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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 SOOO effective?
- Since some cities don't even have an efficiency program, there mush 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 over-stating 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 **NOTHING** 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…

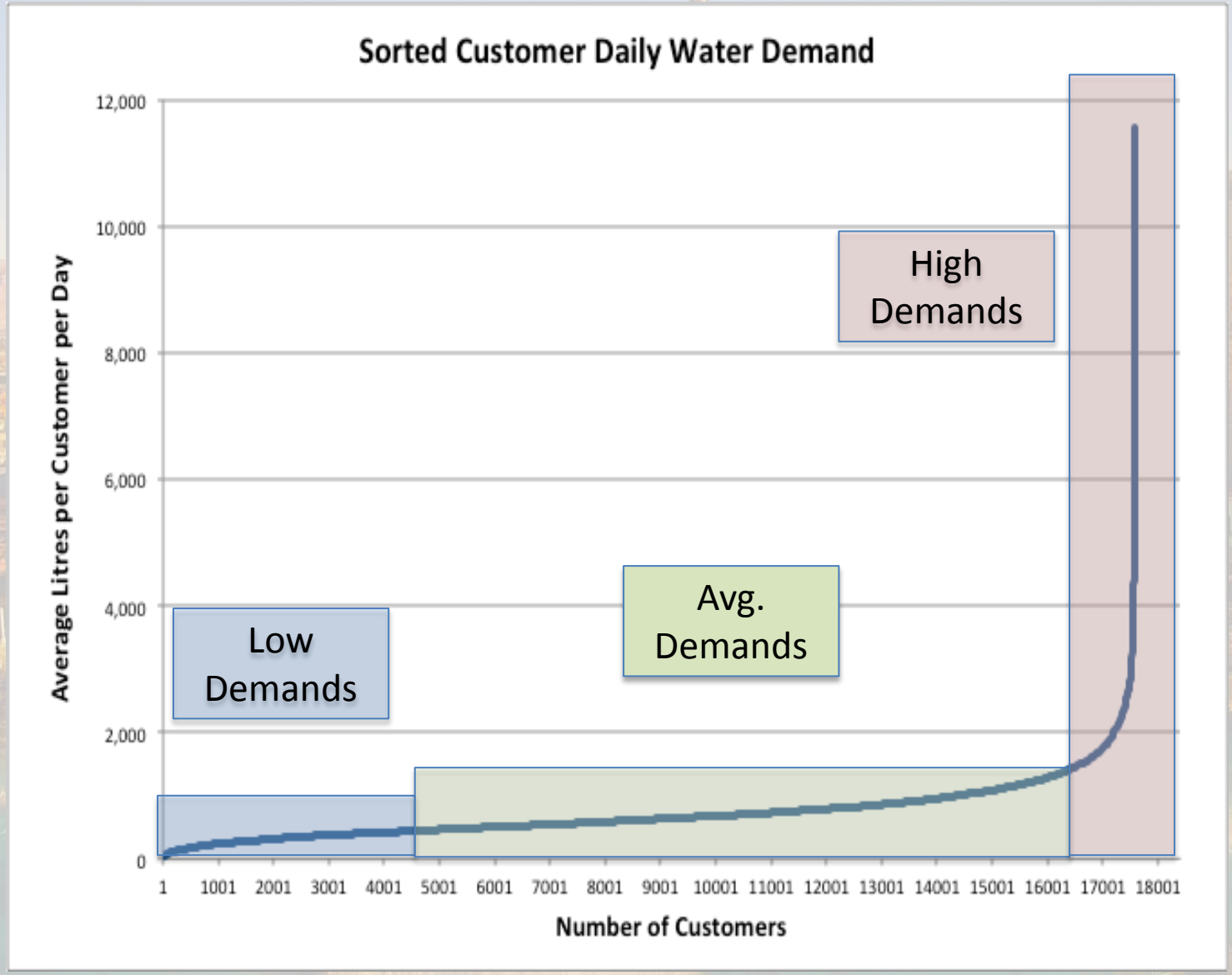
- You would expect to see reductions in excess of 0.75 gcd per year (based on 60% res. customers)

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


Sorted Customer Daily Water Demand
Average Litres per Customer per Day
12,000
10,000
8,000
6,000
4,000
2,000
0
1
1001
2001
3001
4001
5001
6001
7001
8001
9001
10001
11001
12001
13001
14001
15001
16001
17001
18001
Number of Customers
High Demands
Avg. Demands
Low Demands

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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