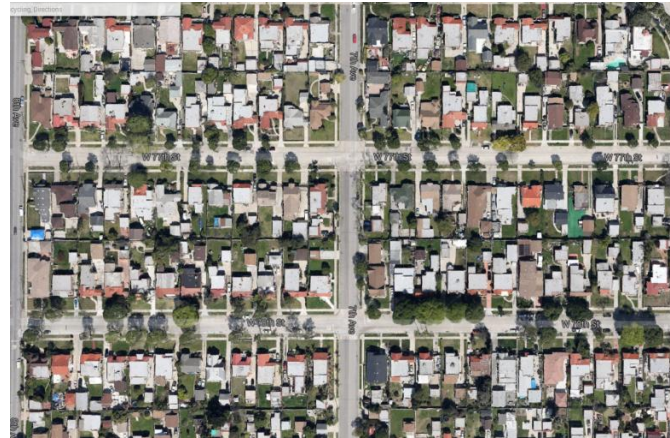


# 2016 AQMP White Paper- Residential and Commercial Energy



Residential and Commercial Energy Working Group  
June 25, 2015



# White Paper – Residential and Commercial Energy

- 1 of 10 White Papers for 2016 AQMP

- Blueprint for Clean Air (Preface)
- 21<sup>st</sup> Century Goods Movement Systems and Air Quality
- Passenger Transportation
- Energy Outlook
- Residential and Commercial Energy Use
- Industrial Facility Modernization
- VOC Controls
- PM Controls
- A Business Case for Clean Air
- Off-Road Commercial/Industrial Equipment



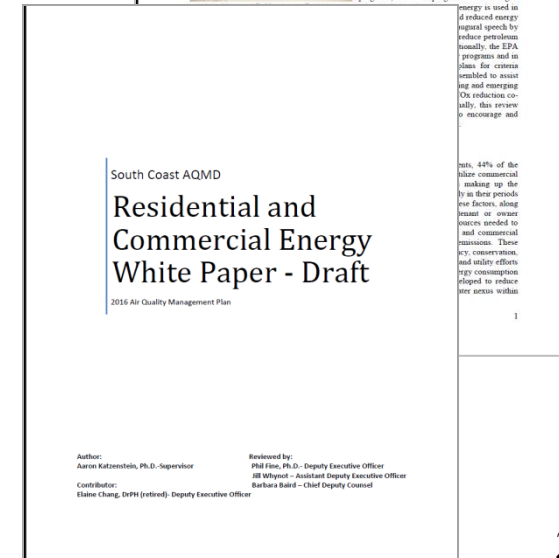
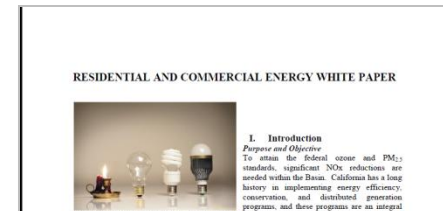
- White Paper Website

- Search - "2016 AQMP White Papers"

<http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers>

# Overview – Preliminary Draft

- Preliminary Draft for Workgroup Review
- Shortened Outline
  - Broad Overview
- Terminology
  - “Energy Savings Measures”
- Data and Literature Search



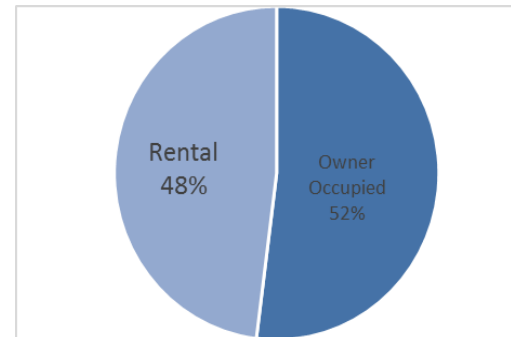
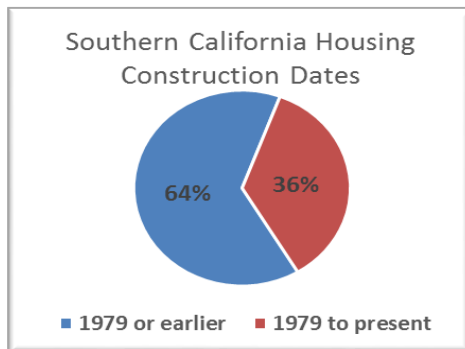
# Contents

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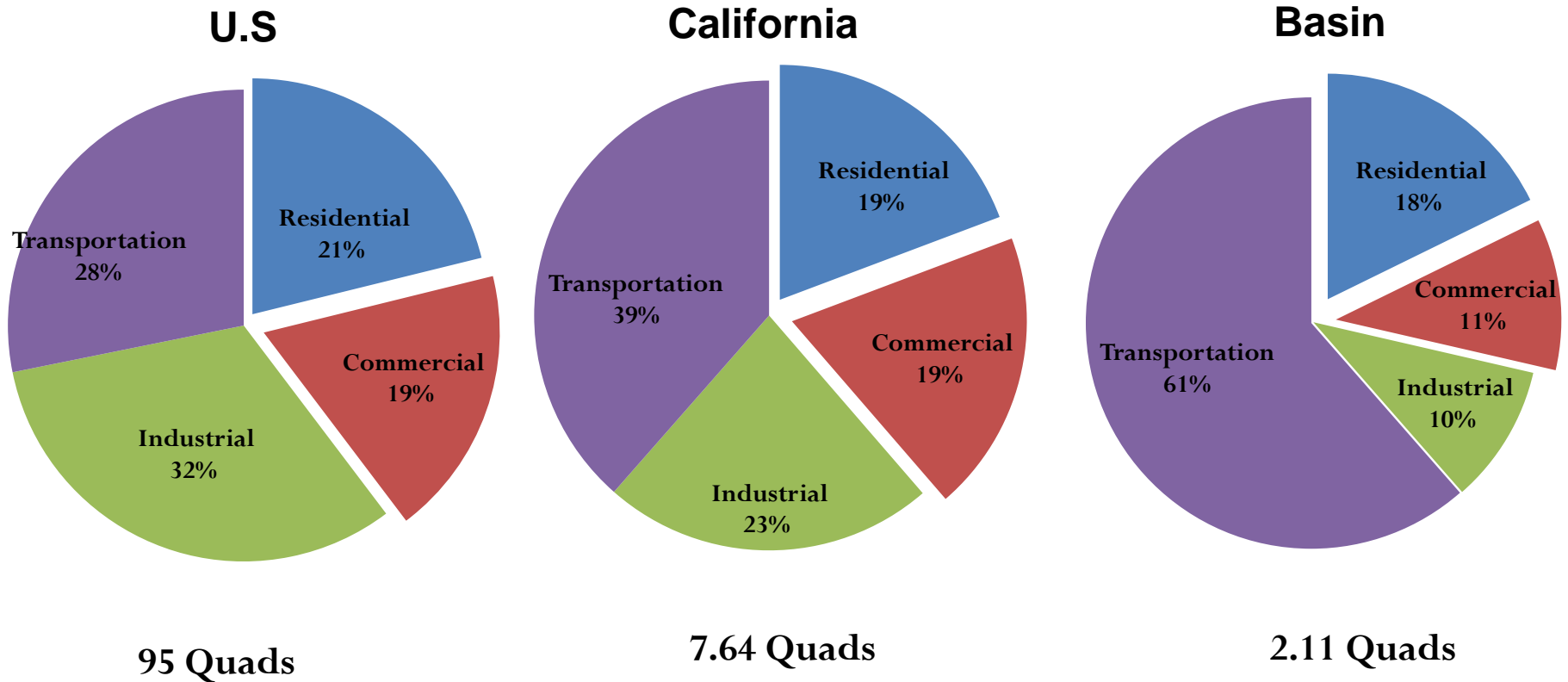
- I. Introduction
- II. **Background**
- III. **Residential and Commercial Energy Usage**
- IV. **Emissions**
- V. Current Practices and Barriers to Implementation
- VI. **Existing Programs, Regulations, and Financing Mechanisms**
- VII. **Achieving Greater Implementation**
- VIII. **Technology Assessment**
- IX. **Scenario Analysis**
- X. **Findings and Recommendations for the 2016 AQMP**
- XI. References

# Background – Overview of Sectors

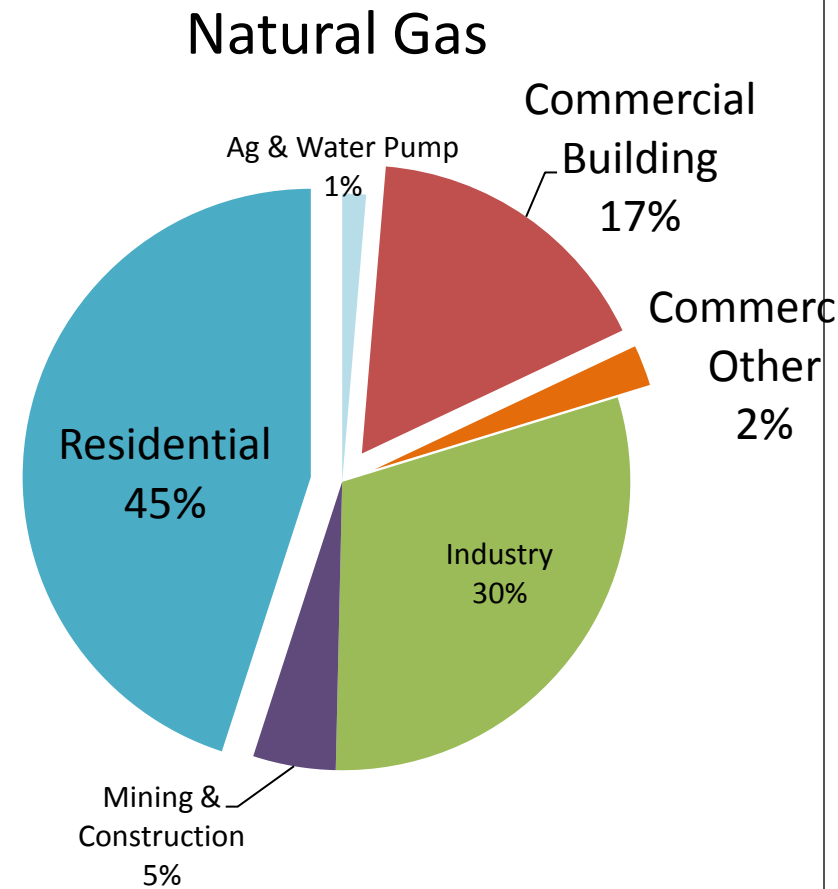
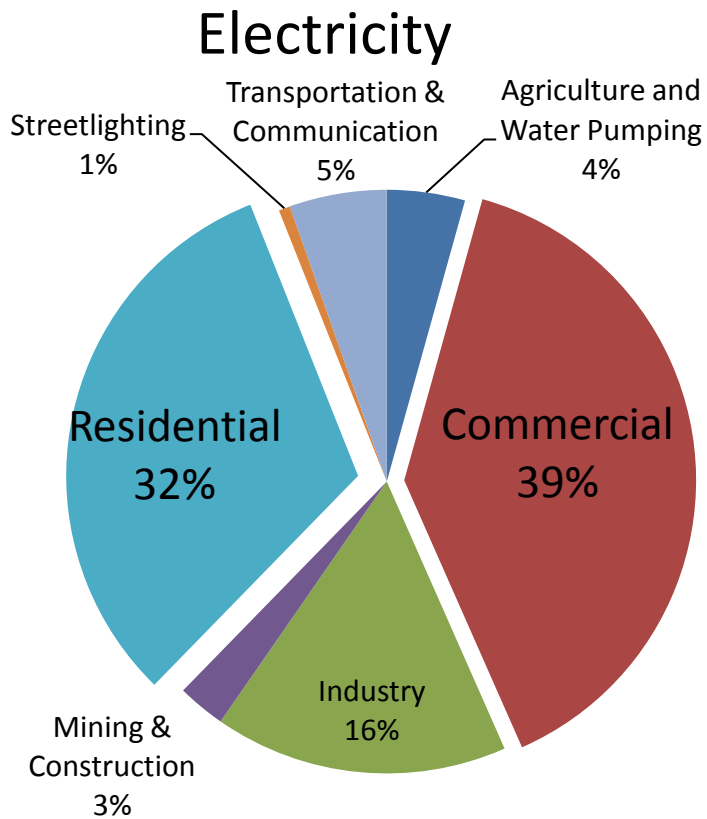
- Commercial Sector
  - Data limitations
  - Building use type, size, age built
- Residential Sector
  - American FactFinder – Census Bureau



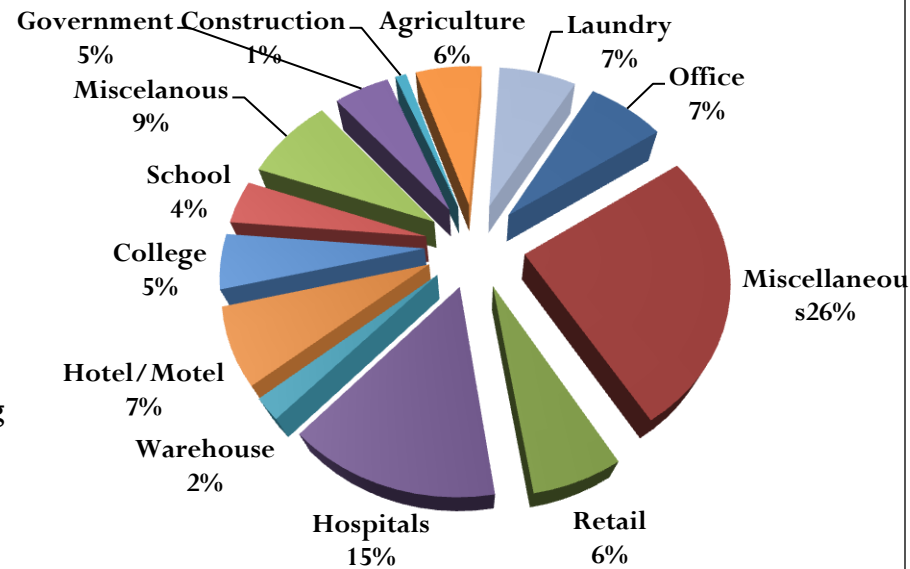
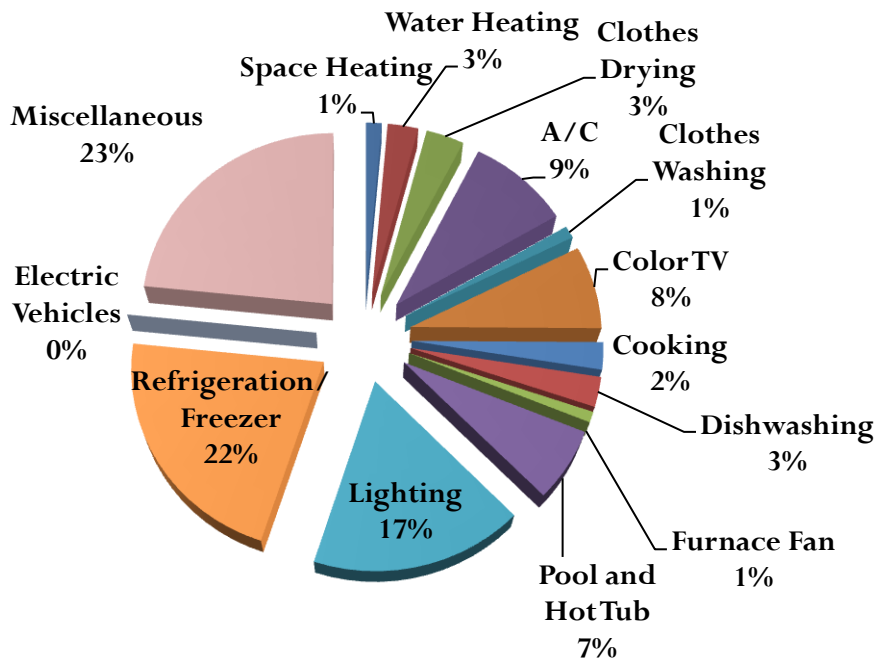
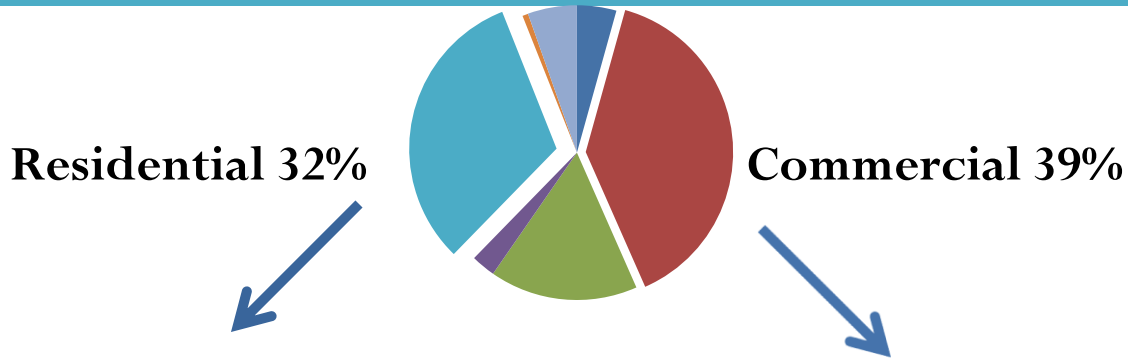
# Sector Energy Use\*



# Energy Use

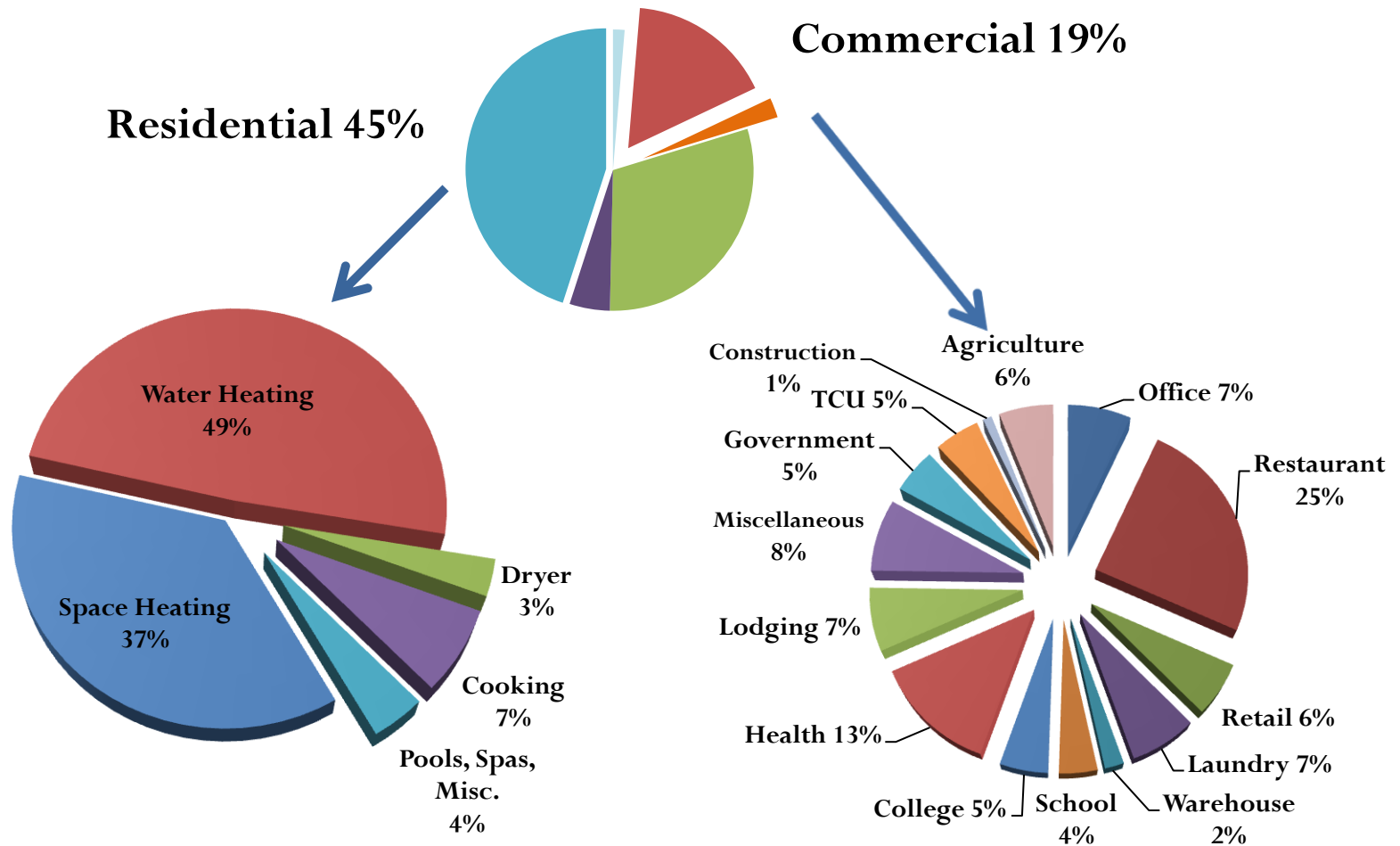


# Electricity





# Natural Gas



# 2012 AQMP Emissions

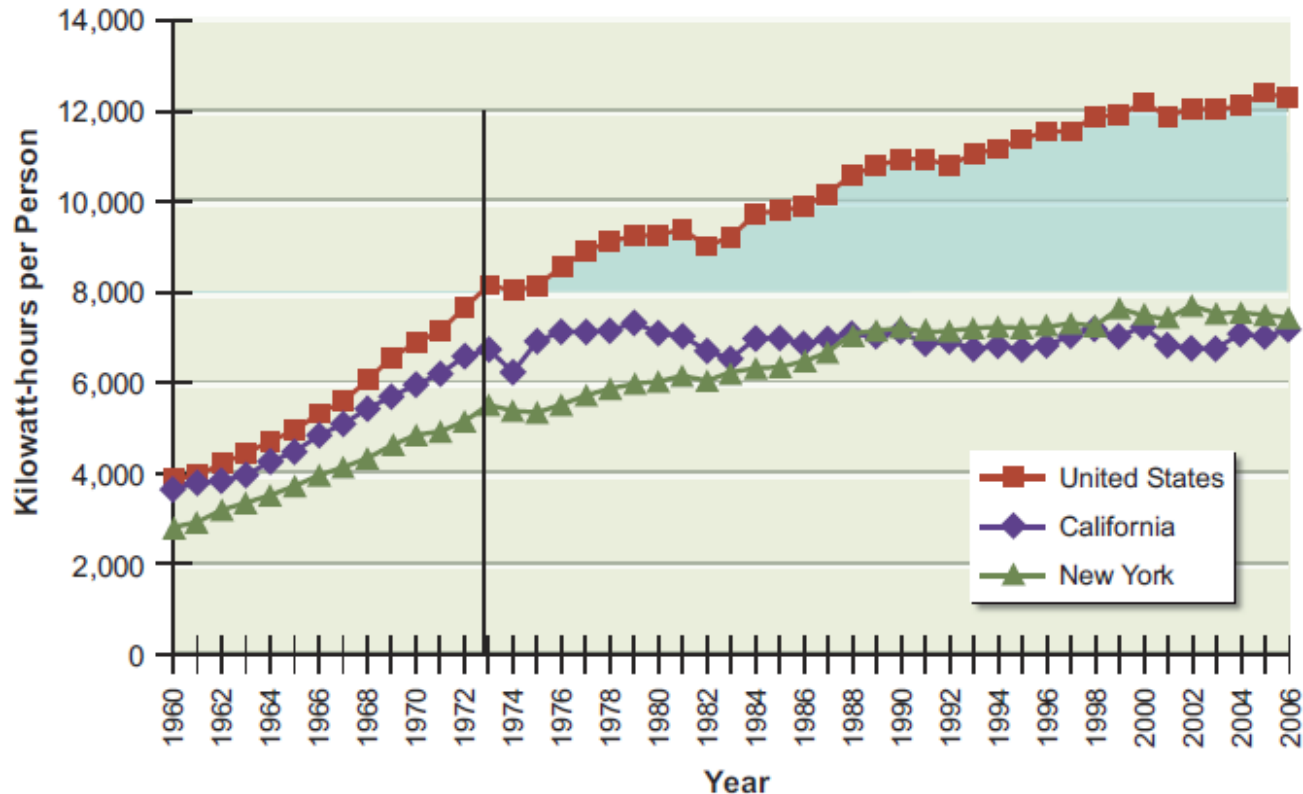
## Direct Residential and Commercial Emissions

Year	2014	2023	2030	2014	2023	2030
	Residential			Commercial		
NOx (tpd)	19.79	15.58	13.45	9.53	9.17	9.60
(% of inventory)	(3.9%)	(4.7%)	(4.6%)	(1.9%)	(2.8%)	(3.3%)

- Indirect NOx from electricity generation  
 ~1.4 tons per day (71% of 2 tpd electricity generation in Basin)

# Existing Programs, Regulations, and Financing Mechanisms

Success of State Programs (per capita energy use)




# Greater Implementation of Energy Savings Measures

- Existing Buildings
  - Rental and leased properties
  - AB758 + AB1103
- Gamification
  - Energy savings contests
  - California Cool Communities Challenge
- Coupling emission benefits with energy savings
  - Appliance labels

# Emission Benefits: Appliance Labels

**EPA DOT Fuel Economy and Environment** Gasoline Vehicle

**Fuel Economy**  
 **26** MPG  
 combined city/hwy    **22** city    **32** highway  
**3.8** gallons per 100 miles

Small SUVs range from 16 to 32 MPG. The best vehicle rates 99 MPGe.

**You save \$1,850**  
 in fuel costs over 5 years compared to the average new vehicle.

**Annual fuel cost \$2,150**




**Fuel Economy & Greenhouse Gas Rating (tailpipe only)** **7** (Scale 1 to 10, Best)


**Smog Rating (tailpipe only)** **6** (Scale 1 to 10, Best)

This vehicle emits 347 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at [fuel economy.gov](http://fuel economy.gov).

**Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and costs \$12,600 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.70 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.**

**fuel economy.gov**  
 Calculate personalized estimates and compare vehicles

Smartphone QR Code 

U.S. Government Federal law prohibits removal of this label before consumer purchase.

# ENERGYGUIDE

Refrigerator-Freezer Electrolux FFHS2611L\*  
 \* Automatic Defrost Capacity: 25.8 Cubic Feet  
 \* Side-Mounted Freezer  
 \* Through-the-Door-Ice-Service

**Estimated Yearly Operating Cost**

**\$62**

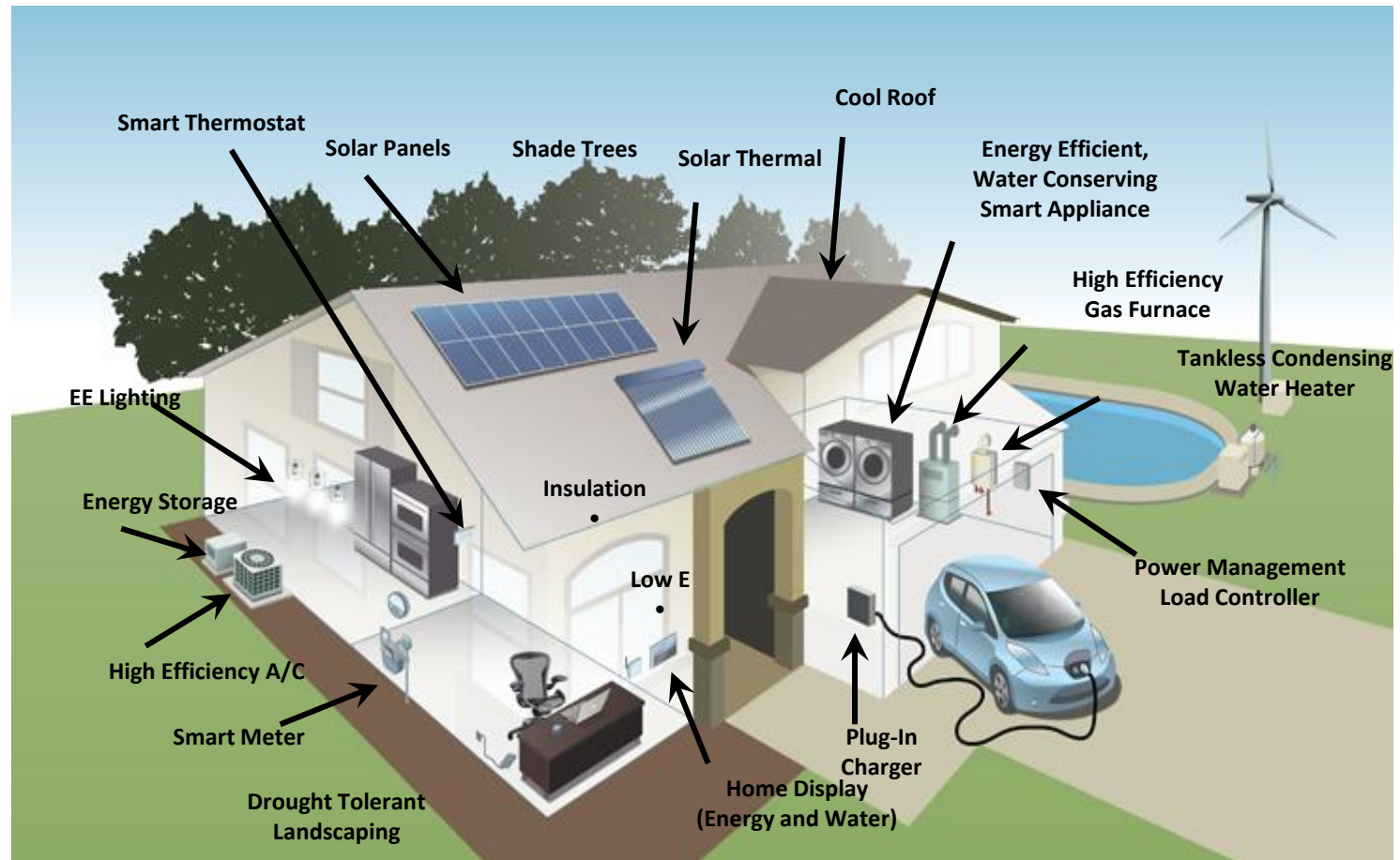
560 578  
 Cost Range of Similar Models

**582 kWh**  
 Estimated Yearly Electricity Use

Your cost will depend on your utility rates and use.

- \* Cost range based only on models of similar capacity with automatic defrost, side-mounted freezer, and through-the-door-ice-service
- \* Estimated operating cost based on a 2007 national average electricity cost of 10.65 cents per kWh. PART NO. 242028541
- \* For more information, visit [www.ftc.gov/appliances](http://www.ftc.gov/appliances).

# Technology Assessment



# Scenario Analysis



- Projected energy savings of existing buildings
- 25% and 50% reductions by 2030 (50% Governor's target)
- Assumed proportional co-benefits emission reduction from existing and planned energy state targets

YEAR *	2014	2023	2030	2014	2023	2030
	<i>Residential (tons/day)</i>			<i>Commercial (tons/day)</i>		
<b>2012 AQMP</b>	19.8	15.6	13.4	9.5	9.2	9.6
<b>Scenario 1 (25% by 2030)</b>	-	13.6	10.1	-	8.0	7.2
<b>Scenario 2 (50% by 2030)</b>	-	11.4	6.7	-	6.7	4.8

\*Analysis on 2012 AQMP inventory

# Recommendations

- Actions, planning efforts, programs, control strategies that SCAQMD might further pursue
  - General, Electricity, Natural Gas
- Some Key Recommendations:
  - Quantification of emission reductions energy efficiency and distributed generation for SIP
  - Add emission reductions to appliance labels
  - Methodologies and best practices in moving towards net zero energy in existing buildings
  - Transparent utility rate structures (electricity)
  - Use energy efficiency as emission reduction tool in SCAQMD regulatory or incentive programs



# Further Efforts

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- Improvements in data availability
  - Land use data
  - Energy data
- Monitor impact of existing and future programs on emissions
  - Integrate into SCAQMD planning efforts
  - Continue to monitor technologies and other agencies efforts
  - Identify areas that SCAQMD may play a role
- Monitor emissions from integration of new technologies
  - Transportation
  - Renewables

# Next Steps

- Incorporate Workgroup Comments
  - July-August 2015
- Formulate information from this and other white papers into Energy Outlook Whitepaper
  - July-August 2015
- Present to SCAQMD Governing Board
  - September 2015
- Evaluation of potential AQMP control strategies
  - Fall 2015