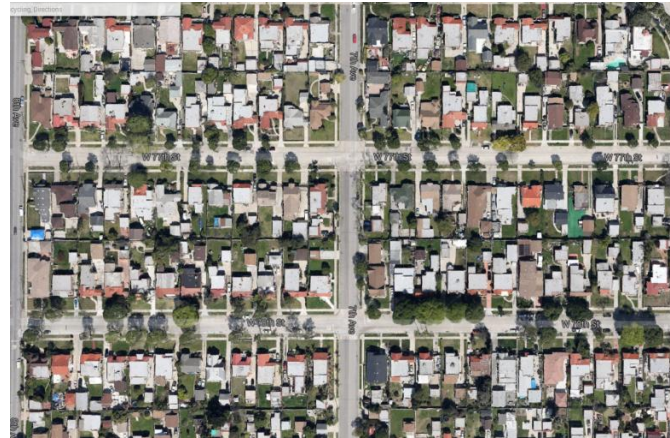


2016 AQMP White Paper- Residential and Commercial Energy



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)
- 21st 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



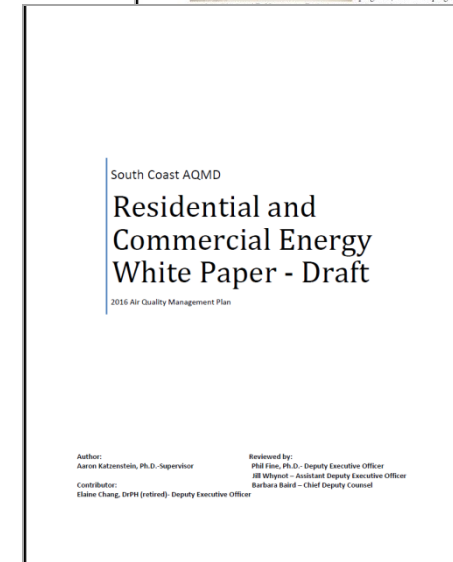
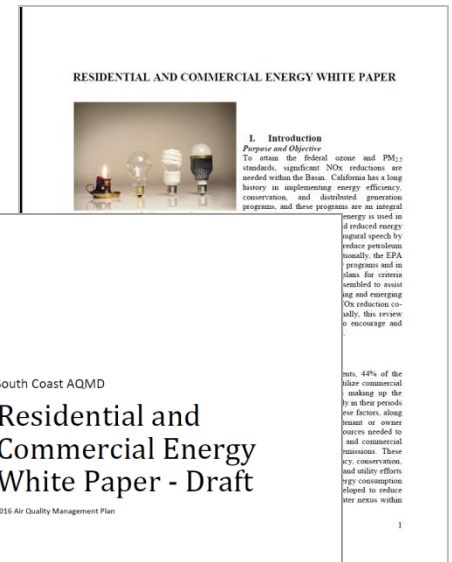
- White Paper Website

- 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

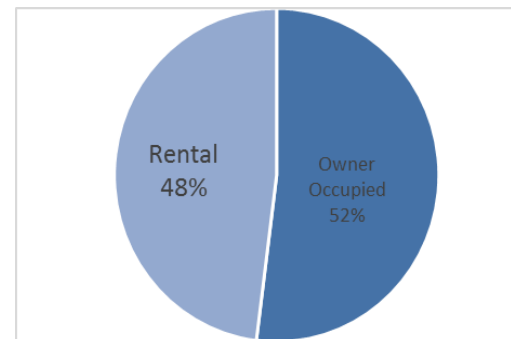
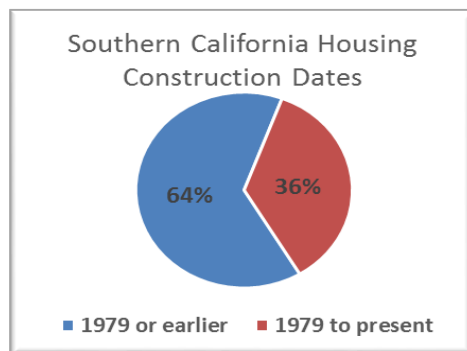


Contents

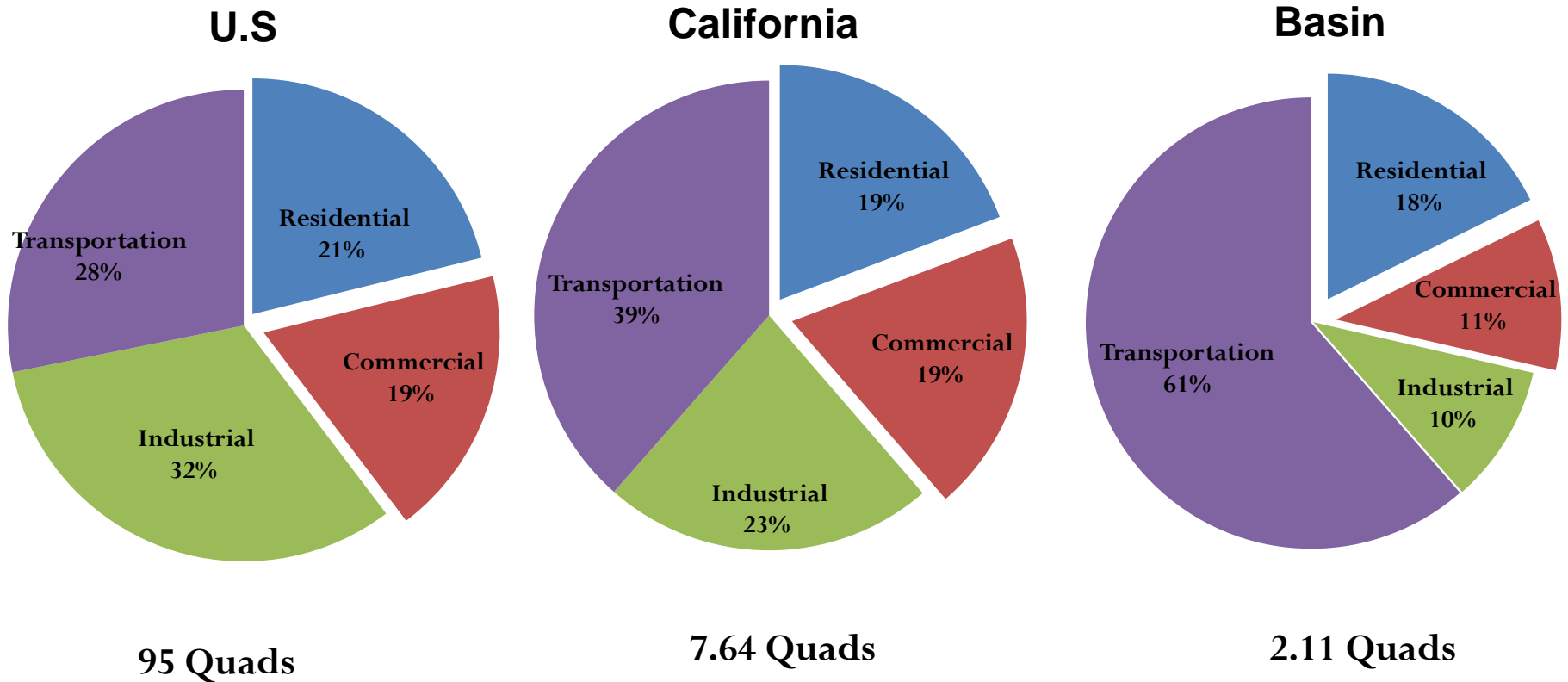
- I. Introduction
- II. **Background**
- III. **Residential and Commercial Energy Usage**
- IV. **Emissions**
- V. Current Practices and Barriers to Implementation
- VI. **Existing Programs, Regulations, and Financing Mechanisms**
- VII. **Achieving Greater Implementation**
- VIII. **Technology Assessment**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

Background – Overview of Sectors

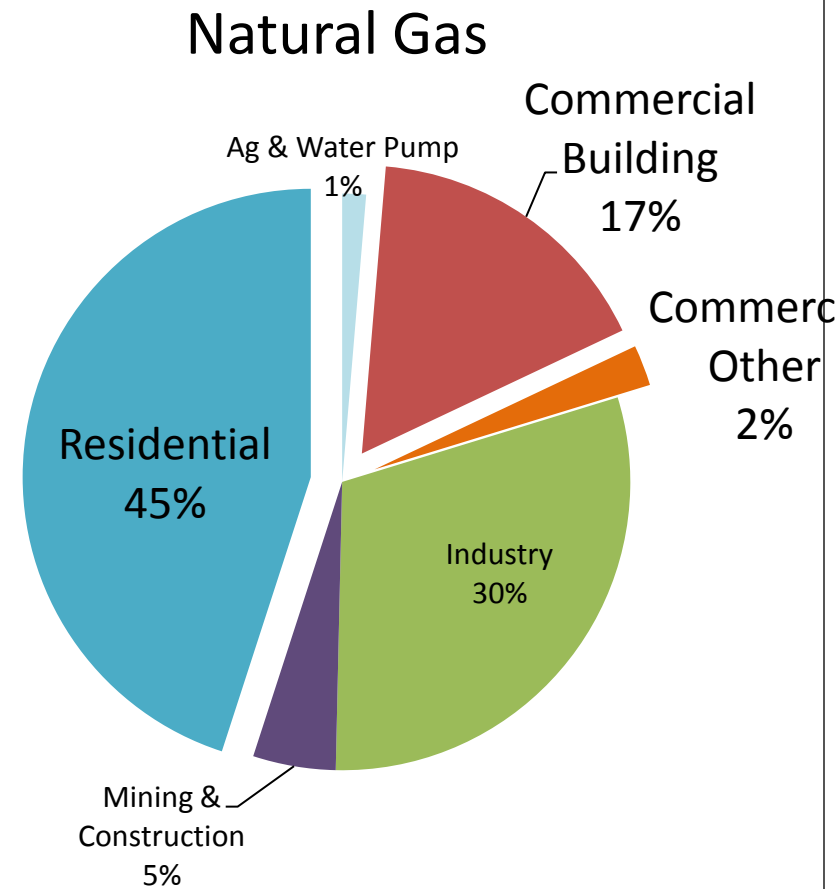
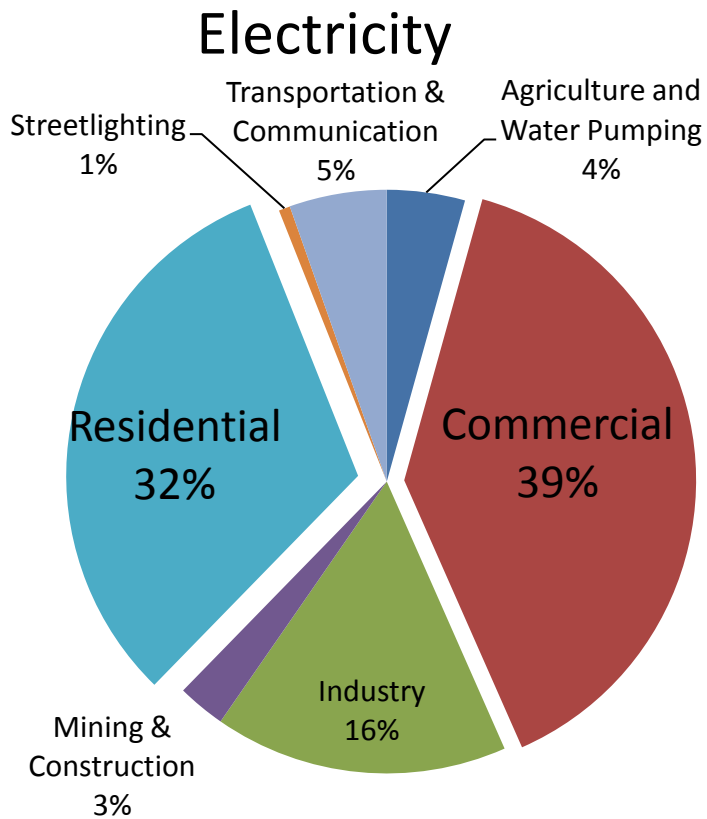
- Commercial Sector
 - Data limitations
 - Building use type, size, age built
- Residential Sector
 - American FactFinder – Census Bureau



Sector Energy Use*



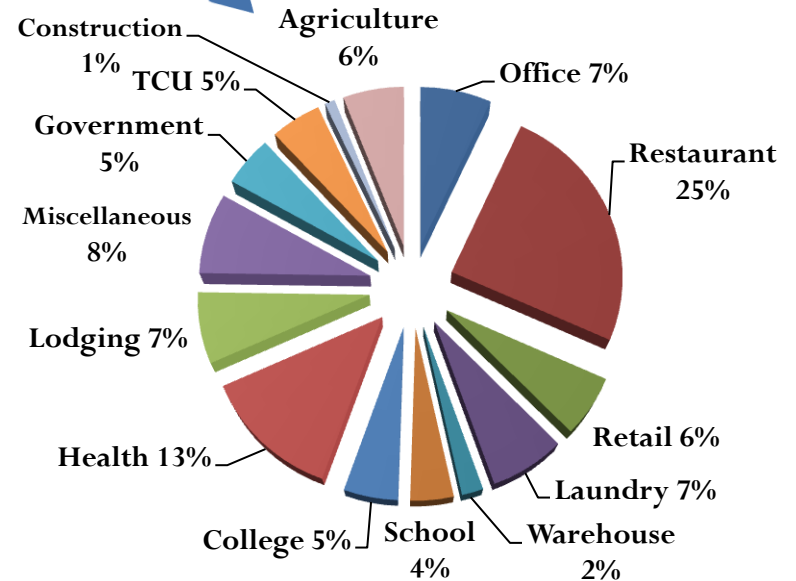
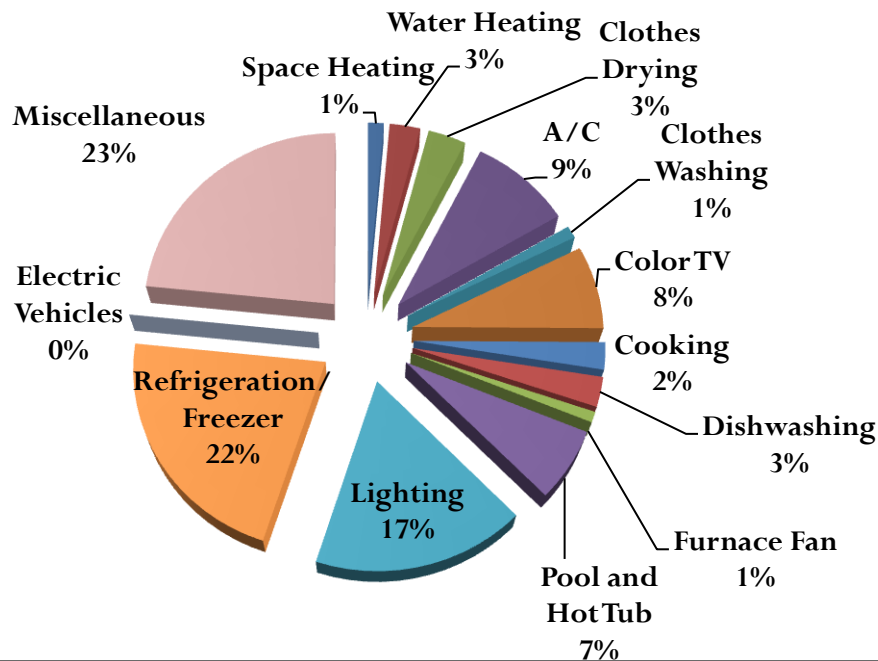
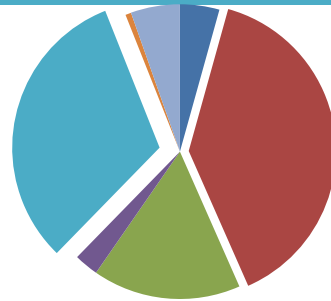
Energy Use



Electricity

Residential 32%

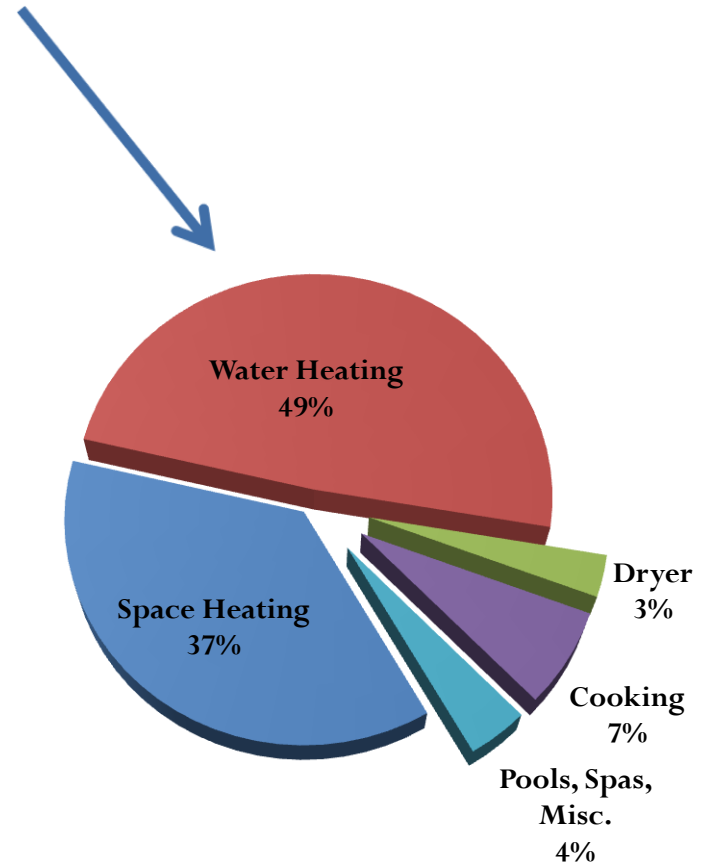
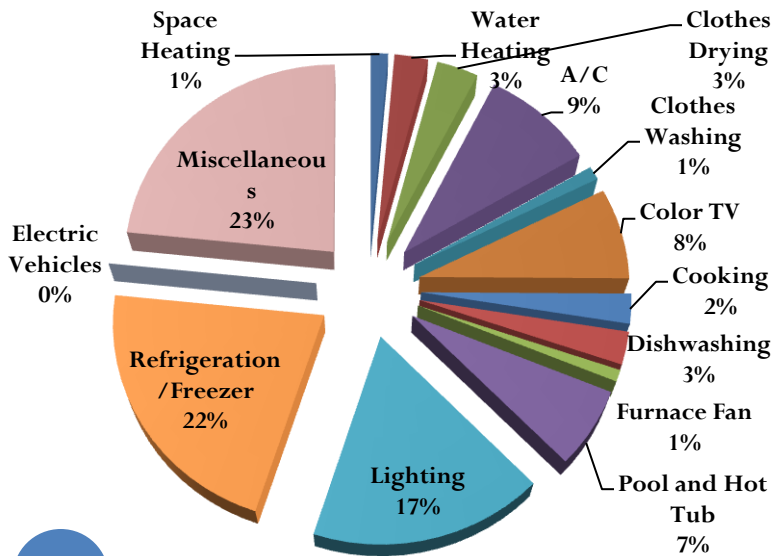
Commercial 39%



Natural Gas

Residential 45%

Commercial 19%



2012 AQMP Emissions

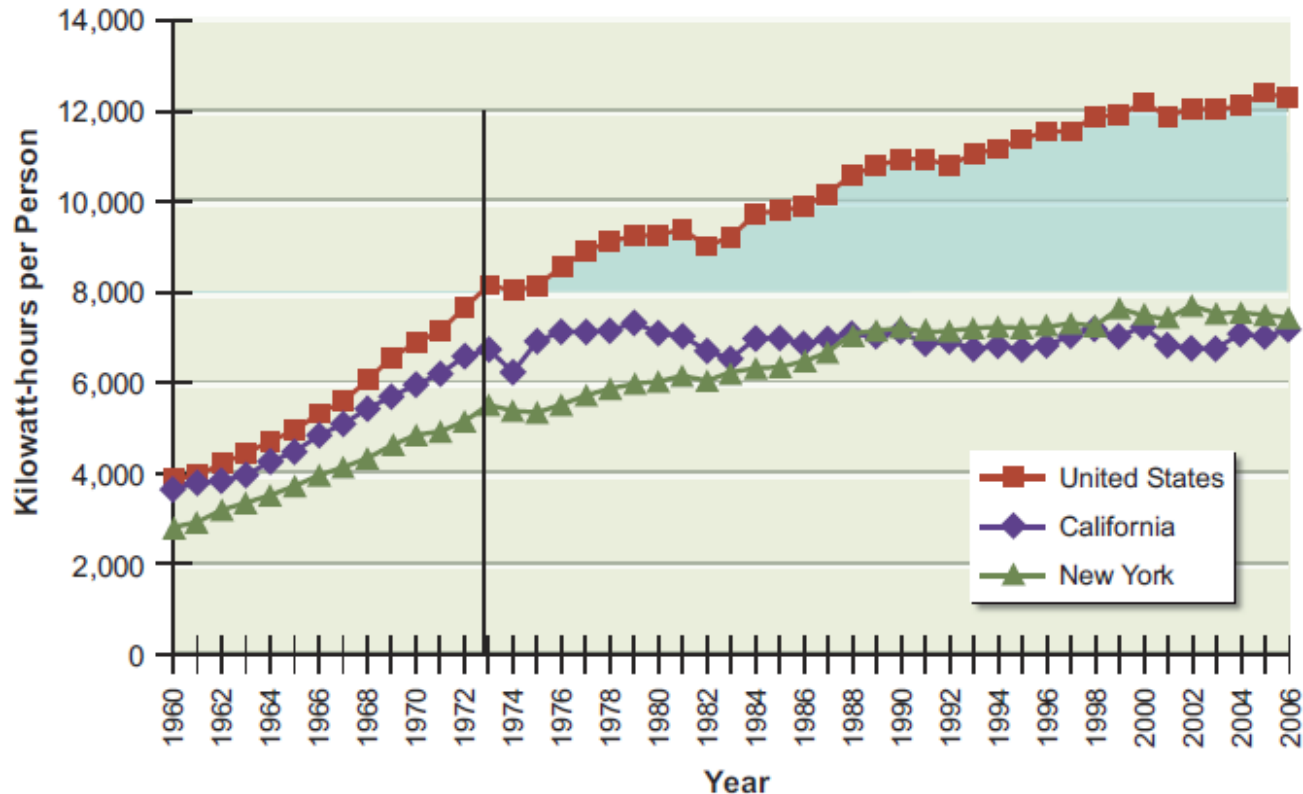
Direct Residential and Commercial Emissions

Year	2014	2023	2030	2014	2023	2030
	Residential			Commercial		
NOx (tpd) (% of inventory)	19.79 (3.9%)	15.58 (4.7%)	13.45 (4.6%)	9.53 (1.9%)	9.17 (2.8%)	9.60 (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 CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at 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
 * Side-Mounted Freezer
 * Through-the-Door-Ice-Service
 Capacity: 25.8 Cubic Feet

Estimated Yearly Operating Cost

\$62

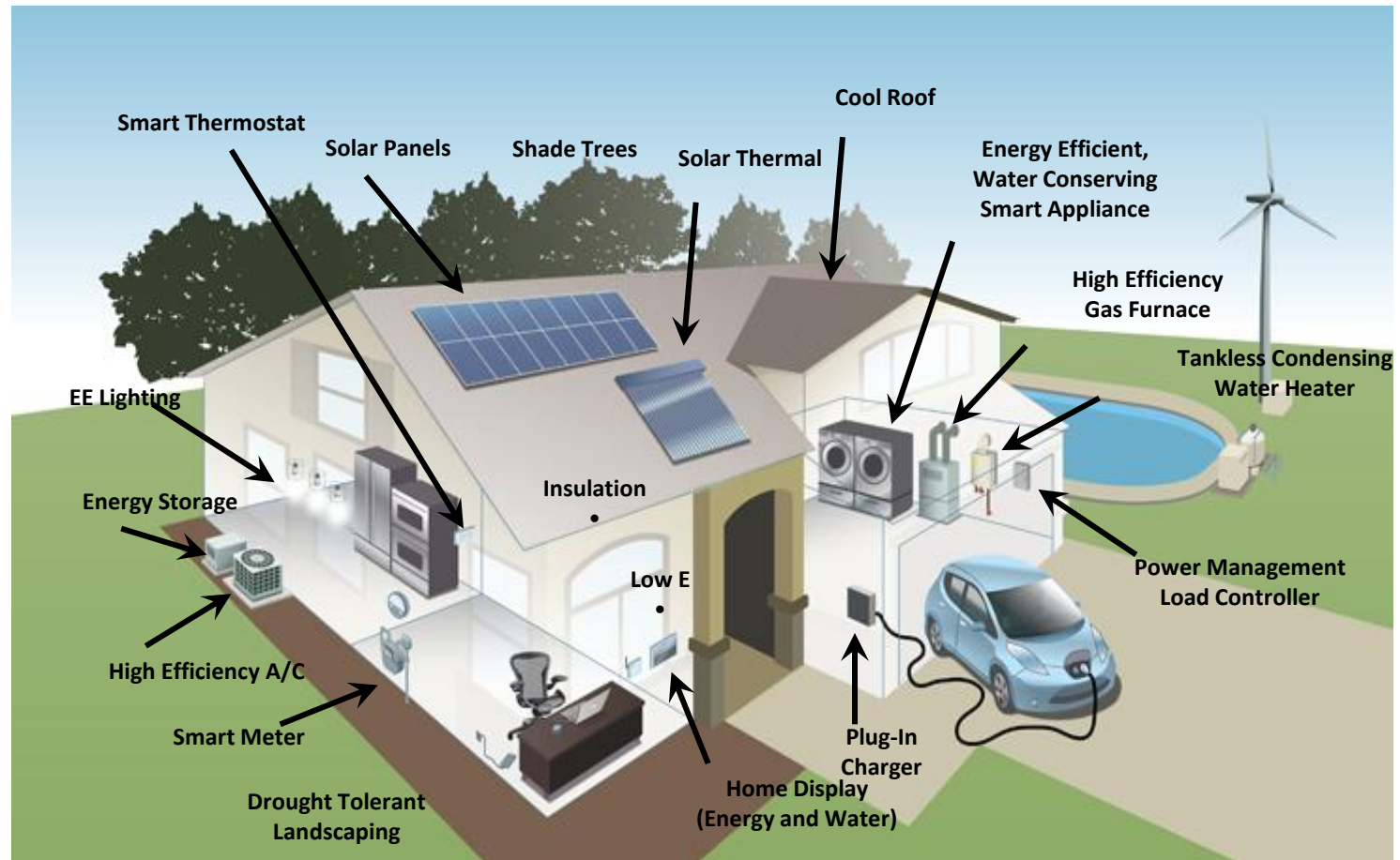
560 578
Cost Range of Similar Models

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.

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>		
2012 AQMP	19.8	15.6	13.4	9.5	9.2	9.6
Scenario 1 (25% by 2030)	-	13.6	10.1	-	8.0	7.2
Scenario 2 (50% by 2030)	-	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

- 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