

Interra Reciprocating Reactor for Low-Cost & Carbon Negative Bioenergy



INTERRA ENERGY®

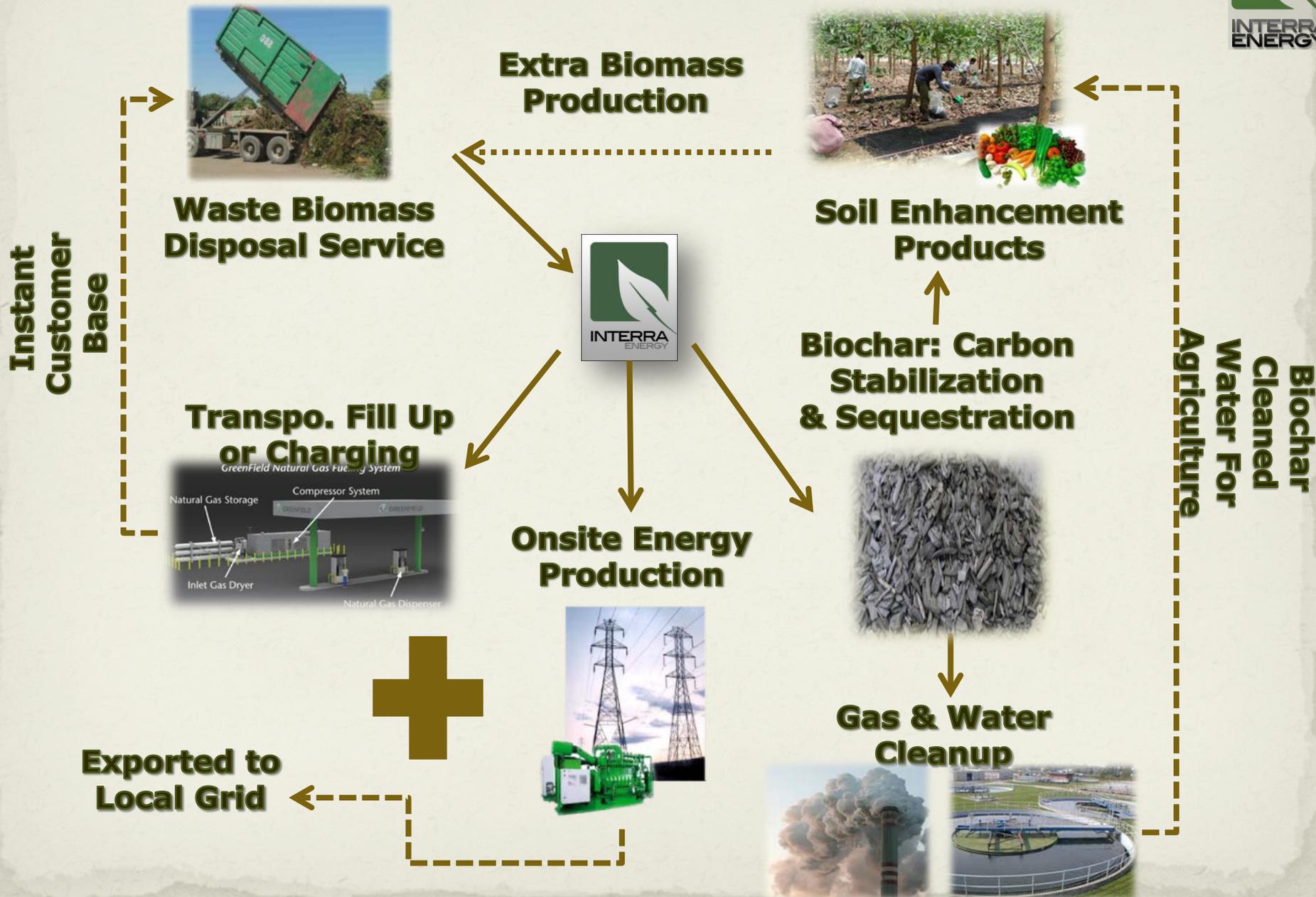
Thursday, December 3, 2015
EPIC Symposium

Presenter: Thomas Del Monte, CEO

Introduction to Interra



Activity Model: Integrated View



Overall Project Purpose



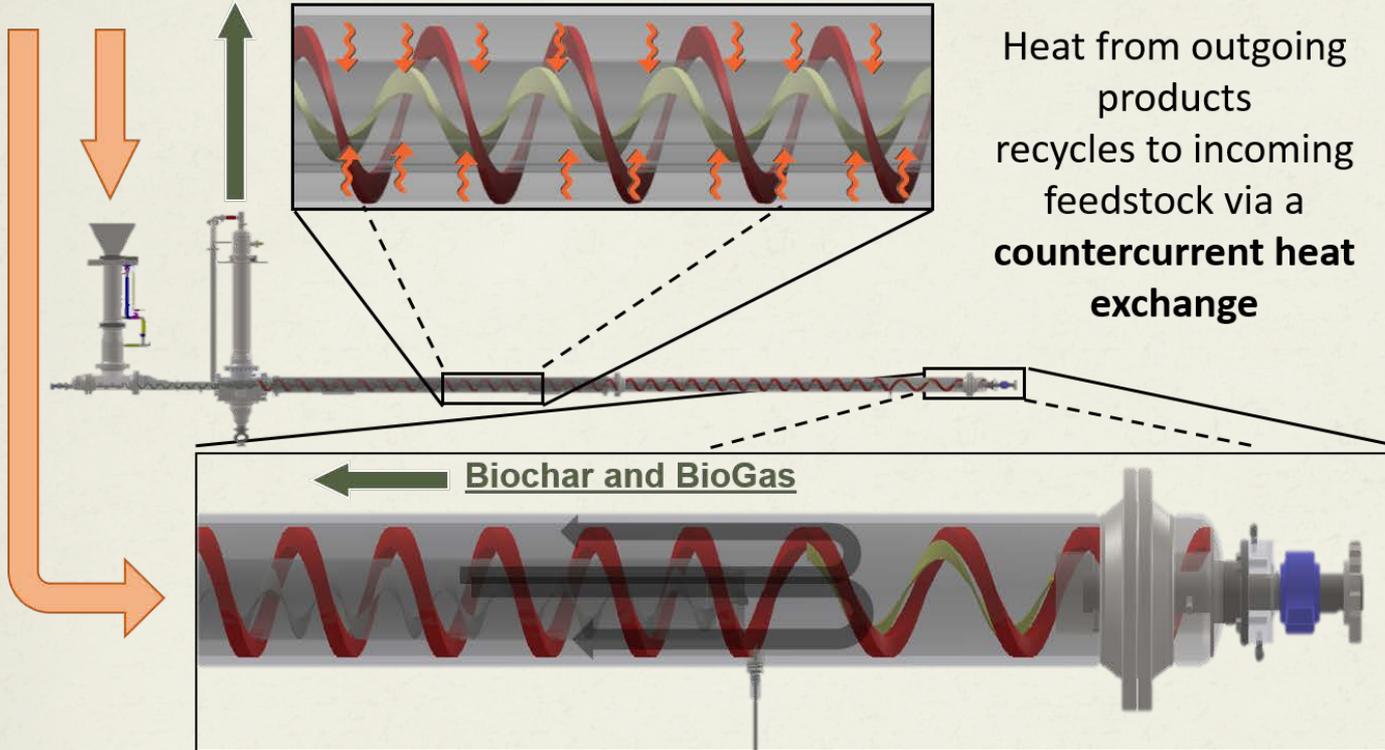
- Installation of a Distributed Gen. (DG) scale system technology demonstrating suitability for **forest/urban interface**.
- Determine if Interra Energy's technology and **biochar co-product value creation strategy** is sufficiently powerful to **overcome the affordability burden** that currently blocks widespread implementation of DG bioenergy projects in California.

Interra's Heat Problem Innovation



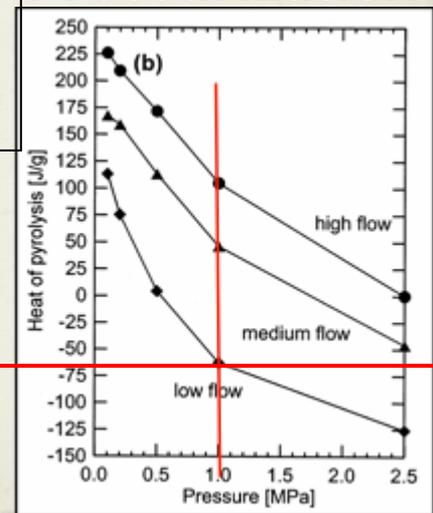
BioChar and BioGas

Feedstock

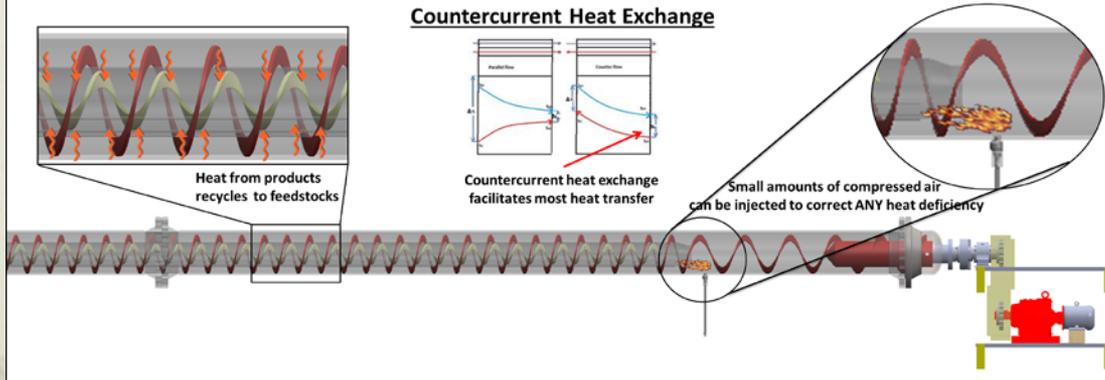


Heat from outgoing products recycles to incoming feedstock via a **countercurrent heat exchange**

Pressurization

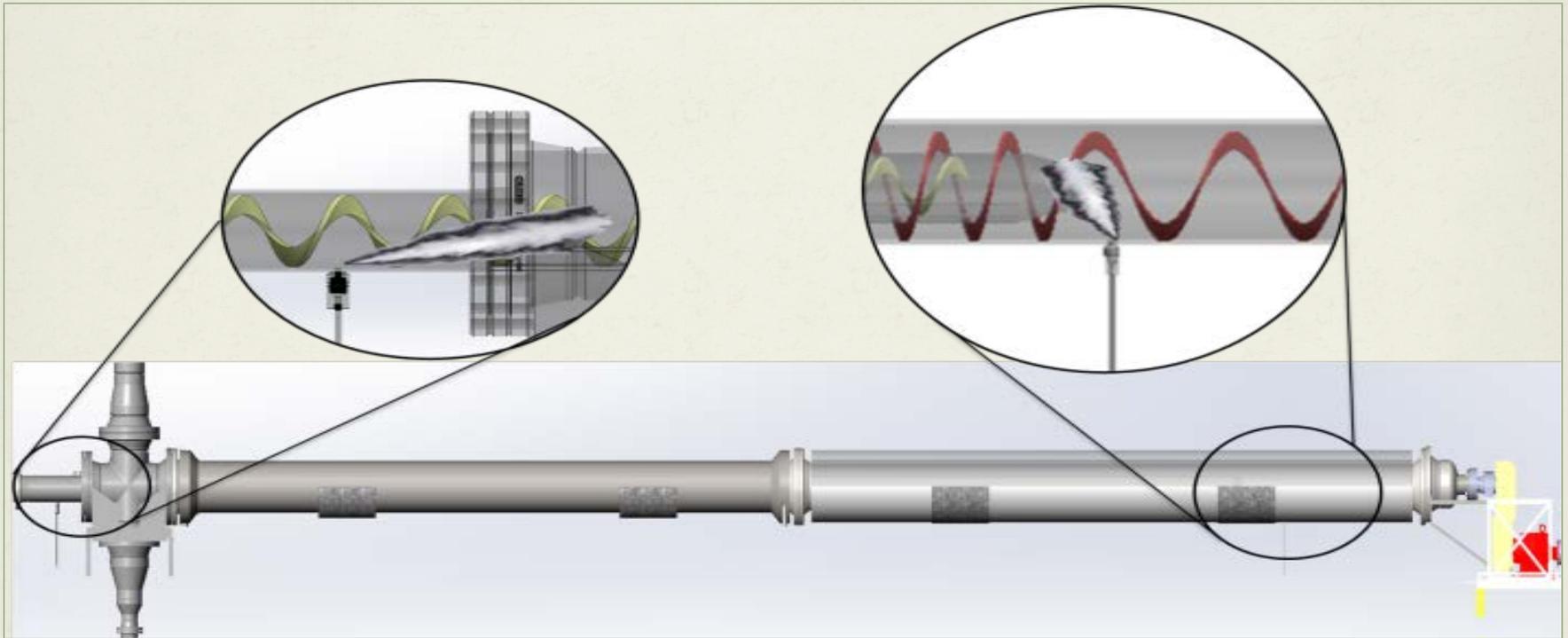


Countercurrent Heat Exchange



Heat Backup Solution

...also enhances throughput



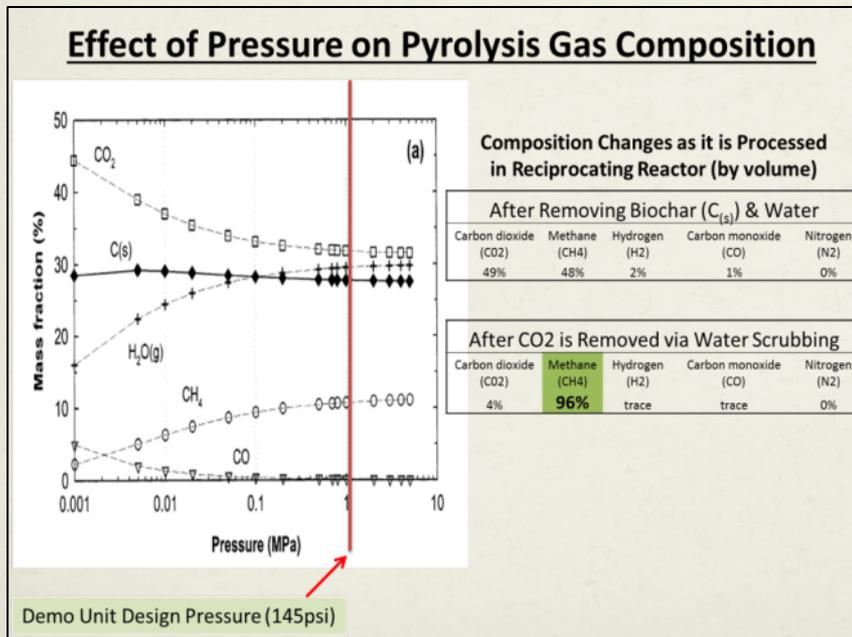
Air and/or Steam injection utilized to ensure thermodynamic heat balance.

Gas Quality Problems & Innovations



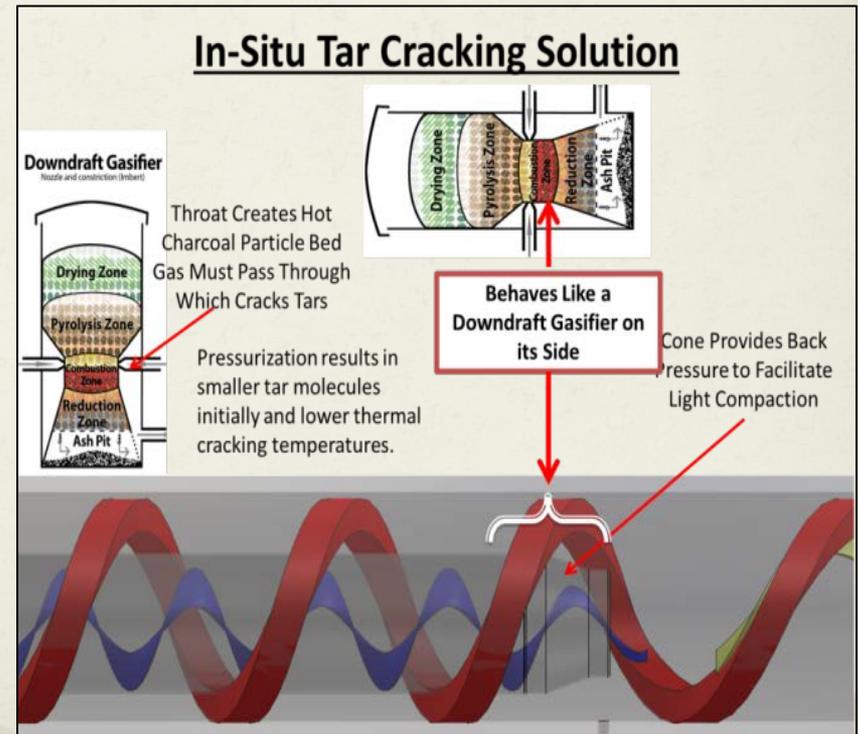
Energy Density

- Pressure makes gas more energy dense by increasing methane and decreasing CO



Tar Innovations

- Inner reactor designed to enhance tar cracking
- Pressure also helps



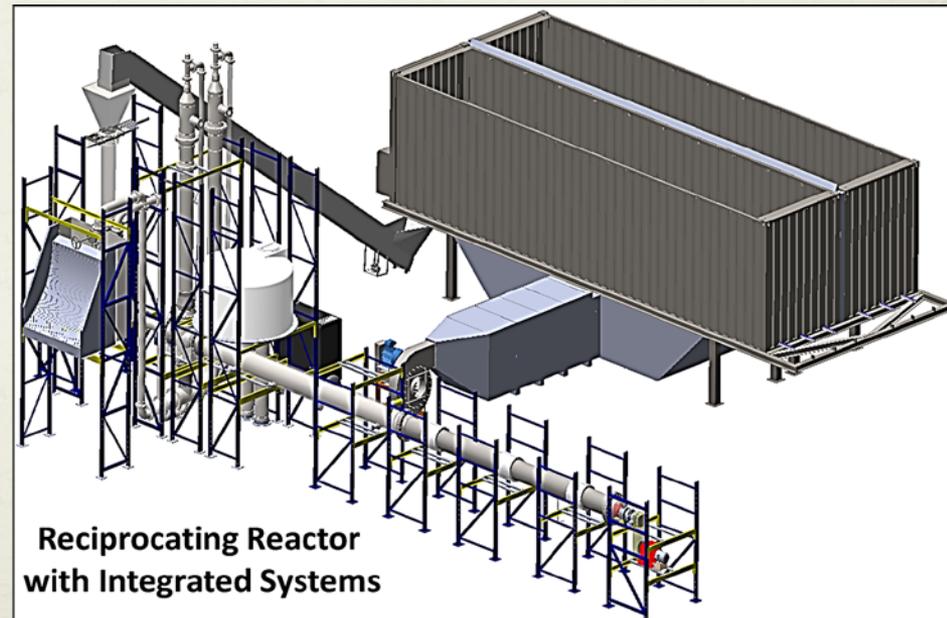
Specific Technical Goals

Goal 1: Throughput maximization operational modifications while maintaining usable fuel gas.

Goal 2: Demonstrate system mobility & evaluating further modularly design enhancements.

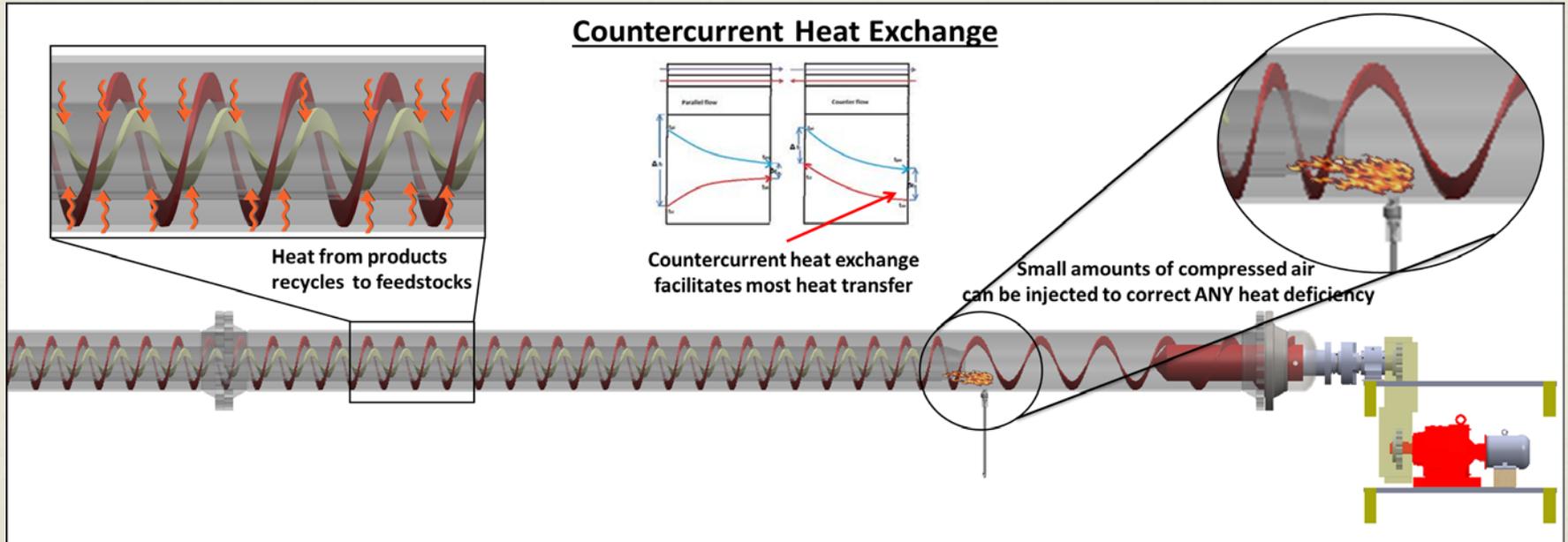
Goal 3: Performance enhancement upgrade & evaluation.

Goal 4: Demonstrate ability to meet SCAQMD Rule 1110.2 with the fuel gases created.



Preliminary Results

- Counter-current heat exchange innovation proven mechanically.
- Ran first “Hot Test” producing limited amounts of product—Results positive.



Fit with Other State Programs

...thoughts



- CalFire

- Providing a small compact system designed to avoid NIMBY issues—small footprint is key.
- Provide closer (cheaper way) locations for forest management crews process thinnings.
- Potential for forest carbon sequestration through biochar redistribution.

- CalRecycle

- Provide additional locations for green waste disposal.

Thank You

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