

## Goodyear Water Incentive Program

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## **Introduction**

The city of Goodyear is located west of Phoenix, covering approximately 190 square miles. Its 73,000 residents represent a mere 10 percent of the build-out population (Demographics, 2014). From approximately 2,500 residents in 1980 to more than 65,000 residents in 2010, the City of Goodyear is expected to increase to over 100,000 residents between 2020 and 2025 (Strategic, 2016). As population and utilities are expected to increase, the City intends to maintain four focus priorities: quality of life, economic vitality, a sense of community, and fiscal resource management (Strategic, 2016). Unfortunately, the West Valley alone already has a water resource deficit of 750,000 acre-feet, with most water demands coming from single family residences (CHOICE, 2016).

To tackle this issue of water insecurity, the team discussed ideas and methods with water and planning experts Mark Holmes, Goodyear's Water Resources Manager, and Katie Wilken, Goodyear's Planning Manager. This was necessary to learn how the City, the primary stakeholder, plans to reduce or eliminate outdoor water use. The following introductory research questions were asked:

- Who is the City trying to incentivize?
- What does the City want them to do?
- What successful incentives have other places implemented?

Goodyear's objective is to reduce or eliminate outdoor water use for upcoming new residential, commercial, and industrial developments. This can be done through xeriscaping, passive and active rainwater collection, shade through trees and architecture, and permeable walkways, driveways, and patios (Maddaus, 2014). However, this problem is complex and not one-sided. As there is room for multiple stakeholders' perspectives, the team will take advantage

of the City's knowledge, research successful incentives, thoroughly document existing conservation programs, and make recommendations for the City of Goodyear going forward.

### **Progression**

The first step in creating this program was meeting with Mark Holmes and discussing the City's objectives and how this incentive program aligns with Goodyear's master plan and design guidelines. As proactive as the City of Goodyear is being, how do they want this program to function? The city is unique in its early implementation of this program, as the city is largely undeveloped with few high-density regions. As the City of Goodyear expects to quickly develop and expand, the City intends to implement bottom-up conservation strategies by aiming the program at new construction and development rather than retrofits and remodels. This also makes participation in the program more appealing to developers keen on improving returns on investment.

The City of Goodyear's design guidelines and master plan outline not only aesthetic and ergonomic planning concepts, but also heavily discuss integration with 'green' construction practices. From water-conscious plant selection and clever shade tree placement to storm-water retention and reclaimed water usage, the design guidelines are a concerted effort to consolidate – not distinguish – good design and *green* design. The team frequently used the design guidelines and master plan as a baseline for creating an incentive program.

That said the City has no incentive-based efforts for the team to reference, with only a handful of voluntary education programs (City of Goodyear). The team would have preferred to see a local source for successful incentives, but instead extensively searched for cities which have potential solutions to Goodyear's issues.

## **Data Gathering**

### The City of Goodyear

Based on the City of Goodyear's intentions and objectives, the team focused heavily on home builders and developers in the City of Goodyear. Developers have no intrinsic motivation to join this program unless it benefits their bottom line, therefore the team searched for frequently used incentives, how they may be applicable within the City of Goodyear, and what issues the City may encounter while trying to employ such incentives.

### Pre-existing programs

In the team's background research process, many water conservation programs - most of them a subset of a larger effort - were found. These programs ranged in size from community and municipal building programs to state or nation-wide systems with widespread recognition. In both cases, the scope of the programs were very similar - they covered a handful of essential areas of conservation and provided incentives for participation and, in some cases, certification. For instance, Washington employs two statewide sustainable building programs: *Built Green* and *Earth Advantage* (Built Green Washington, 2013). The former uses a 1-star to 5-star rating system which depends on accumulated points and minimum requirements while *Earth Advantage* highlights five conservation categories, awarding certification levels for accumulation of points in each category (Earth Advantage, 2012). California - with objectively the most stringent green-construction code in the country, CALgreen - has a statewide set of construction mandates and conservation requirements which, in some cases, rival or even exceed LEED expectations (StopWaste, 2014). Municipalities and counties occasionally offer incentives for developers which exceed these requirements. Elsewhere in the United States, comprehensive sustainable building programs consistently reward developers for meeting or exceeding

conservation and design goals. These systems have had mixed results, but through time have proven themselves as viable solutions to a problem very similar to Goodyear's.

### Incentives

Incentives must be made to entice developers to efficiently conserve water. Generally, a developer's main goals involve profits and not sustainability, requiring the program to be financially appealing. Incentive programs have been implemented by many organizations and institutions with varying results. For instance, Ohio's Oberlin College successfully implemented a water and energy conservation program for its dormitory residents. Over two weeks, the students in their respective dorms competed to conserve the most water. With real-time monitoring, the students collectively reduced average water consumption by 20,500 gallons (with over \$5,000 worth of energy saved overall) – the only incentive being an ice cream party for the winning dorm (Peterson, Shunturov, Janda, Platt, Weinberger). However, the case only grows more interesting. Students interviewed after the completion of the contest stated that although there was no longer an incentive, they were still motivated to save energy (Peterson, Shunturov, Janda, Platt, Weinberger).

In contrast, the Beloit Corporation – a manufacturing company – had a long standing incentive program that was removed by request of its workers union (Kohn). First the production level drove down, as the extra pay was the source of the employee's motivation (Kohn). Soon after however, production rose to a level higher than when the program was in place (Kohn). Behavioral expert Alfie Kohn wrote about of this situation and other failed programs to give insight on how and why incentives can fail. Of the multiple reasons given, one significant point sticks out; "Rewards ignore reasons" is a main point of Kohn's article "WHY INCENTIVE PLANS CANNOT WORK" (Kohn). This partly could be seen as to why the Beloit

Corporation's production levels rose after removing an incentive. The employees' motivators seemed to shift from sole personal gain to the general well-being of the company.

Given these examples the objectives change in developing an incentive program for the City of Goodyear. Developers must be given an incentive program that motivates them to participate, while at the same time influencing them to truly care about the goals of water conservation; not the incentive aspect alone. The key questions relevant to this are:

1. What types of incentives will work for developers?
2. What conservation methods will developers be willing to adopt?

Although developers are not interested in ice cream parties, small incentives can still be very effective in implementing conservation policies. For example, Coconino County has a sustainable building program that has been in effect since 2010 (Coconino County Arizona). Businesses and developers are rewarded for meeting certain water and energy conservation criteria with an award and community recognition. They are offered advertising by the County and displayed as a role model through event participation and marketing (Coconino County Arizona). This is an excellent example of a reward that does not disregard its reason. The developments are awarded certification and then given free recognition in their community, all while businesses help reduce energy and water overconsumption. Evidence suggests Coconino County's incentive for developers is more likely to create lasting results compared to a monetary reward, such as a tax credit. Psychologists generally refer to incentives as a form of extrinsic motivation – they do not change our attitudes on the *reason* an incentive is offered in first place (Kohn). The reward of being presented as a sustainability leader however implies that the developer would intrinsically hold themselves to that standard of practice. In regards to monetary value, these developers can find motivation to conserve even without a City-run incentive policy.

By reducing their water consumption, they will enjoy reduced water costs and a marketable selling point. This is an incentive in itself and could be used to promote the policy to new developments.

### **Data Analysis and Solution**

After considering what incentives could be used to convince developers to conserve water, the focus shifts to what methods they would be willing to commit to. There are an overwhelming number of conservation methods, and developers are likely to favor only a handful. Green plumbing systems are one of the best methods for a development to save water and money (Green Plumbing Systems Save Water and Energy). However, existing developments without efficient plumbing will be unlikely to convert as the plumbing becomes nearly impossible to access after the project's completion (Green Plumbing Systems Save Water and Energy). Efficient appliances may save a significant amount of water, but an office building is not likely to have a need for any large amount of appliances (Green Plumbing Systems Save Water and Energy). Xeriscaping, a method of water efficient landscaping, is capable of reducing outdoor water use by 50-70% (Xeriscape). Conversely, establishments with little outdoor space will be able to build the area needed for xeriscaping, but may not see such significant benefits. Since different methods of conservation have varying effectiveness between businesses and developments, an incentive program should provide developers choice in their methods of water conservation.

Based on the team's extensive background research, the City of Goodyear's objectives and master plan, the viability of incentive programs, and the success of other programs, a point-based, tiered certification system was selected by the team as the best structure for Goodyear's pilot incentive program. As previously mentioned, many existing programs use a tiered

certification hierarchy, where developers acquire points for their efforts and are rewarded with city-sponsored marketing, recognition, or financial incentives. A number of these programs have seen significant success, and although the scope of these programs ranges from national to municipal, the premise is the same. The team firmly believes that such a system is a solid foundation for not only the City of Goodyear's water conservation goals, but their design guidelines and sustainable building as a whole. Points-based systems allow the City of Goodyear the flexibility to weigh certain conservation efforts more heavily than others, passively guiding development projects to their design guidelines and conservation objectives, while providing an expandable and otherwise exhaustive list of options for developers and home builders. As developers accumulate points for their decisions, certification levels should be employed to distinguish and even reward developers for their efforts.

The team recommends that Goodyear uses three or four tiers of certification, dividing each by not only cumulative point value, but resultant incentive as well. For instance, with four levels of certification - *bronze*, *silver*, *gold*, and *platinum* - the lowest level may entail marketing and recognition, while intrepid developers seeking platinum status may see permitting, water connection, and/or inspection fee decreases alongside offset LEED certification costs and reduced property valuations or mill rates. Although these incentives are perilously close to undesirable direct rebates, the City of Goodyear may distribute these incentives among certification levels as they deem fit, and scale incentives to be mutually beneficial for both developers and the City.

Based on the success of conservation programs with similar structures, such as the City of Scottsdale, the City of Goodyear can expect reasonable developer participation. Scottsdale's program has been in existence for nearly 20 years, but has issues 'green permits' for over 1,300



single-family residences and upwards of 30% of all multi-family construction (Floyd, 2016). In addition, the team has found that sustainable building attracts tenants, provides developers with a competitive edge, increases property values, and has numerous benefits to the City, community, and developers (US Green Building Council, 2015). Based on the City of Goodyear's development design review, inspection, permitting processes, and design guidelines the team concluded that offsetting permitting fees and turnaround time, decreasing inspection fees, reducing LEED registration and certification fees, and expediting the design review process may be the proverbial 'lowest hanging fruit,' all the while minimizing the initial cost to the City.

Lastly, the City of Goodyear should incorporate a method of breaking down the outdoor water use figure into more digestible portions. Though 60 to 70 percent of Goodyear's municipal water use is outdoors, the City is unaware of how that water is budgeted to irrigation, inefficiency, pool use, and other areas. By measuring volunteer homes' outdoor consumption habits and pinpointing wasteful use, the City may find significant data with which to create incentives or distribute incentive points effectively.

### **Future Considerations**

Although water-use measurements and inspections may be revealing, the City of Goodyear should further investigate the difference between water use in traditional and xeriscaped homes. As well, the City should examine the difference in water conserved by homes using runoff-capturing landscaping and homes using different active forms of rainwater collection. In addition, irrigation inefficiencies and leaks should be more actively mitigated or eliminated. For example, the City of Goodyear's *irrigation checkup* program could evolve into an annual inspection or mandatory requirement newly installed systems (City of Goodyear).

There may be potential shortcomings of the program as initially proposed that the City of Goodyear should be aware of. It is possible that developers will 'cherry-pick' particular conservation methods which yield the most points-per-dollar in order to maximize potential rewards and certification tier. While this does not necessarily cost the city money, it is at odds with the extrinsic motivation issue discussed above. In this case, the City of Goodyear may need to reevaluate the points system and redistribute accordingly so as to discourage this behavior.

Additional data is required for proper implementation of the program as outlined. The team has performed no cost benefit analysis nor examined the financial repercussions to the City of Goodyear for the aforementioned incentives, so the City must determine which taxes, fees, and other costs of development fall within the scope of the incentive program, and what costs it is willing to incur. A long-term reduction in fee revenue, for example, is less of a burden on the City than the up-front costs presented by offering rebates or grants (American Institute of Architects, 2012). Any cost-benefit analysis cannot be complete until these considerations are made. In addition, the City of Goodyear will need to implement a method of observing the success of the project. Options include participation-based meter measurement of average household water use, an overall ratio of participating developers to total developers, or a ratio of certified developments to total developments. Ongoing measurement and administration of these values will allow the City of Goodyear to gauge the program's success, ascertain how to progress, and potentially amend the incentive program.

## **Conclusion**

The City of Goodyear is increasing in population density and aims to eliminate outdoor water use in order to provide a strong, sustainable environment for businesses, citizens, and future generations. The recommended solution involves a points-based certification program that

offers developers and home builders flexibility in water efficiency techniques. Taking into account the success of certain incentives, this program purports to highlight actively green developers and provide them numerous incentives to preserve this fundamental change. Though this is a complex problem with room for multiple stakeholder perspectives, the team is confident that this structure is capable of succeeding. More research and data is required for quantitative and cost-related analyses, but the basic premise is a strong candidate for the City of Goodyear's pilot incentive program.

## Citations

- AIA California Council. (2013). 2013 California Green Building Standards Code Mandatory Measures. Retrieved from American Institute of Architects: <http://www.aiacc.org/wp-content/uploads/2014/03/AIACC-2013-GBC-Requirements-ResidentialMandatoryMeasures.pdf>
- American Institute of Architects. (2012, March). Local Leaders in Sustainability: Green Building Incentive Trends. Retrieved from The American Institute of Architects: <http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab093472.pdf>
- Built Green Washington. (2013, December). A Green Building Program. Retrieved from [http://www.builtgreencw.org/assets/final\\_bgwa\\_single-family\\_handbook\\_2014.pdf](http://www.builtgreencw.org/assets/final_bgwa_single-family_handbook_2014.pdf)
- CHOICE- Goodyear Development Incentive Program [PPT]. (2016). Goodyear: Water Resources Division.
- City of Goodyear. (n.d.). Irrigation Checkups. Retrieved from City of Goodyear, AZ: <http://www.goodyearaz.gov/government/departments-divisions-a-z/public-works/water-services/water-conservation/irrigation-checkups>
- Coconino County Arizona. (n.d.). Coconino County Sustainable Building Program. Retrieved from Coconino County Arizona: <http://www.coconino.az.gov/index.aspx?NID=625>
- Demographics & Growth. (2014). City of Goodyear. Retrieved April 13, 2016, from <http://www.goodyearaz.gov/about-us/demographics-growth>
- Earth Advantage. (2012). Measures Resource Guide. Retrieved from 2012 Earth Advantage Residential: [http://www.earthadvantage.org/assets/documents/NH\\_MeasureGuide.pdf](http://www.earthadvantage.org/assets/documents/NH_MeasureGuide.pdf)
- Floyd, A. (2016, March 4). Scottsdale Green Building Trends. Retrieved from City of Scottsdale Green Building Program: <http://www.scottsdaleaz.gov/Assets/ScottsdaleAZ/Design/green-building/2015+Green+Building+Trends.pdf>
- John E. Petersen, Vladislav Shunturov, Kathryn Janda, Gavin Platt, Kate Weinberger, (2007) "Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives", *International Journal of Sustainability in Higher Education*, Vol. 8 Iss: 1, pp.16 – 33

- Kohn, A. (1993). Why incentive plans cannot work. *Harvard business review*, 71(5).
- Maddaus, L., Maddaus, W., Maddaus, M., & ebrary., I. (2014). *Preparing urban water use efficiency plans: A best practice guide*. London, England: IWA Publishing.
- StopWaste. (2014, February). *Comparing Residential Green Building Rating Systems and the CALGreen Code in 2014*. Retrieved from [www.stopwaste.org/file/1059/download?token=oZOsJ6QG](http://www.stopwaste.org/file/1059/download?token=oZOsJ6QG)
- StopWaste of Alameda County. (2013, September). *CALGreen 2013 Tier Comparison to LEED v4*. Retrieved from Bay Area Regional Energy Network:  
[https://www.bayren.org/sites/default/files/CG%202013\\_LEEDv4\\_Comparison\\_Detailed.pdf](https://www.bayren.org/sites/default/files/CG%202013_LEEDv4_Comparison_Detailed.pdf)
- Strategic Plan [PDF]. (2016). Goodyear: Water Resources Division. Retrieved April 13, 2016, from <http://www.goodyearaz.gov/home/showdocument?id=13075>
- US Green Building Council. (2015, February 10). *The Business Case for Green Building*. Retrieved from USGBC: <http://www.usgbc.org/articles/business-case-green-building>