

Feasibility Study Results

January 23, 2020

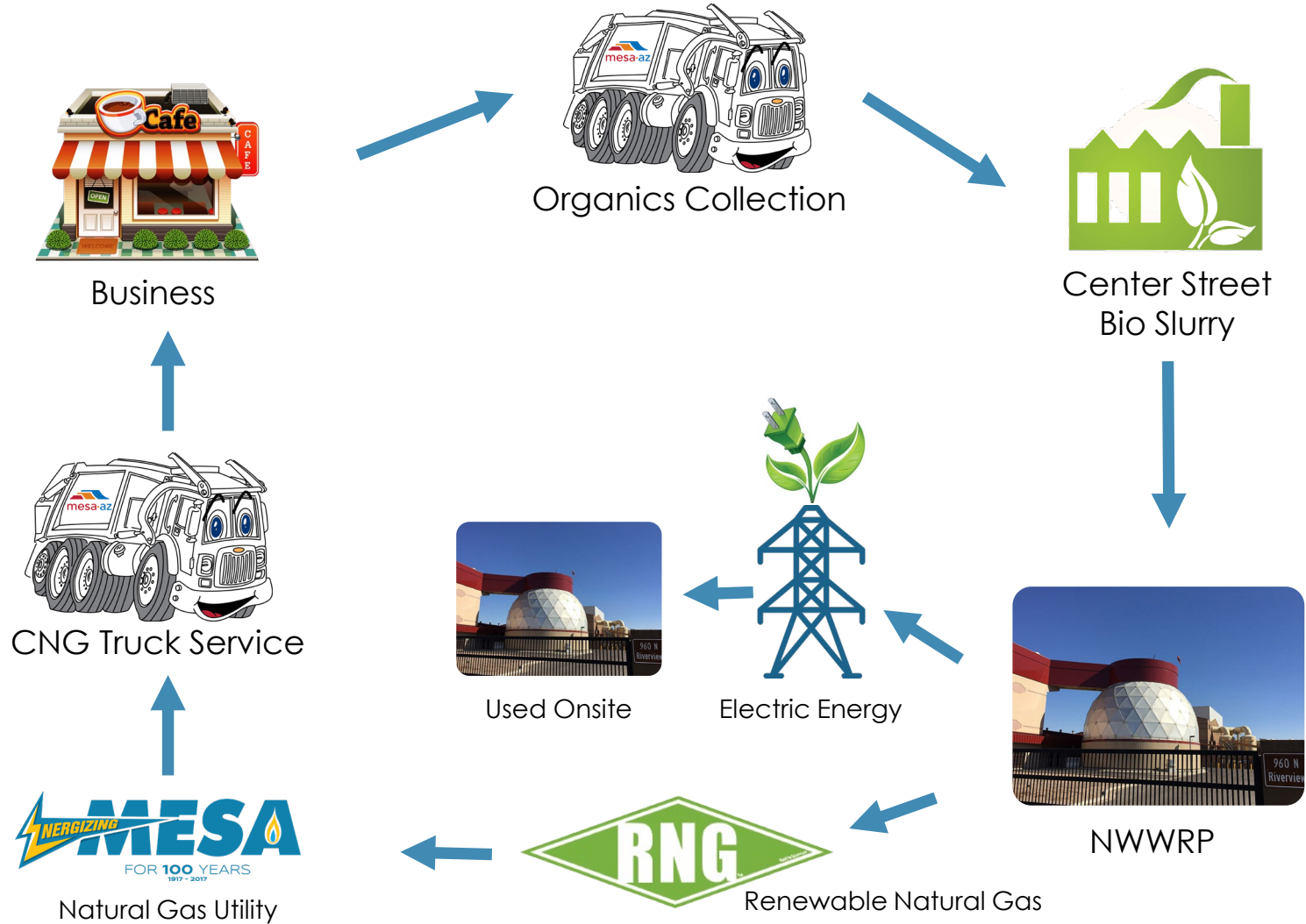
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Environmental Management & Sustainability

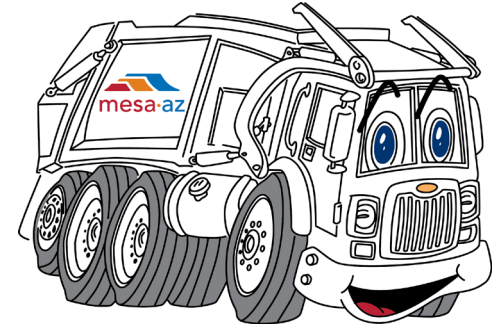
- Converting wastes into resources
- Reduce harmful environmental impacts
- Increase resiliency
 - Fuel supply for solid waste fleet derived from local renewable sources
 - Biogas infrastructure redundancy at NWWRP
 - Vertical integration

Food **to** Energy



Partners

- United Food Bank
- Mesa Public Schools
- Sheraton
- East Valley Institute of Technology Culinary School
- Bashas
- Arizona State University
- City of Tempe Grease Cooperative
- Arizona Recycling Coalition



Collection and Processing

Designed food waste collection service delivery model

Pre-processing facility design

Equipment needs identified



Co-Digestion

40+ ton per day capacity

Established safe operating parameters

Identified warning indicators



Biogas Upgrading

Developed RNG specifications
with Energy Resources

Developing RNG monitoring
procedures

Gas system interconnection



Biogas End Use



Power Generation



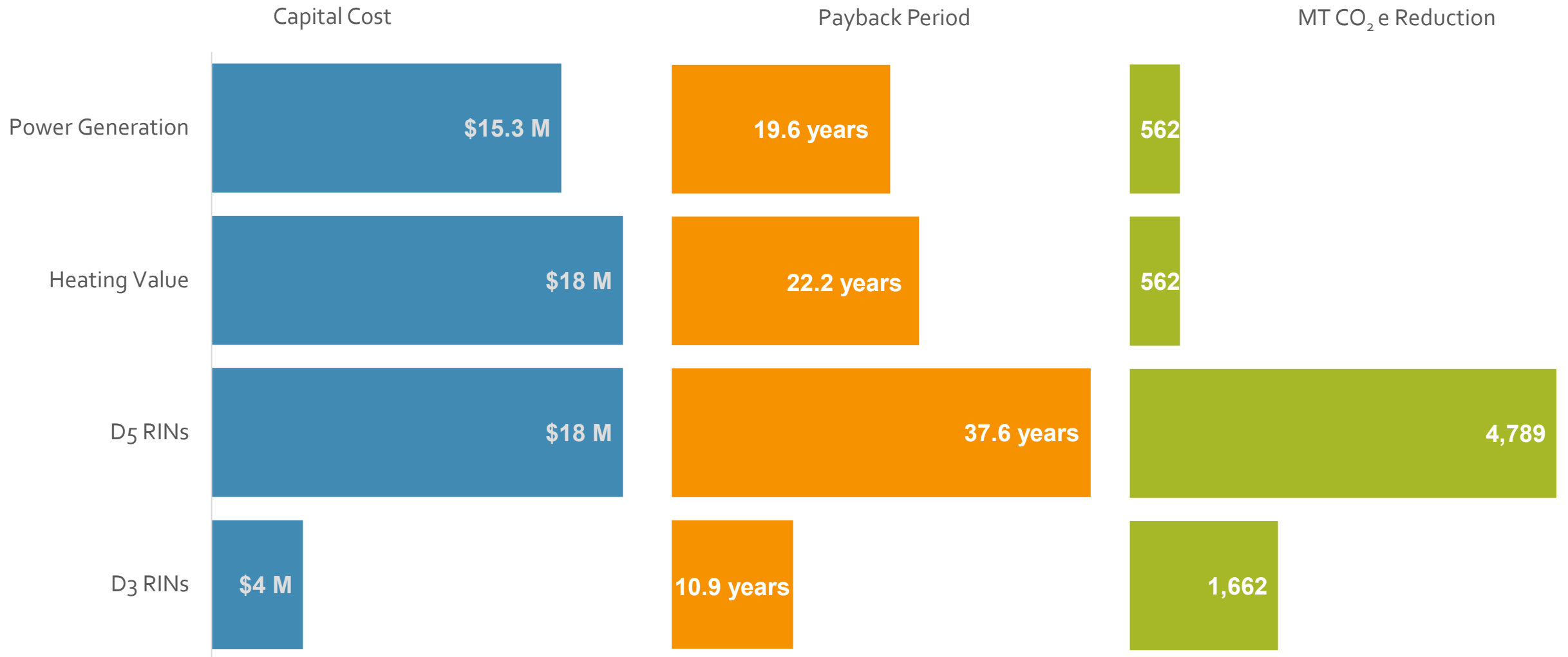
Heating Value



Transportation Fuel

Scenario	Capital Cost	Expected NPV	Expected ROI	Expected Payback Period
Power Generation	\$15,300,000	-\$8,500,000	-1.75%	19.6 years
Heating Value	\$18,000,000	-\$8,800,000	-1.27%	22.2 years
Transportation Fuel Food Waste Generate D5 RINs	\$18,000,000	-\$13,000,000	-6.33%	37.6 years
Transportation Fuel No Food Waste Generate D3 RINs	\$4,000,000	\$180,000	6.55%	10.9 years

Scenario Comparison



Flare to Fuel

- Upgrade biogas to generate D3 RINs
- Inject RNG into natural gas system
- Supply approximately 50% of solid waste fleet annual natural gas consumption

Next Steps

- Progress to 30% design
- Continue to work with EPA on Renewable Fuel Standard changes
- Engage with EPA to approve the eRIN pathway
- Source food waste from regional partnerships

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Model Assumptions

- 3% interest rate
- 6% discount rate
- 20-year forecast
- Costs increase by 2.5% each year
- Equipment life expectancy 15-20 years
- D3 RIN prices between \$0.50 and \$1.75
- D5 RIN prices between \$0.10 and \$0.60
- RNG price \$11 per MMBtu
- \$0.46 DGE
- \$0.0659 kWh
- Solid Waste tipping fee \$30.31