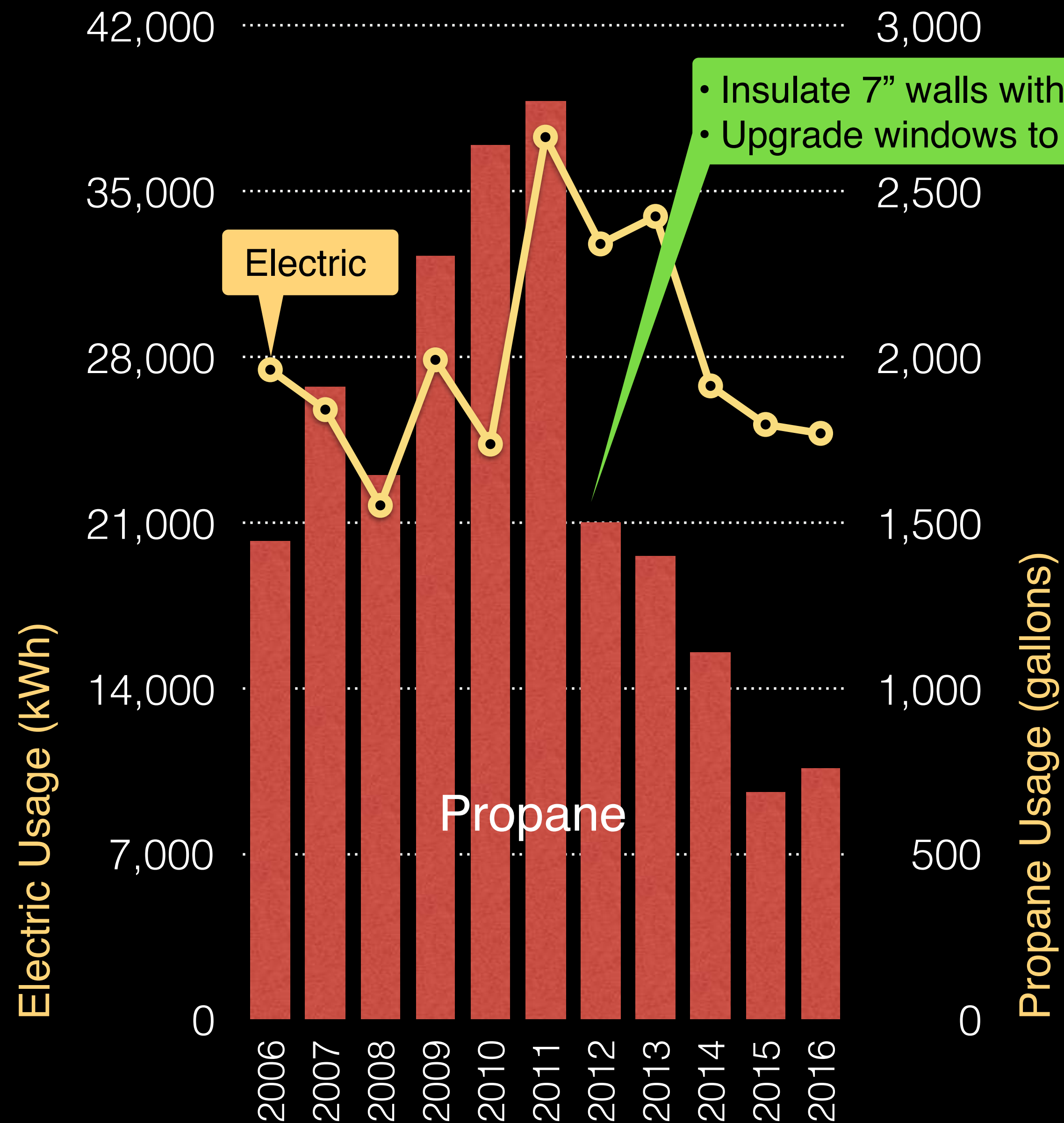
The chart at left shows the cost of various forms of heating, based on price of various forms of energy, including **electricity**, **propane**, and **fuel oil**.

Note: Electric rates are based on OPALCO usage rate. Propane and fuel oil are based on national pricing, and may be more, locally.

Also note the **price volatility** of propane and heating oil, relative to electricity.



# Energy Efficiency Results: Odd Fellows Hall - 2012



In 2012, the Odd Fellows Hall had some attic insulation, but none in the walls. So the first thing they did was to blow in **soy foam insulation**, through discrete holes in the walls.

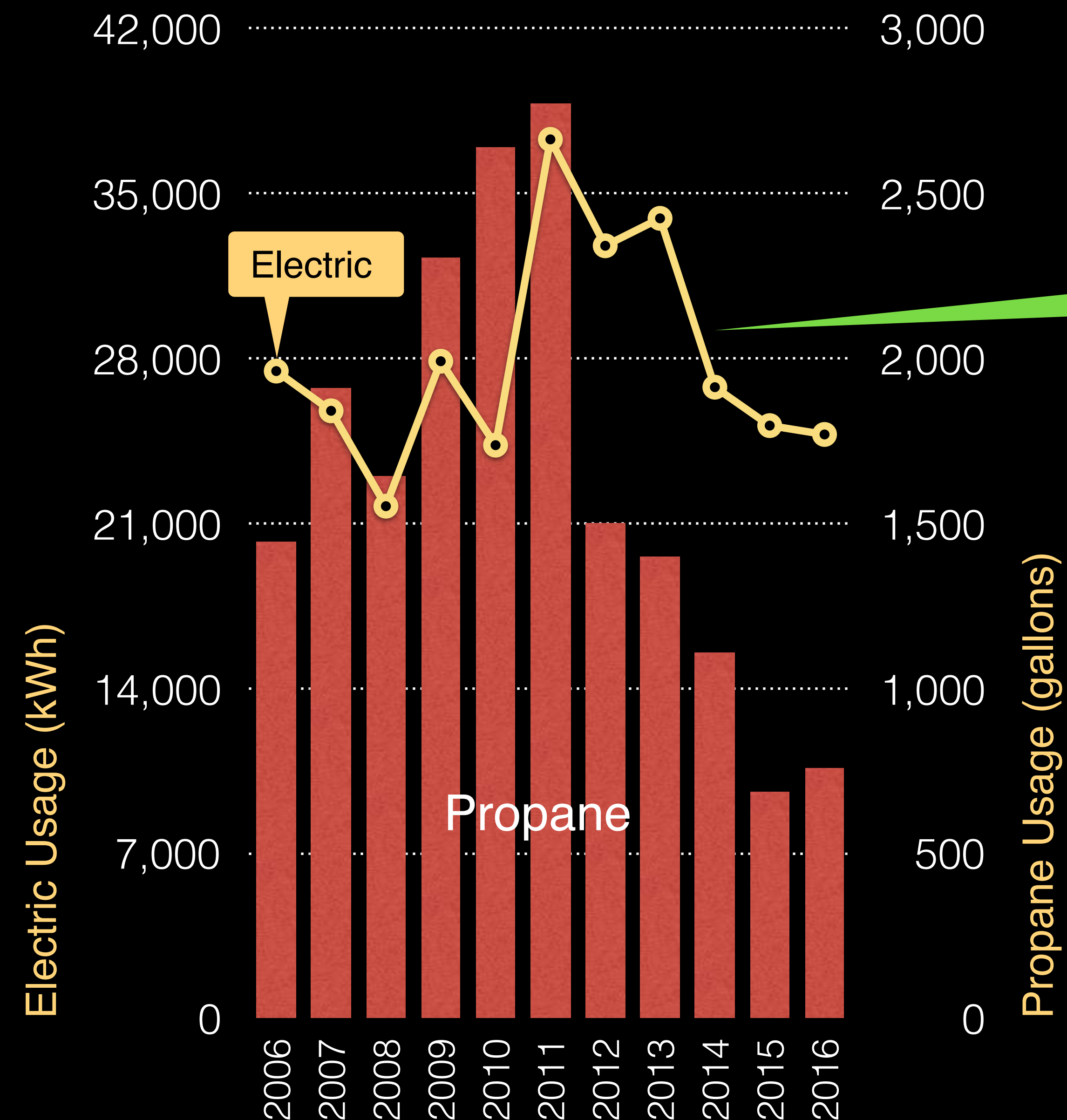
They also replaced their old drafty single-pane windows with modern **double-paned windows**.

This cut their propane use in half, and reduced electricity usage too, since the propane furnaces used electric motors for the fans.

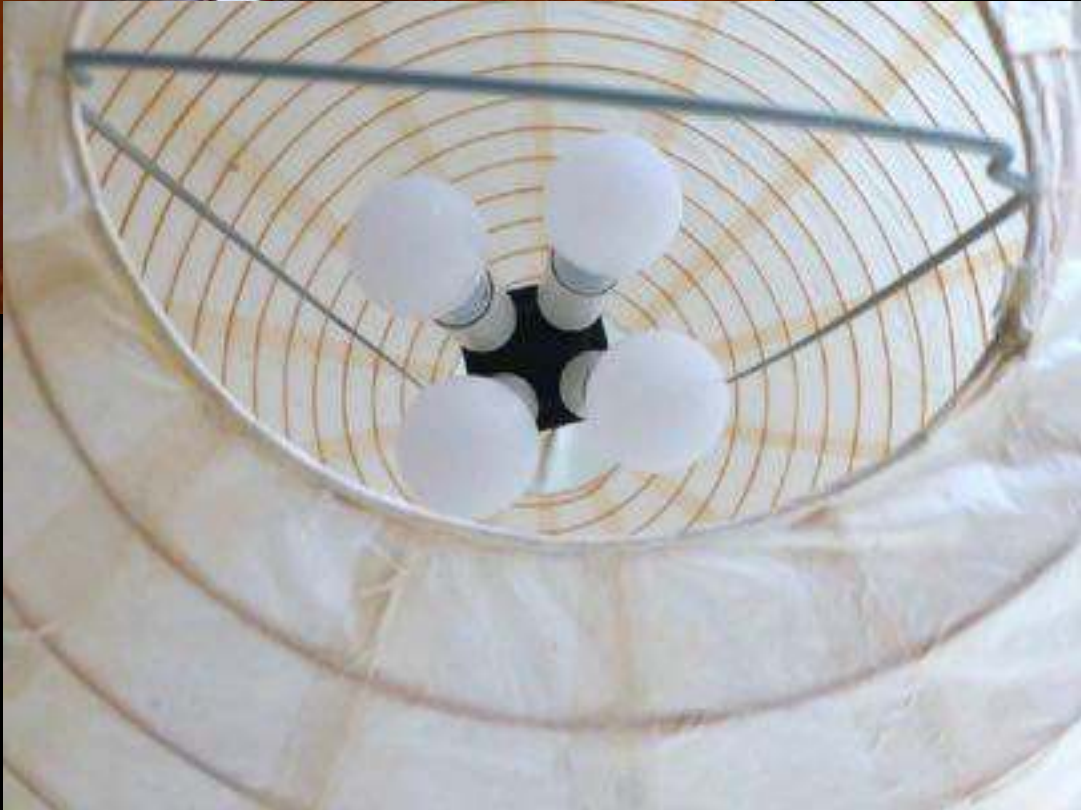




# Energy Efficiency Results: Odd Fellows Hall - 2014

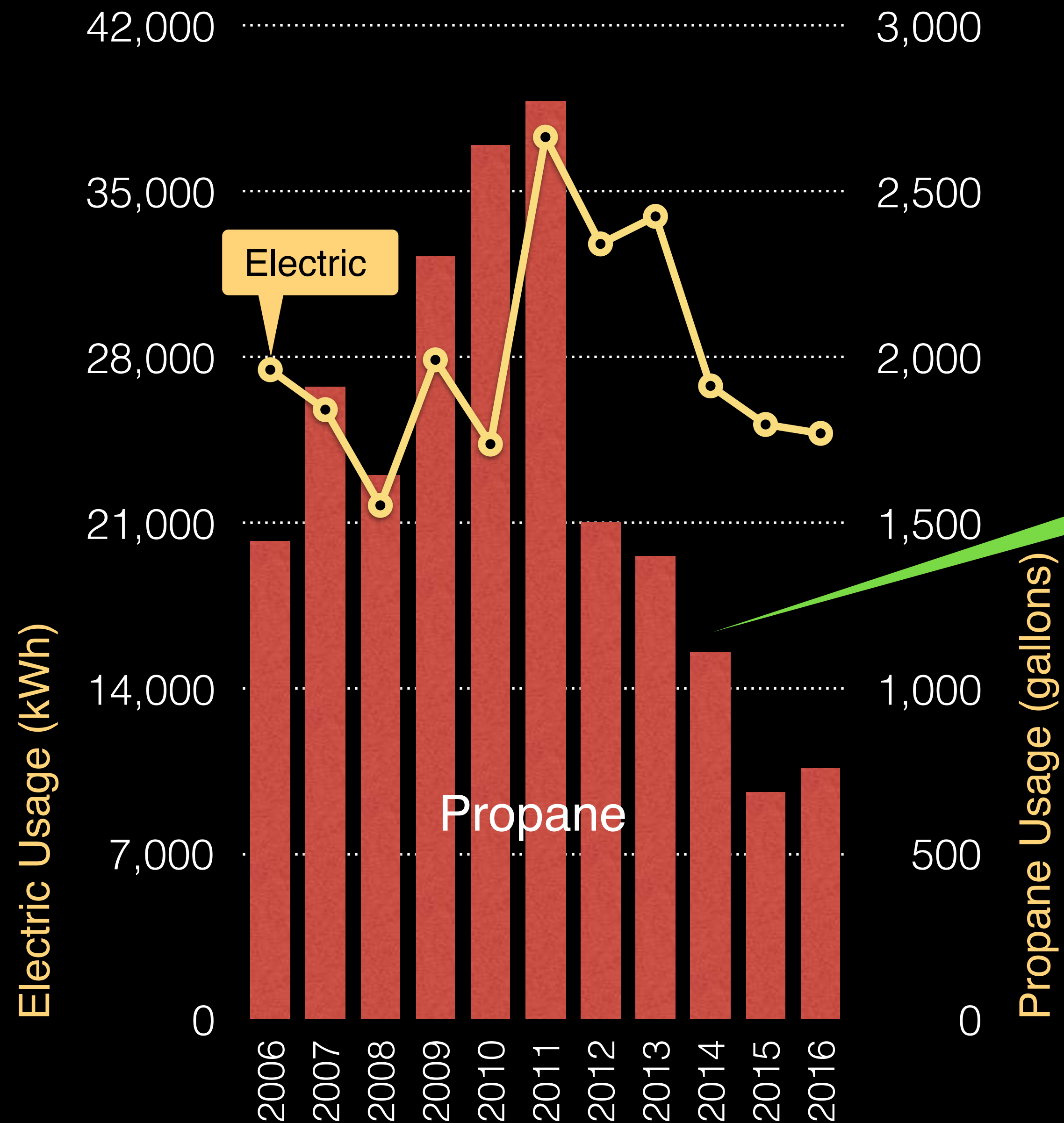


In 2014, they replaced all their incandescent lights with **LED lighting**. The lights were paid for with **energy rebates** from OPALCO and their partner the Opportunity Council.





# Energy Efficiency Results: Odd Fellows Hall - 2014



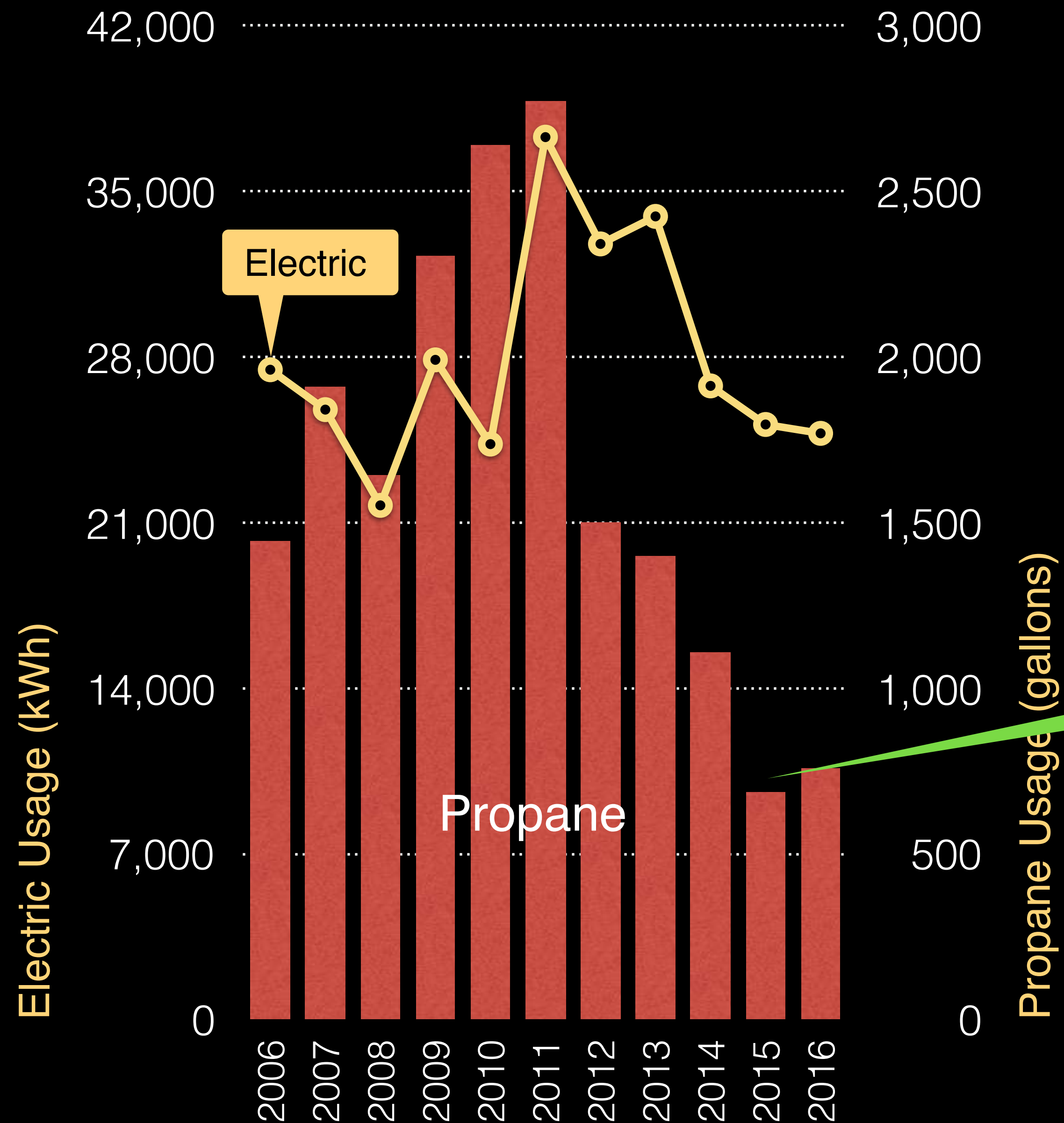
Also in 2014, they installed a **smart thermostat**, which provided Internet monitoring and scheduling of heating activity. This allowed them to heat the building only when needed, to meet the needs of each renter of the hall: **comfort increased, energy usage decreased.**

Smart Thermostat





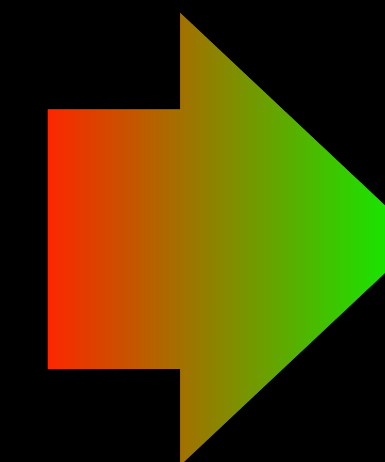
# Energy Efficiency Results: Odd Fellows Hall - 2015



In 2015, they **air sealed** the building, and doubled the depth of their attic insulation, using **blown-in cellulose**.

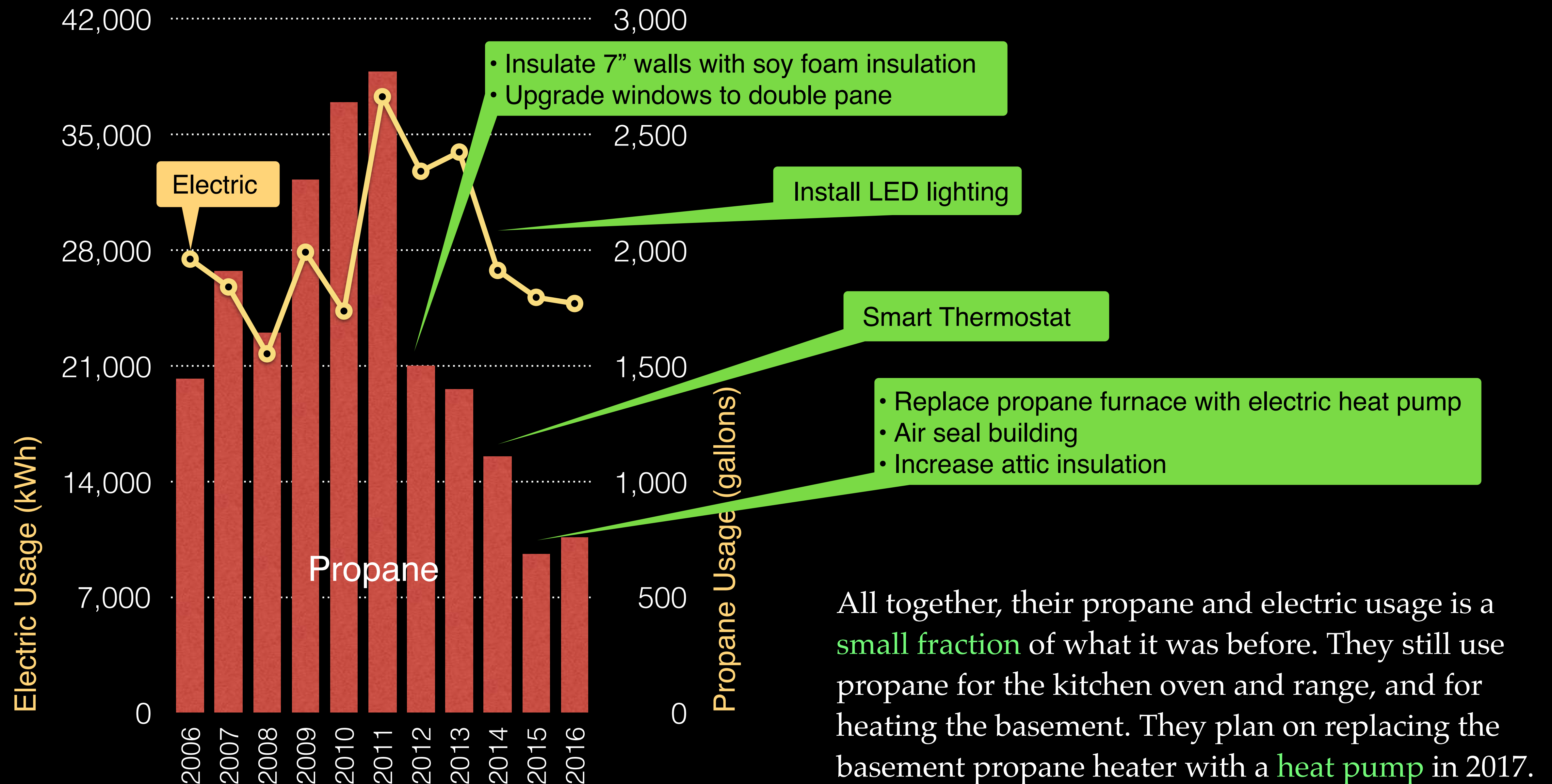
And they replaced one of their propane heaters with a modern **ductless heat pump**.

- Replace propane furnace with electric heat pump
- Air seal building
- Increase attic insulation





# Energy Efficiency Results: Odd Fellows Hall





# Energy Efficiency Results: Before and After

They cut their **total annual energy** bill from \$10,651 to \$4,319.

	Before and After Cost		Savings				
	2011	2016	Annual	18 Year	Investment	Rebates	Net Savings
Propane (\$2.50 per gallon)	\$7,314	\$2,102					
Electric (\$0.0895 per kWh)	\$3,337	\$2,217					
Total	\$10,651	\$4,319					

# Energy Efficiency Results: Before and After

This represents a savings of \$6,332 per year. And over the 18 year life of a typical heating system, this is a **total energy savings of \$113,976**.

	Before and After Cost		Savings				
	2011	2016	Annual	18 Year	Investment	Rebates	Net Savings
Propane (\$2.50 per gallon)	\$7,314	\$2,102	\$5,212	\$93,816			
Electric (\$0.0895 per kWh)	\$3,337	\$2,217	\$1,120	\$20,160			
Total	\$10,651	\$4,319	\$6,332	\$113,976			



# Energy Efficiency Results: Before and After

	Before and After Cost		Savings				
	2011	2016	Annual	18 Year	Investment	Rebates	Net Savings
Propane (\$2.50 per gallon)	\$7,314	\$2,102	\$5,212	\$93,816	\$32,296	\$5,814	\$67,334
Electric (\$0.0895 per kWh)	\$3,337	\$2,217	\$1,120	\$20,160	\$2,200	\$2,000	\$19,960
Total	\$10,651	\$4,319	\$6,332	\$113,976	\$34,496	\$7,814	\$87,294
					Insulation Air Sealing Windows Heat Pump LED Lighting Smart Thermostat	OPALCO Opp. Council SJICD	

Their **total investment** was \$34,496 for insulation, air sealing, windows, heat pump, LED lighting and smart thermostat. Total rebates were \$7,814, yielding a **net 18 year savings** of \$87,294.



# Putting the Savings to Use: EV Charging Station



The Odd Fellows are putting the savings to work, helping the community save money and reduce carbon footprint. They installed an **electric vehicle** (EV) charging station so people attending classes and dining in the kitchen restaurant can **charge for free** while at the hall.

**Zero Installation Cost**  
**\$1,500 rebate from SJICD/OPALCO**

Fast Level 2 charging station

Top-off your battery while attending classes  
or dining at restaurant

Supports transition to **low-cost clean**  
**electric transportation**

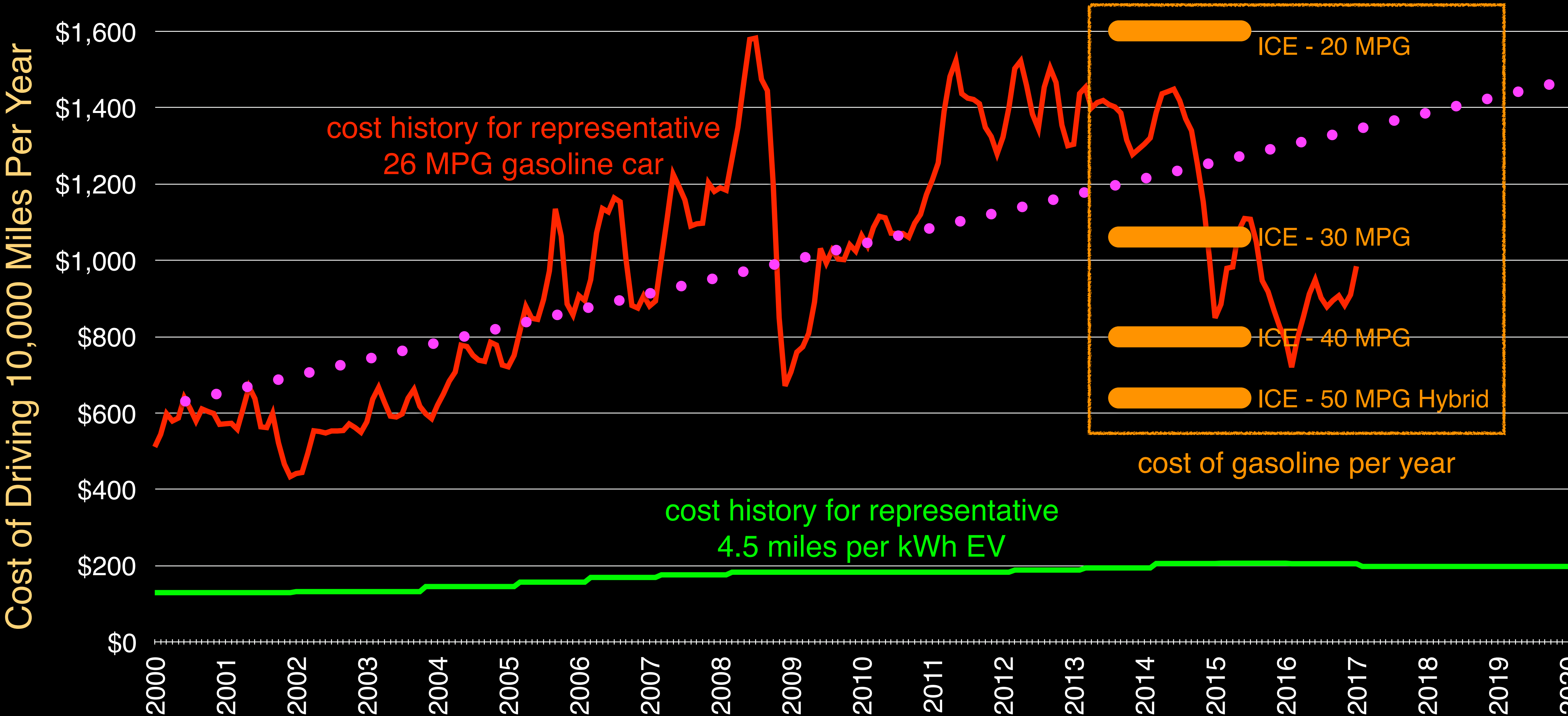


# Appendix

The following slides provide additional data showing the cost and carbon footprint of heating, water heating and driving, using electricity versus fossil fuels such as propane, heating oil and gasoline.

# Annual Fuel Cost of Driving a Gas Car Versus Electric Vehicle (EV)

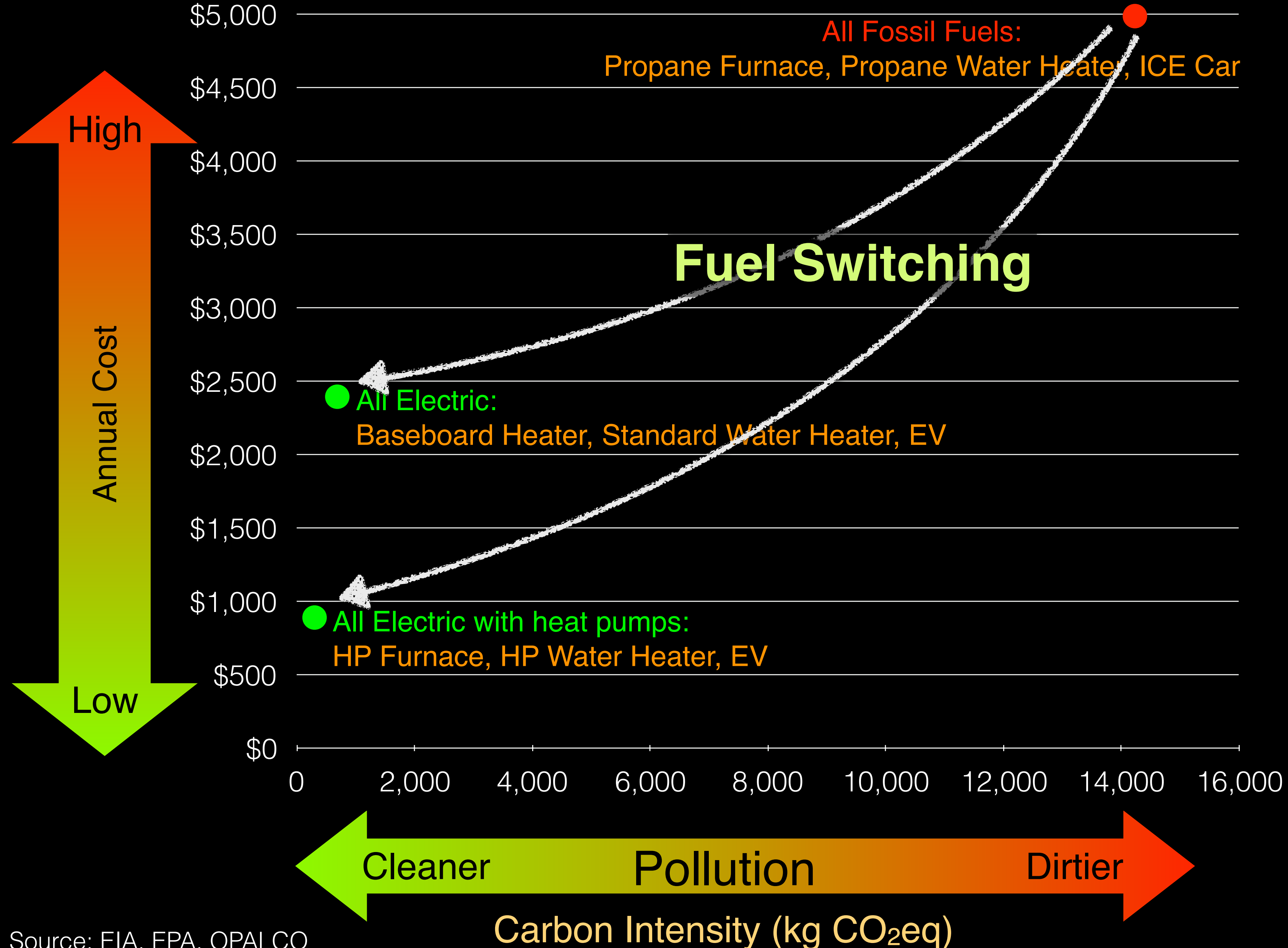
Driving 10,000 miles each year - various gasoline cars versus representative EV



Electric price based on OPALCO rate plan to 2016. Representative EV gets 4.5 miles per kWh. Regular octane gasoline average US price through June 2015. Island gas prices tend to be 10%+ higher. Representative gasoline car gets US average 26 MPG. 2015 comparison based on 2 year average gasoline price to smooth volatility, showing gasoline cars with Internal Combustion Engines (ICE) from 20 to 50 MPG.



# All Electric Home and Car Versus Fossil Fuel



## Headline

- Fuel switching reduces member **total energy cost** and **carbon footprint** by shifting from more expensive polluting fossil fuel heating and transportation to clean **low cost electric**.
- Heat pumps provide the lowest cost of heating, thanks to their very high efficiency.

## Notes

- GREEN** = Electric heating and car  
**RED** = propane heating and gasoline car
- Car: Driving 10,000 miles per year, Internal Combustion Engine (ICE) US avg. 26 MPG, EV avg. 4.5 MPkWH
- Heating: Standard home in SJC, 70,000,00 BTUs
- Water heater: 50 gallon