A Water Conservation Survey of Cary and Brisbane

By the Microbots

A FIRST LEGO League Team

Introduction

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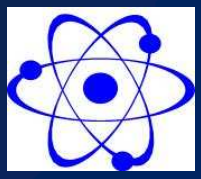
Who Are the Microbots?

- We are a 3rd year FIRST LEGO League team from Cary
- We are 11 to 13 years old and are all homeschoolers



What Is FIRST LEGO League

- FIRST LEGO League is an international competition
- There are 3 components of the competition:
  1. Research and solve a real-world problem
  2. Design and program a Mindstorm robot
  3. Share these results

2008 FIRST LEGO LEAGUE PROJECT CLIMATE CONNECTIONS

Climate Connections

- We focused our 2008 project on water conservation:
  - We looked at Cary and Brisbane
  - Put together an on-line global survey about water conservation
  - Researched different technologies
  - Designed a Lego H_2O House
  - Created a website to share all of our information

Why did we choose **WATER?**

- We spoke to many experts in NC
  - Marie Cefalo, Cary Town Water Conservation Expert
  - Ryan Boyles, NC State Climatologist
- The experts agreed
  - NC faces one major climate related problem: Water
- We also learned our planet faces a global water crisis.
  - 2.5 Billion people live in water stressed areas of our world.
  - World Health Organization, UN, Unicef experts agree
  - "Access to clean water" is the most important global crisis of the 21st Century

Why Did We Choose Cary and Brisbane?

- 2 global towns facing intermittent DROUGHT
  - Though as of this fall, neither city is in a drought
- They have similar climates and rainfall fluctuations
- Fast growing populations
- Forward thinking cities with respect to water planning

Cary and Brisbane

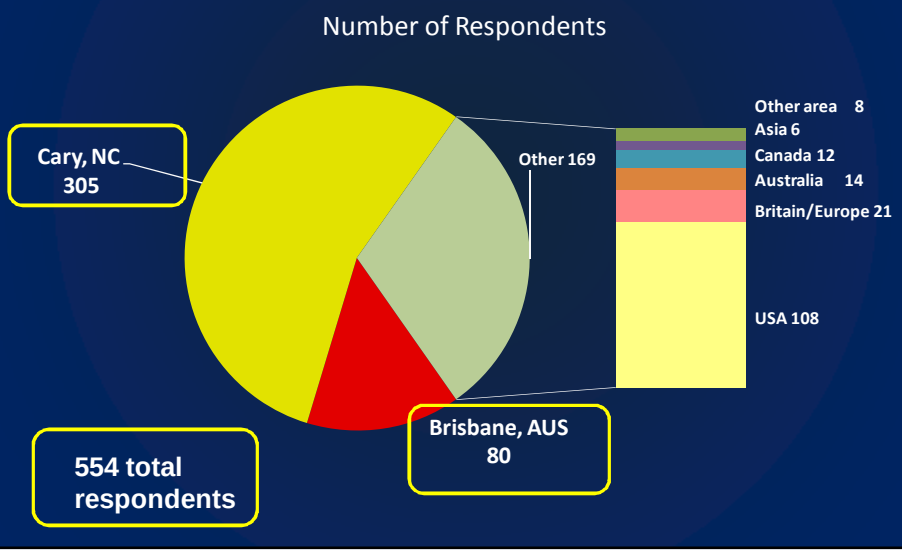
- Cary is a town in a historically water rich region of the USA but in the last few years they've faced a lot of drought pressure
  - 1999-2002 drought was the most severe in 60 years
  - 2007 was Cary's driest year on historical record
  - Water demand may increase more than 25% by 2030.
- Brisbane is in Australia, the worlds largest desert! They have been battling ***drought*** for over a century
  - 3 years out of 10 are drought in Brisbane with severe drought every 18 years.
  - Dam and Weir capacity may be exceeded by 2020.

SURVEY

Survey Description

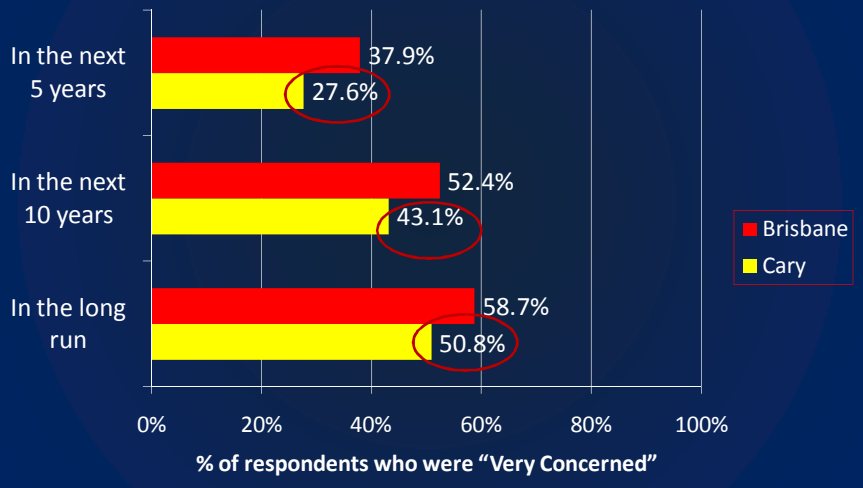
- We did an online survey about water conservation
- We spread the word by telling neighbors and friends, email contacts, website links
- The survey was open for 2 weeks from October 20 To November 4

Who Responded?



FUTURE OF WATER

How concerned are you with your town's ability to meet future water demands?



Cary's Goals

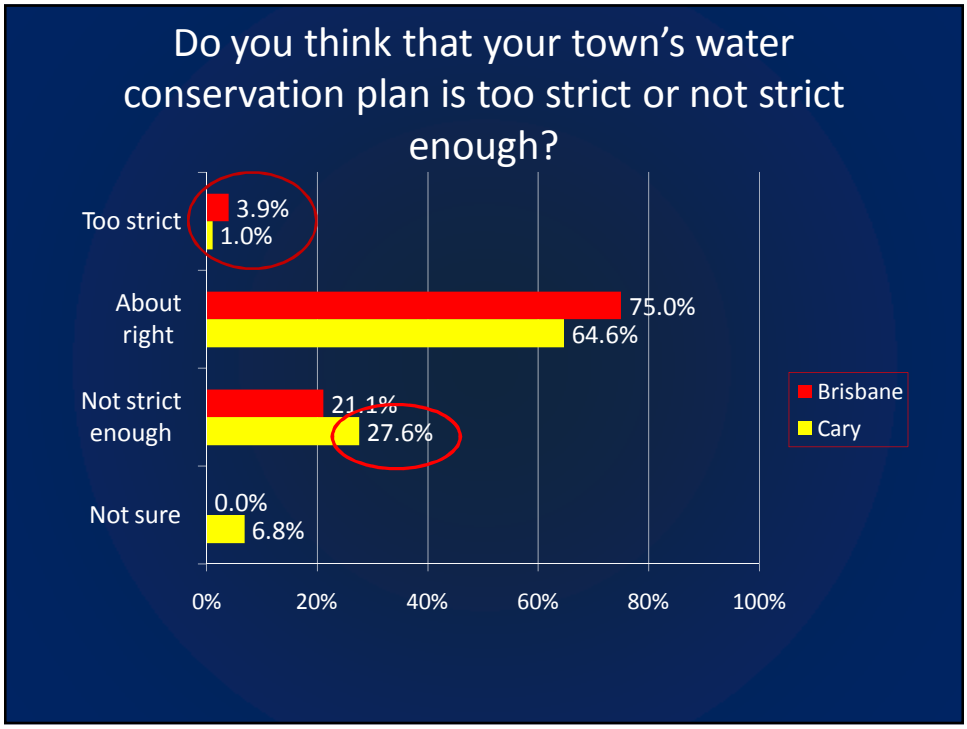
- Cary wants to extend the useful life of the Jordan Lake Basin.
  - They also want to reduce per capita water use 20% by 2015.
  - Rebates, incentives and workshops are in place to help

EDUCATION IS KEY

Brisbane's Goals

- Brisbane wants to reduce reliance on dams from 95% to 40%
  - 30% of their water savings will be from simple "at-home" strategies like gray water systems and dew harvesting
  - Water supply will be increased by nanofiltration, desalination and purified recycled water

AGAIN, EDUCATION IS KEY



The Water Challenge: Reducing Demand

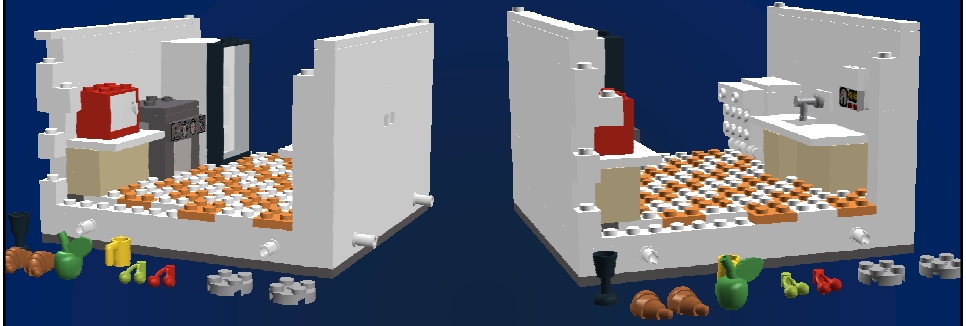
- Demand depends on the number of people and how much is used per person
  - If you can't reduce the population, you must reduce water use
  - BUT how do people buy into this if there's no drought?

Water Challenge: Increasing Supply

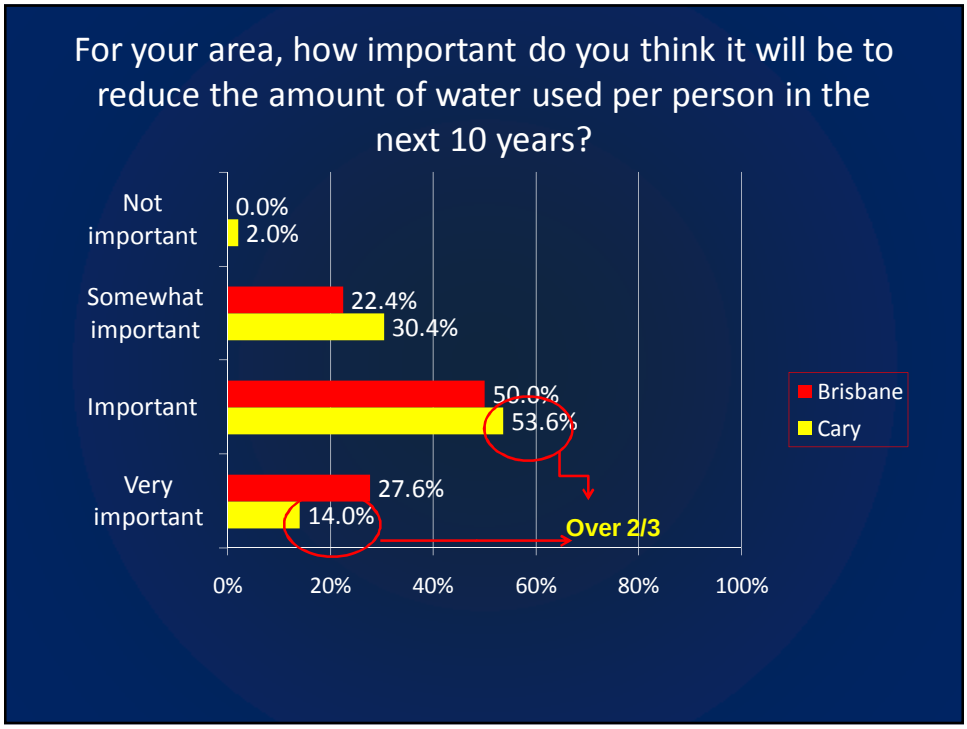
- Supply depends on what's available
  - Cary's supply is Jordan Lake which is filled by rainfall
  - Brisbane depends on dams/weirs but also has other sources such as:
    - Cleaning salt water through nanofiltration
    - Collecting water with rain barrels and dew harvesters

Conserving Water vs. Securing More Water

- This fall, American River's report *Hidden Reservoir* looked at the best way to secure water in the US Southeast
  - They concluded that in the Raleigh area, efficient water use was more cost effective than building new dams

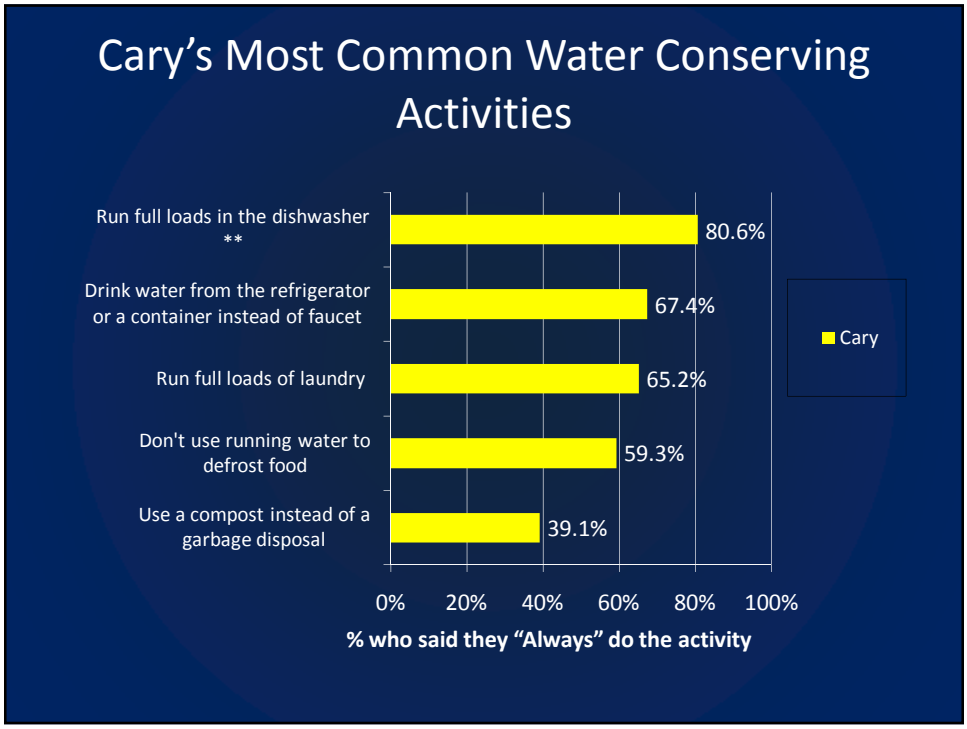


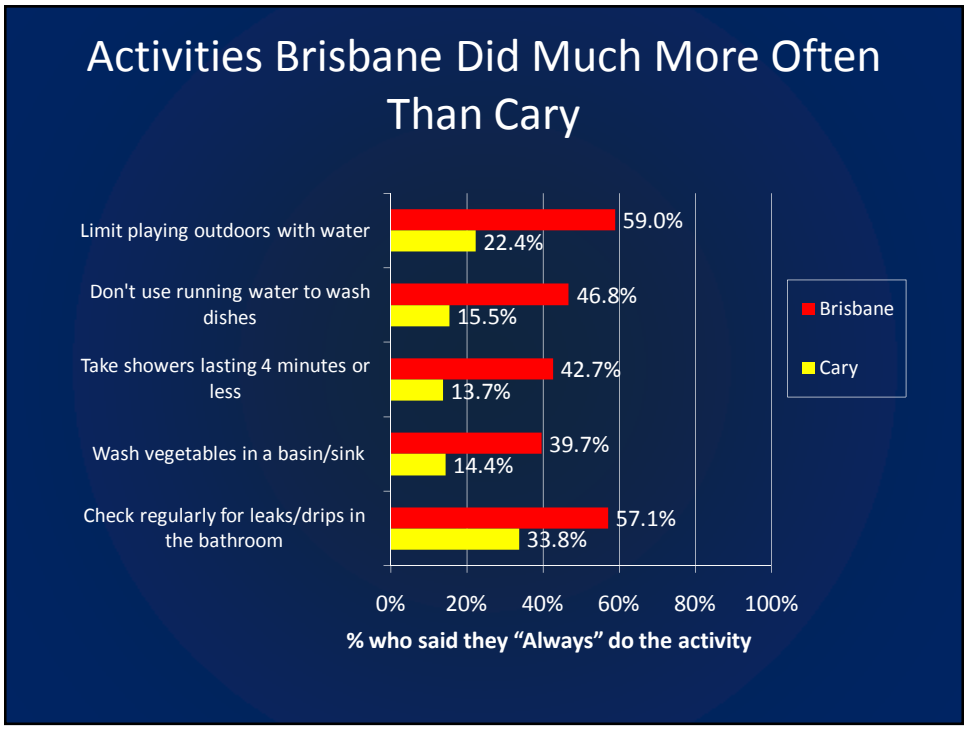
WATER CONSERVATION PRACTICES



Water Conserving Activities

- In the survey, we asked about 19 different water saving activities residents could do
- For all but 2 of those activities, Brisbane did them more often
  - Cary washes full loads in the dishwasher (but 39% of people in Brisbane didn't have a dishwasher)
  - Cary washes their car with a hose (but Brisbane residents used harvested water to wash their car)

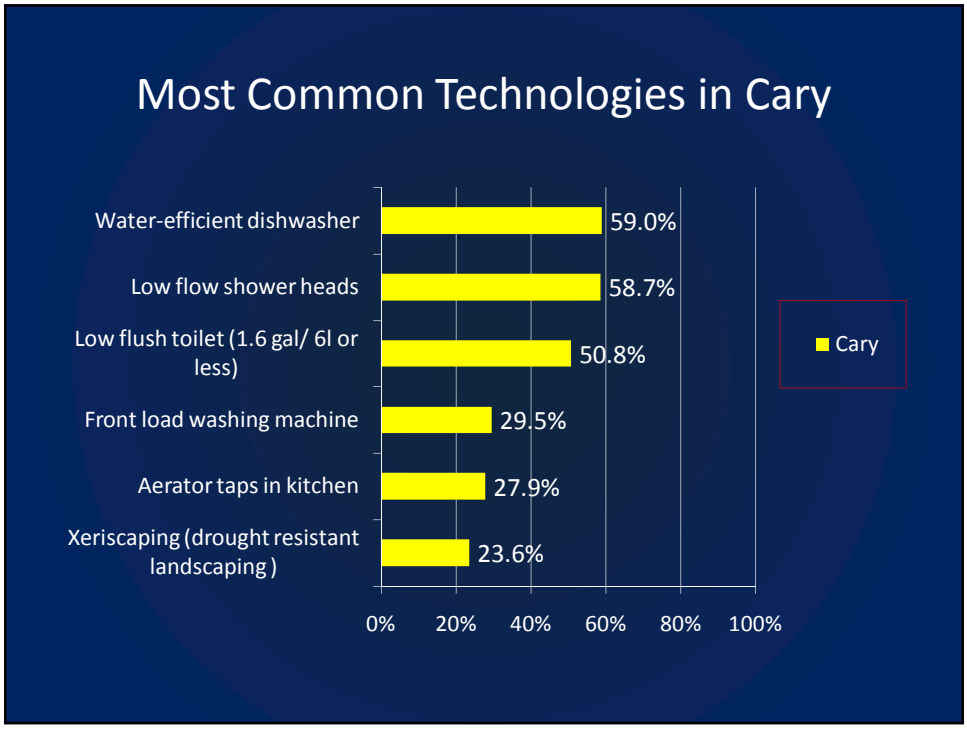


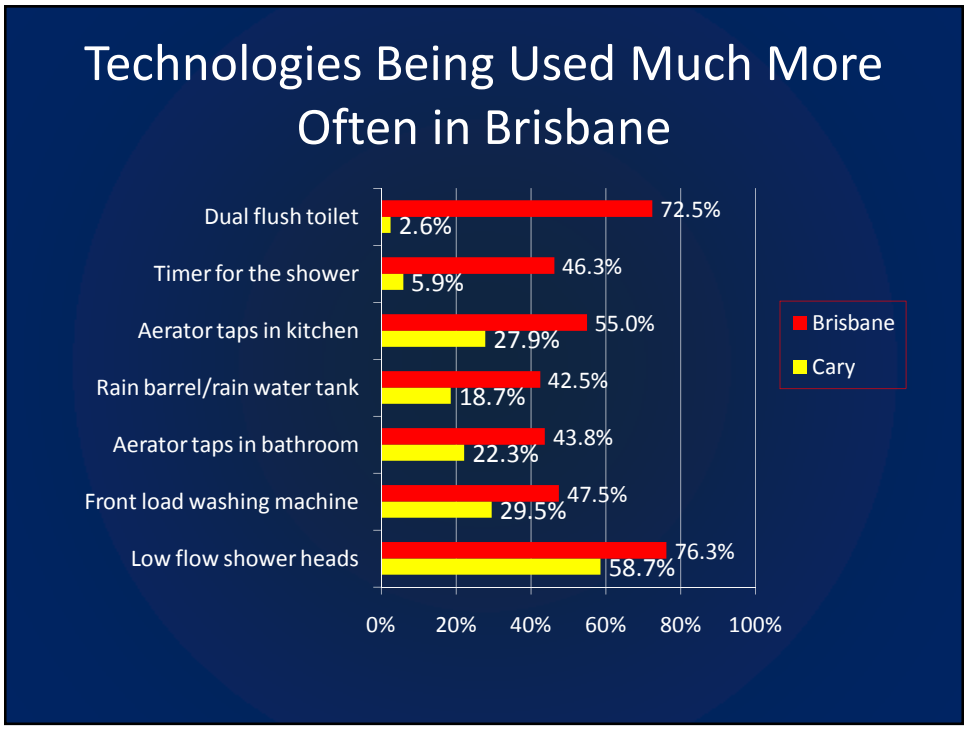


WATER CONSERVING TECHNOLOGIES

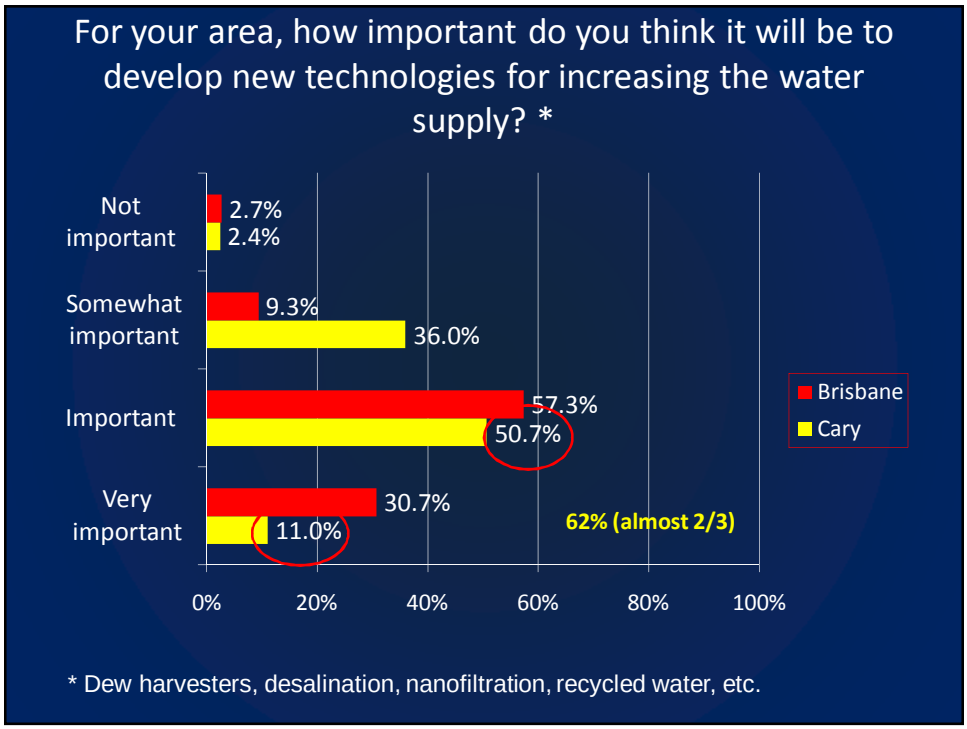
Technologies

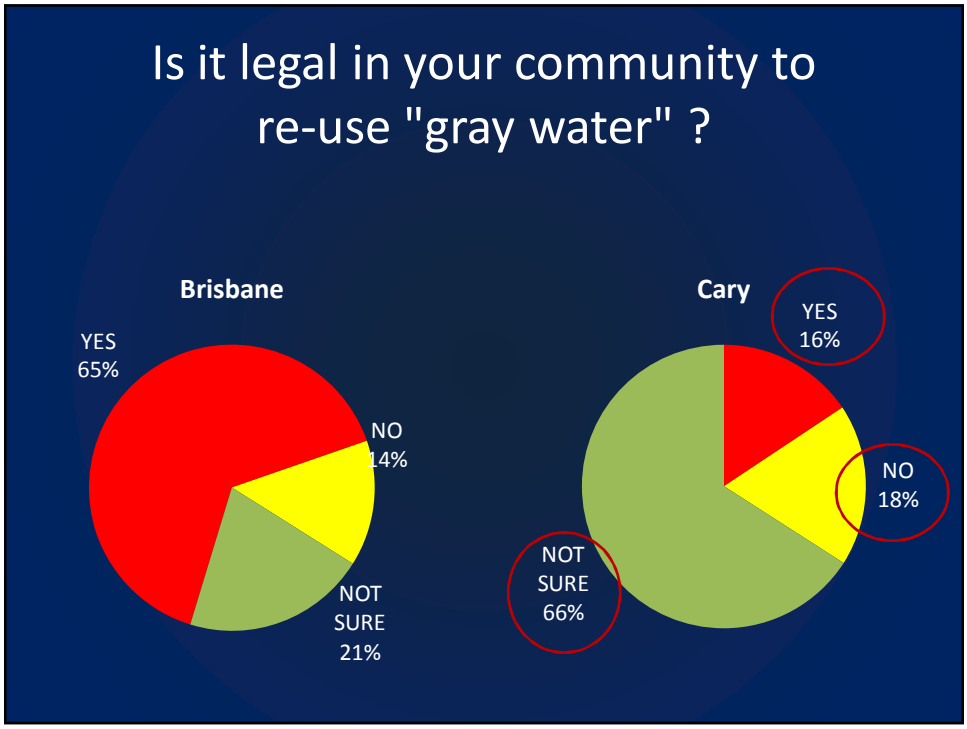
- We asked whether or not respondents had 16 different water saving technologies in the kitchen, laundry, bathroom and outside
- Again, Brisbane had many more than Cary

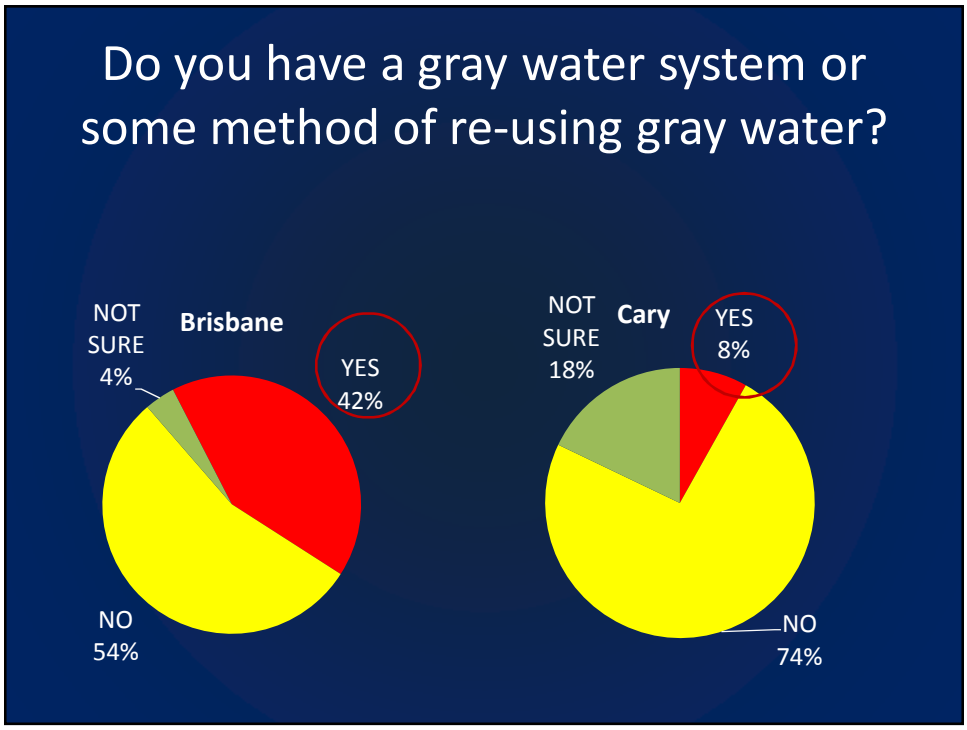

Most Common Technologies in Cary
Water-efficient dishwasher
59.0%
Low flow shower heads
58.7%
Low flush toilet (1.6 gal/ 6l or less)
50.8%
Front load washing machine
29.5%
Aerator taps in kitchen
27.9%
Xeriscaping (drought resistant landscaping)
23.6%
0%
20%
40%
60%
80%
100%
Cary


Technologies Being Used Much More Often in Brisbane
Dual flush toilet
72.5%
2.6%
Timer for the shower
46.3%
5.9%
Aerator taps in kitchen
55.0%
27.9%
Rain barrel/rain water tank
42.5%
18.7%
Aerator taps in bathroom
43.8%
22.3%
Front load washing machine
47.5%
29.5%
Low flow shower heads
76.3%
58.7%
0%
20%
40%
60%
80%
100%
Brisbane
Cary


WATER SUPPLY TECHNOLOGIES


For your area, how important do you think it will be to develop new technologies for increasing the water supply? *
Not important
2.7%
2.4%
Somewhat important
9.3%
36.0%
Important
57.3%
50.7%
Very important
30.7%
11.0%
62% (almost 2/3)
0%
20%
40%
60%
80%
100%
Brisbane
Cary
* Dew harvesters, desalination, nanofiltration, recycled water, etc.


Is it legal in your community to re-use "gray water" ?
Brisbane
YES 65%
NO 14%
NOT SURE 21%
Cary
YES 16%
NO 18%
NOT SURE 66%


Do you have a gray water system or some method of re-using gray water?
Brisbane
NOT SURE 4%
YES 42%
NO 54%
Cary
NOT SURE 18%
YES 8%
NO 74%

Dew Harvesting

- At night the plastic or aluminum is cooled below the dew point, and in the humid air, the dew condenses on its surface.
- Dew harvesting is available not only for roofs, but on a smaller scale and is very affordable for the public.

SUGGESTIONS FOR CARY

How Could Cary Respond?

- Increase awareness
  - Work shops on checking for leaks and simple repairs
  - Have water conservation block parties
  - Create a workshop with kid-friendly props like a Lego H_2O House!
- Give out shower timers and aerators
- Have composters more available
- Offer rebates or incentives for dew harvesters and rain barrels

For more information, check out our website:

water4tomorrow.org

- Background about Cary and Brisbane, survey results, water saving technologies and the LEGO H_2O House

Questions