ERS Polyol Opportunity Overview
October 2012

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ERS Company Overview

Company Overview

WHAT WE DO

Elevance Renewable Sciences Inc. is the leader in the chemical conversion of renewable feedstock into a wide range of both 'drop in' and novel specialty chemicals

TECHNOLOGY

Elevance produces a wide range of specialty chemicals from renewable oils using proprietary, Nobel prize winning metathesis technology developed by Dr. Robert Grubbs at Caltech

COMMERCIAL PRODUCTION

Already commercialized, marketed and generated gross profits from first suite of commercial products

Asian JV 180,000mt biorefinery with Wilmar commences production in 2012

KEY STATS

Employees: 140
Founded: 2007
Headquarters: Woodridge, IL

Elevance™

High Performance Specialty and Intermediate Chemicals from Natural Oils

- Variety of Natural Oils
- Widely Available

- Commercial Today
- Low Capital Requirements
- Low Operating Costs

- High Value Product Mix
- Addresses Critical Shortages
- Meets Customer Performance Needs

Specialty Chemicals

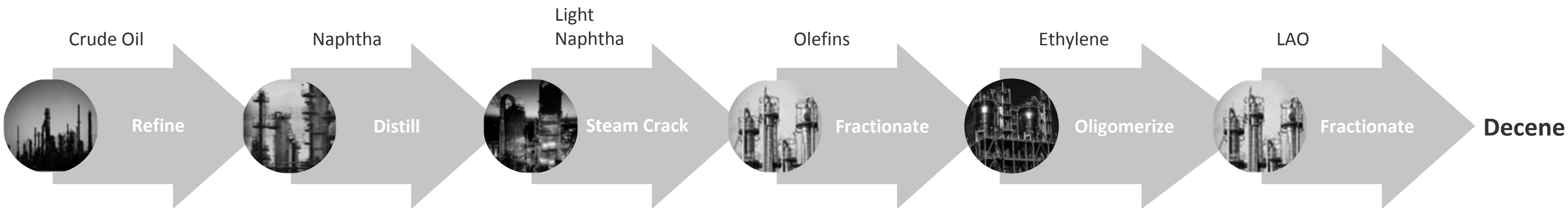
Olefins

Oleochemicals

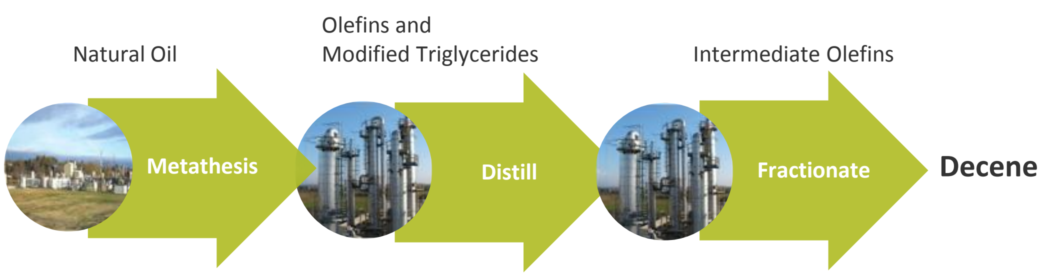
Elevance™

Elevance *Advantage*: An Elegant Conversion Process

Petroleum Route to Decene



Elevance Route to Decene



Less than ¼ of the Capital and Operating Costs of Traditional Processes

Fewer steps and with lower capital and operating costs

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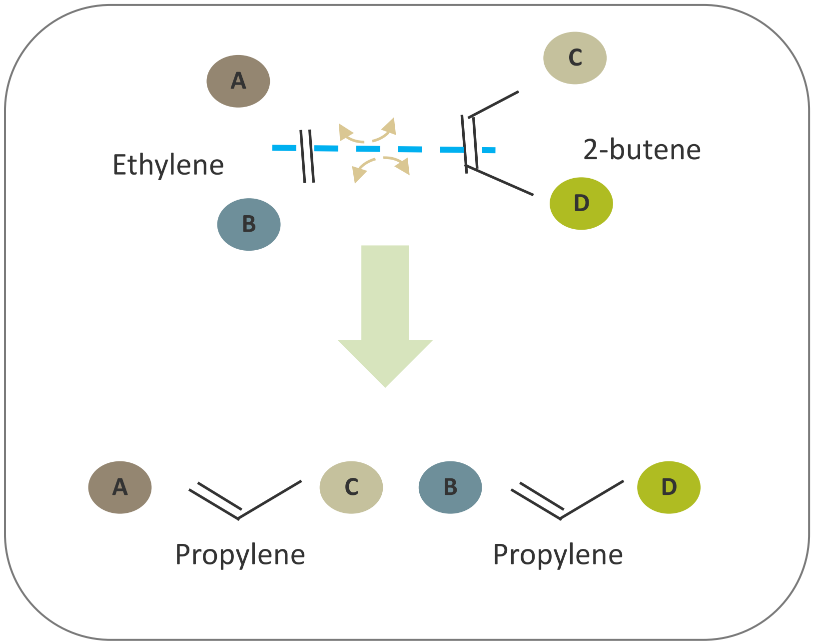
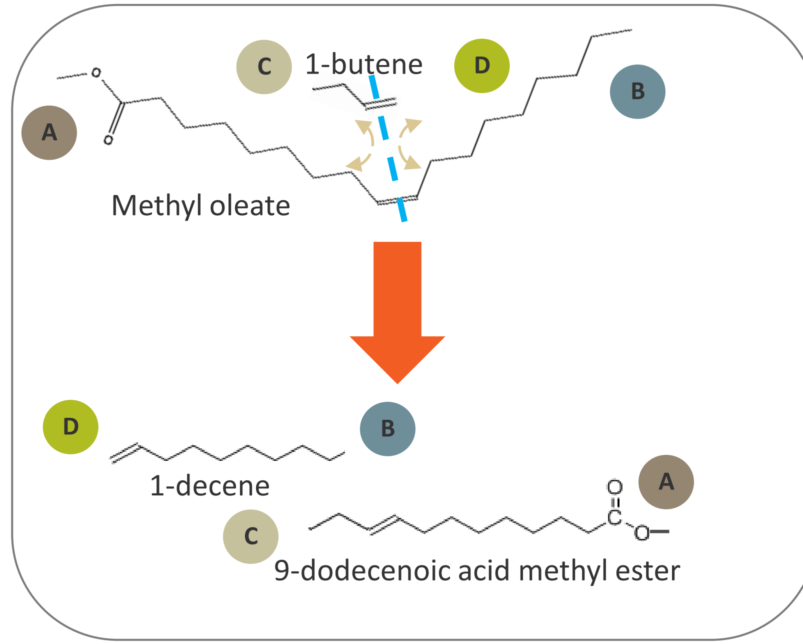
Elevance *Advantage*: Proprietary Metathesis Technology

Traditional Catalyst



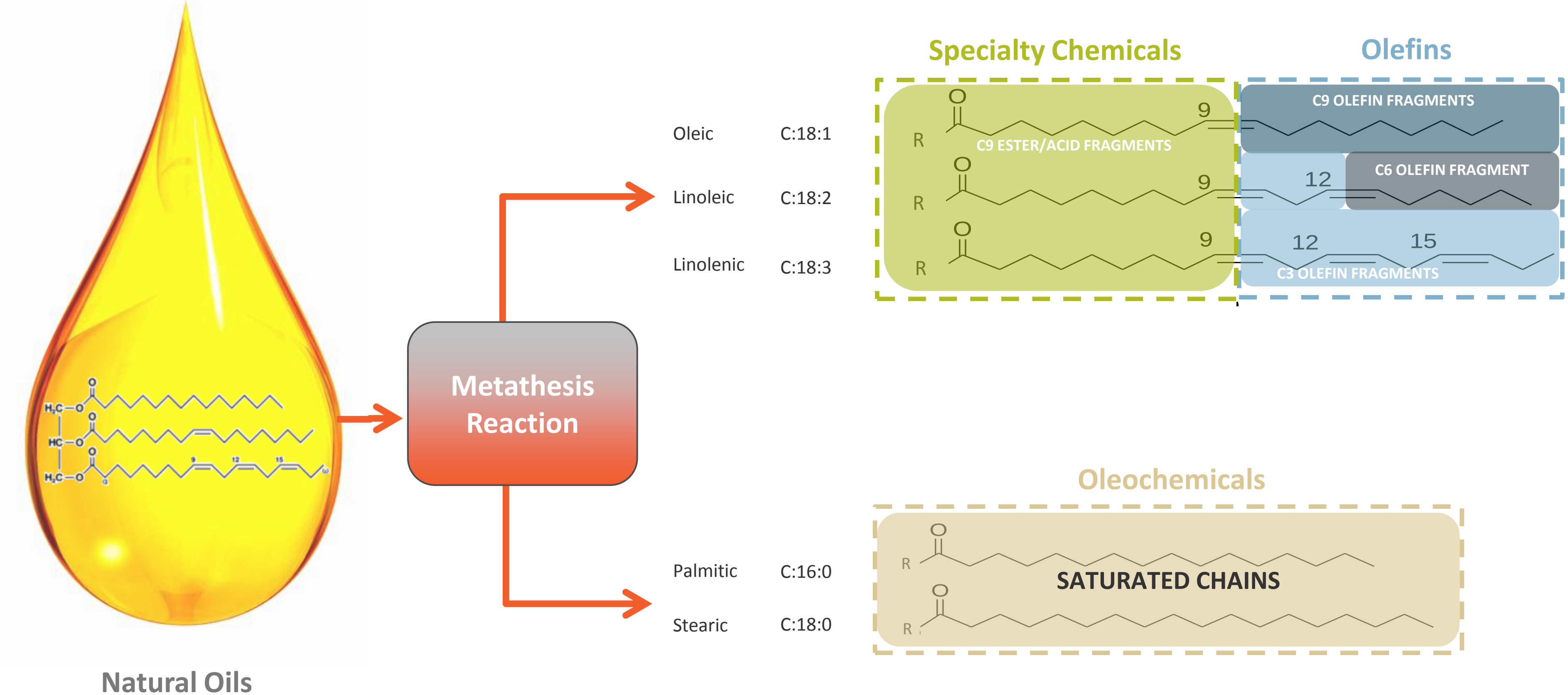
Our Proprietary Catalyst



Refining natural oils to specialty chemicals and intermediate chemicals using metathesis technology

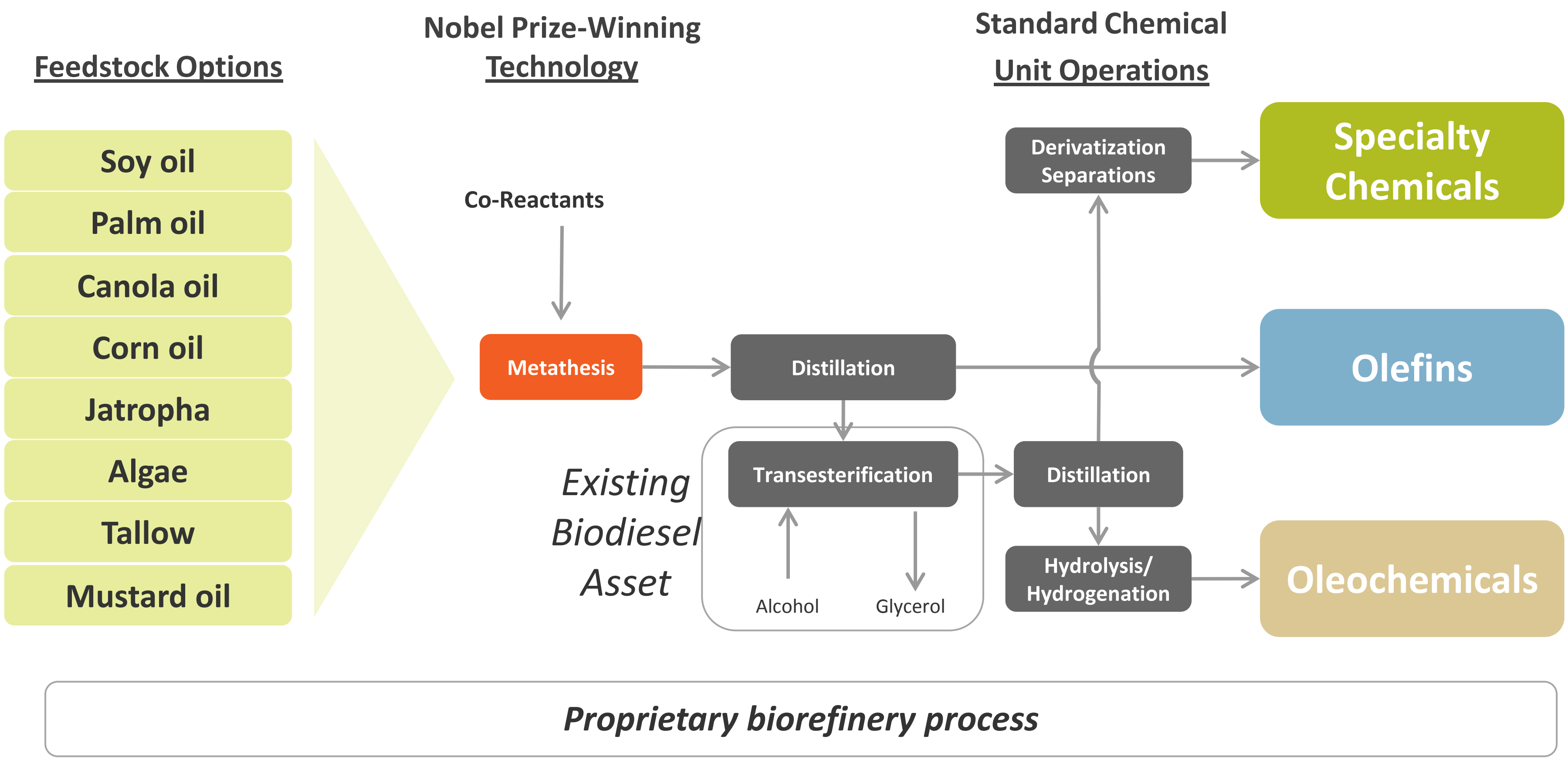
Elevance *Advantage:* Leveraging the Inherent Complexity of Plant Oils

- Traditional processes use small molecules to build more complex molecules
- The Elevance process reduces costs by leveraging natural plant oil complexity



Elevance *Advantage*: Superior Process

- Low capital intensity and low cost of production
- High value product mix
- Technology process proven and *scalable*



Near-Term Large-Scale Commercialization
One million metric tonnes from three biorefineries by 2015

Plant #2: Natchez, MS

Expected Commissioning: 2014

Capacity: 310,000 MT

Plant #3: South America / SE Asia

Status: In discussions with petrochemical and agricultural processors to evaluate biorefinery JV and offtake opportunities

Plant #1: Gresik, Indonesia

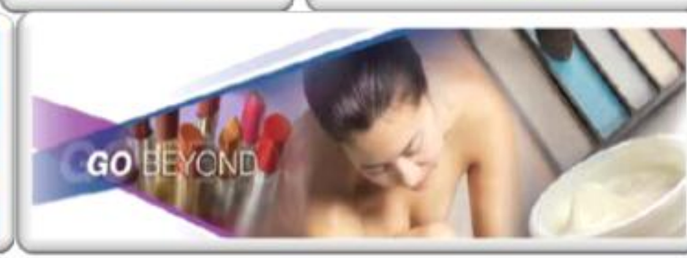
Expected Commissioning: 2012

Capacity: 180,000 MT expandable to 360,000 MT

Accelerated Market Entry through Leading Commercial Partners

Partner	Product	Addressable Market
ARKEMA	Specialty Polymers	Engineered Polymers & Coatings
Clariant	Polymer Additives	Engineered Polymers & Coatings
HUTCHINSON WORLDWIDE	Rubber Processing Oils	Lubricants & Additives
NL Grease	Greases	Lubricants & Additives
Stepan	Surfactants and Antimicrobials	Consumer Ingredients & Intermediates
DOW CORNING	Personal Care	Consumer Ingredients & Intermediates

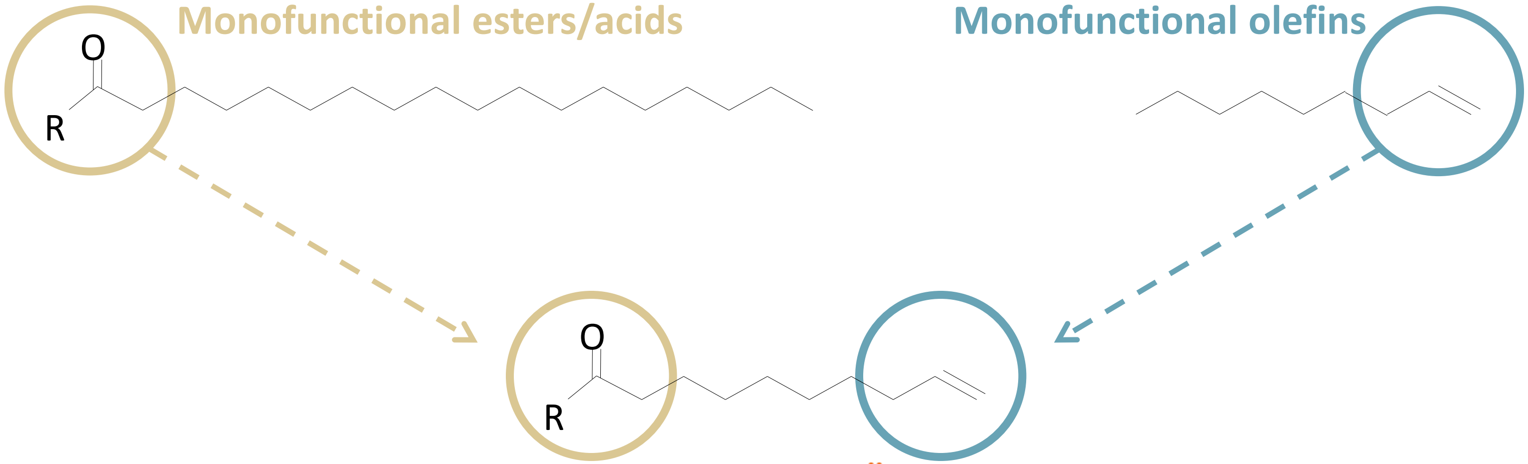
Polyol Opportunity



Specialty Chemicals Based on Novel Di-functional Molecules

Typical oleochemicals:
Monofunctional esters/acids

Typical olefins:
Monofunctional olefins



Di-Functional Molecules

Chemicals from the Elevance process combine functional attributes of olefins and oleochemicals in a previously unachievable single molecule

Products Address Critical Customer Needs

Detergents & Cleaners
- ✓ Improved cold water performance
- ✓ Alternative feedstock with pricing/supply dynamics

Personal Care Products
- ✓ Anti-frizz and shine for leave-in hair care
- ✓ Moisturizing benefits and smoother feel for skin care products

Performance Waxes
- ✓ Thermal stability
- ✓ Increased fragrance loading

Lubricant Base Oils
- ✓ Reduction in formulation costs
- ✓ Improved fuel economy

Lubricant & Fuel Additives
- ✓ Improved lubricity
- ✓ Enhanced cold flow properties

Engineered Polymers & Coatings
- ✓ Enhanced corrosion, chemical and heat resistance
- ✓ Light weight replacement for metal alternatives

Products specifically target customer desired functional attributes

Elevance™

Engineered Polymers & Coatings: Di-functional Monomers

High performance polymers rapidly replacing metal & other materials:

- ✓ Lower weight
- ✓ Easier to process
- ✓ Better performance in difficult environments

Automotive under hood components

Electrical and electronic parts

High performance sports and leisure goods

ERS is Partnered with ARKEMA ***in Engineered Polymers***

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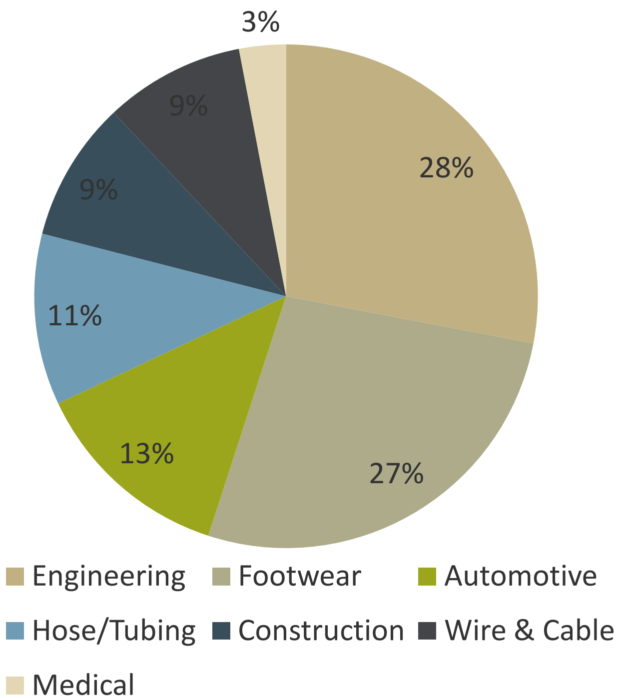
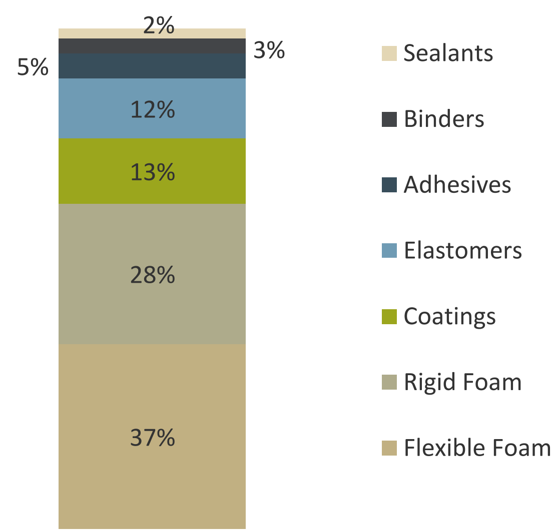
Market Landscape: Thermoplastic Polyurethanes (TPU's)

Global TPU Consumption by End Use,



2007 TPU Demand by End-use

End-use market , kMT	EMEA	Americas	Asia-Pacific	Total
Injection	53	30	85	169
Extrusion	41	45	46	132
Adhesives	14	8	23	46
Coatings	4	3	17	23
Total	112	86	172	370



Sources: IAL, several PU articles

Polyurethane Chemistry

PU chemistry uses 3 key ingredients: isocyanates, chain extender (diol), and polyol

- Polyurethanes are synthesized by a poly-addition reaction between polyols & isocyanates
- TPU are segmented linear polymers made from alternating hard (urethane) & soft segments
- A thermoplastic polyurethane (TPU) uses a specific combination of 3 classes of raw materials:
  - Isocyanate (NCO)
    - Difunctional
  - Chain extender (CE),
    - Low molecular weight diols difunctional monomers
  - Polyol,
    - Difunctional oligomeric material, OH terminated

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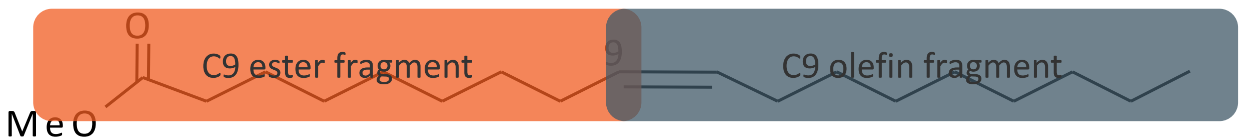
Example: Olefin Metathesis for Polyol Precursor Production

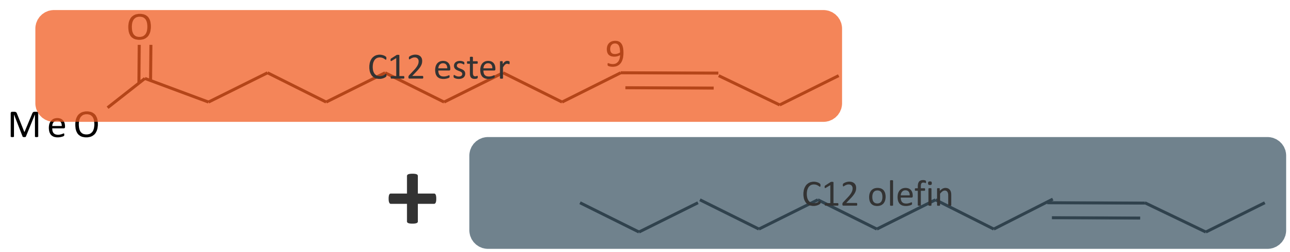
- **We can utilize the metathesis reaction to convert natural oils into di-functional esters**

Oleate C18:1



Plus: 3-hexene

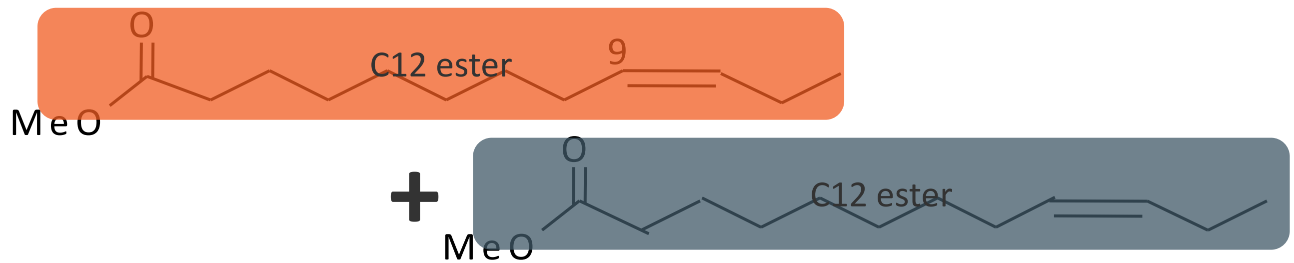
Resulting Molecules



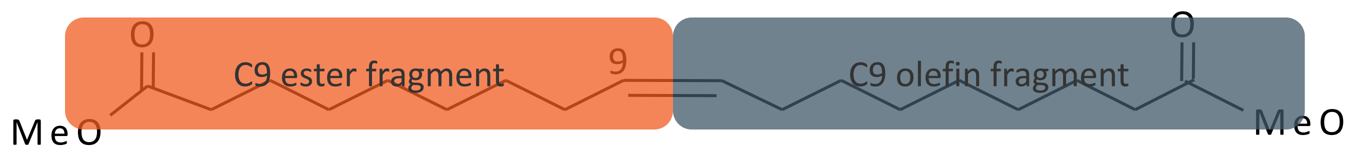
Example: Olefin Metathesis for Polyol Precursor Production

- **We can then utilize self-metathesis to convert methyl 9-dodecenoate into a diester**

Resulting Molecules



C18 Di-ester



Plus: 3-hexene

- **We can subsequently deploy standard organic chemistry techniques to form mid-chain diacids and diols, which can be used as a chain extender or polyester polyol raw materials**

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RENEWABLE SCIENCES

Thank You