Commercial Production and Substitution of Petrochemicals through Innovative Biorefineries producing Cost Advantaged and Higher Performing Green Specialty Chemicals based on Nobel Prize-winning Metathesis Catalysis for Markets of $176 Billion

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PROJECT TITLE: Commercial Production and Substitution of Petrochemicals through Innovative Biorefineries producing Cost Advantaged and Higher Performing Green Specialty Chemicals based on Nobel Prize-winning Metathesis Catalysis for Markets of $176 Billion.

RECENT MILESTONES: Since inception in 2007, building upon a collaboration between Cargill and Materia initiated under a Department of Energy (DOE) grant, Elevance has optimized, engineered, scaled, and commercialized Nobel-prize winning innovations in energy efficient, cost advantaged metathesis catalysis using multiple renewable oil feedstocks. In 2009, won a $2.5M DOE grant to understand the impact of feedstocks and recycle streams, as well as produce platform chemicals and fuels for market development and performance testing from its integrated biorefinery. In 2010, partnered with Wilmar International to build a world-scale biorefinery in Indonesia, and closed $100M investment in Series C funding. In 2011, expanded technology with XiMo AG licensing agreement to use proprietary molybdenum and tungsten metathesis catalysts. In May 2011, validated technology at commercial scale tolling facilities, converting 1mlbs (450 metric tonnes) of feedstock into green chemicals for market development. Secured sales in performance waxes and candle markets, and in personal care markets. From 2007 – 2011, established partnerships with industry leaders in feedstock, technology and commercialization, including Cargill, Clariant, Dow Corning, Materia, Stepan, Wilmar, DSM, and Hutchinson Worldwide. June 2011, purchased an 80 mgpy biodiesel plant in Mississippi, to repurpose as biorefinery with annual production capacity of 280,000 metric tonnes (610 mlbs). Filed S1 to begin IPO process.

ELIGIBILITY OF BUSINESS AWARD: Elevance was incorporated in the State of Delaware on October 17, 2007, to pursue work started in 2004 in a collaboration between Cargill and Materia, Inc., a leading-edge catalyst technology company founded by Dr. Robert H. Grubbs. To date, Elevance has less than 100 employees, and has generated less than $40 million in annual revenues.

FOCUS AREA: Fits all focus areas, with emphasis on Focus Area 3: design of greener chemicals.

US COMPONENT: Elevance has grown from 2 employees in 2007 to just under 100 employees at two US facilities at the end of 2011, and has optimized, engineered, scaled and commercialized US-based Nobel Prize-winning technology supported twice by the DOE. As of June 2011, conducted R&D in Bolingbrook, Illinois, then expanded and relocated in September to Woodridge, Illinois. In June 2011, acquired a former 80 million gallon per year biodiesel plant in a USDA designated priority development area in Mississippi, to repurpose into Elevance's second commercial biorefinery. This involves remediating a Brownfield site, helping to save regional rail line from being scrapped, and providing overall revitalization of regional economy, including approximately 165 direct jobs and over 300 construction jobs with an estimated $275 million investment.

ABSTRACT:

Elevance produces high performance and cost advantaged green chemicals from renewable oils, to address markets of $176 billion. Its processes use Nobel Prize-winning innovations in metathesis catalysis, which consume significantly less energy, and reduce GHG emissions by 50% compared to petrochemical technologies. Elevance products enable novel surfactants, lubricants, additives, polymers, and engineered thermoplastics. Elevance has secured strategic partnerships with value chain global leaders to accelerate rapid deployment and commercialization for these high performance products and their applications. Elevance's technology addresses the increasing

demand for everyday products made from non-toxic, environmentally friendly and renewable sources. For instance, Elevance is producing specialty chemicals to enable cold water detergents with more concentrated formulations and improved solvency for better cleaning, to improve sustainability metrics and reduce energy costs for customers and consumers. Other examples include biobased anti-frizz and shine additives for leave-in hair care products to replace petroleum-based petrolatum, alternatives to paraffin for high performance waxes, novel plastic additives for PVC and unique monomers for bio-based polymers and engineered plastics.

Supported in 2004 and 2009 by the Department of Energy, Elevance's process results in lower source pollution, production costs and capital expenditures than petrochemical refineries. The process uses a highly efficient and selective catalyst to break down natural oils and recombine fragments to produce high value chemicals with superior functional attributes previously unavailable commercially. Elevance has completed validation in toll manufacturing and plans are underway to build three world-scale facilities with combined annual production capacity of one million metric tonnes (2.2 billion pounds). The company is currently building one of the world's largest integrated biorefineries in Indonesia with Wilmar International that will start up during 2012, and repurposing a biodiesel plant in Mississippi to operate as a biorefinery in 2013. By 4Q2014, expect third facility in South America. The company's ability to manufacture biochemicals for multiple products—and use a diversity of renewable feedstocks—reduces reliance on petrochemicals, provides more effective and sustainable products to consumers, and helps green chemistry take route in the US for jobs and competitiveness in low carbon, global sustainable economy.

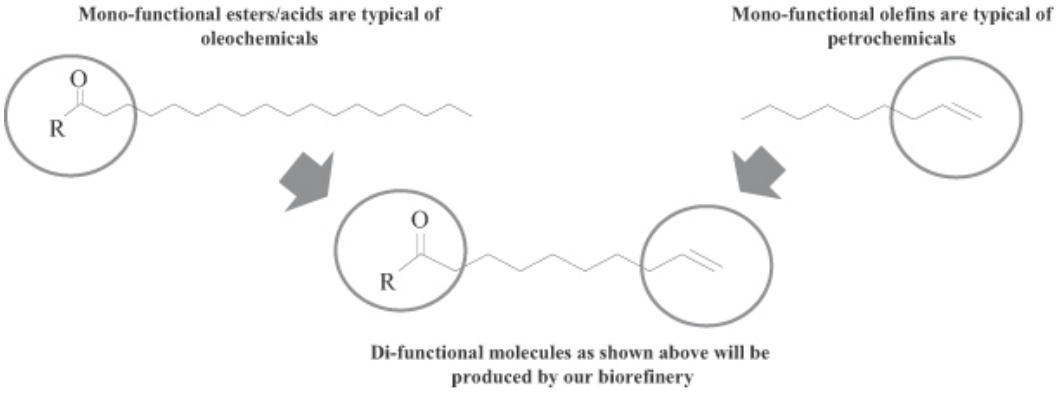
SCOPE AND SELECTION CRITERIA: Elevance's technology fits all three Focus Areas, especially Area 3. It meets the scope and selection criteria of the program through optimization, and scale up of US-based metathesis catalysis technology, coupled with novel downstream green product applications. It incorporates "the principles of green chemistry at the earliest design stages of a new product or process which have yielded benefits to human health and the environment along many points in the technology's lifecycle", from renewable feedstock conversion to synthesis, use, and end of life of greener products. Elevance's technology is sustainable, with a small environmental footprint. Its cleantech catalytic processes are low-pressure and low-temperature, yielding low-toxicity products and byproducts. The natural oil compounds are synthesized with high efficiency, offering superior performance at a lower cost with less energy than fossil-based oils. In 2009, DOE acknowledged Elevance's innovation with a $2.5 million grant to advance its metathesis and biorefinery technologies for greener synthetic pathways. The core technology is based on the work of Nobel Laureate Dr. Robert H. Grubbs. Elevance further expanded its proprietary technology in 2011 with a licensing agreement with XiMo AG to use proprietary molybdenum and tungsten metathesis catalysts based on the work of Nobel Laureate Dr. Richard Schrock. Collectively, Elevance's disruptive technology delivers a broad portfolio of high performance products targeted at markets estimated at over $176 billion.

1. Science and Innovation: Original and Scientifically Valid

Elevance's proprietary process is based on Nobel Prize-winning innovations in metathesis catalysis, a chemical reaction that uses a highly efficient and selective catalyst to break down and recombine molecules into new chemicals. The company uses metathesis to make novel, di-functional molecules, as building blocks of a specialty chemical business. As shown below, these molecules combine the functional attributes of an olefin, typical of petrochemicals, and a mono-functional ester or acid, typical of oleochemicals, in a single molecule. Elevance is the only company to date that can economically produce these di-functional chemicals, which provide access to a large

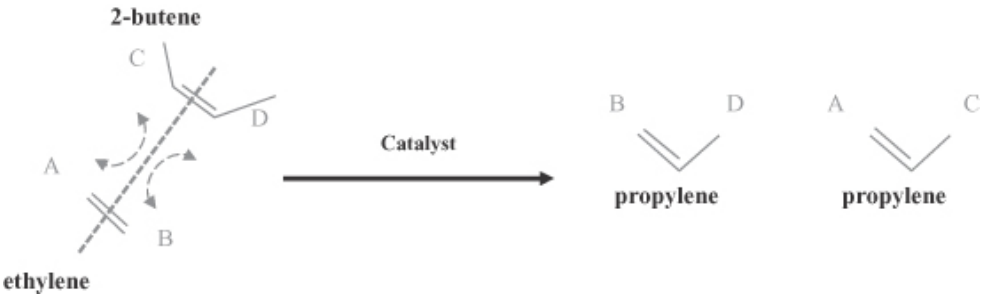
market opportunity. By providing both an olefin functional group and an ester or acid functional group, these di-functional building blocks access performance characteristics of both traditional petrochemical and traditional oleochemical chemistries on one molecule.

For example, each 9-decenoic acid methyl ester and 9-dodecenoic acid methyl ester consists of olefin and methyl ester functional attributes. Conventional producers have developed manufacturing capabilities using either olefins and related derivatives (largely produced from petroleum) or esters and acids (often



oleochemicals derived from natural oils), though they and their customers desire the functional attributes of both. To access these functional attributes simultaneously, these producers have to blend and formulate a number of separate ingredients, which increases their production costs. Elevance's di-functional building blocks change this paradigm by allowing the creation of specialty chemical molecules which simultaneously include desired attributes enabled by both chemistry families, such as lubricant base oils with improved stability or surfactants with improved solvency. In addition, Elevance products can be used to provide a lower cost route to manufacture existing specialty molecules, such as diacids, which are highly valued in the manufacture of polymers.

Elevance's breakthrough and cost-advantaged route to these di-functional molecules is enabled by metathesis. Metathesis is a powerful chemical reaction, initiated by using a catalyst, involving carbon-based molecules with at least one double bond between two carbon atoms (a "carbon-carbon double bond"). Metathesis breaks the carbon-carbon double bond and re-connects the molecule fragments in new ways. By changing the process conditions under which this reaction occurs, Elevance can tailor which fragments are created. Metathesis can be used to perform chemical operations such as cleaving, coupling, ring-closing, ring-opening or polymerization. An example of a metathesis reaction using traditional catalysts is shown in the following figure.

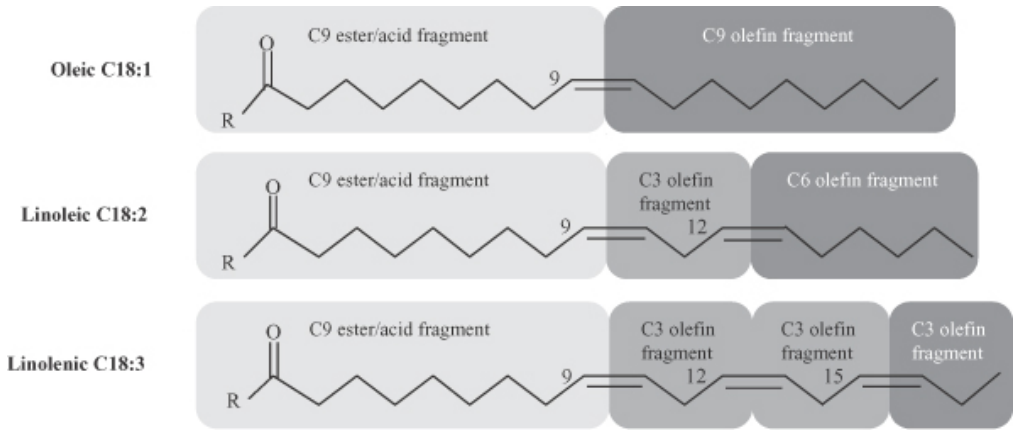


The earliest examples of metathesis date to the 1950s and showed that double bonds in olefins could be rearranged using certain catalysts. The first industrial olefin metathesis processes were developed in the petrochemical industry to produce higher-value chemicals through metathesis of lower-value olefins. The early commercial applications all used catalyst systems that were sensitive to air, water and the presence of polar functional groups. These limitations prevented significant use of olefin metathesis for synthesis of value-added

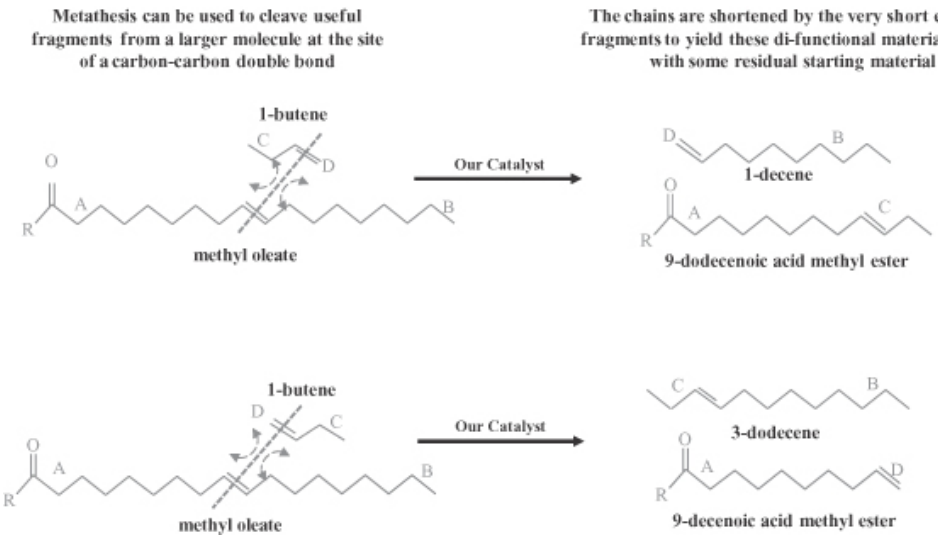
functional molecules and polymers, and made metathesis of functionalized molecules, such as natural oils, infeasible.

The 2005 Nobel Prize in Chemistry was shared by three researchers for their breakthroughs that made the metathesis of functional molecules possible. Among these laureates, Dr. Robert Grubbs of the California Institute of Technology ("Caltech") developed metathesis catalysts that are highly active, stable in air and tolerant of reactants with functional attributes. Dr. Grubbs shared the Prize with Dr. Yves Chauvin and Dr. Richard Shrock. Dr. Chauvin discovered the mechanism by which metathesis operates, and Dr. Shrock invented metathesis catalysts that are highly active. Elevance has an exclusive license for the patents, for use with natural oils, owned and licensed to Materia, which includes all of the innovations created by Dr. Grubbs. Elevance also has a license with XiMo for innovations either created by Dr. Schrock and his team or developed with Elevance.

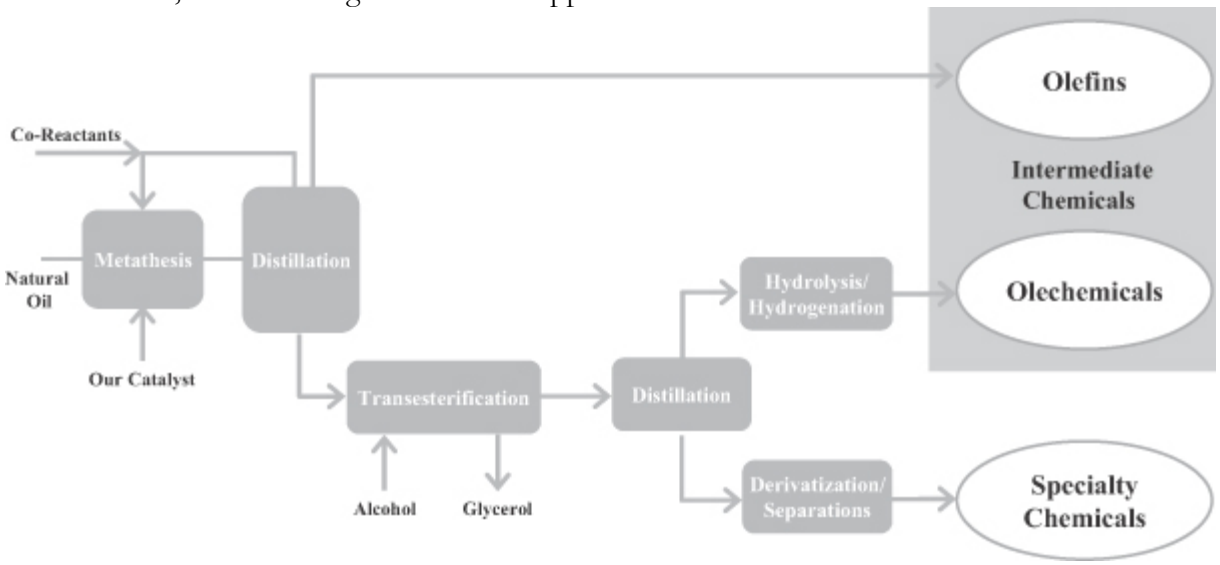
Because natural oils are functionalized molecules, without Dr. Grubbs' innovations, the metathesis of natural oils would be technically impractical and commercially uneconomic. Elevance's proprietary biorefinery combines metathesis of natural oils with established industrial processes, such as transesterification and distillation, to economically produce specialty chemicals and direct replacement intermediate chemicals through a single process. Natural oils provide a wide array of useful molecule fragments that can be accessed through metathesis. The fragments below are among the most common that can be created from natural oils.



In Elevance's proprietary biorefinery design, a stream of natural oils, which are chemically made of triglycerides, is reacted with short-chain olefins, such as butene. This reaction cleaves olefin molecules from the triglyceride, producing higher value olefins, including decene. Moreover, the metathesis reaction of the natural oil cleaves its triglycerides into ones rich in valuable, medium chain-length unsaturated fragments (C10-C15), as well as unreacted saturated long chain fragments (C16-C22). An example of thus reacting 1-butene with methyl oleate, a common natural oil component, is



demonstrated to left. When these unsaturated and saturated fragments are freed from the triglyceride's glycerol backbone, the resulting unsaturated fragments produce a distribution of di-functional molecules, including fatty acids and esters, as further described below. The saturated fragments, which are inert to metathesis because they lack a carbon-carbon double bond, produce saturated acids, esters or oleochemicals. The figure below illustrates how Elevance produces products from its novel biorefinery process. The reactor used in toll manufacturing to date operates at a similar scale as will the reactor installed at the first biorefinery. Note three main product streams: one stream of specialty chemicals and two streams of intermediate chemicals, namely olefins and oleochemicals, to access large commercial opportunities.



2. Remedy for Environmental and Health Problems: Innovations for Large Industry Sectors

Environmental Benefits: Elevance's biorefinery design reduces source pollutants and requires less capital than conventional technologies because of the following characteristics: fewer major process steps; lower operating temperatures and pressures providing energy efficiency; and limited production of hazardous and toxic by-products. As a result, environmental benefit is evident in the development of an improved, energy efficient process that achieves a greater than 50% reduction in GHG emissions by substituting biomass for petrochemical feedstock, and using a more energy efficient conversion process. A key criterion of the DOE grant for an integrated biodiesel-renewable chemical biorefinery was to demonstrate a 50% lifecycle GHG emissions reduction compared to petrochemical technologies. Elevance used The GREET 1 model, Version 1.8c.0., with the "energy-based allocation" method to account for co-products for a more conservative value for emission reduction compared to the displacement method. Elevance contracted with Earthshift Inc. to validate calculations. In addition to significant energy and GHG reductions, the process can use a variety of natural oils, including emerging oils, such as those derived from algae. Primary feedstocks include palm, soy and rapeseed oils, though can use many other natural oils. These are available in liquid form in industrial quantities from a variety of geographic regions. This allows for low-cost transportation and storage compared to other renewable feedstocks such as industrial sugars, biomass and waste. The ability to use a range of oils in various geographies optimizes feedstocks dynamically based on the cost to use the oils and the value created from the resulting product mix. This de-risks production and maximizes profitability. Elevance does not expect large price increases of primary feedstocks, as will consume a de minimis percentage of global natural oil supply.

Health Benefits: Beyond the significant environmental benefits accrued from the process described above, there are vital health and environmental benefits derived from Elevance's broad portfolio of high performance products meeting customer needs for non-toxic, environmentally friendly and renewable sources in three large market platforms: Consumer Ingredients and Intermediates; Engineered Polymers and Coatings; and Lubricants, Additives, Specialty Fuels. Summary tables follow, with markets based on management estimates.

Ingredients & Intermediates

Market Platform/Segment (Addressable Market Size)	Elevance Value Proposition
Consumer Ingredients & Intermediates ($31 billion)	
Detergents, cleaners ($20 billion)	
• Specialty surfactants	• Various formulation benefits including improved cold water performance, concentration, compaction, hard water tolerance and solvency • Alternative alcohol feedstock to palm kernel oil, coconut oil and fossil fuels to address price and supply concerns
Personal care products ($6 billion)	
• High performance soy wax	• Naturally derived wax, eliminates brittleness, adds body
• Emulsifiers	• Improved emulsification, improved film forming and emolliency, naturally derived
• Soy petrolatum to replace petroleum derived petroleum jelly	• Naturally derived and elegant aesthetics • Anti-frizz and shine for leave-in hair care • Moisturizing benefits and smoother feel for skin care
Performance waxes ($5 billion)	
• Plastic processing additives	• Thermal stability with low volatility and good release/anti-stick effects
• Soy and palm formulated wax blends for candles	• Reliability of supply, increased fragrance loading, alternatives to paraffin
• Palm wax blends for corrugated coatings	• Improved recyclability, reliability of supply, sustainability

Lubricants & Additives

Market Platform/Segment (Addressable Market Size)	Elevance Value Proposition
Lubricants & Additives ($29 billion)	
Lubricant base oils ($17 billion)	• Reduction in formulation costs • Improved fuel economy, wear, sludge resistance, stability • Less frequent oil changes • Alternative and renewable source of olefins for PAO
Lubricant and fuel additives ($12 billion)	
• Viscosity improvers, extreme pressure and anti-wear additives, dispersants	• Improved lubricity, detergency to control impurities, corrosion prevention • Renewable-novel additives improve cold flow, lubricity
• Cold flow modifiers, lubricity	• Supply chain improvements

enhancers, deposit control

Engineered Polymer & Coatings

Market Platform/Segment (Addressable Market Size)	Elevance Value Proposition
Engineered Polymers & Coatings ($116 billion)	
Monomers and building block chemicals used in: • Specialty polyamides, polyesters and polyols ($25 billion) • Epoxies and polyurethanes ($58 billion) • Coatings and cross linking agents for coatings ($33 billion)	• Enhanced corrosion, chemical and heat resistance and improved electrical insulation over existing alternatives • Light-weight replacement for metal alternatives • Produce existing products via lower cost routes • New source of C10 molecules • Renewable products & polymers

3. Applicability and Impact: Practical and Cost Effective Approach

Overall, Elevance has operated innovative source reduction programs by transforming a diversity of natural plant-based oils into cost advantaged and high performance green chemicals as substitutes to petrochemicals. The breakthrough process is practical and cost effective, with lower construction and production costs than alternative routes to comparable products, such as olefins produced 56-79% cheaper than incumbent products. Execution ongoing to build three world-scale facilities by 4Q2014, with combined annual production capacity of one million metric tonnes (2.2 billion pounds). Concurrently building one of the world's largest integrated biorefineries in Indonesia with Wilmar International Limited, and repurposing a biodiesel plant in Mississippi. Construction of these facilities is estimated to cost $215 to $535 per metric tonne ($0.10 to $0.25 per pound) of annual production capacity compared to $920 to $2,300 per metric tonne ($0.42 to $1.04 per pound) for conventional facilities. By 4Q2014, expect third facility in South America. As evidence of widespread market applicability, Elevance has secured significant global partner agreements related to: sales, marketing and application development; manufacturing; technology; and feedstock supply. Accordingly, Elevance benefits from a number of competitive strengths:

- Proprietary technology produces high-value specialty chemicals and direct replacement intermediate chemicals that are cost-advantaged, higher performing compared to incumbents.
- Biorefinery design requires less capital than conventional technologies because: (1) fewer major process steps; (2) lower operating temperatures and pressures; (3) limited production of hazardous and toxic by-products; and (4) ability to integrate process into existing industrial sites.
- Lower production costs because: (1) more direct process, resulting in fewer conversion steps; (2) highly efficient and selective catalyst; (3) feedstock flexibility; and (4) lower operating temperatures and pressures, resulting in greater energy efficiency.
- Strategic partnerships with industry leaders provide sales and marketing expertise, established distribution channels, technical know-how, product and application expertise and infrastructure.
- Feedstock flexibility: technology has the flexibility to use diverse natural oils. Ability to adjust inputs in real time to take advantage of changes in feedstock prices and product demand.
- Targeting large and well-established end markets, currently estimate addressable specialty chemical markets represent $176 billion in annual commercial opportunity.
- Rapid deployment because: (1) ability to repurpose or integrate into existing sites; (2) low capital requirement; (3) existing large markets; and (4) relatively short engineering, construction cycle.