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## Executive Summary

### The Company

Smart Tire Recycling Inc. developed an innovative process to recycle the vast amounts of used tire rubber - one of the most serious global environmental problems, by recovering the precious components within the tires and completely reusing them.

This concept will create **a full recycling of tires**. This will eliminate the need to manufacture up to half of the global demand for carbon black (a major component in the manufacturing of tires and all rubber-based products). This will also reduce CO<sub>2</sub> emissions by a significant measure<sup>i</sup>.

### Market Overview

Images of stockpiled tires scattered around the countryside or in vacant lots are familiar to most people. Over a billion tires are disposed of every year around the world. This represents over 22 billion pounds of predominantly hydrocarbon-based materials generated annually that are largely underutilized. Scrap tires are either burned, and used as fuel (producing harmful emissions), as mulch or as filler for asphalt. Most of the current methods (using tires as fuel and asphalt) have also proved to be economically non-viable options<sup>ii</sup>.

### The Technology

Smart Tire Recycling uses their propriety equipment to create a continuous process that breaks down scrap tire rubber and subsequently "cracks" the polymeric materials reverting it back to oil and gas. The remaining solid materials consist principally of the original carbon black materials, which are recovered in a manner that retains their reactivity and usefulness in rubber products. The process does not form "waste" byproducts and produces 3 products: carbon black, oils, and gas, with carbon black being the most valuable material.

The work is backed up by two patents relevant to parts of our technology and one patent-pending on the whole system and process, in addition to trade secrets.

Key aspects of our process have been proven on a lab scale. A demonstration plant is in the process of being built to create a full proof of concept.

### Business Model

Smart Tire Recycling takes a waste product (shredded rubber) that is being sold at \$50 per ton and turns it into material worth \$250 per ton. Smart Tire Recycling will take waste material that has little or NO worth and increase its value significantly.

We can license our technology (or sell turn-key plants,) to major tire shredders and enable them to fully recycle their rubber, adding **significant** value to their product.

We have been contacted by several companies and states, in the US and other countries, who are extremely interested in our technology.

An alternative plan to licensing, would be for Smart Tire Recycling to commercialize our system and sell our carbon black.

Carbon black is one of the key by-products of our recycling process. Global demand for carbon black in 2016 was 13 million tons (CAGR 6%). The carbon black market size is expected to reach \$20 Billion by 2022. 80% of carbon black is used in the automobile industry and the remainder is used in other applications.

## Brief Milestones

2016

- A lab scale system was assembled that proved important features of our process
- Acquired two patents relevant to our technology
- Brought on board an industry pioneer with 20 years of experience

2017

- Patent pending on our whole system
- Partnered with a major engineering firm to build our proprietary extruder
- Partnered with Idea Foundry to help prepare our project for commercialization
- Received the 1<sup>st</sup> place award amongst 30 local start-up companies from TiE Pittsburgh
- Have been contacted by key potential strategic partners interested in our technology

2018

- Purchased a key component of our demonstration system assembled by an engineering firm in PA and moved into our new demonstration facility
- Hired a process engineer and a design engineer to assist in assembling the full demonstration system

2019

- Completed our upgraded demonstration system
- Filed for international patents in various countries

2020

- Hired a full-time engineer to scale the technology
- Created a board with industry experts that have decades of experience scaling technologies and raising millions of dollars

## The Team

**Co-Founder & CEO: Mendel Bassman** - Mendel has been a proven leader for 10 years first in the field of education and later in the recycling world. He led many projects in the non-ferrous and e-scrap recycling industries. He's an action oriented out-of-the box thinker that takes ideas and makes them reality. In 2014, he founded Smart Tire Recycling. He built a team of world class engineers to make Smart Tire Recycling an industry leader in tire pyrolysis.

**CTO: Lacramioara Schulte auf'm Erley, PhD** - Lacramioara has a B.S. in chemical engineering from the University Politehnica din Bucuresti in Romania and a PhD from the University of Florida in Nanotechnology. She later got an MBA from the Massachusetts Institute of Technology – M.I.T. She worked in Romania doing research in the tire manufacturing industry. She authored several patents in chemical engineering. She also successfully led commercialization projects in the nanotechnology fields and has being a PI and co-PI on few SBIR awards.

She is also an entrepreneur with 15 years of experience in startup companies both as a founder and scientist. She led commercialization of several product platforms ranging from product development to market research to securing funding and customer/supplier relationship development for NanoDynamics.

**COO: Carlos Cabral** - Carlos has decades of engineering experience scaling technologies and building numerous large plants around the globe. Carlos focuses on environmental engineering.

**CFO: Adam Epstein** - Upon graduating from Emory University, with a degree in Economics-Mathematics, he began managing his own private equity fund, specializing in Biotechnology. Soon after, he transitioned into consulting startup companies during their initial capitalization and development. With his background in marketing and product analysis, he advises small businesses throughout the United States.

## VP of Commercialization: Raymond Riek

An action-oriented executive with experience in all facets of industrial business. CEO of Carbolytic Material Company LLC (2006-2012). Founded a chemical company based on green proprietary technology to convert scrap tires to carbon black and oil. First to market with recycled carbon black.

COO of Delta Energy (2004-2005) A start-up chemical company recovering materials from scrap tires. Developed economics and business plan for investors. Developed commercial strategy, pricing, and industry targets, including approval for sale at first customers.

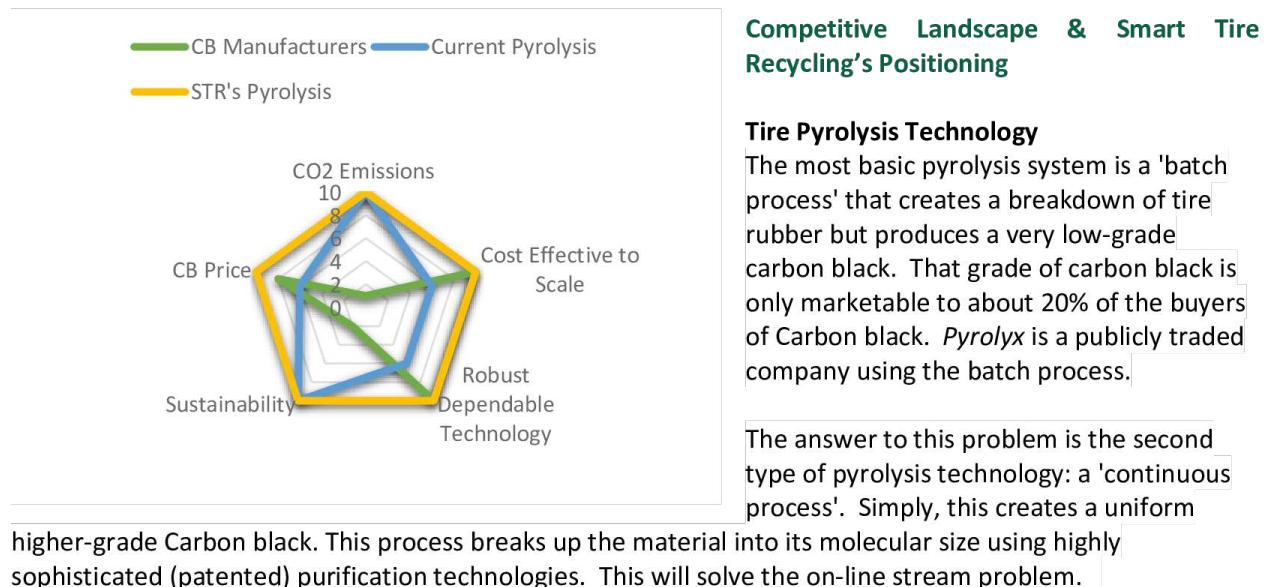
Worked for Monsanto Company for over 30 years including directing of Technology, Rubber and Process Chemicals Division 1989-1993.

#### **Chemical & Process Engineer: Clint Edelman**

Clint has over a decade of experience as a mechanical engineer working in facilities ranging from university laboratories to managing the construction of a 140,000 sq. ft. production plant. As an engineering manager he has experience working with diverse teams of employees as well as creating and implementing safety and quality assurance programs for start-up enterprises. As a mechanical designer he has experience performing analysis with ANSYS in accordance with the ASME Boiler and Pressure Vessel Code for the commercial and nuclear power industry.

#### **Design & Test Engineer: Tom Koger**

Tom has over two decades of experience building and operating supercritical extraction, chromatography and test systems. He has conducted laboratory & pilot scale investigations utilizing supercritical technology. Tom has evaluated & modified powerplant FGD processes, conducted SO<sub>2</sub> removal testing, conducted source sampling investigations, purchased lab equipment & supplies, trained new hires, conducted routine inorganic chemical analyses, developed & refined sample prep methods for XRF & ICP Spectroscopy, Ion Chromatography.



#### **Competitive Landscape & Smart Tire Recycling's Positioning**

##### **Tire Pyrolysis Technology**

The most basic pyrolysis system is a 'batch process' that creates a breakdown of tire rubber but produces a very low-grade carbon black. That grade of carbon black is only marketable to about 20% of the buyers of Carbon black. *Pyrolyx* is a publicly traded company using the batch process.

The answer to this problem is the second type of pyrolysis technology: a 'continuous process'. Simply, this creates a uniform

higher-grade Carbon black. This process breaks up the material into its molecular size using highly sophisticated (patented) purification technologies. This will solve the on-line stream problem.

The company Bolder Industries uses a continuous process and is reported to have a successful on-line stream. It is estimated that the technology used by Delta Energy is 50% more expensive to commercialize than Smart Tire Recycling's process.

#### **Virgin Carbon Black Manufacturers**

Smart Tire Recycling would market our recycled carbon black at a significantly lower price than the current virgin carbon black, due to the environmentally friendly nature of our mechanical process.

80% of carbon black is used in the automobile industry and the remainder is used in other rubber products, plastics and paints. Virgin carbon black manufacturers in the US and around the world face very strong pressure from government and environmental agencies due to their significant CO<sub>2</sub> emissions. They are

being forced to spend a lot of money to reduce emissions. This is causing the price of virgin carbon black to go up, and many smaller manufactures who cannot keep up with the regulations, are forced to close<sup>iii</sup>.

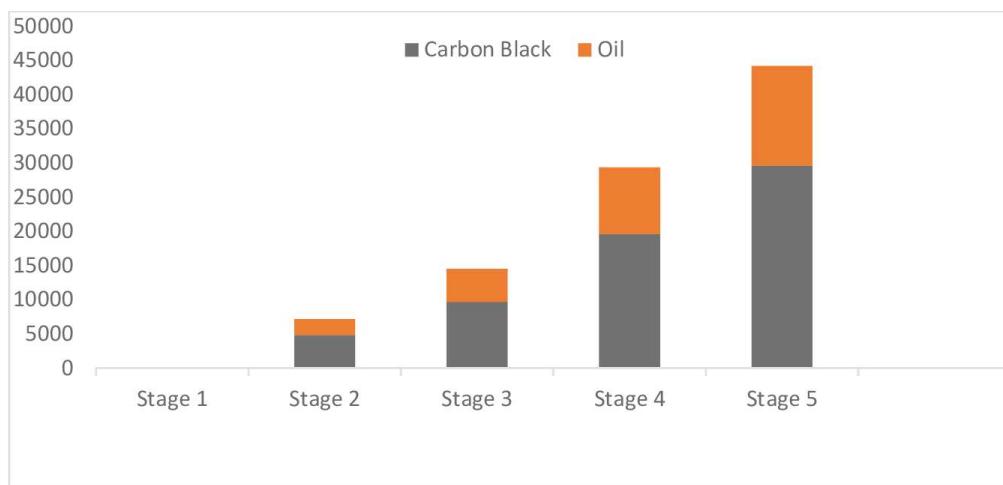
Smart Tire Recycling's recycled carbon black would be of the same quality, would have 90% fewer emissions<sup>iv</sup> and would be a producer of oil instead of a consumer of it.

(In addition, companies are excited by the prospect of purchasing raw materials produced in an environmentally sensitive manner.)

Secondly, our company would provide significant savings (15%-20%) in the shipment of carbon black. Fresh "virgin" carbon black manufactures use tremendous quantities of residual oil to produce the carbon black and therefore are typically located near oil refineries, mainly on the gulf coast (TX and LA.) Carbon black customers are concentrated in the "rust belt" of the US, generally between Missouri and Pennsylvania with concentrations in Illinois, Indiana, and Ohio. Having carbon black produced from recycled tires is possible all over the country, offering major savings in shipment costs.

### Financial Highlights

The graph shows revenue projections, in \$,000<sup>v</sup>



### Traction & Offering of the Company

Smart Tire Recycling raised \$350,000 to build our lab scale and our basic demonstration system.

We are seeking to raise a seed-round of \$750,000 to build a larger scale automated system and apply for international patents.

<sup>i</sup> US Dept. of Energy - DOE 2011 "Identification and Selection of Major Carbon Dioxide Stream Compositions" pp. 10-11

<sup>ii</sup> [https://rma.org/sites/default/files/RMA\\_scrap tire\\_summ\\_2015.pdf](https://rma.org/sites/default/files/RMA_scrap tire_summ_2015.pdf)

<sup>iii</sup> <http://www.rubbernews.com/article/20160519/NEWS/160519940/sid-richardson-to-raise-carbon-black-prices>

<sup>iv</sup> US Dept. of Energy - DOE 2011 "Identification and Selection of Major Carbon Dioxide Stream Compositions" pp. 10-11

<sup>v</sup> Any projections, forecasts or estimates are purely speculative and cannot be relied upon to indicate actual results that may be obtained through this investment; any such projections, forecasts and estimates are based upon assumptions which are subject to change and which are beyond the control of the Company or its management. Also, the tax effects which may be expected by this investment are not susceptible to absolute prediction, and new developments and rules of the Internal Revenue Service (the "IRS"), audit adjustment, court decisions or legislative changes may have an adverse effect on one or more of the tax consequences of this investment.