

RNG WORKS



How to Redeem a Waste Product for Positive End-Use: WWTP to RNG

Presentation by:

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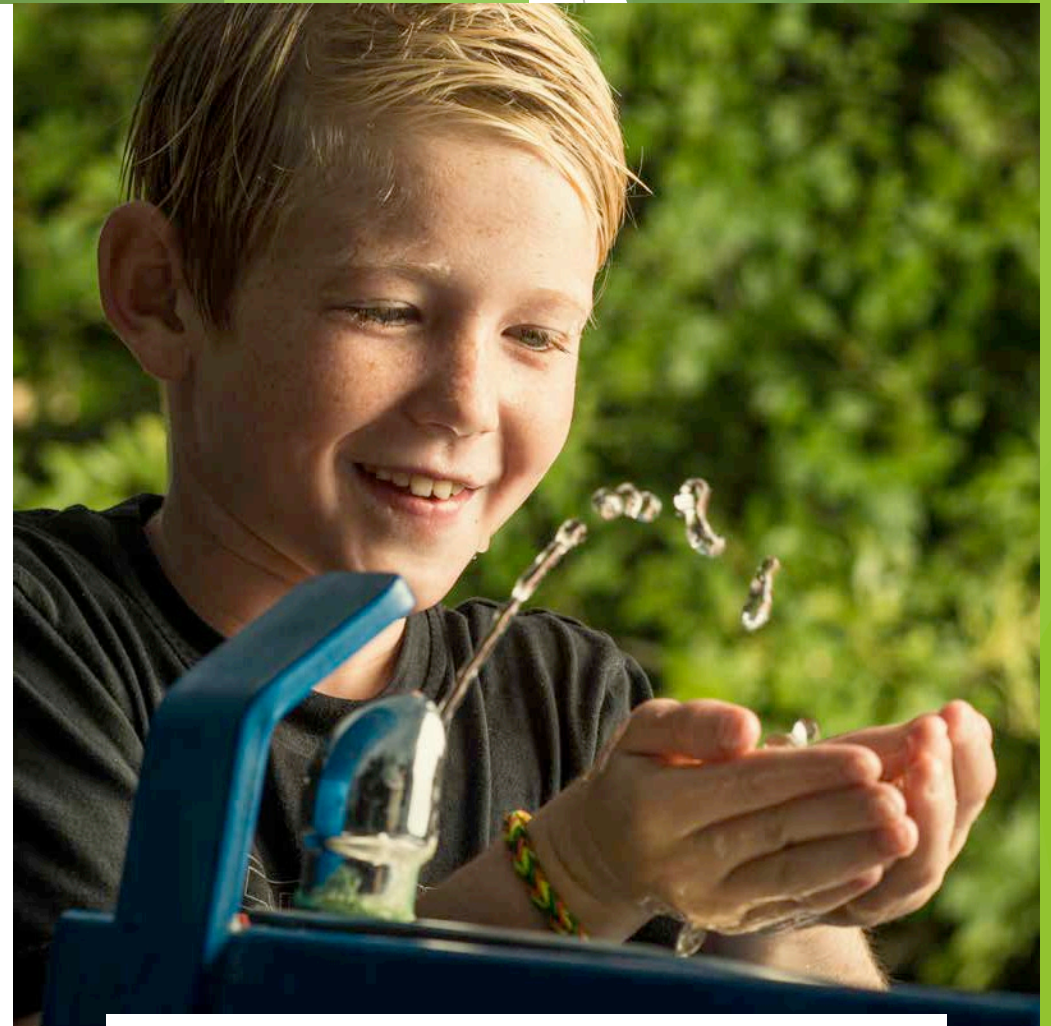
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PRESENTATION OVERVIEW

- ▶ 91st Avenue WWTP
- ▶ Project Development Overview
- ▶ Project Details
- ▶ Project Timeline
- ▶ Project Challenges
- ▶ Project Partner Benefits
- ▶ Project Team



91st Avenue WWTP



2010

UP05 Completed

91st Avenue WWTP

- ▶ 1958 - 5mgd facility
- ▶ 1965 - 45mgd facility
- ▶ 2010 - 230 mgd facility
- ▶ 2019 Averaging 138 mgd
- ▶ Joint Exercise of Powers Agreement
 - ▶ 5 partner municipalities
 - ▶ Joint ownership
 - ▶ City of Phoenix operates



1959

Original Trickle Plant



1965



1990

Post Plant 3a

Project Development Overview

- ▶ Mesophilic anaerobic digestion
- ▶ 600,000 mmBtu/yr, escalating 1%/yr
 - ▶ ~21 commercial blimps/day
 - ▶ ~3,750 tanker trucks/day
- ▶ Options Considered
 - ▶ On-site CHP
 - ▶ Sell green power to grid
 - ▶ RNG sales to vehicle fuel market

Project Development Overview

- ▶ **Multiple Ownership Structures Contemplated**
 - ▶ **Originally 3rd Party ownership**
 - ▶ Financing challenges
 - ▶ **City-ownership**
 - ▶ Phoenix interested, but not other SROG Cities
 - ▶ **ASU-ownership**
 - ▶ 9-month analysis/evaluation
 - ▶ Staff supportive
 - ▶ Board of Regents resistance
 - ▶ **Ameresco-ownership** only remaining option

Project Development Overview

- ▶ Kinder Morgan & Guild PSA Selection
 - ▶ KM proximity & capacity
 - ▶ KM Achievable Quality Standard
 - ▶ Positive Previous Experience with KM
 - ▶ Proven Technology
 - ▶ Proven Operational Record
 - ▶ Same platform as other Ameresco RNG project

Project Site



Gas Processing Facility



AMERESCO 

PHX WATER SMART

Gas Processing Facility



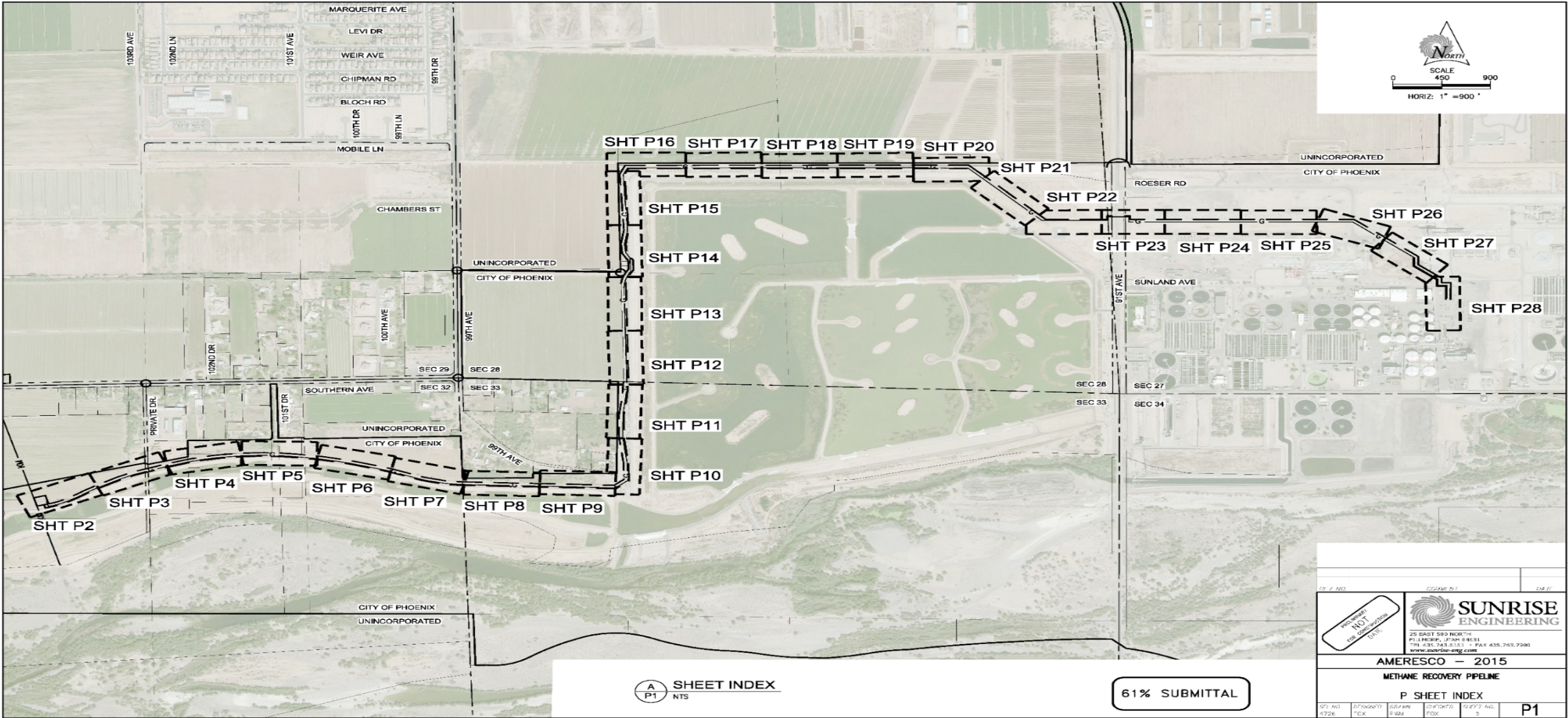
High Pressure Pipe



High Pressure Pipe



Methane Recovery Pipeline



Natural Gas Pipeline Quality Specification

- ▶ >950 Btu/cf
- ▶ <1/4 grain of H₂S
- ▶ <2% CO₂
- ▶ <2% N₂
- ▶ <0.2% O₂
- ▶ <4% of non-hydrocarbons
- ▶ <7 lbs H₂O vapor / 10⁶ cf
- ▶ >40° F and <120° F

Project Timeline

- ▶ 6/14/12: SROG issues RFQ
- ▶ 9/7/12: Ameresco submits best & final offer
- ▶ 11/5/12: Ameresco notified of project award
- ▶ 4/30/13: SROG selects ASU-owned option
- ▶ 3/13/14: ASU signs IGA contract with Ameresco
- ▶ 8/20/14: Ameresco submits IGA Report to ASU

Project Timeline

- ▶ **12/18/14**: ASU decides not to move forward with project
Ameresco commits to proceed w/o ASU
- ▶ **6/15/16**: City of Phoenix approves project agreements
- ▶ **3/6/17**: Ameresco commences construction
- ▶ **2/17/19**: Ameresco reaches COD
- ▶ **4/25/19**: Ribbon Cutting Ceremony

91st Avenue Groundbreaking (2/2/2017)



“Making Phoenix more sustainable isn’t just the right thing to do, it is also sparks innovation and creates exciting new economic opportunities. By partnering with Ameresco at our new processing plant, Phoenix is taking previously untapped raw biogas generated by wastewater treatment and turning it into a renewable energy source that can be sold. This cutting-edge partnership benefits our regional economy and environment at the same time. **Phoenix has set ambitious sustainability and renewable energy goals, and this partnership will help us get there.**”

*Phoenix Mayor Greg Stanton
February 2, 2017*



Project Challenges

- ▶ 5 SROG “Negotiators”, City Councils & City Attorneys
- ▶ Pipeline routing and interconnection
- ▶ Adjacent Wetlands
- ▶ Maricopa County Air Permitting
- ▶ Palo Verde construction window
- ▶ Financing
- ▶ Evolving RNG market

Project Partner Roles

- ▶ Ameresco
 - ▶ Own the Biogas Processing Facility & Pipeline
 - ▶ Purchase Biogas
 - ▶ Staff facility / Operate & Maintain
- ▶ SROG Partner Cities
 - ▶ Deliver Biogas
 - ▶ Lease Property and Easements
 - ▶ Provide Access to Utilities

Project Partner Benefits

- ▶ Value Proposition for SROG Members
 - ▶ Utilization of Wasted Renewable Resource
 - ▶ Site emissions reduced
 - ▶ WWTP equipment O&M savings
 - ▶ Estimated 2019 Royalty: ~\$1.0M/yr
 - ▶ No equity required by SROG partners
 - ▶ Positive PR
 - ▶ Working towards Sustainability Goals

Project Partner Benefits

- ▶ Potential for future partnership opportunities
 - ▶ LED Streetlight & Traffic Signal Pilot Project
 - ▶ Discussion additional Biogas resources (e.g., SR 85 LF)
- ▶ Emission reductions/year equivalent to:

Annual greenhouse gas emissions from __ passenger vehicles:	70,452
Carbon sequestered annually by __ acres of pine or fir forests:	87,425
CO ₂ emissions from burning __ railcars' worth of coal:	2,009
CO ₂ emissions from __ barrels of oil consumed:	894,582
CO ₂ emissions from __ gallons of gasoline consumed:	43,662,920
Heating __ homes per year:	10,584

Project Team Members

Consultant

SCS Engineers

Brown and Caldwell

Ninyo and Moore

Sunrise Engineering

Harris Environmental

DED Engineering

Guild

Wilson Engineers

AON Fire Protection

Project Role

Biogas Sampling and Analysis

Due Diligence Report and Preliminary Engineer

Geotechnical Consultant

Pipeline Engineer

Environmental Assessment

Facility (Biogas Processing Facility) Engineer

Process Equipment Engineer

Site Utility Engineer

Fire Consultant

Contact Information

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Thank you!!!

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PHX
WATER
SMART