CHOICE-Development Pilot Program

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Presentation Outline

- Introduction
- Project Objective
- Research Questions and Method
- Results
- Challenges
- Questions

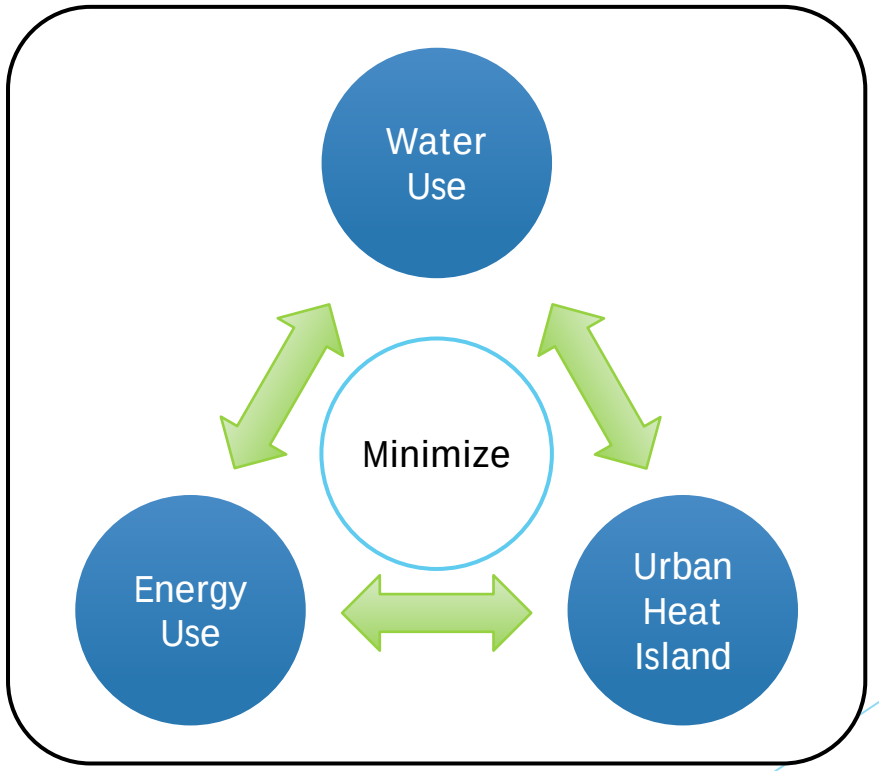
Introduction

- Background
  - City of Goodyear on track for growth
  - Water supply will likely remain the same/decrease in future
  - Urban heat island concerns
- Sustainability challenge:
  - Incentivize developers to design low-water consumption developments

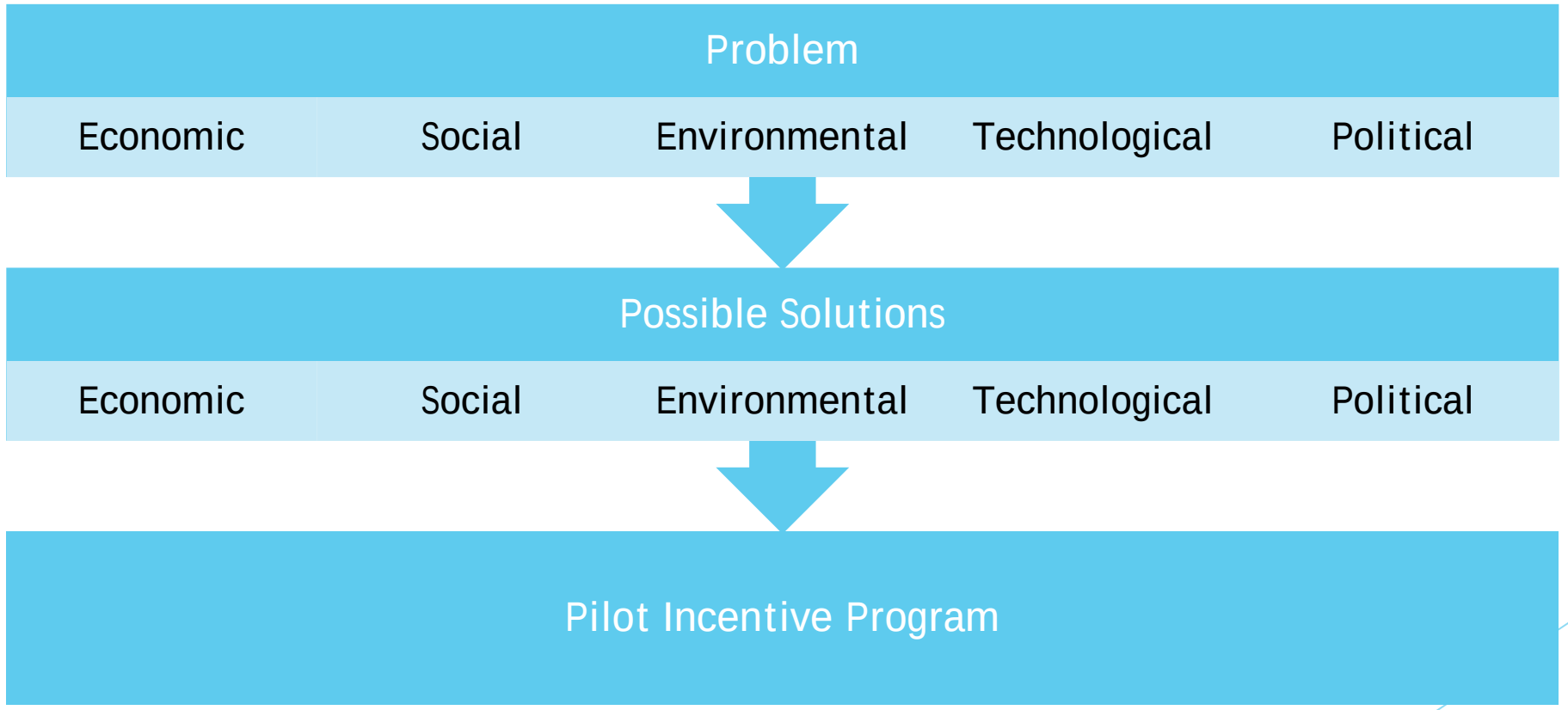
Project Objective

- Provide ***CHOICE*** through ***incentives***
  - Create pilot incentive program
  - Include monitoring plan

Goal of Incentives



Research Questions



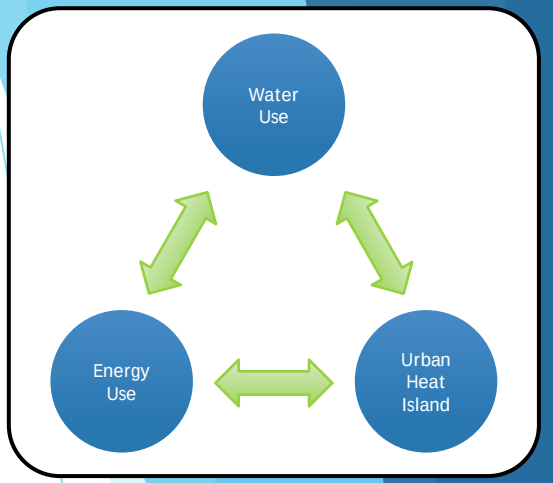
Research Strategy

1. • Literature Review
   - 25+ sources
2. • Problem Framework
   - Visual Model
3. • Draft Incentive Program
4. • Stakeholder Feedback

Technological Analysis

Infrastructure & technology challenges and solutions

Challenges



Urban Surfaces

Urban Landscapes

Low Density

Solutions

Devices

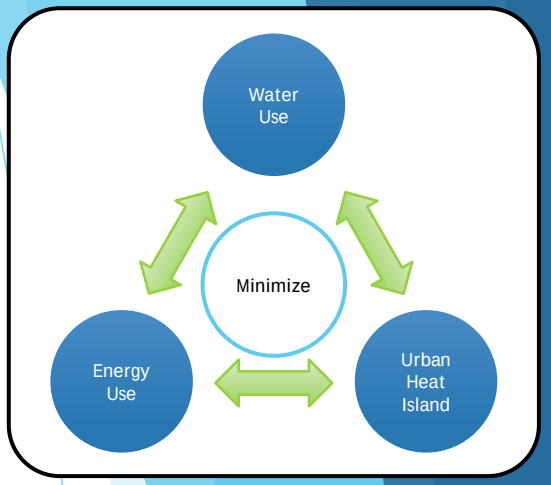
- Energy efficient appliances
- Water efficient fixtures
- Pressure management technology
- Leak detection technology
- Outdoor water saving technology

"Green" Infrastructure

- Bioretention & Bioswales
- Rainwater harvesting
- Green and cool roofs
- Porous & water holding pavement

Master Planning

- Increase density
- Less pools
- Low-water use renewable energy
- Expand water reuse
  - ex. grey water reuse

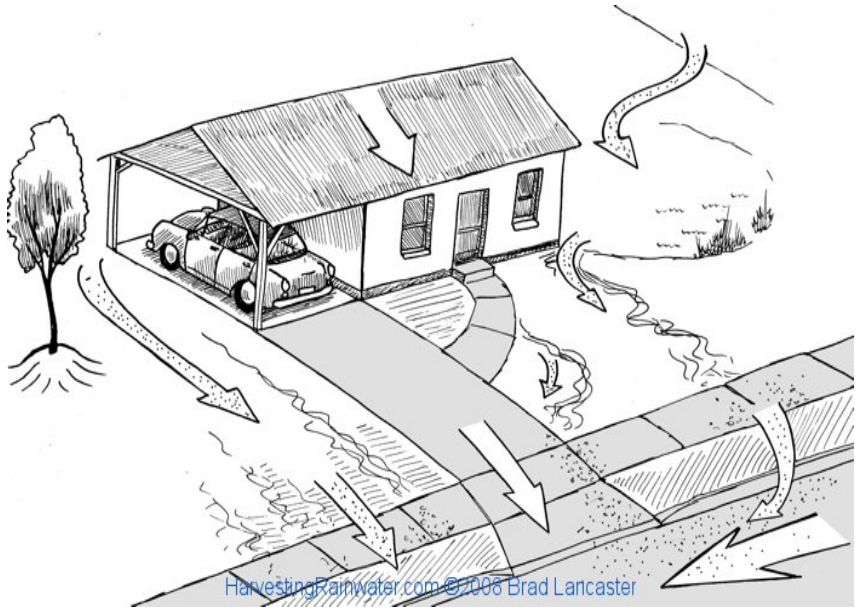


Environmental Analysis

Problem

- Rapid population growth impacts water usage.
- Drawing from ancient aquifer water for municipal use.
- Lowering water tables affects surface water and riparian life.
- 70% of household municipal water is used to moisten dirt in the yard.
- To obtain the platinum water award requires zero municipal water usage for landscaping.
- Changing the current water consciousness regarding rainwater: from liability to asset.

What is Passive Rainwater Harvesting?



- An average 1/6 acre parcel receives 4500 gallons per inch of rain. This equals 36000 gallons annually of salt free rainwater.
- With a simple change of topography the rain that falls on a property can be captured in the soil.
- A 2000ft roof can divert 9600 gallons of rainwater which can either be stored in a cistern or directed to a sunken rain garden.

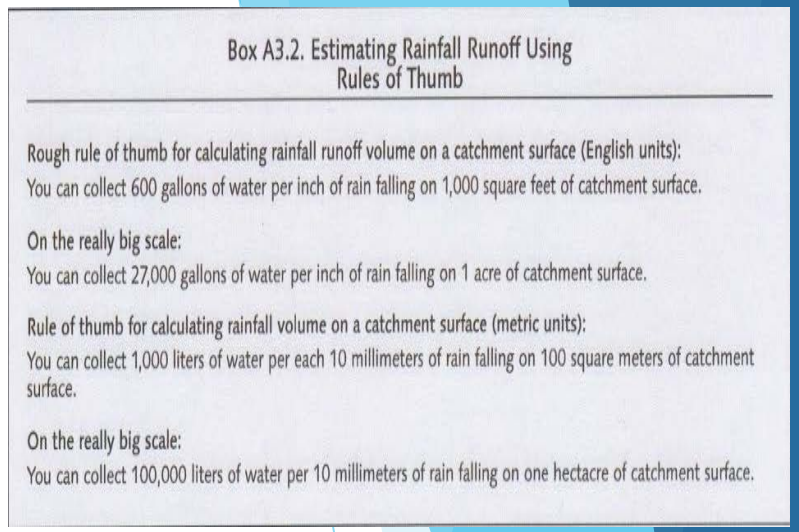
Water scarcity or mismanagement?

- Goodyear residents use an average of 7000 gallons a month of municipal water which equates to 84,000 gallons a year.
- Goodyear has approximately 75,000 residents using municipal water which equals **6.3 billion gallons per year of municipal water.**

- 27,000 gallons of rain that fall per inch, per acre
- Goodyear has 75,000 acres which equates to 2,013,120,000 gallons per inch of rainfall
- The city of Goodyear averages 8 inches of rain annually equates to **over 16 billion gallons per year of rainfall.**

- **Goodyear residents receives over twice the amount of rainfall than they use in municipal water in an average year!**

- And the current paradigm has people using 70% of total household potable municipal water in yards to moisten dirt.



Box A3.2. Estimating Rainfall Runoff Using Rules of Thumb

Rough rule of thumb for calculating rainfall runoff volume on a catchment surface (English units):
You can collect 600 gallons of water per inch of rain falling on 1,000 square feet of catchment surface.

On the really big scale:
You can collect 27,000 gallons of water per inch of rain falling on 1 acre of catchment surface.

Rule of thumb for calculating rainfall volume on a catchment surface (metric units):
You can collect 1,000 liters of water per each 10 millimeters of rain falling on 100 square meters of catchment surface.

On the really big scale:
You can collect 100,000 liters of water per 10 millimeters of rain falling on one hectacre of catchment surface.

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Economic Analysis

Economic Analysis

- Las Vegas Case Study
  - Conversion from mesic to xeric landscapes with 50% canopy coverage in 5 years
  - Reduced water usage of 30%
  - Reduced water bill cost by 54%
  - Breakeven point was reached in less than 2 years
- Push LEED certified buildings to developers
  - Relatively same cost to build
  - Buyers often overestimate costs of LEED homes
  - People are more likely to buy efficient homes than to convert them
- Incentives for everyone
  - Buyers get better houses and cheaper bills
  - Developers can charge more for the houses with the same costs
  - Landscapers get business for putting in canopy trees

Social Analysis

Social Analysis

- General consumer attitudes are geared towards consumption being “good”
- Society lacks momentum to change attitudes and to reform current institutions, which disincentivize sustainable behavior
- Lack of civic engagement
- Citizens aren’t directly facing the scarcity

Solution

- An incentive approach to policy to pull citizens into sustainable behaviors rather than push them
  - Ann Arbor, Michigan (2006)
- Engage citizens in potential policies regarding water supply
  - Boston, Massachusetts (1980)

Political Analysis

Political Analysis

- 1980 Groundwater Management Act
  - Established as a result of consistent annual overdraft
  - Three major goals
    - Control overdraft
    - Sustainable resource allocation
    - augmentation of water through a supply development
  - The City of Goodyear currently receives all physical water supplies from groundwater.
  - Arizona groundwater rules requires sustainable pumping and groundwater replenishment
  - Turf Related Facilities Program
    - Industrial Sites
      - water intensive landscapes

Political Concerns

- Average annual water demand in 2013 and 2014 was 8.0 million gallons per day with a projected increase by 2.4 million gallons per day by 2020.
  - The City of Goodyear signed a subcontract with the Central Arizona Project that allocates an annual 7100 acre-ft of water, with an addition 7100 acre-feet of Cap water from the Arizona tribal community.

- Public outreach between city council and general population
  - With Goodyear's consistent increase in population, the need to generate public awareness regarding the issue of water conservation is becoming more necessary in order to meet the city's water conservation goals.
  - The concern around the growing population and water consumption is limiting Goodyear’s ability to continue attracting new residents and businesses.

Lessons learned

- Interconnectedness of problems and solutions
- Printed agendas and supporting documentation facilitate collaboration
  - Faster meeting
  - Focused meeting

Future Challenges

- Pilot program tiers reasonable & push for change
  - Not too challenging that no one attempts
- Pilot program feasibility
- Further stakeholder engagement

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Questions?

Thank you for your time.