This presentation premiered at WaterSmart Innovations

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Los Angeles Department of Water & Power

Water Conservation Potential Study: Part Deux

Jevon Lam

Supervisor of Water Conservation Policy

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Presentation Highlights

- Recap from last year
- Water Conservation Potential Study
- Results and Conclusions
- Lesson Learned
- Next Steps

Sources of Water for Los Angeles

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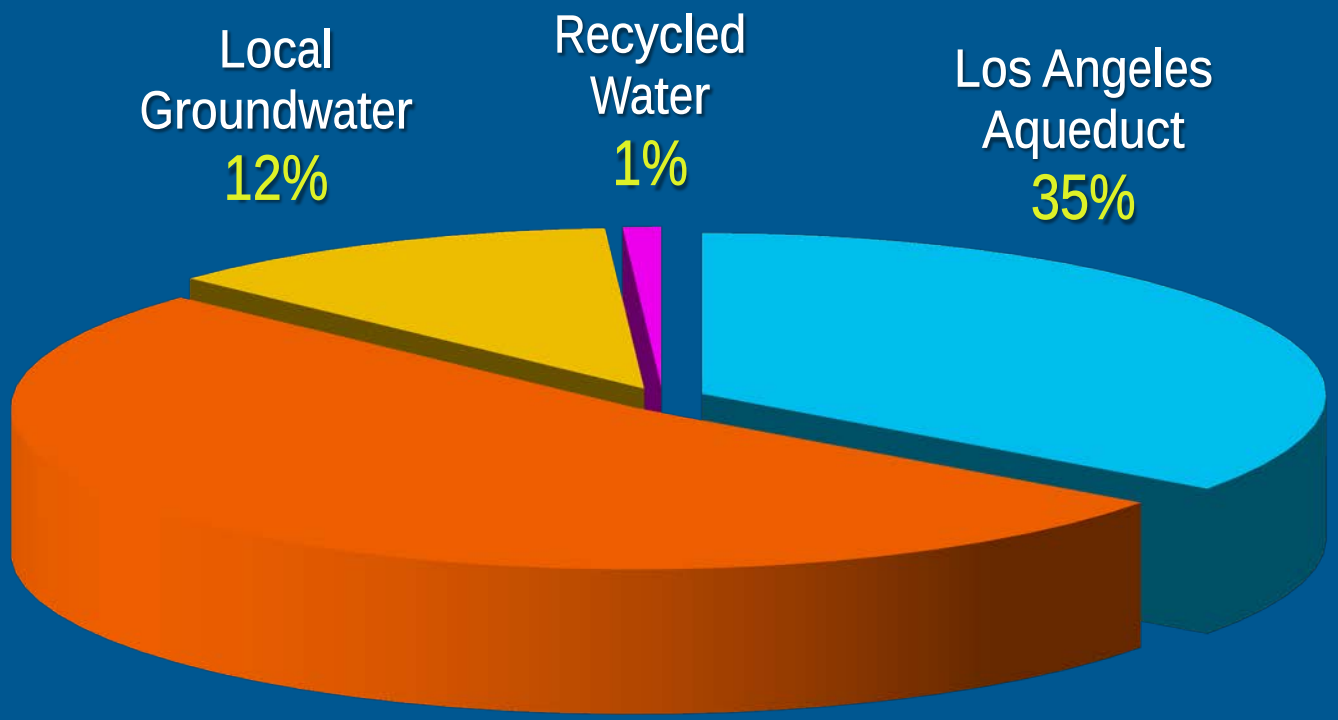
Los Angeles Water Supplies

Average Year



Over 85 percent of L.A.'s water supplies are imported

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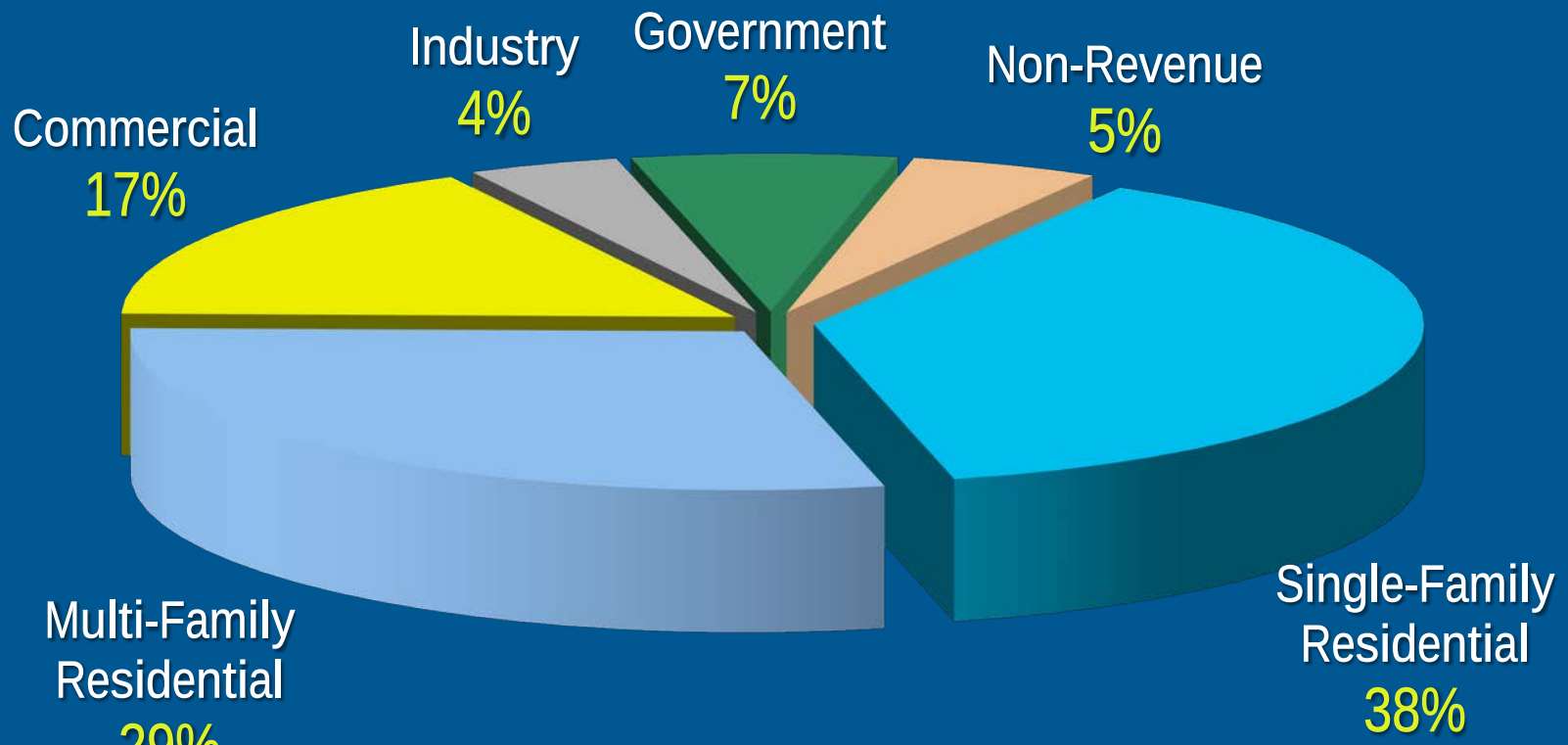
Los Angeles Water Demands

Average Year



Two-thirds of L.A.'s water supplies are used in the residential sector

L.A.'s non-revenue rate is among the lowest in the U.S. for large water agencies

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Water Conservation Since 1977

CONSERVE

- Local City Ordinances
- Commercial Programs
- Residential Programs
- Public Outreach & Education
- LADWP Partnerships

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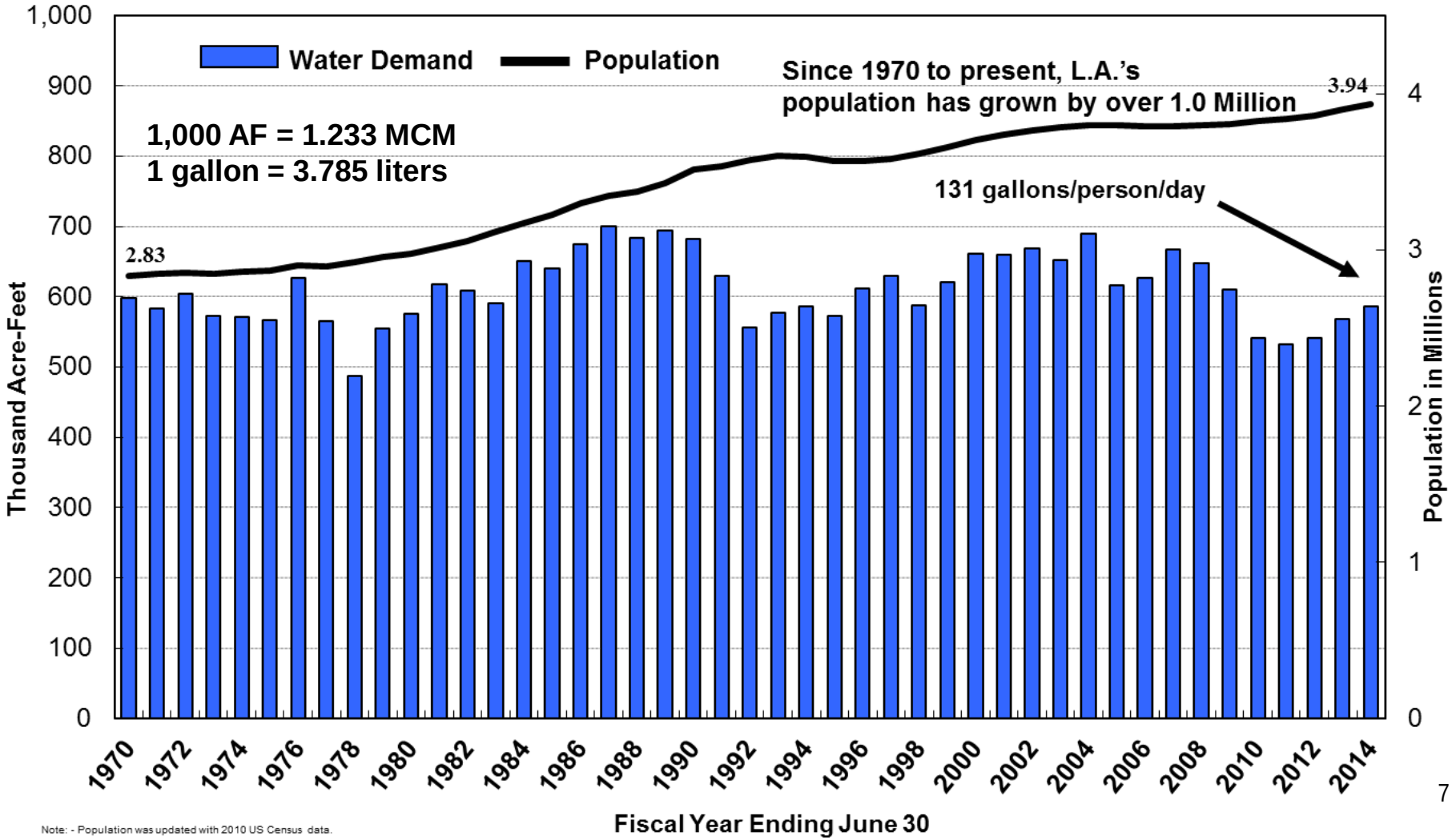
Long-Term Effect of Conservation on Water Demand

CITY OF LOS ANGELES WATER USE AND POPULATION



Note: - Population was updated with 2010 US Census data.

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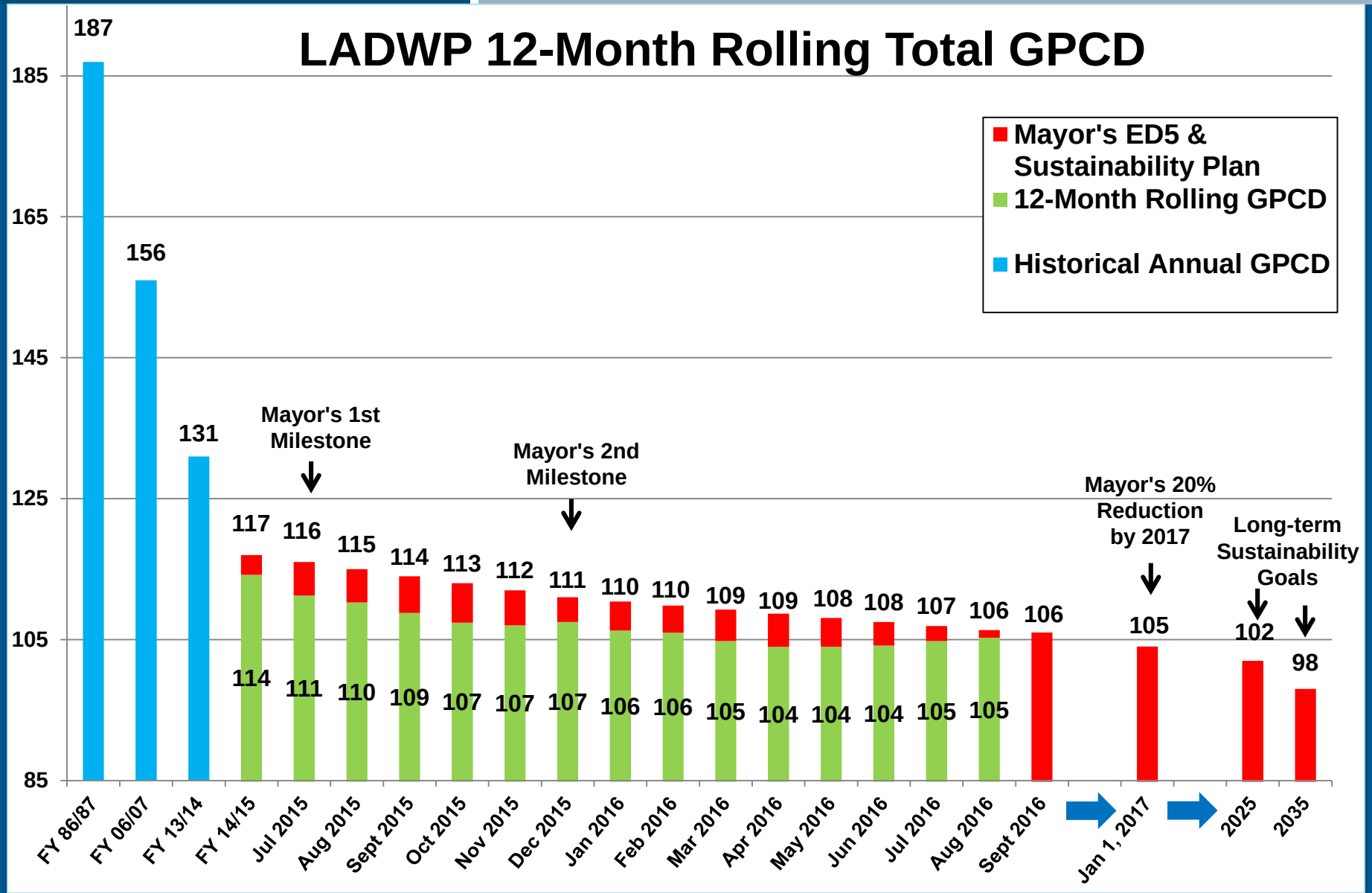
Aggressive Short and Long-Term Conservation Goals



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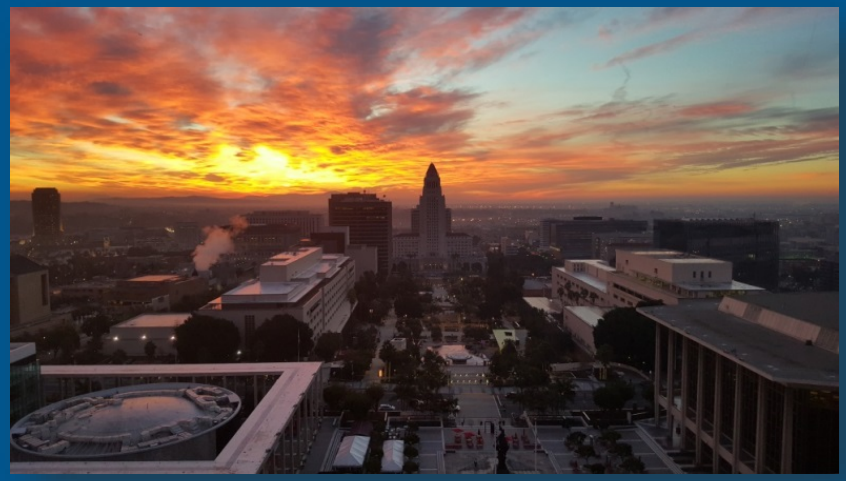
Potential Study Approach and Methodology

- Comprehensive study of water use in Los Angeles
- Conservation Potential of Each Customer Sector
  - Single Family
  - Multi-Family
  - Commercial & Industrial
  - Government
- **Data Capture from Surveys**
- **Review of Previous Studies**



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Single Family Residential Conservation Potential

- Largest customer group
  - ~450,000 accounts
- Data Collection Method:
  - 615 Phone Surveys
  - 72 On-Site Audits
- High Degree of Statistical Validity

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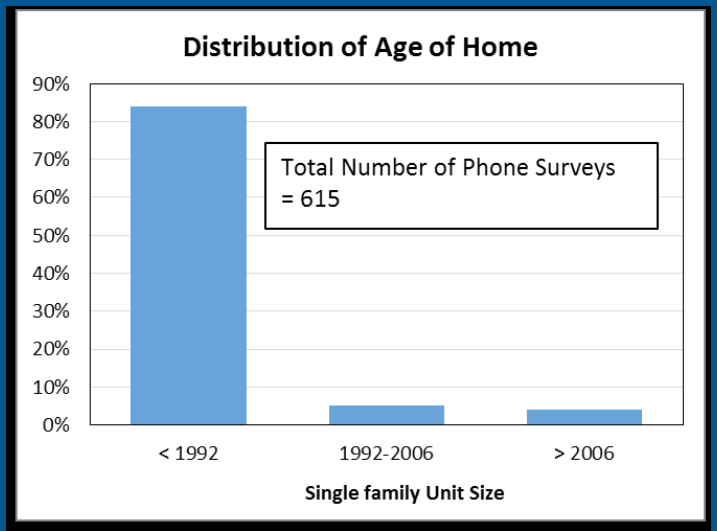
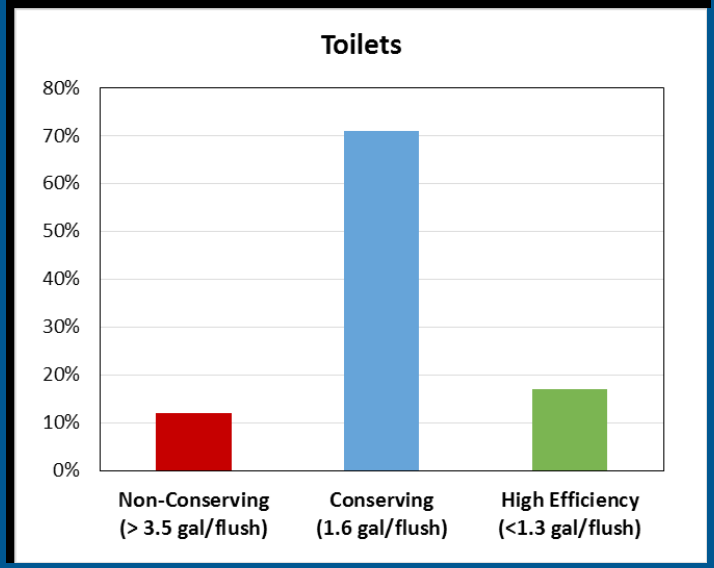
Results – Single Family Residential

- Vast Majority of Homes Built pre-1992
  - Pre-date Ordinance and Code Changes
  - Necessitated Large Scale Rebate Program
- Toilets Mostly Saturated
  - Massive Direct Install (ULFT) Program During 1990s
  - Vendor Direct Install (HET) During Last Decade





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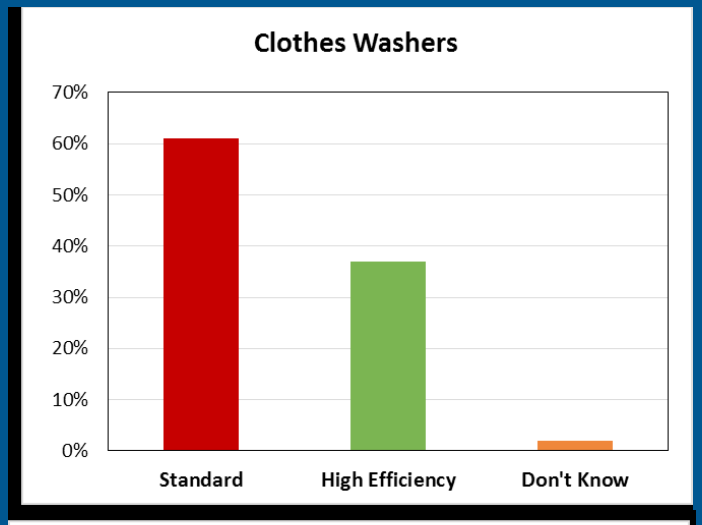
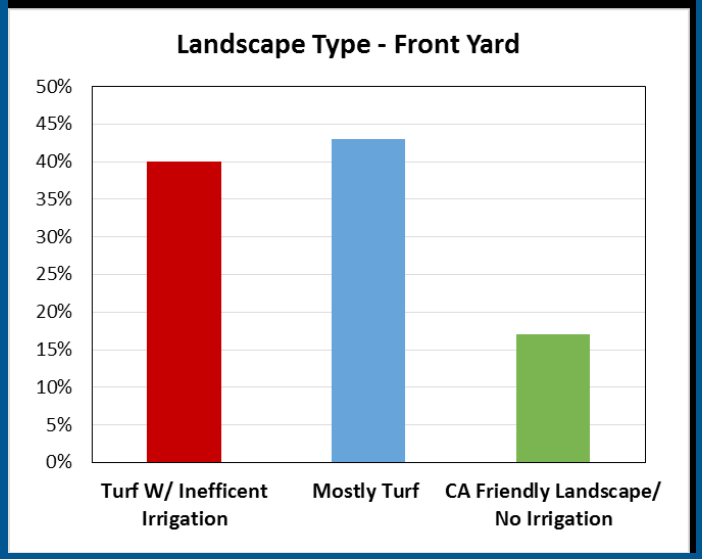
Results – Single Family Residential

- Potential for Clothes Washers
  - Rebate Program Started 10 Years Ago
  - Many Homes Still With Top Loader Style Washers
- Large Potential Outdoor Water Conservation
  - Large Turf Area in Sector
  - Few WBIC Devices
  - Mostly Inefficient Irrigation
  - CA Friendly only ~10%





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SF Results and Conclusions

- Discrepancies in Phone Surveys/In Person Audits
  - Turf/CA Friendly
  - Front Loader Washers
  - Auto Timer vs WBIC
- Logistical Difficulties
  - Scheduling Challenges
  - Very Time and Resource Intensive

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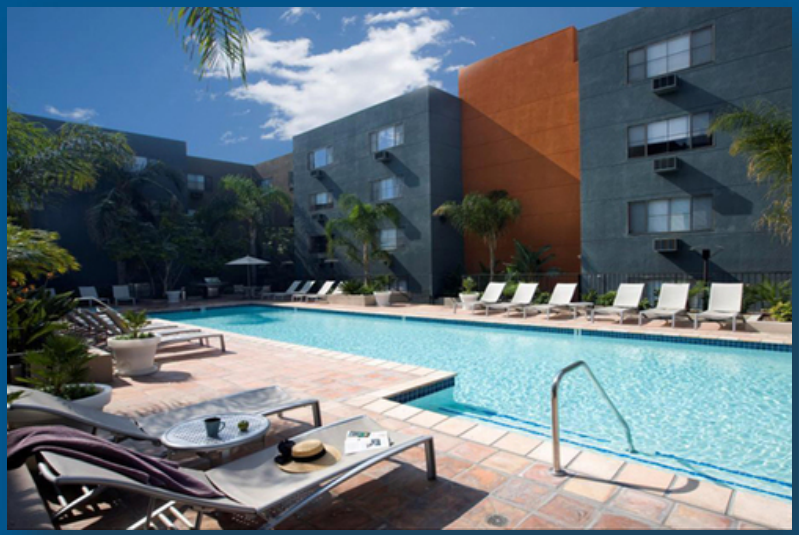
Multi Family Residential

- Data Collection Method:
  - Online Survey
  - Mailed Letter to All Multi-Family Accounts (~90,000 Accounts)
- Partnered with Apartment Association of Greater Los Angeles
- High Response Rate Exceeded Expectations



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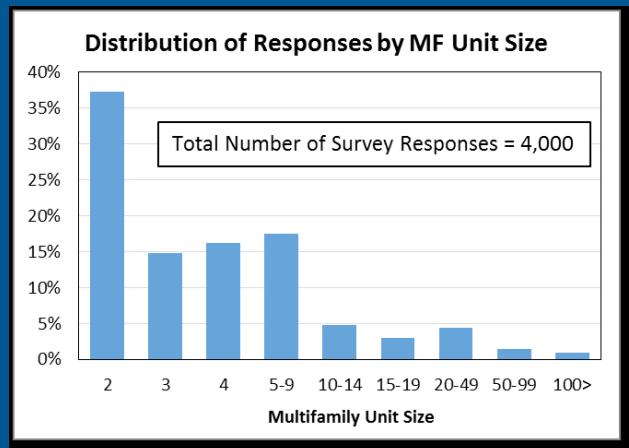
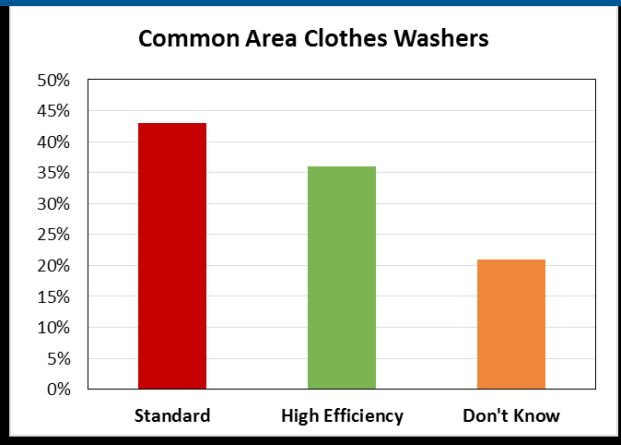
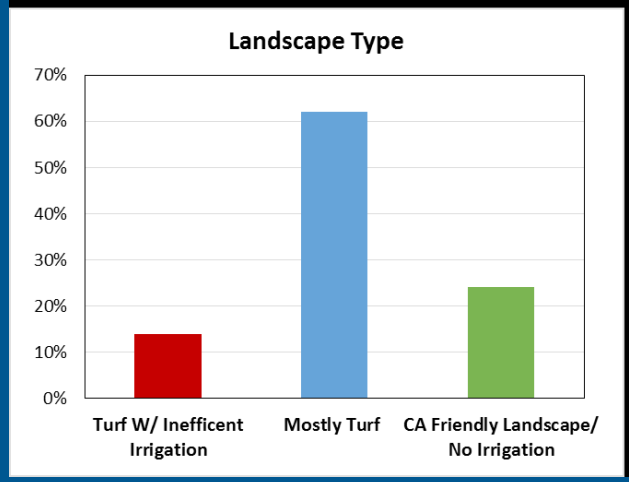
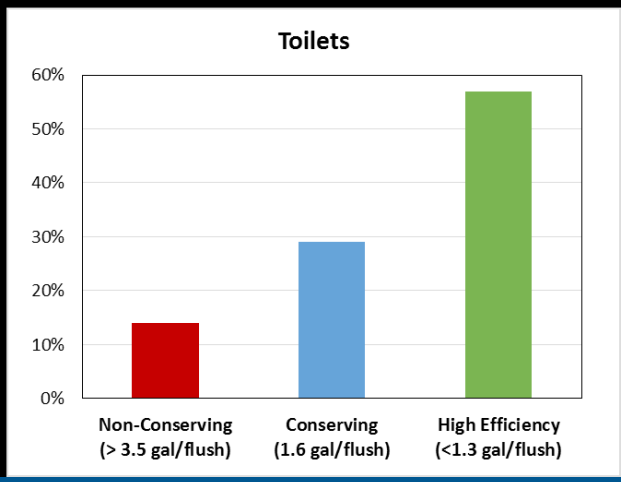
Results – Multi Family Residential

- Key Findings
  - Majority 4 Units or Less
  - High Potential Sector
- Owner Driven Efficiency
  - Residents don't Pay Water Bills
  - Easier to Target Common Areas









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MF Results and Conclusions

- High Potential for:
  - Clothes Washers
  - Outdoor Turf
- Diverse Sector Between Age and Size of Buildings
- Owners Very Engaged With Conservation
- Department Has Tailored Rebate Program for MF

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Commercial & Industrial Conservation Potential

- Most Diverse Dector
  - Schools
  - Hospitals
  - Restaurants
  - Office
  - Retail
  - Manufacturing
  - Petrochemicals
- Large Potential for Innovation and Emerging Technology

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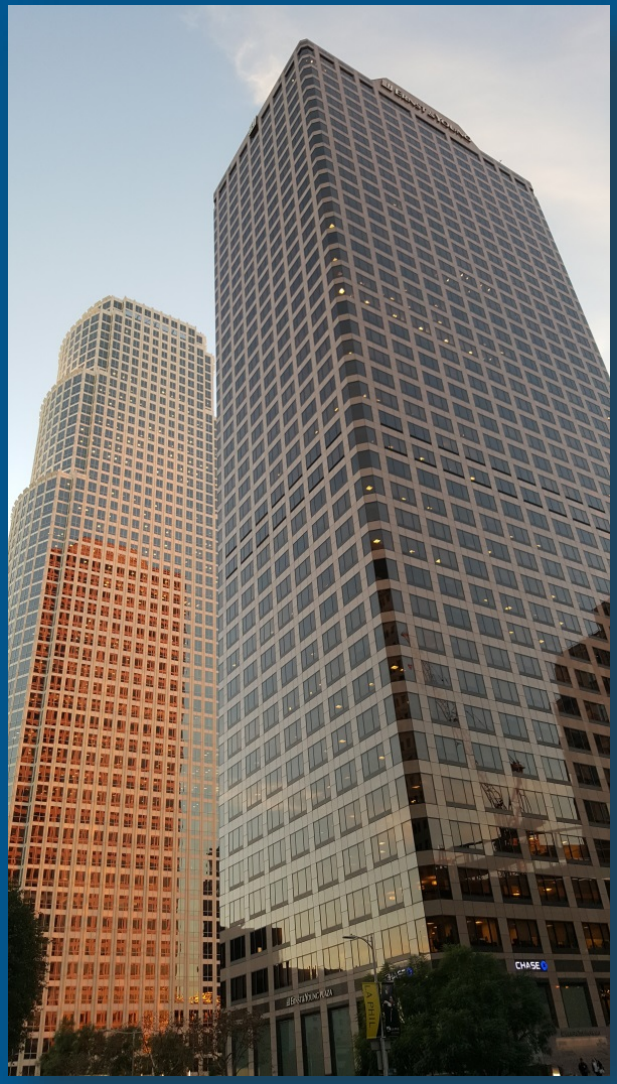
CII Study Challenges and Solutions

- Key Challenges
  - High Cost of Audits and Surveys
  - Difficulty Categorizing Sub Sectors
- Solutions
  - Utilizing MWD CII Study Data
  - Detailed Vendor Pilot Study into Hospital Water Use
  - Existing LAUSD Partnership
  - Consulting Industry Professionals



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Potential Next Steps for CII

- Strategic Survey/Data Gathering
  - Improve LADWP Database on NAICS Tracking
- Full Survey Costs May Outweigh Benefits
  - Comprehensive Study Infeasible
  - Hard to Penetrate Sector
  - Better to Focus on High Water Use Categories
- Full Study Results Pending

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LA City Facilities

- Large Sample Analyzed
  - 100 Facility Audits (~6000 Total Accounts)
- Targeting All Facility Types
  - Offices
  - Maintenance Yards
  - Parks & Golf Courses
  - Airports
  - Port of LA
  - Animal Shelters

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City Owned Facilities Results

- Shows Success in Prior Efficiency Programs
  - Toilets/Faucets Saturation
  - Many City Buildings Have CA Friendly Landscaping
- Potential for Landscaping Efficiency
  - Public Parks
  - Medians

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City Owned Facilities Conclusions

- End Use Categories
  - Better Calibrations
  - High Quality Data
- Challenges
  - Coordination Challenges
  - No Central City Data
- Helps Make City Efficient
  - Civic Leadership
  - Reduced Cost for Residents

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End Use Modeling

END USE	Presence	M1	M2	M3	M4	M5
Toilet	1.00	3.50	1.60	1.28	1.06	0.00

S1	S2	S3	S4	S5	Intensity	Description
0.115	0.710	0.150	0.025	0.000	15.75	flushes per day

Single-family

	END USE	I / O	GPD	Distribution	Presence	EFFICIENCY LEVELS OF END USE M1	M2	M3	M4	M5	Metric	DISTRIBUTION OF END USE BY EFFICIENCY LEVELS S1	S2	S3	S4	S5	Intensity	Description
1	Toilet	I	27.7	7.9%	1.00	3.50	1.60	1.28	1.06	0.00	flushes per day	0.115	0.710	0.150	0.025	0.000	15.75	flushes per day
2	Shower	I	34.1	9.8%	1.00	3.50	2.50	2.00	1.50	1.00	gallons per minute	0.07	0.31	0.32	0.24	0.06	16.36	minutes per day
3	Faucet	I	40.3	11.5%	1.00	2.20	1.50	1.00	0.50	0.38	gallons per minute	0.29	0.59	0.06	0.06	0.00	25.01	minutes per day
4	Bath	I	2.1	0.6%	0.90	45.00	30.00	20.00	10.00	1.00	gallons per bath	0.05	0.25	0.70	0.00	0.00	0.10	baths per day
5	Dishwasher	I	2.2	0.6%	0.60	8.00	5.80	5.00	4.00	2.00	gallons per cubic foot	0.46	0.31	0.18	0.03	0.02	0.56	cubic foot per day
6	Washing Machine	I	34.9	10.0%	0.90	12.00	9.00	6.00	3.70	2.60	gallons per cubic foot	0.38	0.31	0.26	0.04	0.01	4.26	cubic foot per day
7	Water Quality System	I	1.6	0.5%	**0.10**	50.00	30.00	20.00	10.00	0.00	% Discharge	0.25	0.50	0.25	0.00	0.00	0.50	day
8	Central Laundry Facility	I	0.0	0.0%	0.00	12.00	9.00	6.00	3.70	2.60	gallons per cubic foot	1.00	0.00	0.00	0.00	0.00	0.00	cubic foot per day
9	Cooling/Condensing	I	0.0	0.0%	0.00	1.20	2.50	4.50	6.50	25.00	cycles of concentration	1.00	0.00	0.00	0.00	0.00	0.00	sq. ft. cooled
10	Hot Tub/ Spa	O	0.4	0.1%	**0.10**	0.43	0.32	0.21	0.10	0.00	gallons per sq.ft. per day	0.00	0.13	0.13	0.25	0.50	40.00	sq.ft.
11	Other Indoor	I	17.4	5.0%	1.00	100.00	95.00	90.00	75.00	10.00	relative %	0.65	0.25	0.10	0.00	0.00	**0.178**	1
12	Landscape Irrigation	O	161.0	46.2%	0.82	0.099	0.081	0.055	0.043	0.00	gallons per sq.ft. per day	0.40	0.43	0.16	0.01	0.00	2350.00	sq.ft.
13	Swimming Pool	O	7.7	2.2%	0.20	0.105	0.080	0.050	0.020	0.00	gallons per sq.ft. per day	0.50	0.25	0.25	0.00	0.00	450.00	sq.ft.
14	Vehicle Washing	O	1.8	0.5%	0.30	140.00	35.00	10.00	5.00	0.00	gallons per vechicle	0.10	0.84	0.05	0.01	0.00	0.14	vehicles per day
15	Other Outdoor	O	17.4	5.0%	1.00	100.00	95.00	90.00	75.00	10.00	relative %	0.65	0.25	0.10	0.00	0.00	**0.178**	1
16			0.0	0.0%	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.0	
17			0.0	0.0%	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.0	
18			0.0	0.0%	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.0	
19			0.0	0.0%	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	0.00	0.00	0.00	0.0	

Total	**348.6**	100.0%	Target	348.6	residual
Indoor	160.35	46.0%	indoor	160.3	0.0
Outdoor	188.23	54.0%	outdoor	188.2	0.0

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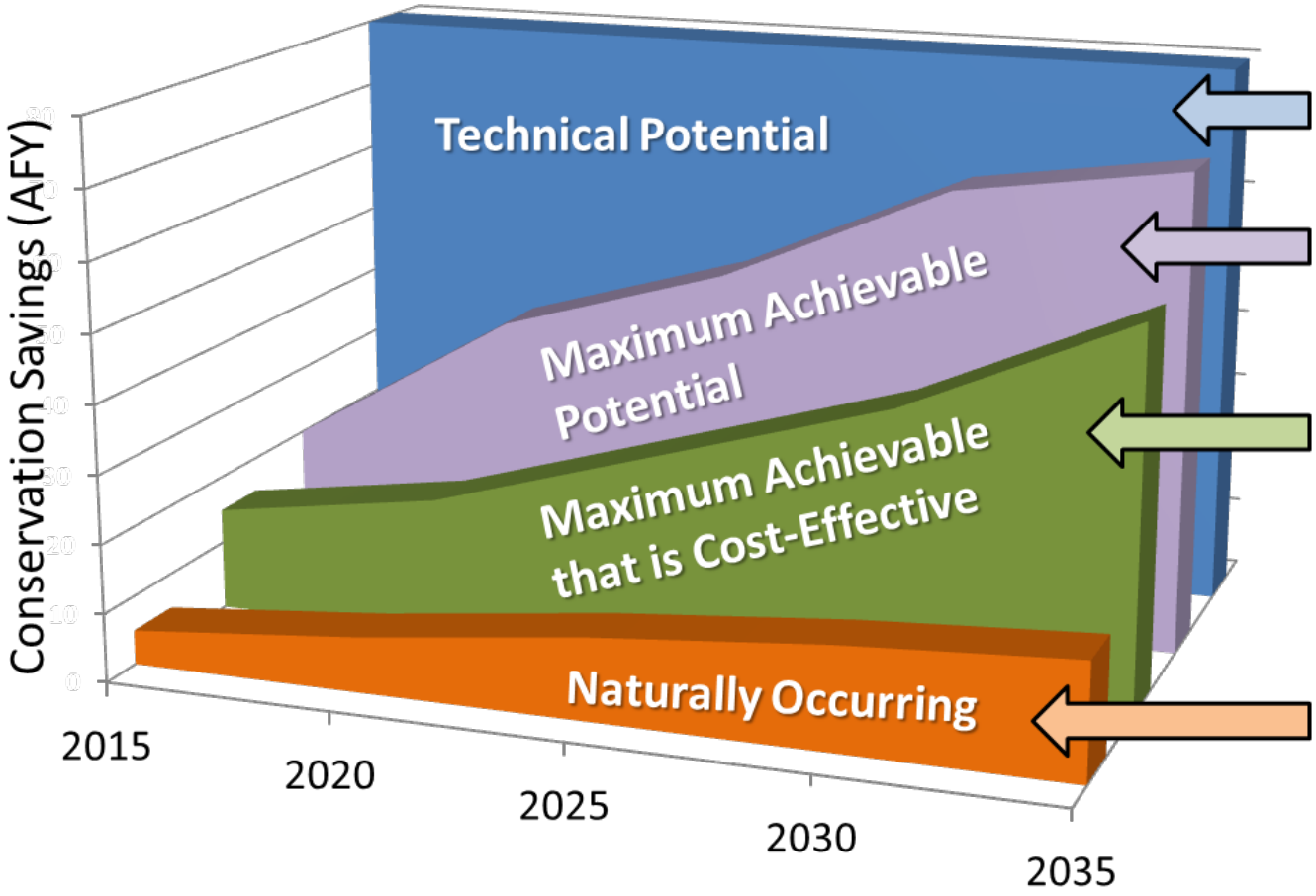
Water Conservation Potential Model



No consideration of cost, implementation effort, or customer acceptance

Considers what is needed for maximum penetration, but does not consider cost-effectiveness

Represents that which is cost-effective and achievable with full implementation, and considers customer acceptance

Achieved by natural market forces, state ordinances and codes, and LADWP influenced ordinances and codes

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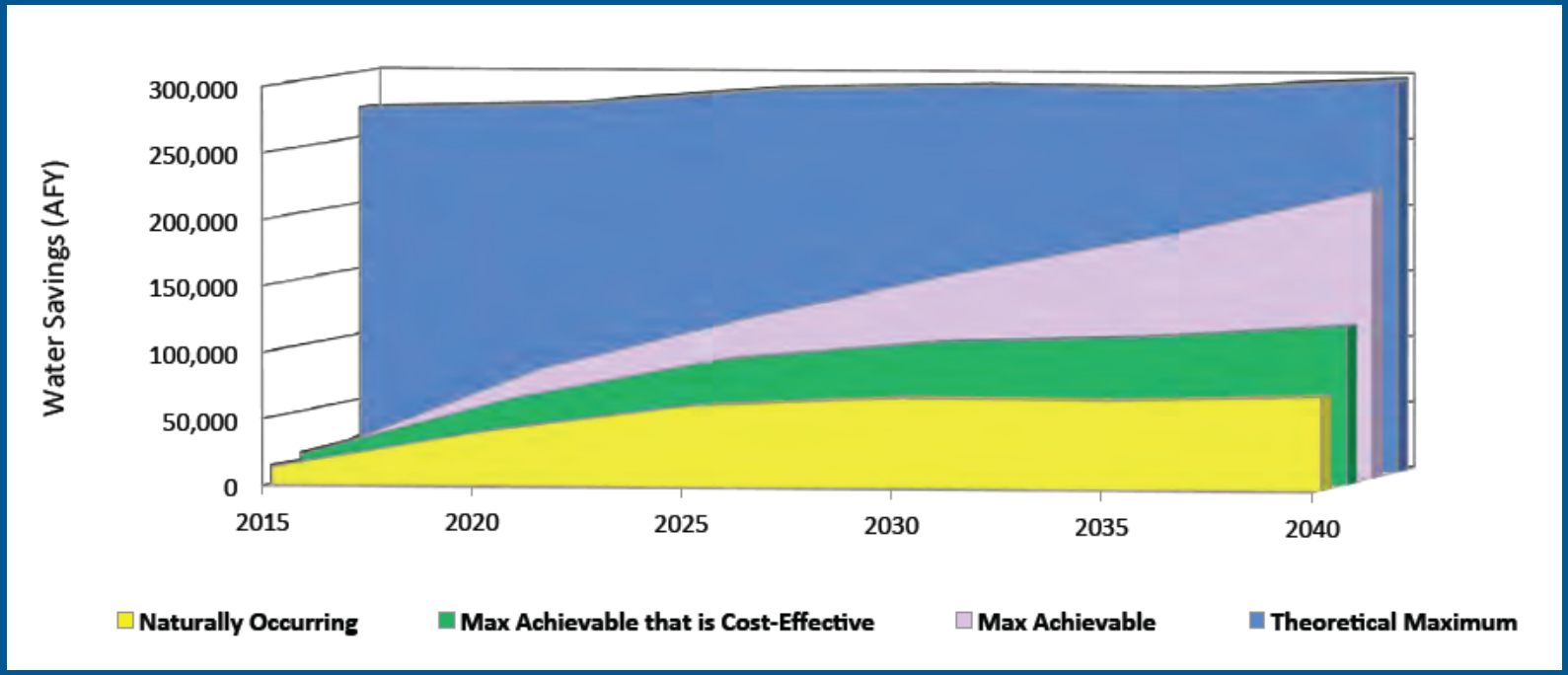
Graph: Results

- Graph Charts:
  - Shows Sectors Vs Time
  - Shows not on track (Based on current investment)
- Active Vs Passive
  - Illustrates Small Share of Active Conservation



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Lessons Learned & Conclusions

- Needed Flexibility
  - Difficult Changing Direction
  - Drought Response Delays
- Requires Full Time PM
  - Massive Project Demanding Full Attention
- Preparation Preparation Preparation
  - Hindsight is 20-20

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Conclusions Cont..

- Project Provides Huge Value
  - Invaluable Data gathering
  - Model Tool Gives Reliable Projections
- Provides Basis for Further Work
  - Much Low Hanging Fruit Gone
  - Helps Focus on Areas of Best ROI
- Later Studies Will be Better
  - Experience Brings Wisdom
  - Better Data Starting Points

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Study Completion and Next Steps

- Analysis Between Conservation Potential and Long-Term Goals
- Long-term Conservation Plan
  - Program Spending
  - Outreach Strategy
  - Potential New Programs

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New Normal – Vision for future Los Angeles Landscaping