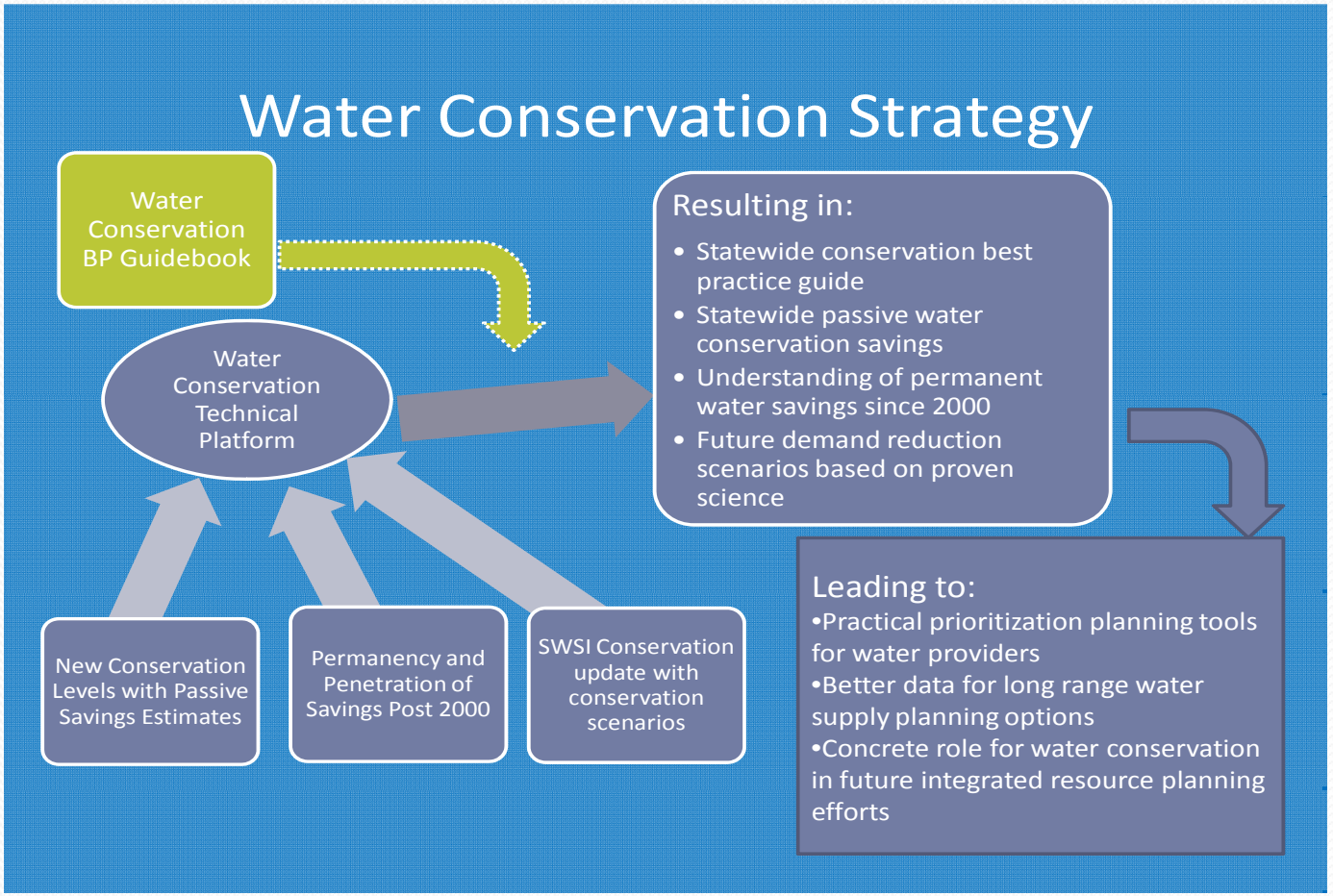
CWCB Water Conservation Strategy

Office of Water Conservation and Drought Planning

Initial Questions

- What amounts of water can M&I conservation provide to meet our 2050 water needs?
  - How much water savings can be expected?
  - How much can be counted on as permanent?
  - When will these savings occur during the planning period?
  - How does water conservation integrate into overall water resource planning?
- What is the best array of conservation measures to achieve these demand reductions?

Water Conservation Strategy



Water Conservation Levels Analysis and Passive Savings

Purpose of Levels Analysis

- To reassess the water conservation levels created in SWSI 1
- To assess present state of water conservation in Colorado
- Determine the amount of passive water Conservation savings possible through 2050

Passive Savings Analyses

- Update Passive Savings Using
  - New Regulations that Will Impact Market
  - Colorado Housing Stock Information
  - New Data on Fixture/Appliance Replacement Rates
  - New Technologies
    - Toilets
    - Clothes Washers
    - Dishwashers

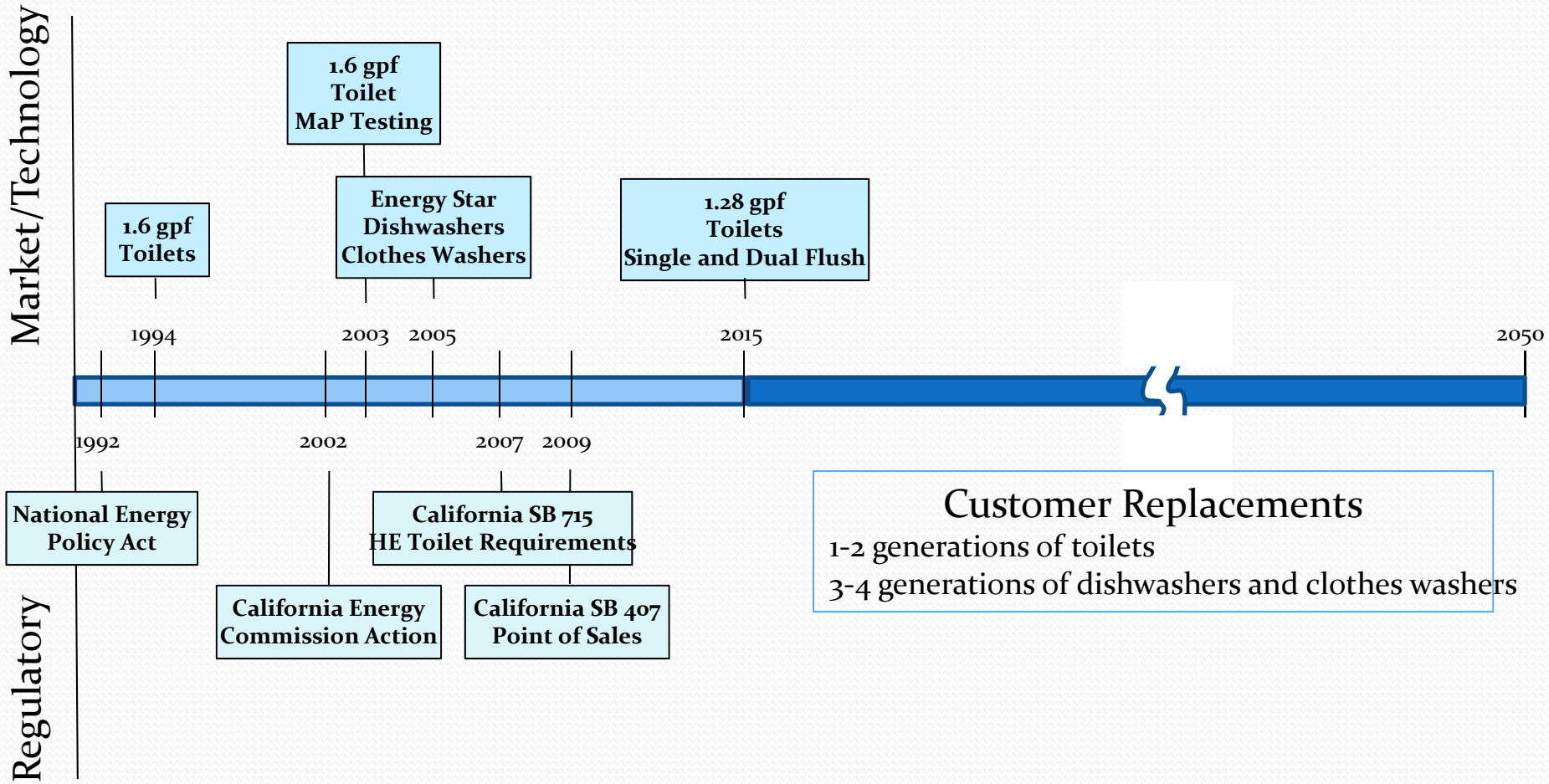
Regulations Influencing Passive Savings

- Savings Related to Impact of Federal, State and Local Statutes and Ordinances
  - 1992 National Energy Policy Act
    (effective 1994/96)
  - 2002 California Energy Commission
    (effective 2007)
  - 2009 California Point of Sale Requirements
    (effective 2014)
- New and Old Construction

Limitations

- Passive Savings Does Not Account Directly for:
  - Impact of tourist use (gpcd is for residents only)
  - Impact of new automatic sprinkler systems installed in existing homes
  - Future technical improvements in lower flow faucets, shower heads, etc.
  - Ordinances for New Construction
    - 2020 20% of All Homes New
    - 2030 42% of All Homes New
    - 2050 80% of All Homes New

Passive Savings Timeline



Customer Replacements

1-2 generations of toilets

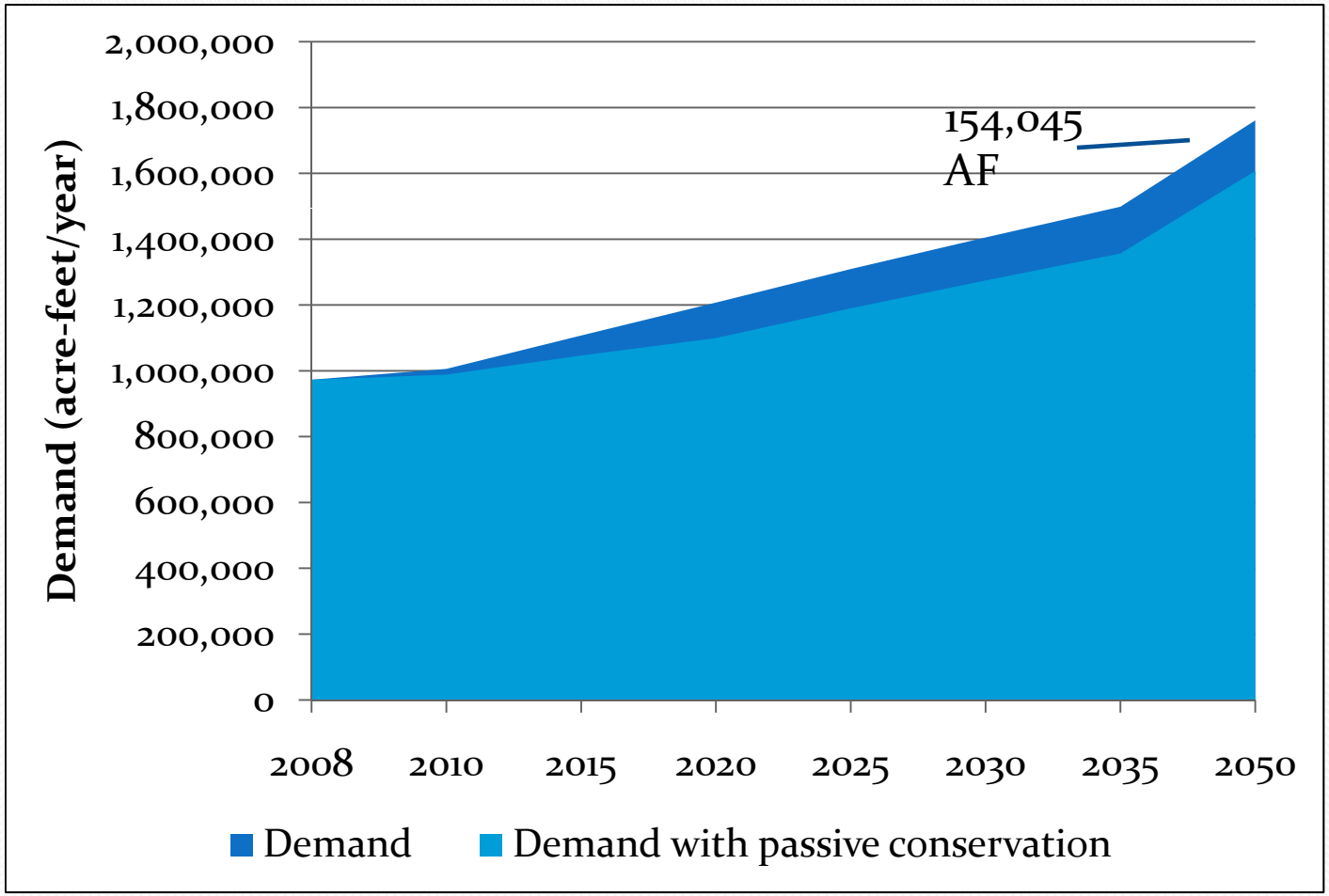
3-4 generations of dishwashers and clothes washers

[1] Statewide totals have been rounded to three significant digits.

Summary of AF Passive Savings

Acre Feet Savings for Period 2008 to 2050		
	Minimum	**Maximum**
Arkansas	19,000	28,400
Colorado	6,600	10,000
Dolores/San Juan	2,200	3,300
Gunnison	2,250	3,400
North Platte	30	40
Rio Grande	950	1,400
South Platte	76,000	106,000
Yampa/White	950	1,450
Statewide	102,500	154,000

Effect of Passive Conservation on Future M&I Demand



Best Practices Guidebook for Municipal Water Conservation in Colorado

What Are Best Practices?

- BPs (AKA Best Management Practices)are water planning , management, and efficiency measures and policies designed to deliver proven water savings and improved water management.

Purpose of Best Practice Guidebook

- A planning tool for improving and enhancing water efficiency in Colorado

- Provides detailed description of specific water conservation measures, program elements, regulations, policies, and procedures that can be implemented by Colorado water providers

Four Categories of BPs

- Water System and Utility Best Practices
- Outdoor Landscape and Irrigation Best Practices
- Indoor Residential (single-family and multi-family) Best Practices
- Indoor Non-Residential Best Practices

Attributes of BPs

- **Foundational** - essential for all utilities
- **Informational** – educate to foster conservation actions
- **Support** –technical information, data, and assistance
- **Management** - improved utility management procedures
- **Understanding** - improve knowledge and awareness
- **Operational** - conservation in everyday utility functions

Best Practice Guidebook

Measure	Best Practice	Category or Sector Impacted
Full metering	BP 1	ALL
Conservation oriented rates	BP 1	ALL
Conservation oriented tap fees	BP 1	ALL
Integrated resource planning, goal setting and monitoring	BP 2	Utility
Water loss control	BP 3	Utility
Conservation coordinator	BP 4	ALL
Water waste ordinance	BP 5	ALL
Public information and education	BP 6	ALL

Best Practice Guidebook

Measure	Best Practice	Category or Sector Impacted
Landscape water budgets	BP 7	Outdoor irrigation
Rules and regulations for landscape design and installation	BP 8	Outdoor irrigation
Certification of landscape professionals	BP 8	Outdoor irrigation
Water efficient design, installation and maintenance practices for new and existing landscapes	BP 9	Outdoor irrigation
Irrigation efficiency evaluations	BP 10	Outdoor irrigation

Best Practice Guidebook

Measure	Best Practice	Category or Sector Impacted
Rules for new construction (residential and non-residential)	BP 11	ALL
High efficiency fixtures and appliances-Residential	BP 12	Residential
High efficiency fixtures and appliances-Non Residential	BP 12	CII
Residential water surveys and evaluations, targeted at high demand customers	BP 13	Residential
Specialized non-residential surveys, audits, and equipment efficiency improvements	BP 14	CII

Best Practice Guidebook Outreach

- Finish review and finalize guidebook
- Graphical design and creation of summary guide
- Three stakeholder workshops
  - Glenwood Springs, Aug. 26
  - Pueblo, Sept. 30
  - Westminster, Oct. 21
- Publication and distribution of Guidebook and Summary

2010 SWSI Update

Water Conservation Section

Project Goal

To update the conservation section of the Statewide Water Supply Initiative (SWSI) report for 2010.

Project Focus

1. Update info on current state of water conservation in Colorado
2. Determine conservation savings estimates and penetration rate analysis
3. Develop alternative water conservation strategies using savings estimates from Best Practice guide and passive savings analysis

Inputs

- Recent “conservation levels” and passive savings analysis by Great Western Institute
- Approved and pending conservation plans
- Current demand levels from *2050 Demands Report*
- WaterSense specification
- 2010 Colorado Legislation
- National plumbing codes

Update Conservation Savings Estimates and Penetration Rate Analysis from SWSI 2.

- Review, update, and improve SWSI 2 conservation analysis
- Prepare revised conservation savings potential
- Use CWW Best Practices Guidebook as framework

Comparison of SWSI Forecasts

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Project	Level	2030 Projections			2050 Projections		
		Baseline Demand (AF)	Volume Savings (AF)	% Savings	Baseline Demand (AF)	Volume Savings (AF)	% Savings
SWSI 1	Level 1 (Passive)	1,926,798	101,900	5%	NA		
	Level 2		170,533	9%	NA		
	Level 3		272,852	14%	NA		
	Level 4		443,385	23%	NA		
	Level 5		699,183	36%	NA		
SWSI 2	Low	1,925,000	287,000	15%	NA		
	Mid		372,000	19%	NA		
	High		459,000	24%	NA		
2010 SWSI	Low	1,275,050	47,202	4%	1,607,564	157, 381	10%
	Medium		138,572	11%		340,116	21%
	High		229,275	18%		521,522	32%

Develop Water Conservation Strategies

- ID current M&I savings
- Assess current conservation level and 2050 potential
- Prepare conservation savings strategies
- Prepare M&I conservation strategy conclusions

Three 2050 Demand Scenarios

- Low, Medium, and High level of conservation
- Clear explanation of conservation measures that reduce demands from 2008 to 2050
- Discussion of inherent uncertainty in demand forecasting
- Methodological transparency (enabling quick updates when new information becomes available such as penetration rate data)

Low Water Saving Strategy
Passive and Active Savings at 2050

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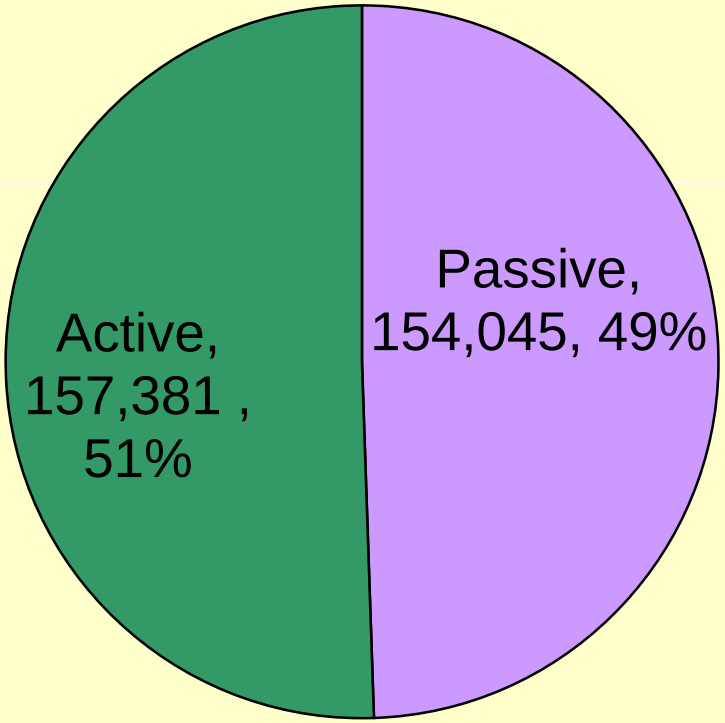

Medium Water Saving Strategy
Passive and Active Savings at 2050

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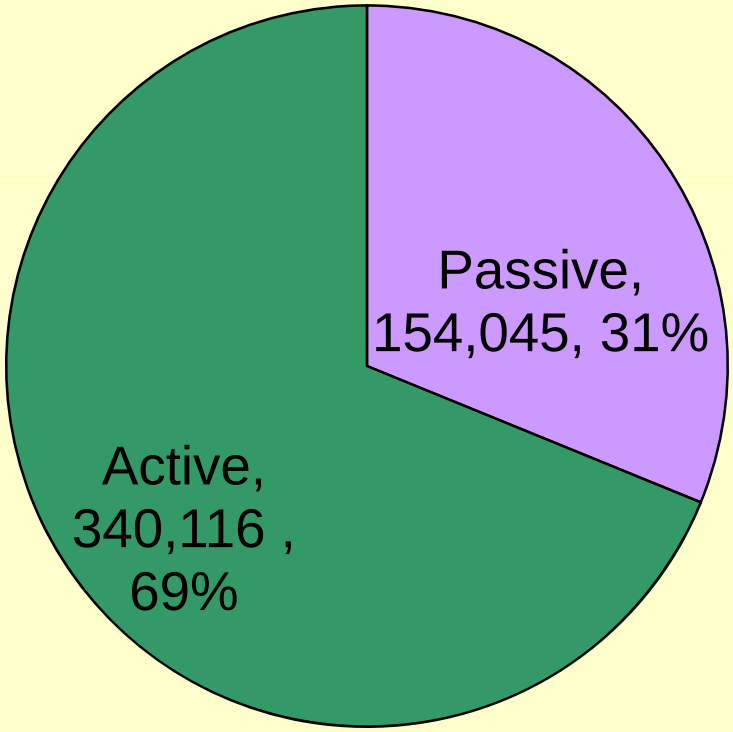
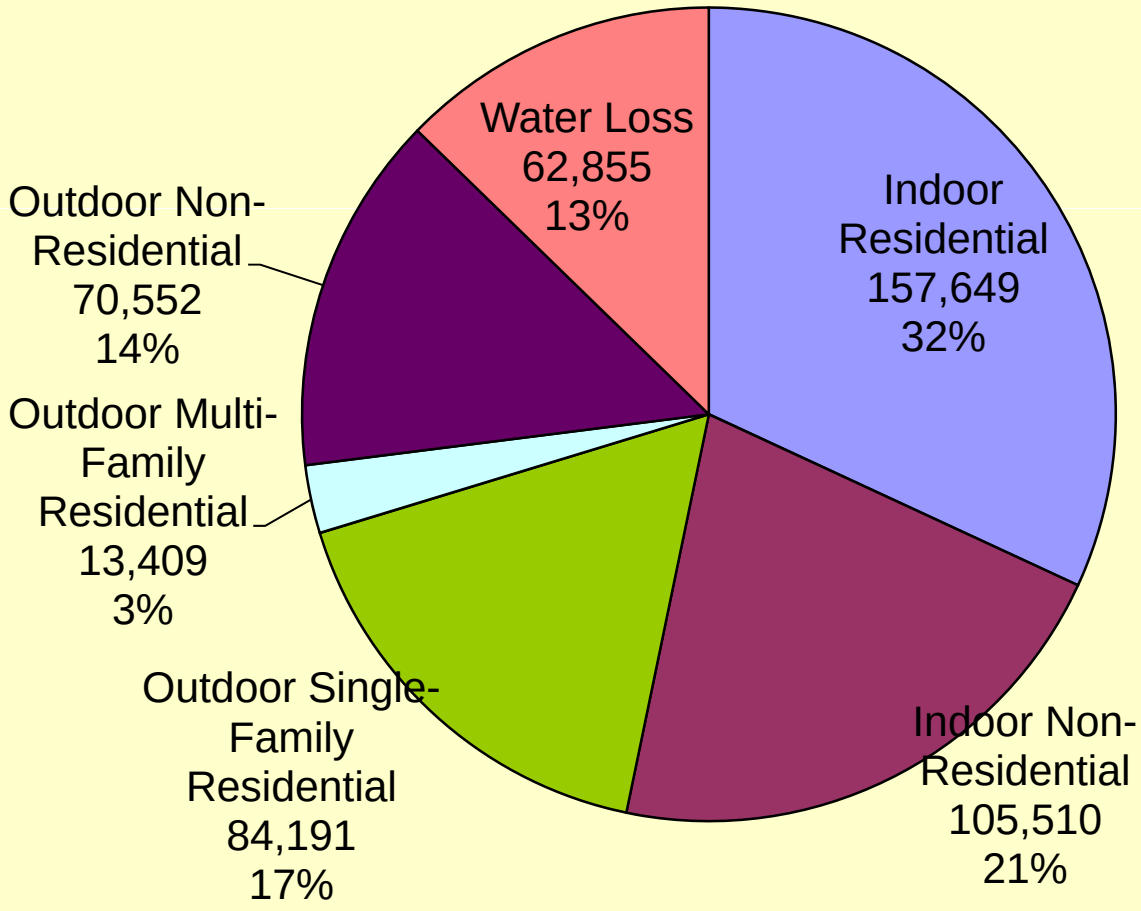


Medium Water Saving Strategy



High Water Saving Strategy
Passive and Active Savings at 2050

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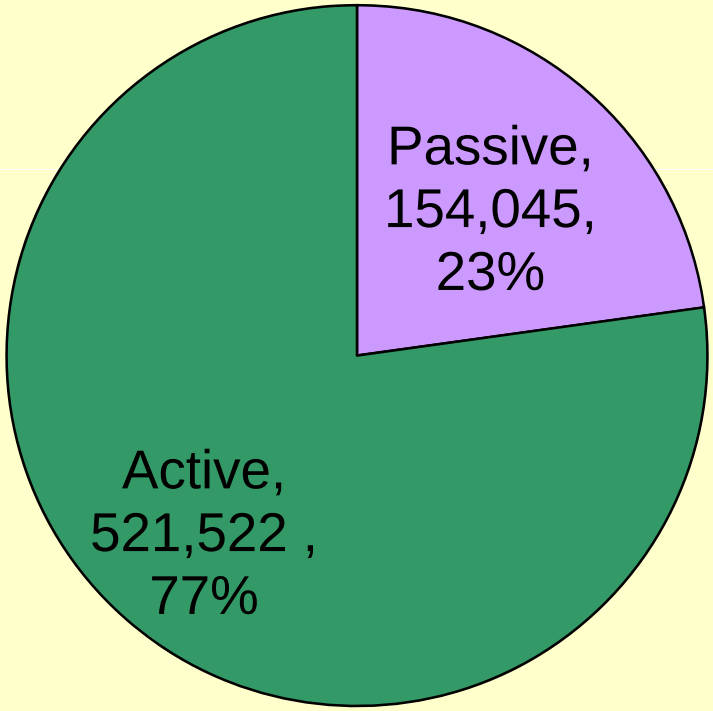
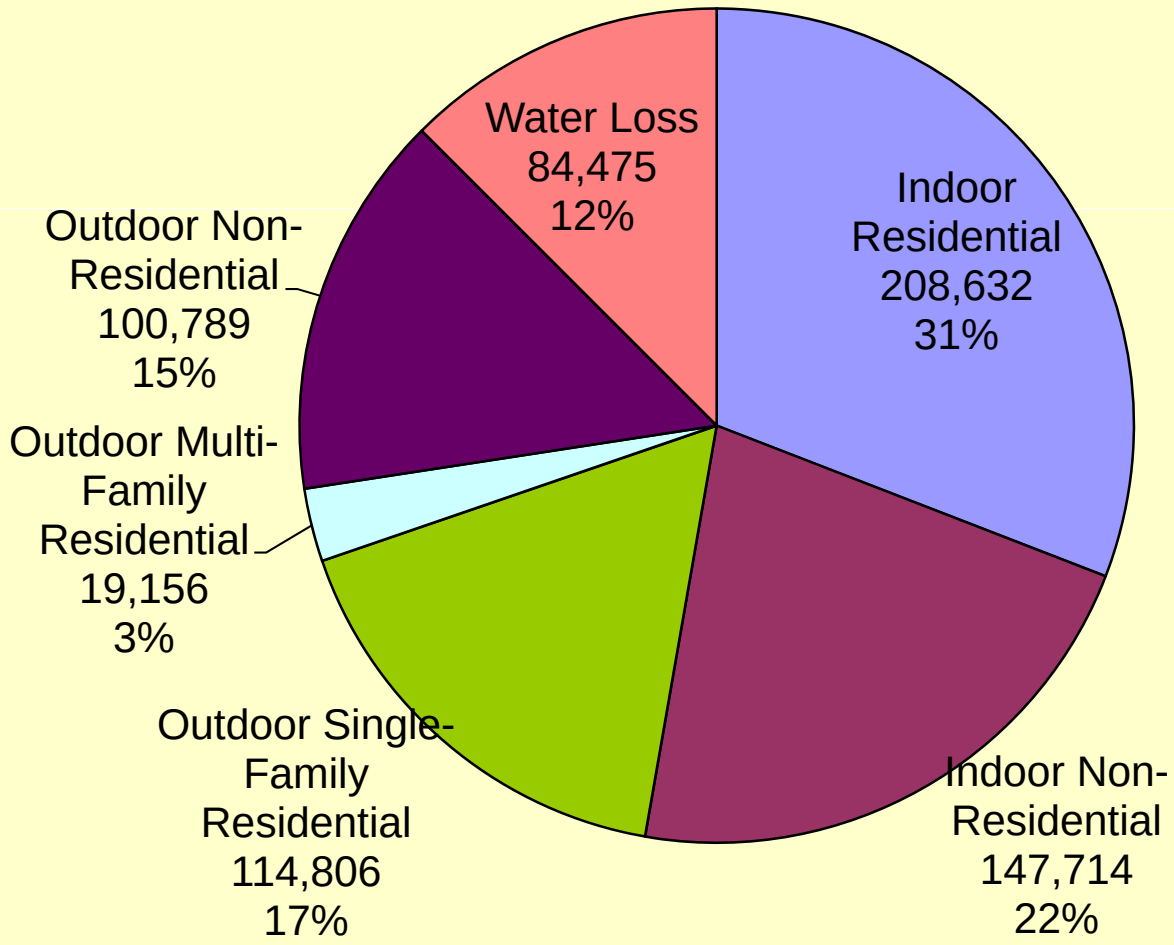


High Water Saving Strategy

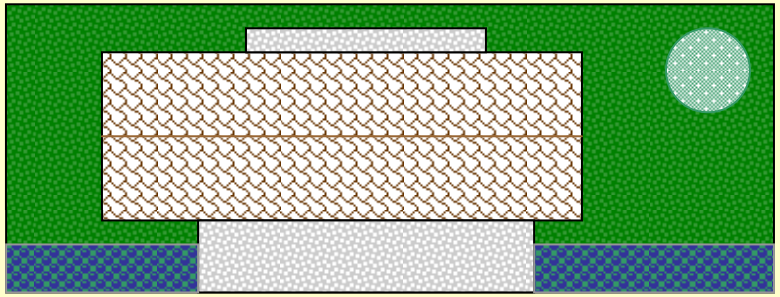


Landscape Demand Reduction Examples

- Residential reductions:
  - 15% - low
  - 22% - medium
  - 30% - high
- Non-Residential reductions:
  - 15% - low
  - 30% - medium
  - 40% - high
- Many ways to accomplish savings (increased efficiency, alternative plantings, hardscape)

Residential Property – Traditional Landscape

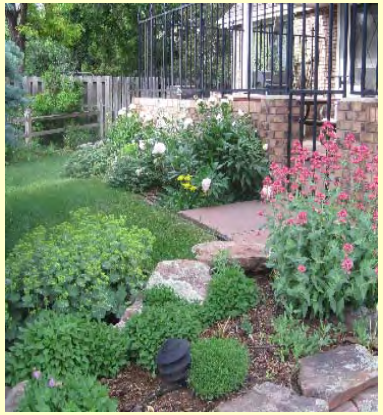
Baseline



	Area	Gal/SF	Gal/Yr
Non-irrigated	5,000	0	0
Turf	3,500	24	84,068
Trees and Shrubs	500	8.1	4,033
Traditional Planting	1,000	12.2	12,228
WaterWise	0	3.9	0
Total	10,000	20.1	100,330

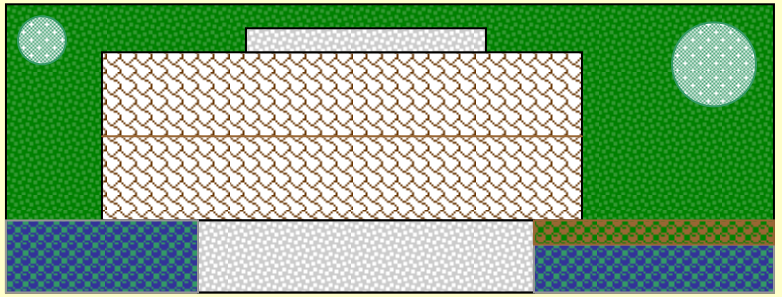
Source: EPA WaterSense Water Budget Water Calculator

Turf = Bluegrass
Planting = Traditional
Irrigation = Spray w/ good efficiency
Turf to Planting Ratio = 1.0:0.43



Residential Property – Low Savings Strategy

15% Reduction



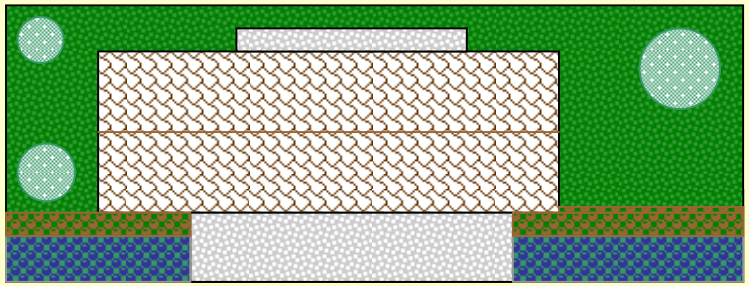
	Area	Gal/SF	Gal/Yr
Non-irrigated	5,000	0	0
Turf	2,700	24.0	64,853
Trees and Shrubs	700	8.1	8,560
Traditional Planting	1,300	12.2	10,487
WaterWise	300	3.9	1,171
Total	10,000	17.0	85,071

Source: EPA WaterSense Water Budget Water Calculator

Turf = Bluegrass
Planting = Mixed
Irrigation = Spray & micros-pray w/ good efficiency
Turf to Planting Ratio = 1.0:0.9

Residential Property – Medium Savings Strategy

22% Reduction



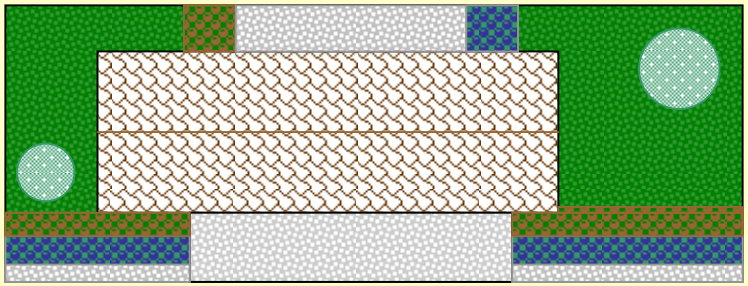
	Area	Gal/SF	Gal/Yr
Non-irrigated	5,000	0	0
Turf	2,300	24	55,245
Trees and Shrubs	1,000	12.2	12,228
Mixed Planting	1,000	8.1	8,067
WaterWise	700	3.9	2,733
Total	10,000	15.7	78,273

Source: EPA WaterSense Water Budget Water Calculator

Turf - Bluegrass
Planting - Mixed + WaterWise
Irrigation - Spray & micros-pray w/ good efficiency
Turf to Planting Ratio – 1.0:1.2

Residential Property – High Savings Strategy

30% Reduction



	Area	Gal/SF	Gal/Yr
Non-irrigated	5,500	0	0
Turf	2,150	24.0	51,642
Trees and Shrubs	750	12.2	9,171
Traditional Planting	800	8.1	6,453
WaterWise	800	3.9	3,124
Total	10,000	15.6	70,390

Source: EPA WaterSense Water Budget Water Calculator

Turf - Bluegrass
Planting - Mixed + WaterWise
Irrigation - Spray & micros-pray w/ good efficiency
Turf to Planting Ratio – 1.0:1.1

Water Conservation Strategies and Demand Levels

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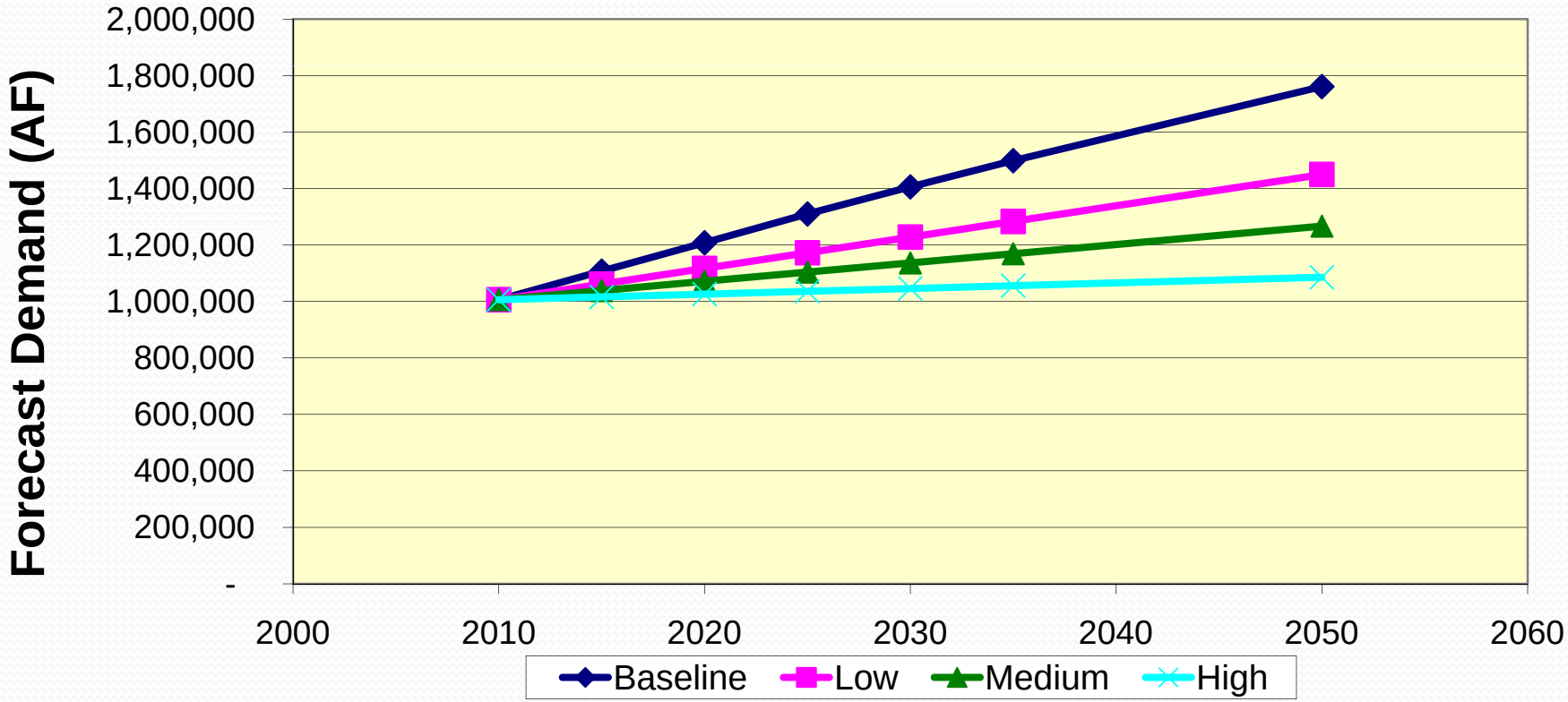
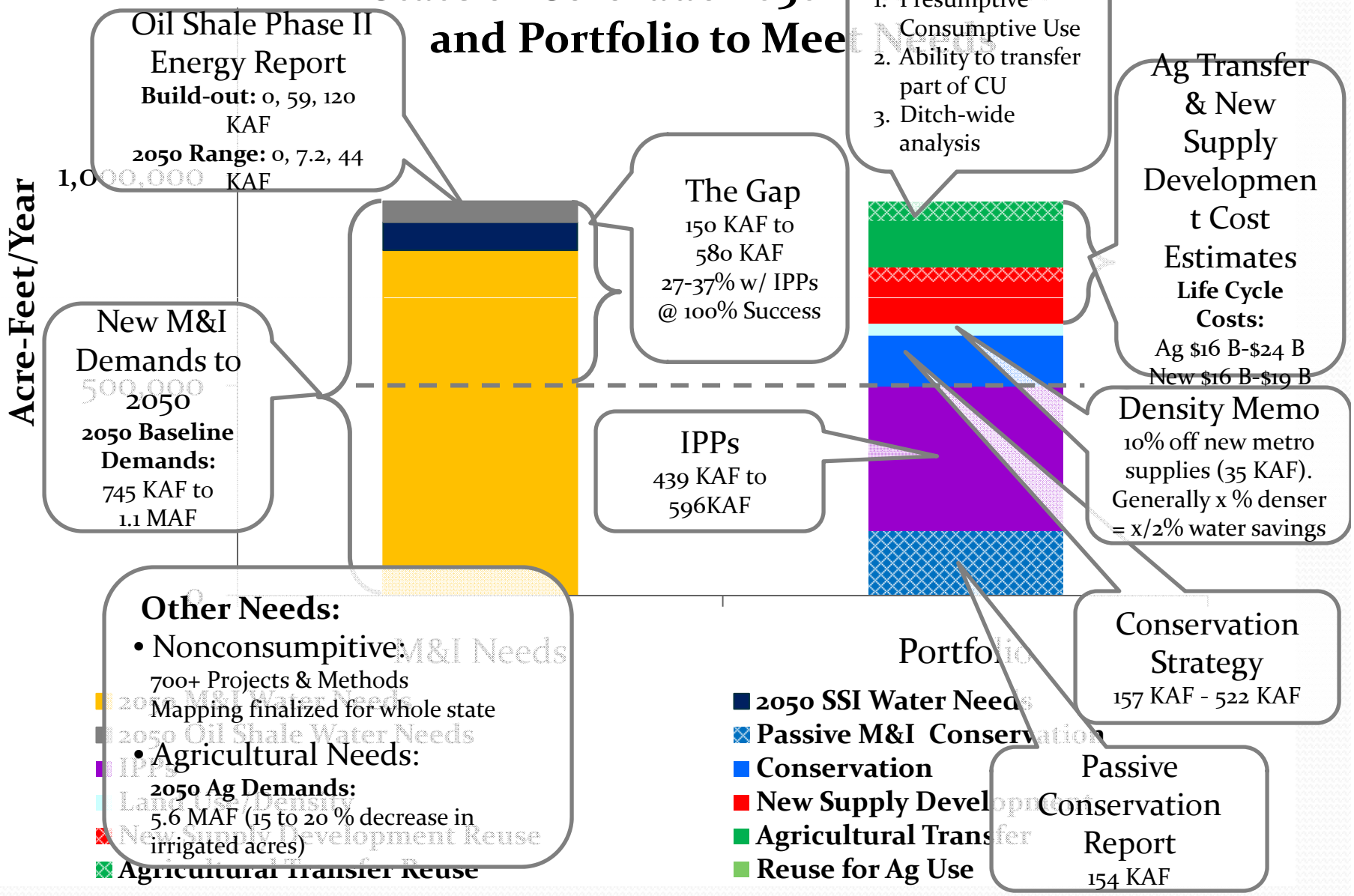


Reports in the M&I Context



Permanency and Penetration of Water Conservation Savings

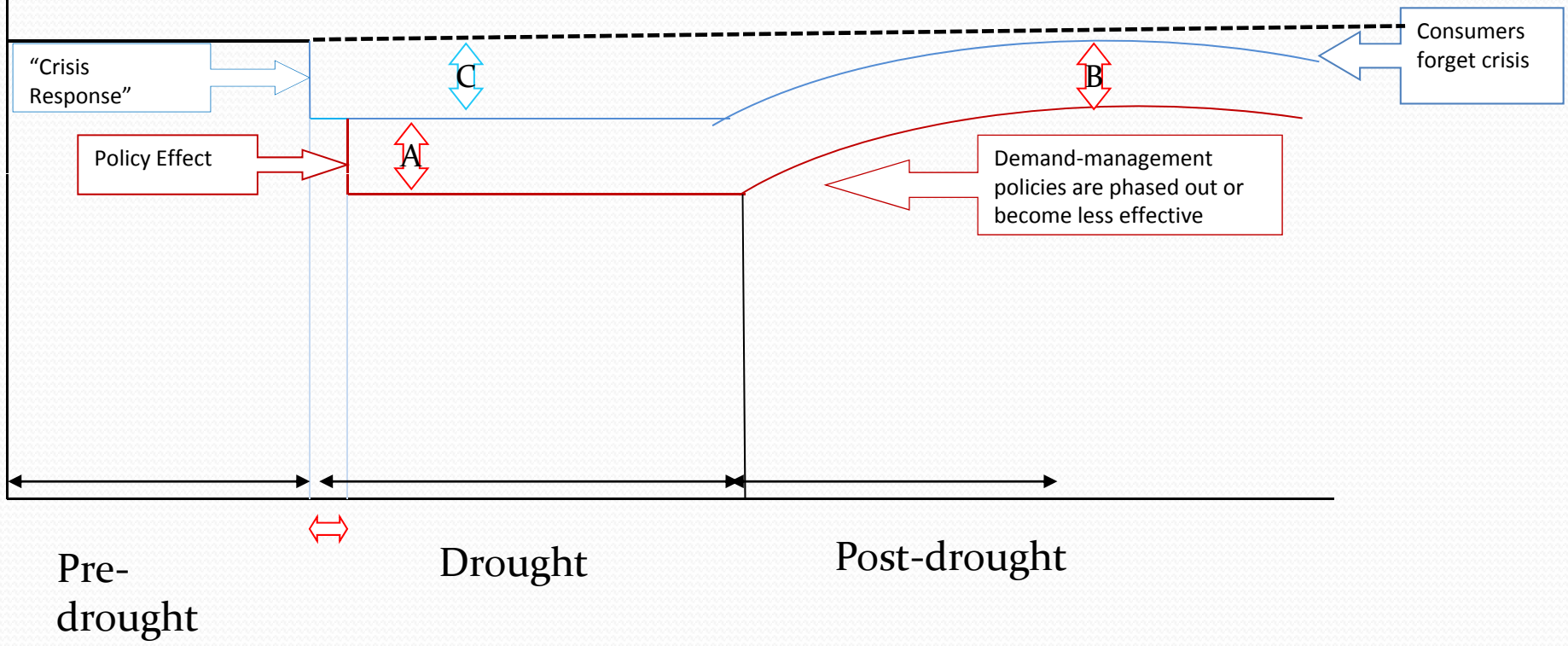
Permanency and Penetration

- Assess the **feasibility** of future research into the permanency and penetration rates of water conservation savings and measures

- To assess what barriers and opportunities exist at the provider level in order to carry out future conservation savings potential and penetration rates research

- Working with a subset of the partner utilities, this project will also include a demonstration of the statistical analysis that can be done with existing information.

Model for Study Approach



A+C; initial change from pre drought demand

Questions?

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