Water Supply Impact of Rainwater Collection – Atlanta Projections

To make this analysis, we look at three scenarios to show a lower impact, base case, and high impact case in increasing impact on Atlanta's water supply. The assumptions required to project potential impact on water supply are as follows:

1. In the three scenarios, assumptions are made for adoption rate for:
    a. Existing Single Family Homes
    b. Existing Commercial and Institutional Buildings and Multi-Family units (Apartments and Condos)
    c. New building in single family and larger buildings

    The adoption rates are higher for new buildings assuming more financial incentive, lower capital cost, and potential ordinances requiring rainwater collection.
2. The total amount of water savings will be achieved over a 10 year span.
3. The number of existing buildings is assumed as follows:
    a. Existing Single Family Homes = 1.5 million
    b. Existing Larger Buildings = 300,000
    c. New Single Family Construction Next 10 years = 225,000
    d. New Larger Building Construction Next 10 Years = 45,000

    These are drawn from several sources, but we'd welcome any challenges or updates anyone may have.
4. For each scenario, assumptions are made for average rainwater used. A conservative amount was selected in each case based on actual ECOVIE projects.

Scenario 1 – Base Case:

This is the case which we at ECOVIE believe is possible with widespread public awareness, support from government, and continuing and increasing financial incentives for rainwater collection.

In this scenario we assume that the average water supplied by rainwater in an existing home for irrigation will be 25,000 gallons which is a typical minimum savings for an ECOVIE system. For new homes, we assume

that rainwater will more than likely be used indoors, so we've increased the water supplied to rainwater to 50,000 gallons. Please review our case studies and completed projects to see examples that support these assumptions.

We assume 20% adoption over the next 10 years for existing homes and 80% adoption for new homes. The higher adoption for new homes assumes that there will be both incentives and requirements in place to use rainwater collection. Even now, the monthly financing cost of rainwater collection is less than water bill savings in City of Atlanta. With any new incentives, increasing water rates, or local requirements, the benefit of installing a system on a new home will only increase.

For larger buildings with larger water use, the impact on water supply is much greater. We have seen projected savings as high as 1.7 million gallons a year for a single facility. For this analysis, we assume an average savings of only 100,000 gallons annually on existing building. For new buildings as with new homes, the adoption rate will be higher. It is more likely to have requirements for rainwater collection for larger buildings and there is the added incentive of LEED credits and ability to publicize the system for business reasons.

	Existing Single Family Homes	Existing Commercial Buildings	New Single Family Homes	New Commercial Buildings
Number of Buildings	1,500,000	300,000	225,000	45,000
Average Water Savings (gal)	25,000	100,000	50,000	225,000
Adoption Rate	30%	30%	80%	80%
Total Annual Water Savings (gal)	11,250,000,000	9,000,000,000	9,000,000,000	8,100,000,000
Total Daily Water Savings (mgd)	30,821,918	24,657,534	24,657,534	22,191,781

Daily Gallons Supplied by Rainwater
102,328,767

The result of this scenario shows that just over 100 million gallons per day can be supplied by rainwater. This amount matches the amount proposed for a new reservoir for Metro Atlanta water supply. Some of the possible factors that would have to be in place to achieve these sort of impressive results include:

1. There would need to be a major effort to make the general public aware of rainwater collection benefits and to recognize the severity of the water supply problem.
2. There may need to be some green building ordinances in place to require rainwater collection for new construction.
3. Outdoor watering bans that are actually enforced may need to be implemented.
4. Incentives like state tax credits may need to be in place.
5. Loan programs for rainwater collection could help adoption rates.
6. Water and sewer rates would likely need to continue to rise, especially outside the City of Atlanta.

Scenario 2 – Low Impact Estimate

For this case, we scaled back the assumptions to reflect lower adoption of rainwater collection and lower water supply from each system.

In this case, we reduced the adoption rate for existing buildings to 15% and for new buildings to 20%. Water supplied by rainwater was likewise reduced. For single family homes the amount of water supplied by rainwater is comparable to that supplied by a small 1,000 gallon system. ECOVIE systems tend to be larger at the current time, but as more and more people install system, we may see the average size of each system drop.

For commercial building, the amount of water supplied is also reduced. As a point of comparison, 100,000 gallons supplied is equivalent to a 3,000 gallon system with high water demand for either irrigation or process water (e.g. laundering or cooling tower make up). These types of systems already show excellent financial returns, often with less than 2 year payback.

	Existing Single Family Homes	Existing Commercial Buildings	New Single Family Homes by 2020	New Commercial Buildings by 2021
Number of Buildings	1,500,000	300,000	300,000	60,000
Average Water Savings (gal)	15,000	100,000	22,500	150,000
Adoption Rate	15%	15%	20%	20%
Systems Installed Per Year	22,500	4,500	6,000	1,200
Total Annual Water Savings (gal)	3,375,000,000	4,500,000,000	1,350,000,000	1,800,000,000
Total Daily Water Savings (mgd)	9,246,575	12,328,767	3,698,630	4,931,507

Daily Gallons Supplied by Rainwater
30,205,479

While this scenario shows modest adoption and supply, the total impact is still 30,000 million gallons per day which is equivalent to one of the smaller reservoir proposals that are out there.

Scenario 3 – High Impact Estimate

This scenario represents a sort of 'wildest dreams' estimate. It would require high adoption rates and a larger amount of water supplied by each system. The adoption rates chosen reflect the rates reported in Australia and therefore are not beyond the possibility for us to achieve. The water supplied by rainwater matches performance on existing ECOVIE systems, and are thus not unrealistic.

To achieve these sorts of results, around 200 million gallons a day, would however required sustained efforts and awareness by the public and by government to use rainwater as a viable water source. It is clear that achieving this would lead to many challenges such as how to provide the equipment and labor to complete the projects, how to monitors results, and how to make sure system quality and performance is maintained. Nevertheless, we get a lot of enjoyment in thinking big and thinking of what could be possible.

	Existing Single Family Homes	Existing Commercial Buildings	New Single Family	New Commercial
Number of Buildings	1,500,000	300,000	300,000	60,000
Average Water Savings (gal)	35,000	150,000	80,000	225,000
Adoption Rate	40%	40%	90%	90%
Systems Installed Per Year	60,000	12,000	27,000	5,400
Total Annual Water Savings (gal)	21,000,000,000	18,000,000,000	21,600,000,000	12,150,000,000
Total Daily Water Savings (mgd)	57,534,247	49,315,068	59,178,082	33,287,671

Daily Gallons Supplied by Rainwater

199,315,068

Wrap Up:

We chose a 10 year time horizon because this is about the time frame for achieving similar results in Australia. Ten years is also the length of time people think it would take before any large new reservoir could be started. This means that rainwater collection could be supplying a significant amount of water before any new traditional water supply project would start!

And, there are benefits compared to large reservoirs in reduction in government spending since most of the rainwater systems will be financed by private citizens and entities. This will be undertaken largely for the financial and environmental benefits (see case studies and project gallery). It is true that there would be public spending for rainwater collection for systems on public buildings and there would also be spending for any tax incentives and regulation. But this amount would be far less than the amount required for new large reservoirs and subsequent water treatment capacity increases.

A final benefit of rainwater collection, may be in creating jobs. Even with the more conservative scenario, there would be around 30,000 systems a year being installed. This would have an obvious impact on economic activity and the job to install and maintain systems.