This presentation premiered at WaterSmart Innovations

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Delineating between Direct, Indirect, and Natural Water Savings

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Per Capita Water Demands

• Per capita indoor residential water demands are declining in virtually every city in North America.

• Is this because our municipal programs are SOOOO effective?

• Since some cities don’t even have an efficiency program, there must be something else going on.
3 Types of Savings

• There are three different types of water savings:
  – Direct Savings
  – Indirect Savings and
  – Natural Savings

• If you don’t distinguish between these three different aspects when you assess the effectiveness of your program, you risk overstating your success
Direct Savings

• Direct savings: savings that would not have occurred without your program
• And
• Can be directly correlated to certain aspects of your program to quantify the savings
• For example...
Direct Savings Examples

• A customer removes their front lawn and replaces it with a native landscape in return for receiving $$ from the water agency.

• A customer replaces a functioning inefficient toilet with an HET because they received a rebate.

• A customer receives a free landscape audit and, based on recommendations in the report, installs a rain sensor on their automatic irrigation system.
Indirect Savings

• Indirect savings: savings **THAT WOULD NOT HAVE OCCURRED** without your program

• But

• **Cannot** be **DIRECTLY CORRELATED** to aspects of your program to quantify the savings

• For example...
Indirect Savings Examples

• The customer that replaces their front lawn also reduces irrigation of their back lawn.

• The customer that installed the new toilet also selected a water-efficient clothes washer when it was time to replace their old model.

• The neighbor of the customer that installed the rain sensor also installed a rain sensor.

• A customer installs an efficient toilet because of the rebate but then doesn’t bother to complete the paperwork.
Natural Savings

• Natural savings occur regardless of your program
• There is **NO** connection between your program and the reduction in water demand
• Customers may not even be aware of your program

• For example...
Natural Savings Examples

• A customer’s toilet/clothes washer, etc., is old and broken – the new model they buy is more efficient because the marketplace no longer sells such inefficient fixtures

• News reports begin to emphasize climate change, etc., people become more ‘environmentally aware’, begin to take shorter showers, irrigate less often, etc.

• Customers reduce water use to save $
Natural Savings (con’t)

• Natural water savings at the level we are currently experiencing is something new

• Many financial and infrastructure planners are not familiar with Natural Savings and, therefore, do not account for them in their projections
  – Many also do not consider Direct and Indirect savings

• So over-estimate demands and
  – revenues (leads to deficits)
  – Infrastructure needs (leads to costly over-building)
Rate of Natural Savings

- Efficient toilets and clothes washers largest impact on residential demands – Assume
  - toilet replaced every 20 years (5%/year)
  - clothes washer replaced every 12.5 years (8%/year)
  - Efficient toilet saves ~ 9.5 gcd (0.475 gcd/yr)
  - Efficient clothes washer saves ~ 7.0 gcd (0.56 gcd/yr)
  - Savings of 1.035 gcd per year residential
  - 60% of total demand is residential
  - Savings of 0.62 gcd per year overall
  - Just from toilets and clothes washers
Natural Savings (con’t)

• The previous savings assumes switching from a 3.5-gal toilet to 1.6-gal – but now most toilet models are 1.28-gal – MORE natural savings!
• Also doesn’t consider other fixtures/appliances or changes to customer behavior
• Natural indoor water savings likely about 0.75 gcd per year overall (not just residential)
• Cities and towns that do NOTHIGN likely still see a decline in water demands ~ 0.75 gcd per year
• This decline, of course, can’t go on forever!
More than Natural?

• If your town offers fixture rebates, and the rebates are having the desired effect and not just padding the wallets of free riders...

• You would expect to see reductions in excess of 0.75 gcd per year (based on 60% res. customers)
Direct & Indirect Savings

- If total avg. winter savings of 1.25 gcd/yr
- Then Direct and Indirect savings together result in savings of 0.5 gcd/yr
  - 1.25 total – 0.75 natural = 0.5 gcd/yr D & I
- Calculate Direct savings – how many rebates awarded, how many CII sites have made changes, how much system leakage reduced, etc.
- Remainder is Indirect savings
- NOTE: program DID NOT achieve 1.25 gcd/yr
Best Bang for Buck

• It may be beneficial to focus program budget on measures that are unlikely to be accomplished through Natural Savings

• Focus on the 20% or so of HIGH-USE customers (both residential and CII) where there is the greatest opportunity for savings
  – You can’t get blood from a stone

• Let Natural Savings take its course:
  – Unless savings need to be expedited or magnified
Natural Savings May Harm Water Conservation Efforts

- You could essentially do NOTHING and still see reasonable water savings in your community.
- As such, a “Turn the Water Off When You Brush Your Teeth” program could appear to be effective.
- Pat yourself on the back – no need to do more – your program is clearly responsible for the savings – ask for a raise in pay.
- There would be no apparent need to implement a truly effective program.
Recommendations

• Review / calculate the Direct, Indirect, and Natural savings associated with your programs
  – Be honest
  – Take credit for Direct and Indirect savings
• Identify ‘high opportunity’ customers / measures that are unlikely to contribute to natural savings
• Redirect budget and efforts to these areas
• Maximize the effectiveness of your water efficiency / conservation program.
Avoid…

• Avoid over-estimating water sales which lead to revenue shortfalls
• Avoid over-estimating water demands which lead to over-building infrastructure (very costly to build and can lead to stale water)

• Both of which (incredibly) sometimes result in blame placed on the water conservation team for saving too much water!
Thank You – Questions?

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