# Economic Modeling: Small-Scale Thermal CT Project for IRS Demolition

Presentation to Los Angeles County
Alternative Technology Advisory Subcommittee

September 20, 2018

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**Alternative Resources, Inc.**

# IRS Demolition/CDR Background

- Presented to the ATAS on August 16, 2018
  - Summary of current operations
  - Overview of site layout and permits
  - Options to maximize diversion
- Factors supporting consideration of a thermal conversion technology project
  - Permitted for up to 3,000 tpd (including MSW and green waste)
  - Site-specific zoning that allows for green energy production
  - Available area at the site with certain existing infrastructure
  - Feedstock control (C&D waste only)
- Need a better understanding of potential project economics

# Preliminary Project Definition

- 80 tpd gasification facility processing captive or readily available C&D waste
  - Manufactured lumber
  - Carpet
  - C&D residuals
  - Non-recyclable paper
- Produce electricity or diesel
  - Meet on-site needs
  - Export electricity to the grid and diesel to the wholesale market
- Assumed independent project
  - Internal tipping fees and charges
  - Certain avoided costs

# Project Uncertainties

- Renewable status
  - Meeting RPS criteria to qualify as a renewable technology
  - Determination that C&D waste is an eligible resource
    - Biomass and/or MSW under California legislation
    - Renewable biomass (which by definition includes separated MSW) under federal legislation
- Feedstock characteristics
- Achieving a certified pathway specific to feedstock, process and fuel for the LCFS program and separately for the RFS program
- Cost and revenue estimates
- Performance parameters

# Potential Project Incentives

| Incentive | Approach for Model |
|---|---|
| Sales and Use Tax Exclusion (STE) for Alternative Energy and Advanced Transportation (CAEATFA) | STE applied to equipment costs, excluding a prorated amount associated with electricity export to the grid. Valued at about $1.2 to $2.1 million. |
| Construction Grants (CEC, CalRecycle, SCAQMD, others) | Assumed grants valued at $5 million. |
| Self Generation Incentive Program (SCE) | SGIP incentives not applied; power exported to the grid is substantially higher than onsite needs. |
| Renewable Fuel Standard Program - RIN Credits (U.S. EPA) | Assumed RIN credits for the production of diesel. Calculated for a portion of the feedstock and using a value of $1 per RIN. |
| Low Carbon Fuel Standard Program (CARB) | Assumed LCFS credits for the production of diesel. Calculated based on average carbon intensity for renewable diesel and using a value of $138 per credit. |
| Cap and Trade Program (CARB) | Carbon credits not applied; no currently-adopted protocols for the project as defined. |

# Other Key Input Parameters

| Parameter | Electricity Project (80 tpd) | Diesel Project (80 tpd) |
|---|---|---|
| Capital Cost | $31.6 million | $46.6 million |
| Annual Operating Cost | $1.4 million | $4.2 million |
| Product Sale Price | $0.113/kWh electricity | $2.21/gallon diesel |
| Renewable Attributes | Sale price reflects renewable electricity under long-term power purchase agreement | Sale price reflects wholesale market excluding renewable credits (input separately) |
| Internal Tipping Fee | $42.00 per ton | $42.00 per ton |
| Avoided Cost of Transportation | $18.00 per ton | $18.00 per ton |
| Financing | 10-year tax exempt bond | 10-year tax exempt bond |

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# Summary of Findings
# Year 1 (2022) Net Cash Flow

| Electricity Project (80 tpd) | |
|---|---|
| Debt Service | ($3,354,341) |
| O&M/Other Costs | ($1,676,292) |
| Avoided Costs | $554,674 |
| Tipping Fees | $1,332,473 |
| Electricity Sales | $2,077,636 |
| Other Revenue | |
| RIN Credits | $0 |
| LCFS Credits | $0 |
| **Net Cash Flow** | **($1,065,850)** |

| Diesel Project (80 tpd) | |
|---|---|
| Debt Service | ($5,223,965) |
| O&M/Other Costs | ($4,700,305) |
| Avoided Costs | $559,629 |
| Tipping Fees | $1,332,473 |
| Diesel Sales | $2,050,854 |
| Other Revenue | |
| RIN Credits | $582,976 |
| LCFS Credits | $871,470 |
| **Net Cash Flow** | **($4,526,867)** |

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# Project Challenges Impacting Economics

| Challenge | Option to be Considered |
|---|---|
| Small-scale project | Larger-scale project |
| Uncertainty feedstock will qualify as renewable | Import supplemental feedstock providing greater certainty (e.g., MRF residuals or green waste) |
| High parasitic electrical load (diesel project) | Evaluate self-generation of electricity with application of SGIP incentive |
| 10-year project financing | 20-year project financing |
| Limited on-site need for electricity and diesel (IRS Demolition/CDR) | Supply electricity to the tenant |

# Alternate 1 – 20 Year Financing

**Changes to Model Inputs**

- Calculate debt service for 20 year financing
- Increase interest rate
- Increase levelized electricity sales price
- Increase equipment repair and replacement cost to account for capital repair and replacement over longer project period

**Comparison of Year 1 (2022) Net Cash Flow**

| Scenario | Electricity (80 tpd) | Diesel (80 tpd) |
|---|---|---|
| **Base Case** (10-year Financing) | ($1,065,850) | ($4,526,867) |
| **Alt 1** (20-year Financing) | $46,277 | ($3,155,587) |

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# Ongoing Work/Potential Next Steps

- Evaluate options that may improve project economics
- Refine cost and performance parameters with system providers
- Consider alternate project development scenarios
- Strategize ways to address uncertainties regarding feedstock and renewable status

# Contact Information

**Traecey Anthony**
Alternative Resources, Inc.
Tel: 909-800-1420 | Email: tanthony@alt-res.com

**Susan Higgins**
Alternative Resources, Inc.
Tel: 978-371-2054 | Email: shiggins@alt-res.com