Introduction

City of Gunnison, Colorado:

Basic Facts

- Rural community with population of 6,261 (US Census Bureau)
- Elevation is 7,703 ft.
- Significant snowfall (45-60" + annually)
- Poverty rate is relatively high (~35.4%)
- Temp. varies from -13° F to 85° F
MSW Generation

- waste generation \( \propto \) increase in population
- volume and composition differs based on population, urbanization, GDP

1.3 billion tonnes generated per year globally and increase to 2.2 billion tonnes in 2025. (Hoornweg et al, 2012)

MSW in the US

- Landfilled: 65%
- Recycled: 35%

US MSW Generation Characterization 2012

- Paper and Paperboard: 27%
- Yard Trimming and Food Waste: 28%
- Plastic: 13%
- Metals: 9%
- Rubber/Leather: 9%
- Wood: 5%
- Glass: 5%

MSW Generation in Colorado

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>Waste Generation</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West Colorado Counties</td>
<td>2015</td>
<td>107,000 tons (1.1 tons/cap/yr.)</td>
<td>South West Colorado Council of Government (SWCCOG)</td>
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<tr>
<td>Colorado</td>
<td>2015</td>
<td>9.3 million tons (1.7 tons/cap/yr.)</td>
<td>Colorado Dept. of Public Health &amp; Environment</td>
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<tr>
<td>Colorado</td>
<td>2014</td>
<td>8.8 million tons (1.6 tons/cap/yr.)</td>
<td>Boulder County Resource Conservation Division Report</td>
</tr>
<tr>
<td>Boulder</td>
<td>2010</td>
<td>221,000 tons (2.2 tons/cap/yr.)</td>
<td>Boulder County Resource Conservation Division Report</td>
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Source: US EPA Fact Sheets, 2012
Plastic Pollution

Plastic pollution by numbers

- Thrown away: 35 billion plastic water bottles a year in the US.
- Approximately 500 billion plastic bags used annually worldwide.
- Over 40 percent of plastic waste is in packaging.
- Plastics are estimated to account for 8 percent of wildlife deaths.
- Over 256 species known to have ingested or become tangled in plastic.
- A 2016 UN study estimated $7 trillion a year of economic value from plastic pollution.

Need for this Project

- Limited Waste Management Infrastructure in Gunnison.
- 18,647 tons of MSW landfilled in 2015 (1.15 tons/cap) (Chavez, 2017).
- ~72,000 tons of food/annum arrives in Gunnison on trucks, contributing about 7,690 metric tons CO2 to the atmosphere.
- Lots of snow limits amount of food that can be grown locally annually.
- Short growing season for local farmers (63 days annually) with limited affordable greenhouse/hoop houses.

Steps Taken to Address Project Needs

- Worked closely with Coldharbour Institute Gunnison-community sponsor.
  - "facilitates education, incubation, and demonstration of responsible personal, community and land practices".
- Development of a "program"- creation of a "step by step" manual on processes involved in the construction of plastic bottle greenhouse from wastes recovered from the community.
- Construction of a demonstration plastic bottle greenhouse in Gunnison.
Project leveraged on community partners:
- Community Members
- Facilities Department, ENVS Dept. (WSCU)
- Gunnison High School
- City of Gunnison Public Works Department (Recycling Center)
- Calder Farms (local farmers)
- Mountain Solar Design- Steve Schechter
- Gunnison Times

Community Engagement Platforms

A ‘growing’ use for repurposed refuse

Student pursuing greenhouse project using plastic bottles

Plastic bottles have appeared everywhere in the environment in recent years and will continue to be a part of our world for years to come. It has been estimated that the United States alone produces 1.5 million tons of plastic waste a year, and we need daily according to a report from “Rise the Ruckus” 100,000 tons of plastic bottles and other waste products. Some waste bottles are sent to the landfill each year, but the Western State Colorado University (WSCU) student, Christopher, is trying to change that. His plan involves recycling plastic bottles to create a greenhouse. Each plastic bottle is a step towards a greener future.
Project Fundraising

- Fundraiser created and promoted on Facebook pages of Gunnison Market place and Coldharbour.
- Received cash donations from and around the community.
- Fundraiser not only raised money, but created huge and impactful awareness about the project.

Hands-On Training on Construction of Plastic Bottle Greenhouse

- Hands-On Training
  - Training of community members on the processes involved in constructing a plastic bottle greenhouse.

Construction of Plastic Bottle Greenhouse

- Structure built on skids- for demonstration and education.
- Encourage local farmers to adopt the innovation for their greenhouse.
- Greenhouse is being used by Calder Farms (local farmers) to grow food during the upcoming winter season.
Project Next steps/ Future Sustainability of Project

- Demonstration of the structure for one year to ascertain its structurally integrity and effectiveness
- Expansion to other rural communities
- Gives more credibility for adoption by local farmers and other community members to embrace concept
- Step by step manual to serve as training guide for communities to build sustainable structures
- Website development for easy access to ‘how to’ manual by US communities and regions around the world

MORE PICTURES OF THE GREENHOUSE
THANK YOU FOR LISTENING