

The background of the slide is a close-up, high-angle shot of numerous water bubbles rising through clear blue water. The bubbles vary in size, from small pinpoints to larger, more defined spheres, and their movement creates a sense of dynamic energy. The lighting is bright, highlighting the refractive properties of the water and the delicate structure of the bubbles.

A Comprehensive Study of Water Usage and Conservation Opportunities at UC Berkeley:

**What Does It Mean to
be a Water Efficient
Campus?**

Joanna Zhang
December 7, 2010



INTRODUCTION

- **2009 California Delta-Water Bill**
- Chancellor's Advisory Committee on Sustainability (CACS) at University of California, Berkeley
- A Comprehensive Study of Water Usage and Conservation Opportunities at UC Berkeley

STEP 1: DATA COLLECTION

Hard Data

- Campus Services Data
- East Bay Municipal Utility District
- Student Projects

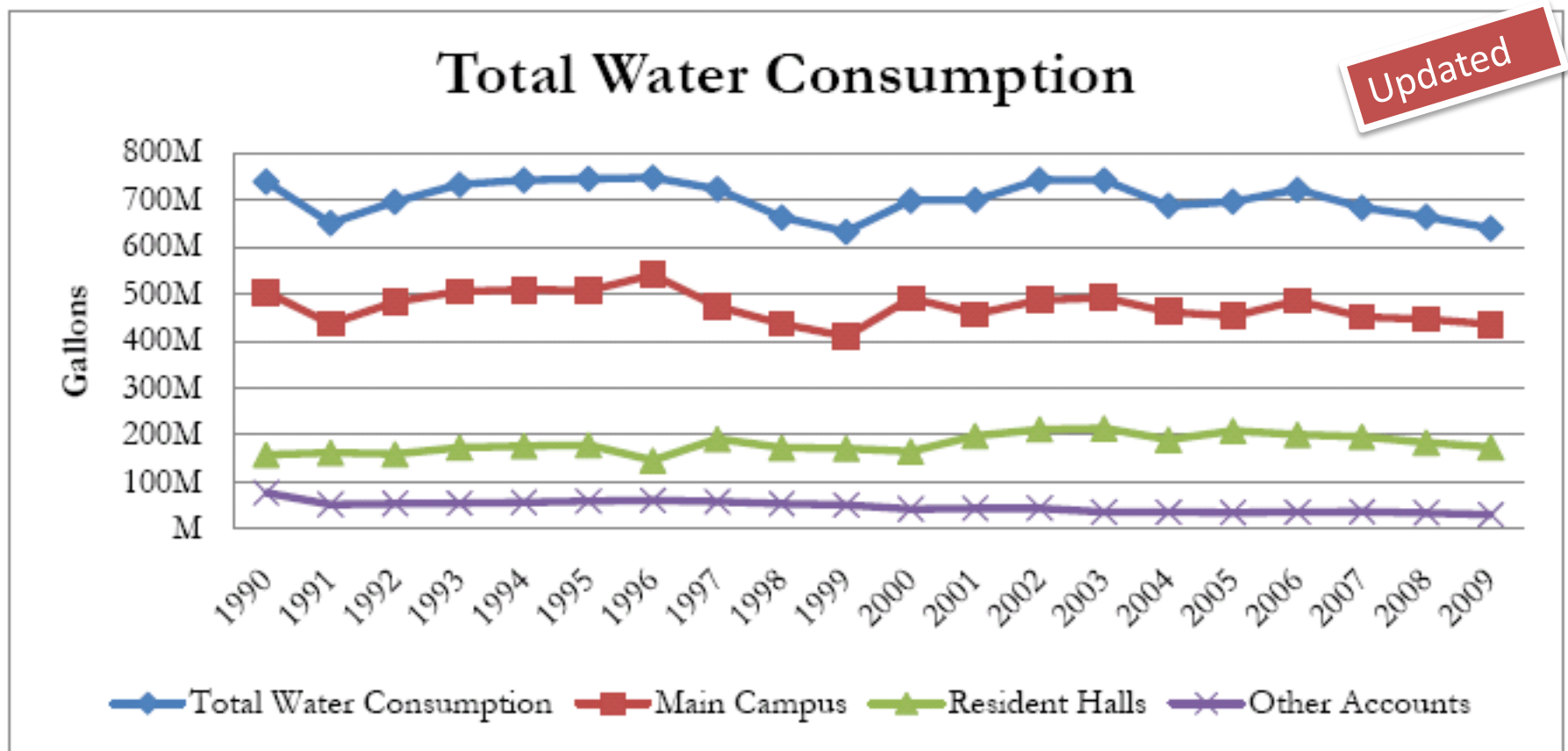
Soft Data

- Extrapolation
- Regression
- Assumptions
- Attendance Based Method

DATA COLLECTION

Year	1990	2009	% change
Total Consumption	739,296,692	639,886,496	-13%
Main Campus	504,155,740	435,620,240	-14%
Other Accounts	77,067,566	30,697,172	-60%
Residence Halls	158,073,386	173,569,084	10%

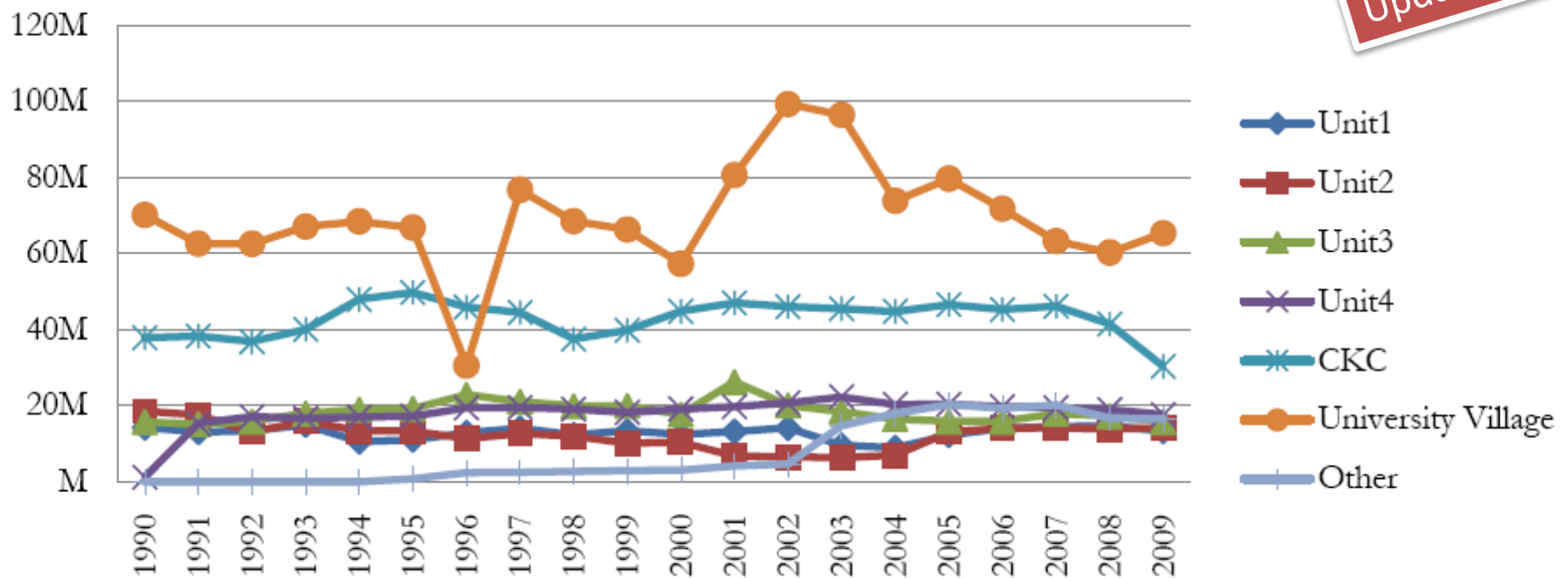
DATA COLLECTION & ANALYSIS



DATA COLLECTION & ANALYSIS

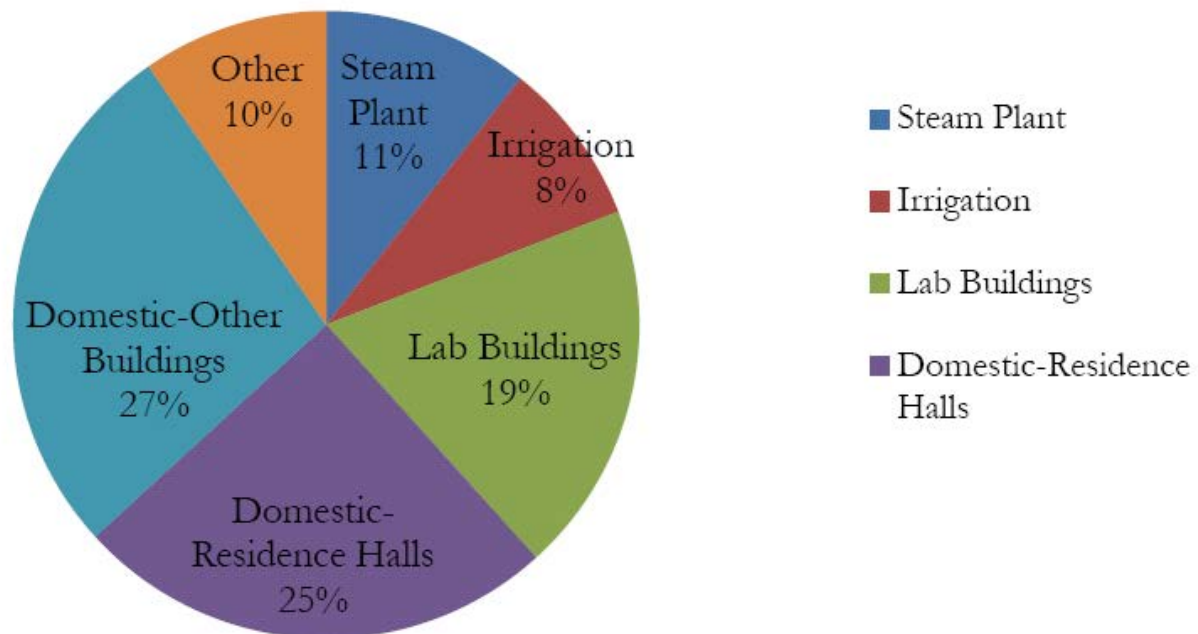
Consumption By Resident Hall

Updated



STEP2: BREAKDOWN ANALYSIS

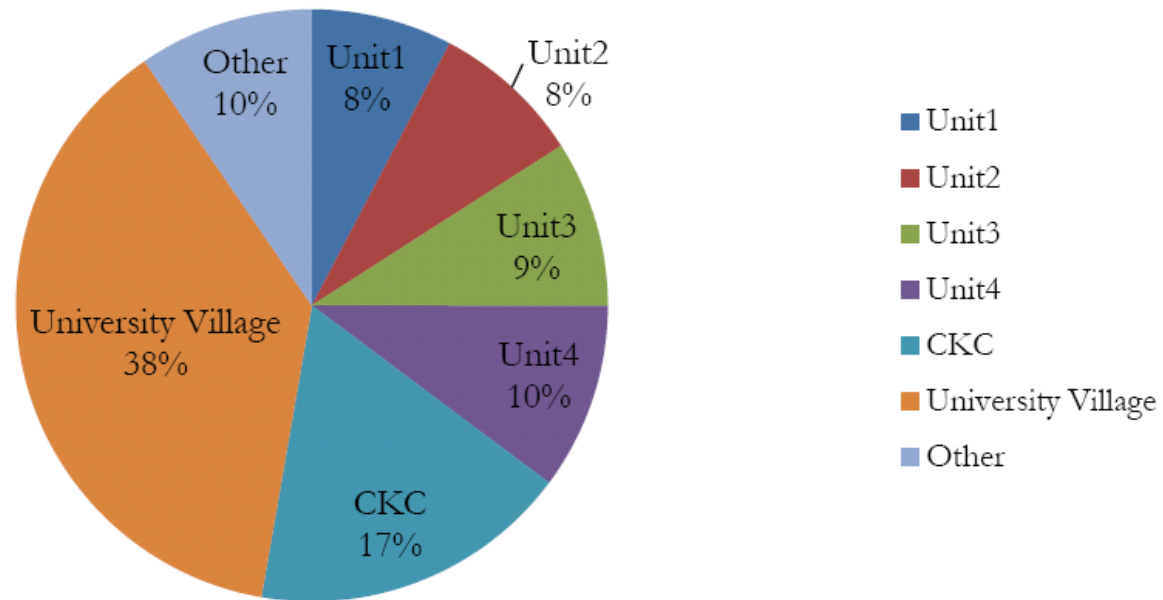
2008 Estimate Usage By Type



Approximately **half is domestic usage** (which is divided equally between residence halls and all other campus buildings). About **one-fifth** of usage was in campus lab buildings

STEP2: BREAKDOWN ANALYSIS

2009 Residential Halls Usage Breakdown



More than **one-third** of total residential hall usage was University Village Usage

STEP3: FEASIBILITY STUDY

Proposed Project	Annual Water Savings (gallons)	Annual Water Savings (%)	Upfront Capital Cost (\$)	Net Annual Costs (Savings) (\$)	Simple Payback (years)	Total Net Present Value (\$)
General Education & Awareness Campaign			\$20,000	-\$10,000		
Install Water Meters in Large Buildings			\$200,000			
Enhanced Leak Reduction Efforts	4,265,372	0.6%	\$10,000	\$18,989	0.53	\$127,917
Expand Sink Aerator Installations	6,548,025	1.0%	\$3,841	\$29,151	0.13	\$126,636
Campus Toilet Conversion	25,940,000	3.9%	\$527,742	\$115,482	4.24	\$2,079,414
Campus Urinal Conversion	5,640,000	0.8%	\$265,698	\$25,109	7.54	\$534,963
Replace Heat Exchangers (2)	2,102,400	0.3%	\$100,000	\$9,360	10.68	\$228,834
Replace Heat Exchangers (10)	10,512,000	1.6%	\$500,000	\$46,798	10.68	\$1,144,168
Subtotal w/ 2 Heat Exchangers Replaced	44,495,797	6.7%	\$1,127,281	\$188,090	5.99	\$3,097,763
Subtotal w/ 10* Heat Exchangers Replaced	52,905,397	8.0%	\$1,527,281	\$225,528	6.77	\$4,013,097
Behavior & Fixture Improvement in Auxiliaries	16,000,000	2.4%	TBD	\$71,229.95	TBD	TBD

Campus: 6-7 years at a cost of \$1.1 to 1.5 million, and a reduction of 7-8%

Auxiliary: no cost estimate currently available, and an estimated saving of 2-3%

Total: ~ 10% of 2008 usage.

RECOMMENDATION & NEXT STEPS

CACS

- Commit the University to reduce potable water usage by 20% (from 2008 levels) and to use no potable water for irrigation by 2020
- Establish a working group to oversee the analysis and implementation of reduction projects
- By 2020, ensure all buildings larger than 50,000 ft² have water meters that allow real-time monitoring of usage and are web enabled
- Beginning June 1, 2010, maximize the number of LEED™ credits achieved under Water Use Reduction Credits #3 and #4 by all new construction and major renovation projects

RESEARCH

- Setting a reduction target with specific planned projects
- Installing water meters on major campus buildings that allow real-time monitoring of usage and are web enabled
- Promoting education and awareness campaigns
- Investigating other recycle and re-use options.

RECOMMENDATION

