

EFFECTIVE BENCHMARKING TO GUIDE URBAN WATER PLANNING

**Wholly H2o's September 13, 2010 Forum
Establishing Water Use Baselines and Balances: Auditing
and Benchmarking Across Sectors**

John Rosenblum, Ph.D.

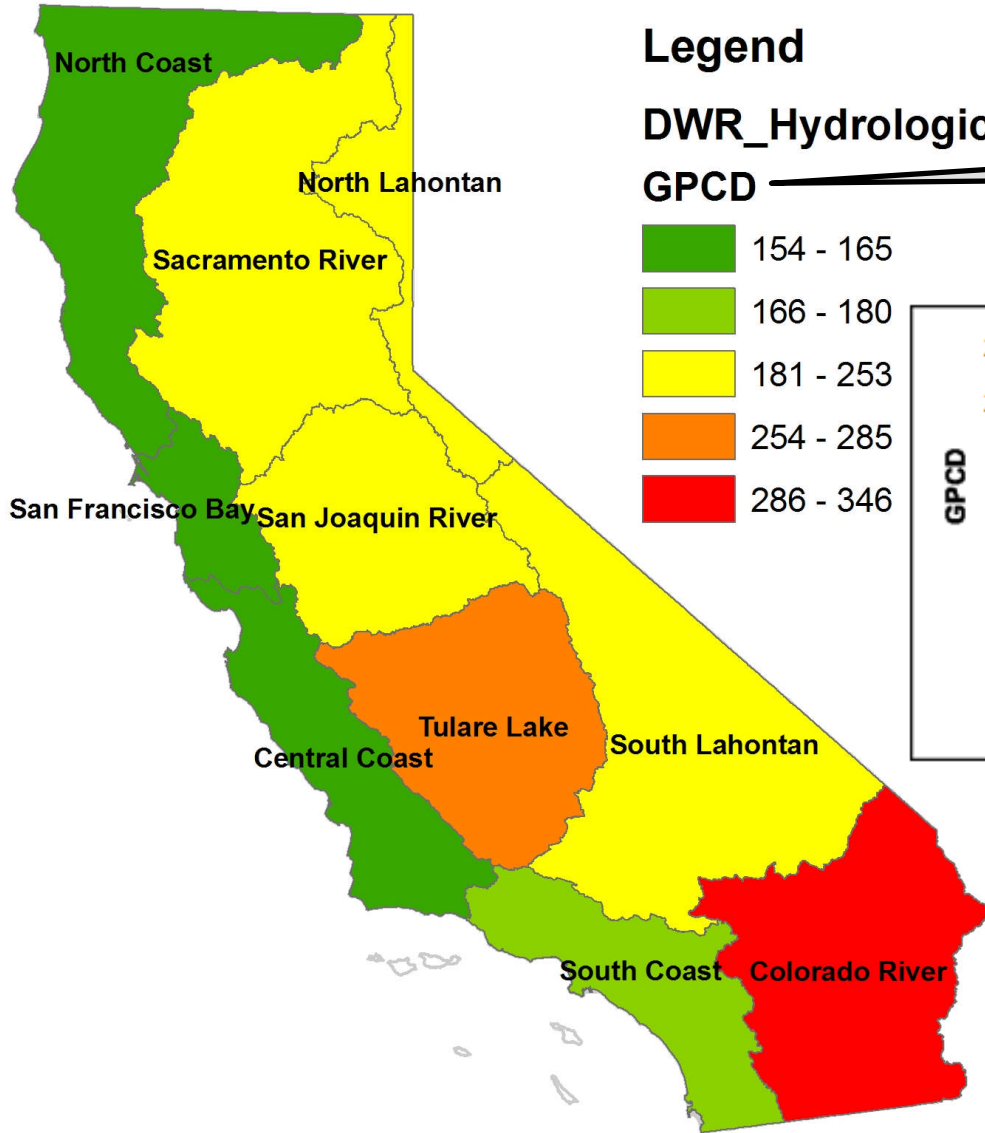
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20X2020 PLAN

(Governor of California directive, Feb.2008)

**... a plan to achieve a 20 percent
reduction in per capita water use
statewide by 2020....**

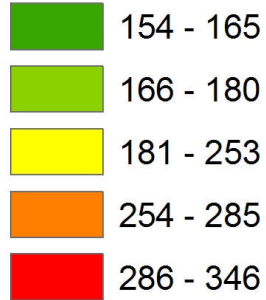
2005 BASELINE



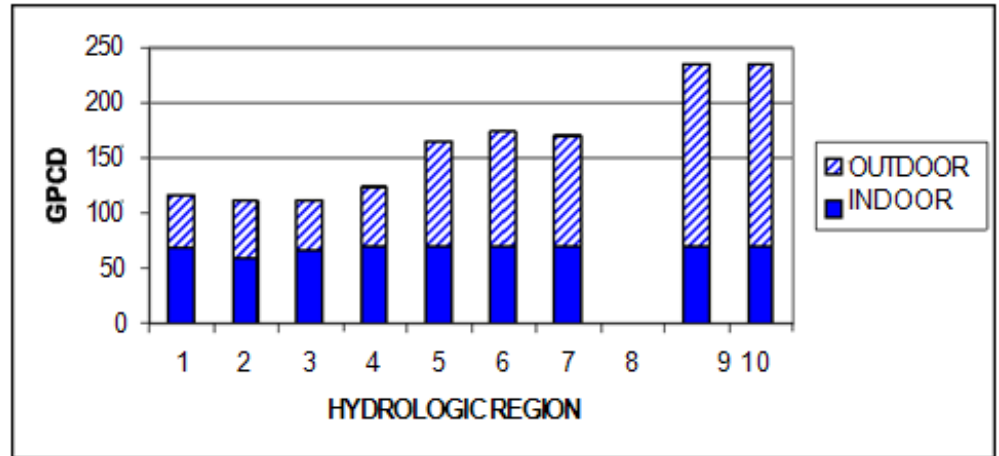
Legend

DWR_Hydrologic Regions

GPCD

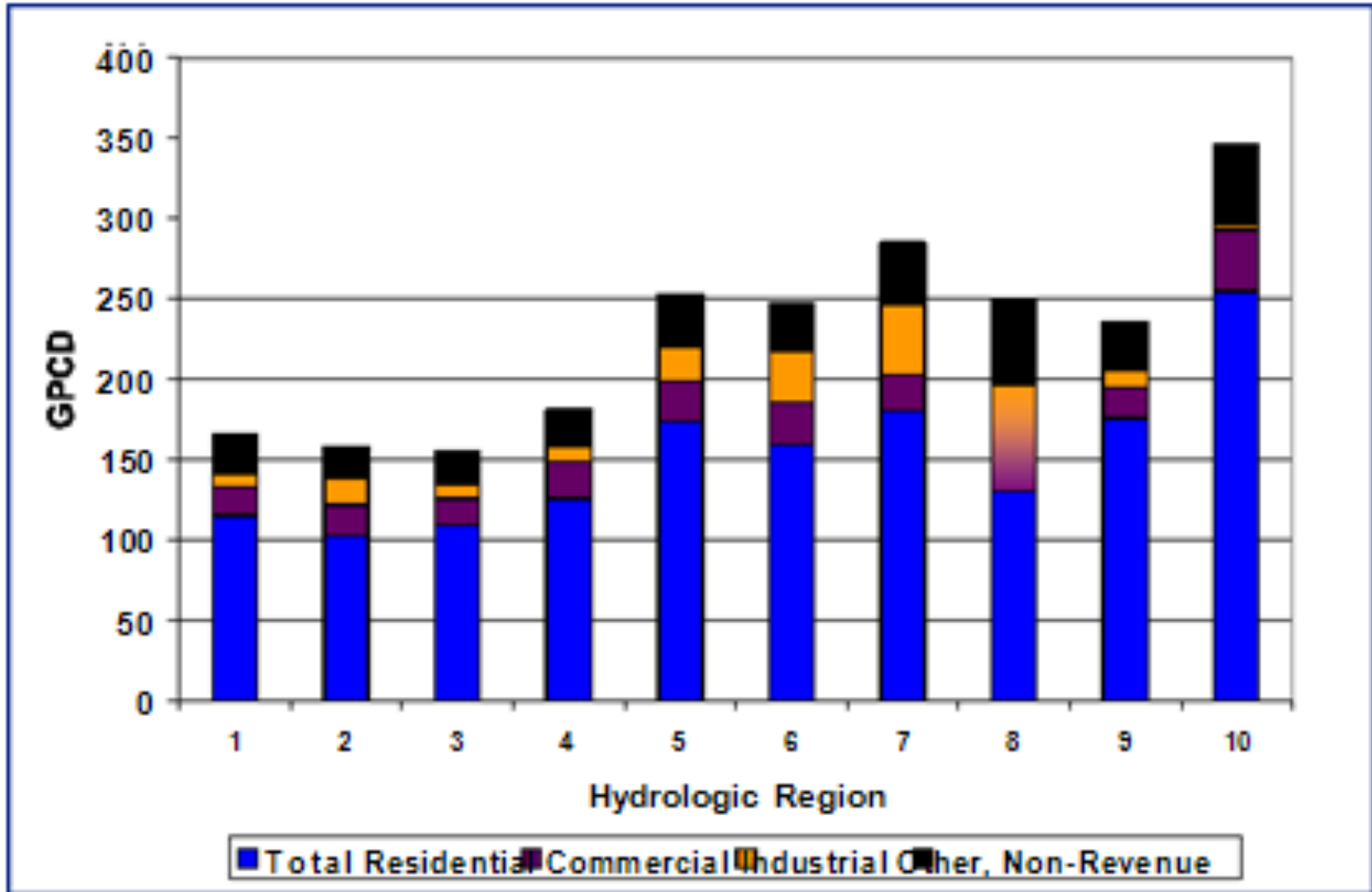


gallons per capita per day



MAIN DIFFERENCE IS CLIMATE/OUTDOORS

2005 BASELINE

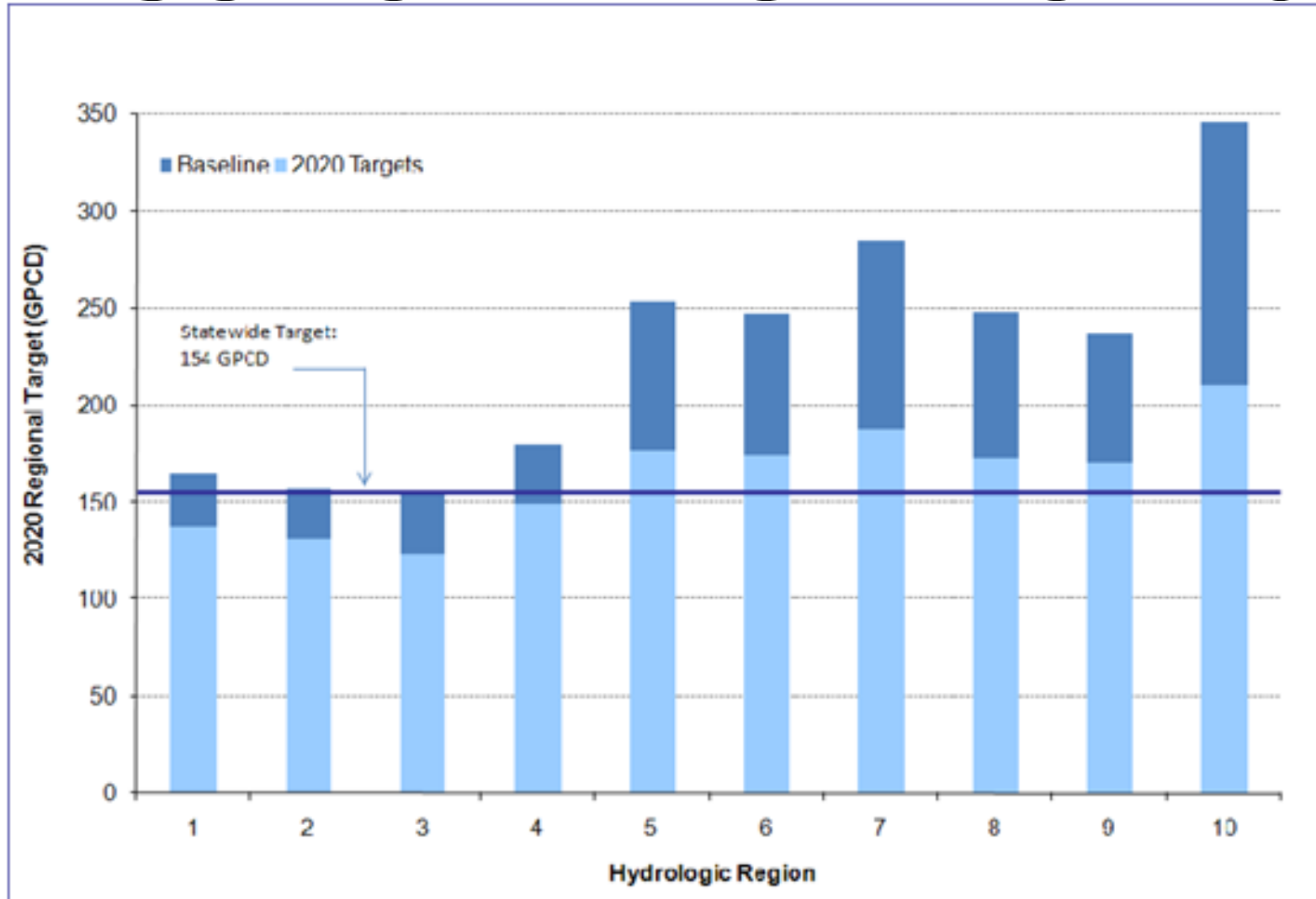


REDUCTION TARGET FOR 2020

HR Number ->	1	2	3	4	5	6	7	8	9	10	
HR Name ->	North Coast	SF Bay	Cent. Coast	South Coast	Sac. River	SJ	Tulare Lake	North Lahontan	South Lahontan	CO River*	State-wide
Savings From Basic Measures											
Code	7	7	7	6	19	17	12	7	6	6	8
80% of local CE	3	12	8	13	0	3	2	6	8	36	11
Grant funded	11	1	12	1	3	8		15	24	8	4
Efficient clothes washers	3	2						3	3	3	3
Residential ET controllers								4	3	3	3
TOTAL (basic measures)								36	43	56	28
Savings From Additional Measures											
Accelerated coverage goals	11	8	10	7	17	13	14	14	17	17	9
Recycling	4	7	1	4	3		1			6	3
Water loss control (40 g/conn./day)	3	2	2	4	11	11	15	11	10	21	6
Irrigation restrictions (2 day/week)	11	11	11	13	23	22	25	11	29	40	16
Miscellaneous PBMPs	2	2	2	2	2	2	2	2	2	2	2
TOTAL (additional measures)	31	30	26	29	56	48	57	38	58	86	37
* Savings estimates for CII and landscape measures in HR 10 may have low reliability due to faulty estimates of landscape applied water.											

2005 BASELINE: 192 gpcd
2020 TARGET: 154 gpcd

REDUCTION TARGET FOR 2020



- **SOME REGIONS NEED TO REDUCE MORE THAN OTHERS**
- **EVEN REGIONS AT/BELOW STATE AVG. NEED TO REDUCE**

20X2020 PLAN BECAME LAW IN 2010 (SB7x7)

HALLELUJAH ?

1. **TOTAL WATER VOLUME: DEMAND vs AVAILABILITY**
2. **OTHER BENCHMARKS: CA vs AUSTRALIA**
3. **FULL SAVINGS POTENTIAL: HIGH-PERFORMANCE WATER
and ENERGY EFFICIENCY**

OTHER ISSUES

Missing data

Unregulated wells and groundwater

Accounting for reclaimed wastewater

Agricultural water + sale to urban agencies

Water for energy production + connection to the urban water cycle

TOTAL WATER VOLUME: DEMAND vs AVAILABILITY

POPULATION GROWTH BY 2020 WILL CANCEL OUT 20% UNIT REDUCTION ⇒ **total urban water demand will increase**

CURRENT DEMANDS ARE ALREADY UNSUSTAINABLE:

- **2008 court ruling on Delta fisheries** ⇒ **up to 85% reduction for SWP**
- **Sierra Nevada snowpack reduction** ⇒ **~60% reduction by end-of-century**
- **Colorado River flows severely declining** ⇒ **no diversions by 2050**

OTHER ISSUES

Overdrafted groundwater aquifers

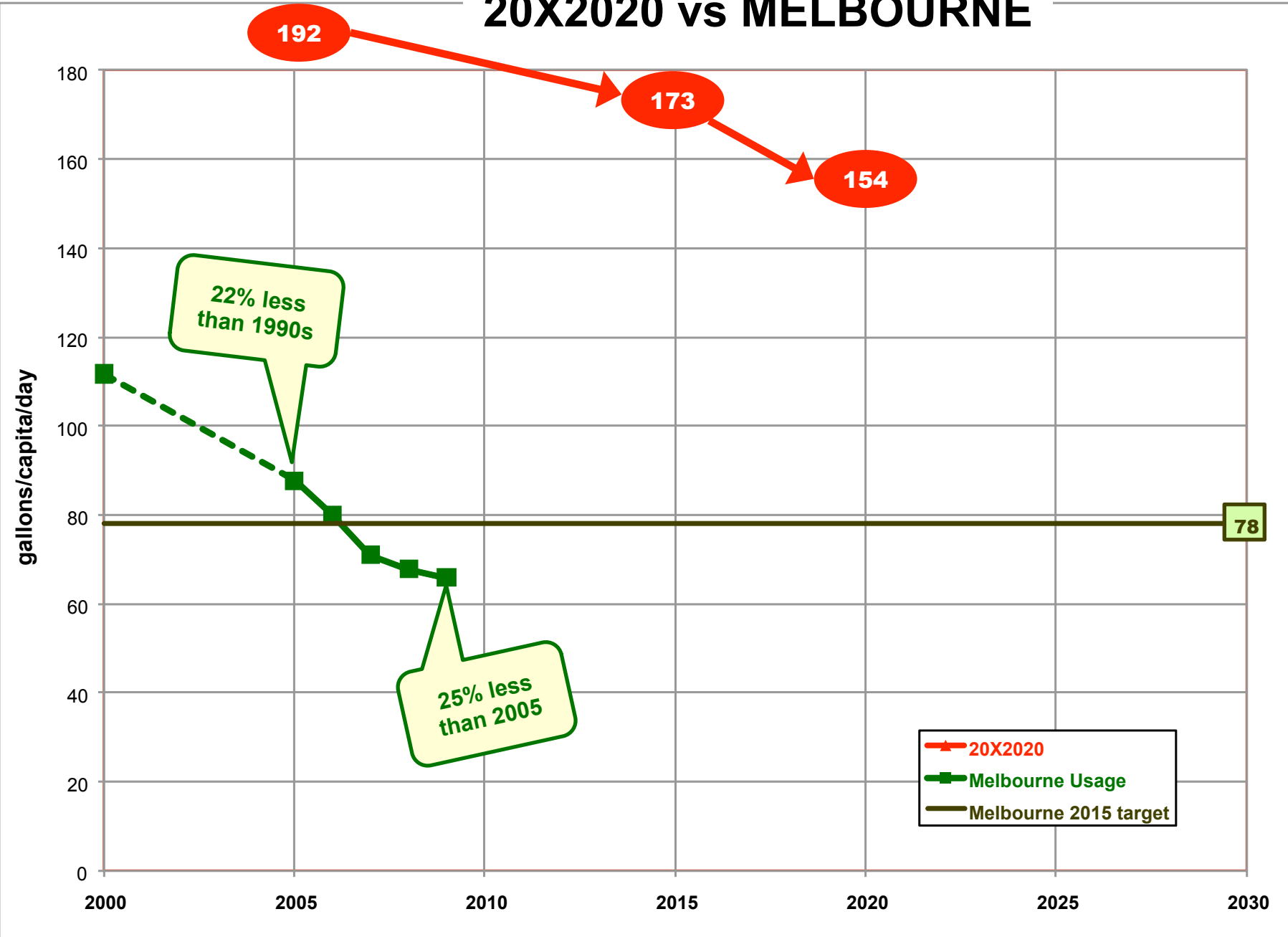
Reclaimed wastewater: distribution piping costs; residuals disposal

Seawater desalination: capital and energy costs; brine disposal

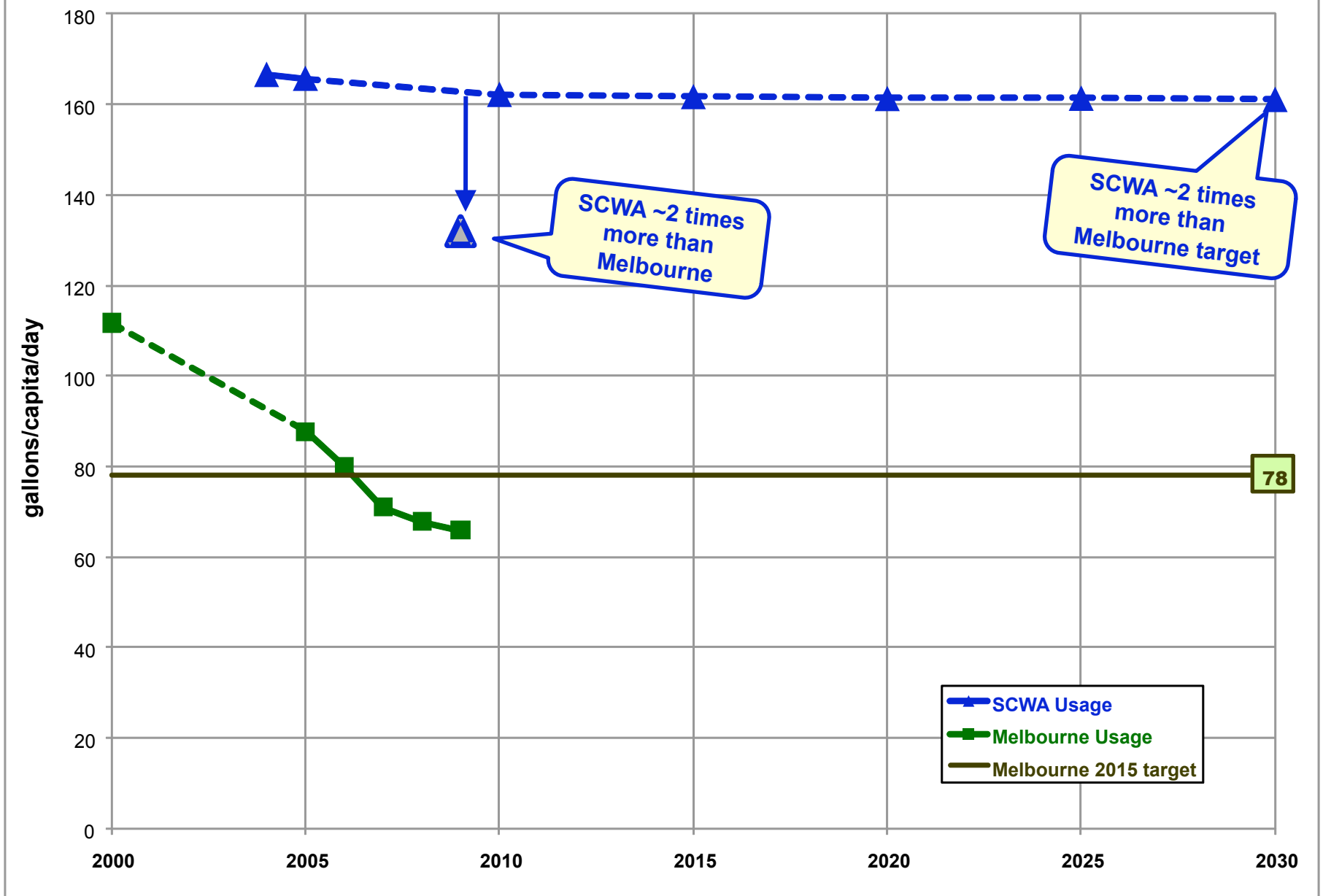
Upstream/downstream watershed restoration: no water ⇒ no aquatic life

OTHER BENCHMARKS:
CA vs AUSTRALIA

20X2020 vs MELBOURNE

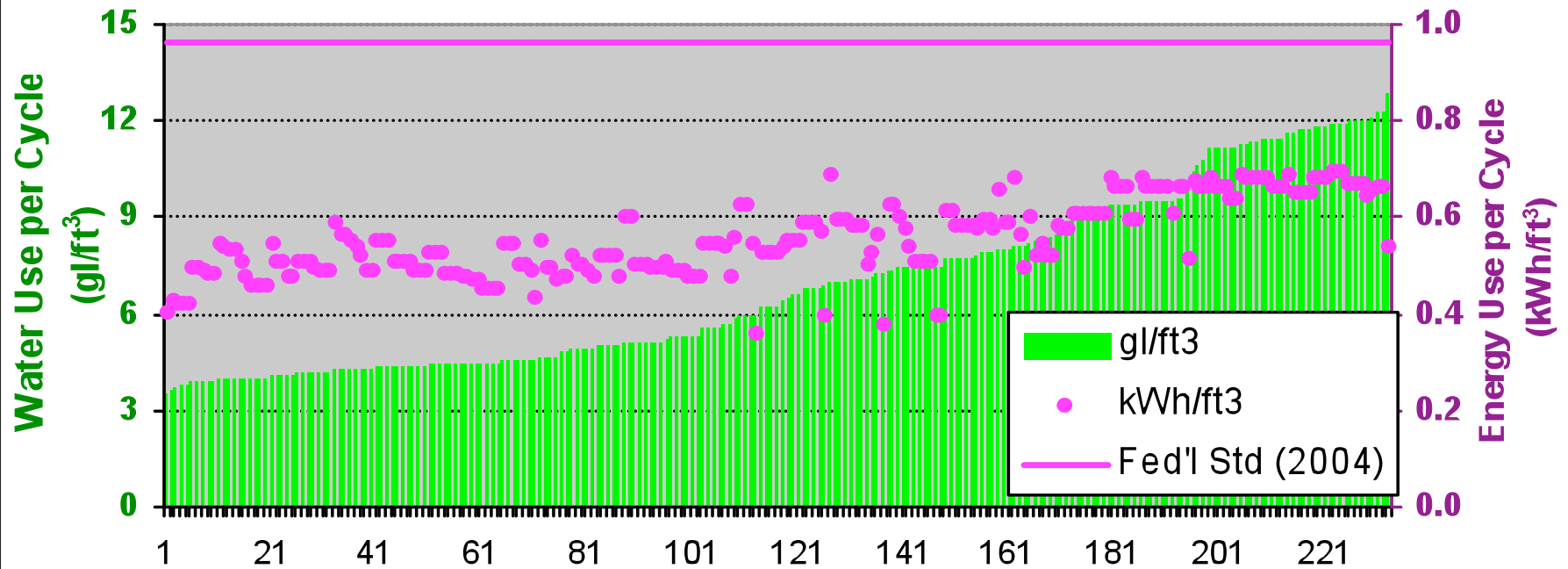


SONOMA COUNTY WATER AGENCY vs MELBOURNE



**FULL SAVINGS POTENTIAL:
HIGH-PERFORMANCE
WATER and ENERGY
EFFICIENCY**

Energy Star-Qualified Clothes Washers Water and Energy Usage Normalized by Tub Volume



Machine ID# (performance reported 21 Mar 2006)

Prepared by E. B. Orrett (RPP, Inc.) from Energy Star data

SELECT FROM THE BEST 20
(in this case, even best 50)

CUSTOMERS' WATER/ENERGY EFFICIENCY

HIGH-PERFORMANCE EFFICIENCY:

SCWA
97 gpcd

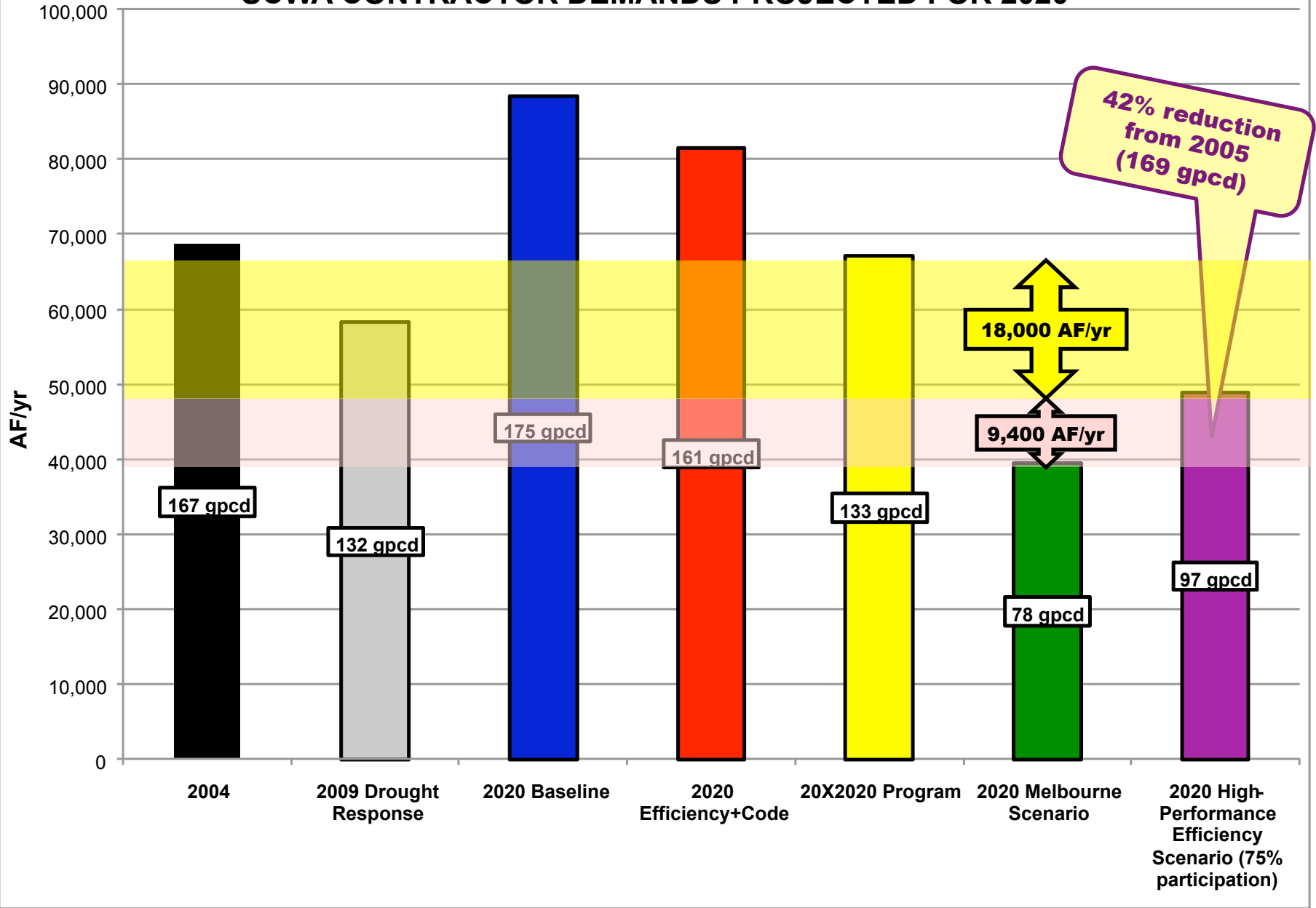
- Off-the-Shelf high-performance appliances (⇒ecovillagegreen.com)
- Smart irrigation controllers
- Up-front financing to increase participation to 75%

DOES NOT INCLUDE:

MELBOURNE
66 gpcd

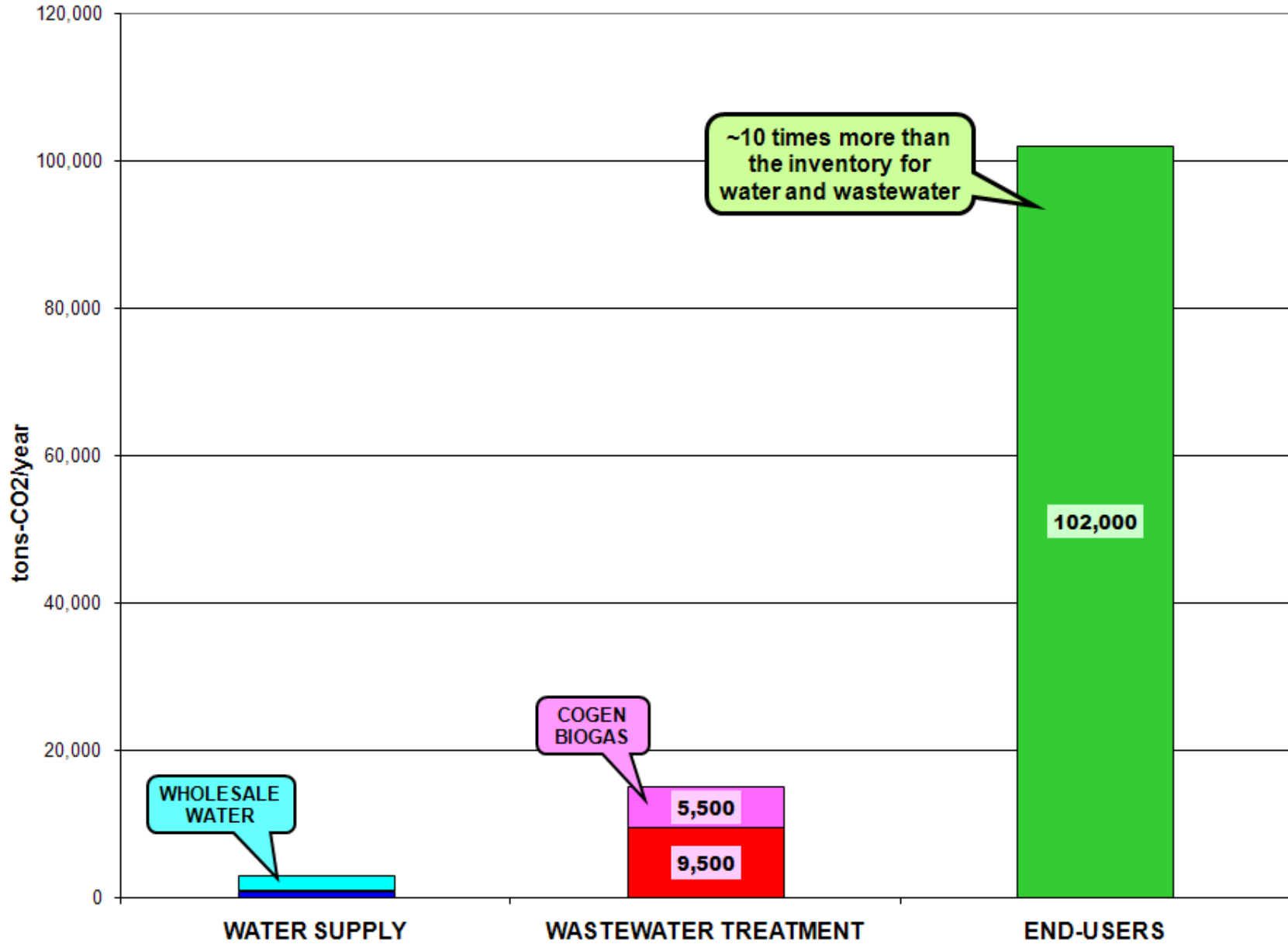
- **Changes in behavior**
- Restrictions & bans ⇒ *irrigation, car-washing, pool-filling*
- Landscape changes
- Sharply tiered rates
- Enforcement, penalties, lock-outs
- Efficiency financing to avoid infrastructure costs
- Tighter - mandatory - performance standards
- Residential plumbing for reclaimed wastewater

SCWA CONTRACTOR DEMANDS PROJECTED FOR 2020



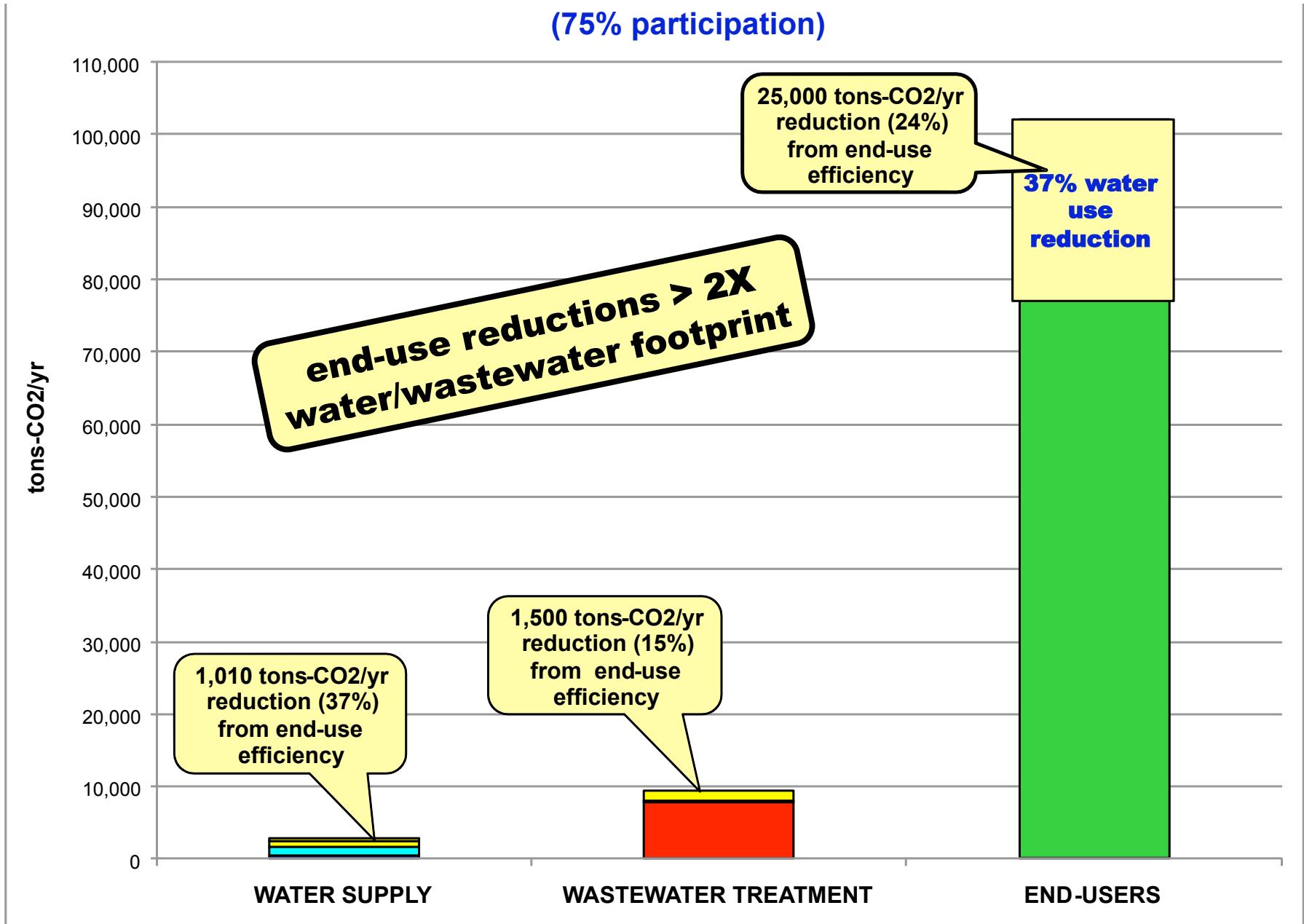
**WATER EFFICIENCY
ALSO PROVIDES
CLIMATE BENEFITS**

2005 GHG EMISSIONS FROM SANTA ROSA'S WATER CYCLE



SANTA ROSA 2005 GHG REDUCTIONS FROM WATER EFFICIENCY

(75% participation)



**SO WHAT IS EFFECTIVE
BENCHMARKING?**

VALIDATED BASELINE:

- **Monitored with calibrated instruments**
- **Cross-checked** (flow/pressure/temp; water vs w/w; energy)
- **Disaggregated** (main function; monthly/seasonal)
- **Correlations** (cause-effect; usual and unusual conditions)
- **Performance metrics** (e.g. gallons per function per period)

TARGET SETTING:

- **Water, wastewater, energy, GHG emissions**
- **Balance demand vs supply** (include environmental needs ; climate change)

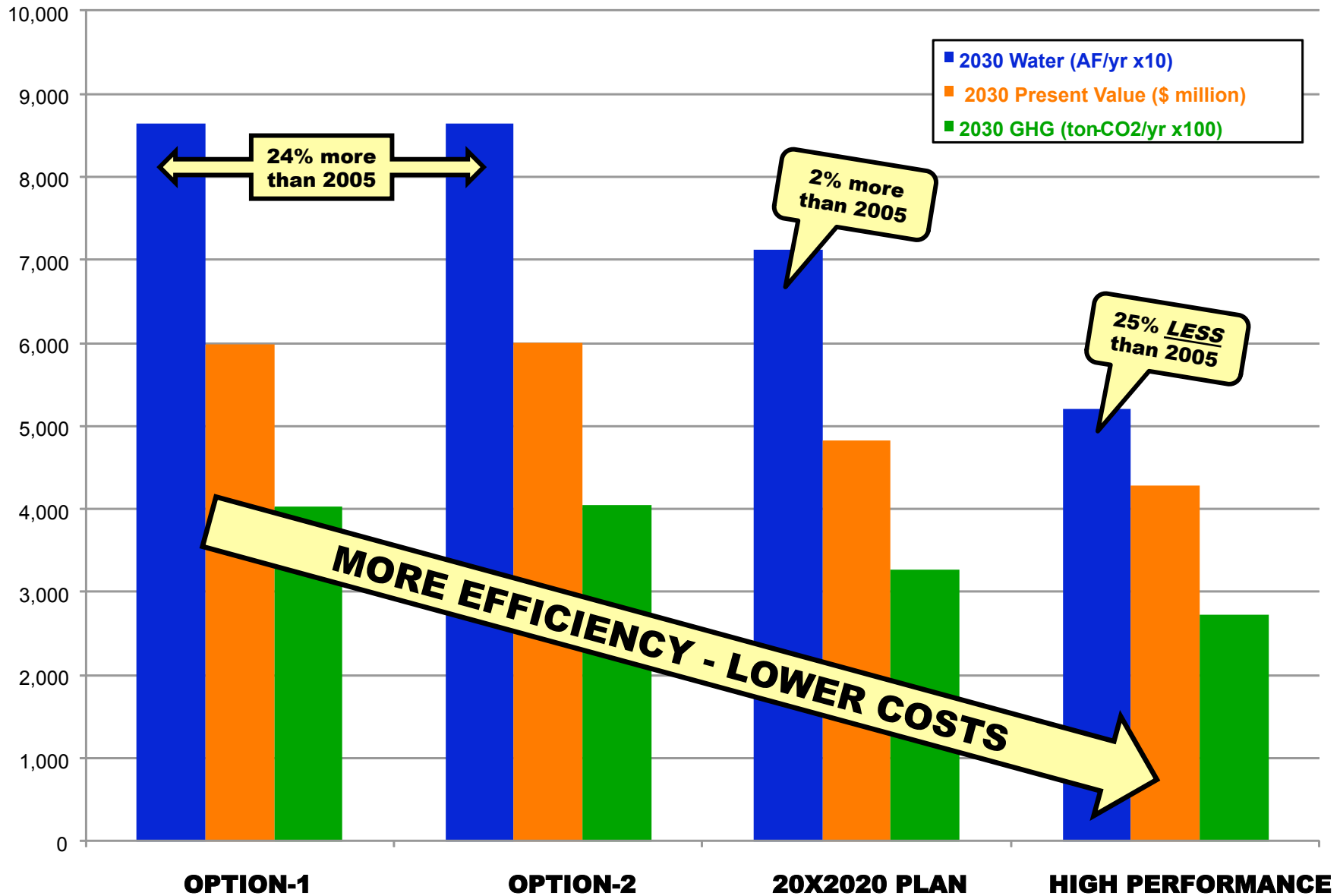
PROJECTIONS FOR THE FUTURE:

- **Improved performance metrics** (less waste; new equipment, processes, and controls)
- **Recalculate baseline with improved metrics**
- **Changes in end-use** (occupancy; production; regulations)
- **Recalculate baseline with end-use changes**
- **NET PROJECTION** (with life-cycle costs and savings)



**IS BENCHMARKING USEFUL
FOR “REAL WORLD”
DECISIONS?**

SCWA 2030 PRESENT VALUE, 2030 WATER USE AND 2030 GHG EMISSIONS



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