



Heavy Esters and Biodiesel

June 2017



REG enables a cleaner world through
lower carbon intensity products and
services

REG Products – High Quality and Value

REG's Competitive Advantage

- Ability to produce from a wide range of lower cost, lower carbon intensity (CI) raw materials enables pricing flexibility
- Reliability as an off-take customer for key suppliers of contract-manufactured fuel
- Ability to meet stringent customer specifications
- Preferred supplier to key customers and trading partners



REG-9000 Biodiesel

- Marketed based on fuel characteristics, not type of feedstock
- Positioned as premium quality product

REG-9000 Distilled Biodiesel

- Eliminates need to switch to lower cloud point biodiesel during winter months
- Easy to blend with petroleum

REG-9000/RHD

- 100% hydrocarbon product
- Used in any diesel engine without modification

REG Performance in 2016

\$2.0 billion in revenue

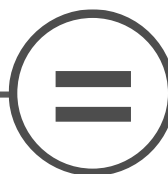
PHYSICAL PRODUCTS



LOWER CARBON INTENSITY

567 million gallons of
fuel

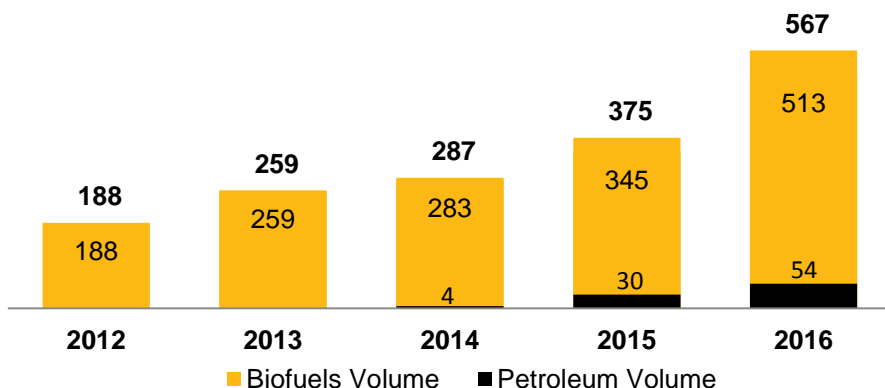
4.0¹ million tons of
carbon reduction



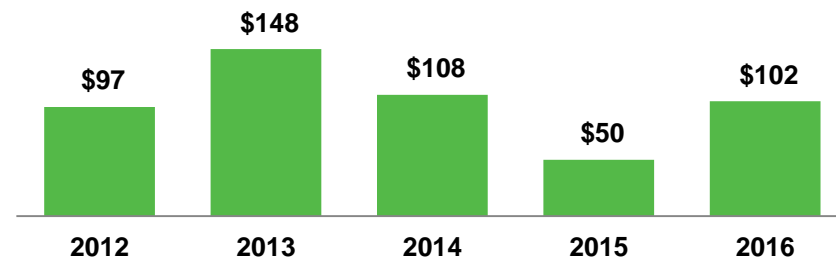
***\$102 million of
adjusted EBITDA***

Historical Financial Performance

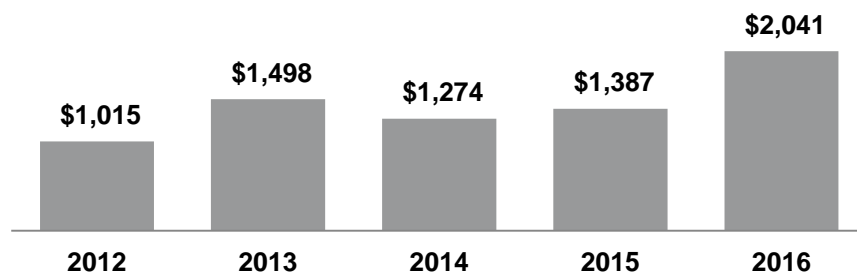
Gallons Sold – Annual Historical (MM gal)



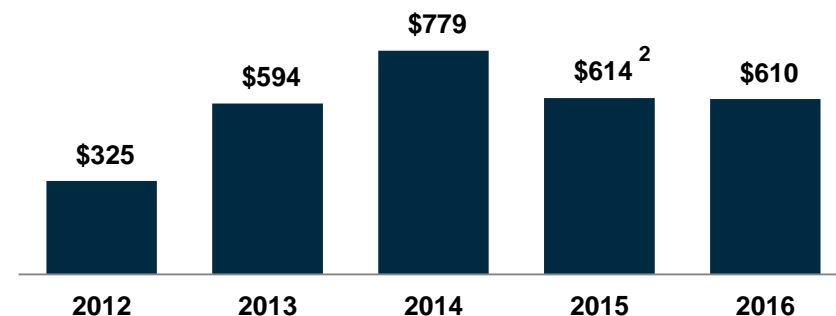
Adjusted EBITDA – Annual Historical (\$MM)¹



Revenue – Annual Historical (\$MM)



Net Book Value – Year end Historical (\$MM)



Foundation for Sustainable Earnings



Revitalization

Benefiting Cities
& Rural Areas

Jobs & Economic Development

New Investment



Energy Security

Long-Term Availability

Energy Diversity

Renewable Alternatives



Environmental Stewardship

Cleaner, Lower Carbon
Intensity

Food Security

Food THEN Fuel™

Lower CI & Cleaner Products Delivered Through Existing Infrastructure and Channels

Business to Business Sales Model



Advanced Biofuels

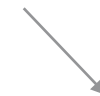
> 50% fewer CO₂ emissions



Lipids
(Oils & Fats)



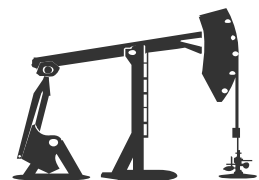
Refining



Fuel Blending



Distribution



Crude Oil Extraction
(sequestered carbon)



Crude Oil



Refining



Fuel Blending



Distribution



Petroleum Fuel

Higher CO₂ emissions

Production



REG Biodiesel

Where clean energy meets smart business

- Biodiesel has a wide range of benefits that stretch far beyond sustainability
- REG-9000 Biodiesel boosts profits, performance and efficiency as you achieve emissions goals
 - Provides economic advantages with tax incentives and RIN trading
 - Reduces life-cycle greenhouse gas emissions by 57 to 86%
 - Biodiesel raises the cetane number of the fuel, speeding up combustion

REG-9000 Product Lineup

REG-9000/1

Cloud Point -2 - +2 °C
(28-36°F)

REG-9000/5

Cloud Point 3-7 °C
(37-45°F)

REG-9000/10

Cloud Point 8-12 °C
(46-54°F)

- Marketing biodiesel on finished fuel attributes, not feedstock sources
- Provides unprecedented options for high quality biodiesel from a single supplier
- **REG-9000 specifications exceed ASTM D6751**

REG-9000 Production Specification

Test Name	ASTM D6751 Specification	REG-9000® Specification
Free Glycerin	0.020 %mass, max	0.014 %mass
Total Glycerin	0.240 %mass, max	0.16 %mass
Water & Sediment	0.05 %vol, max	0.01 %vol
Acid Number	0.50 mg KOH/g, max	0.40 mg KOH/g
Kinematic Viscosity @ 40 °C	1.9 – 6.0 mm ² /sec	3.8 – 5.0 mm ² /sec
Copper Strip Corrosion	No. 3, max	No. 1a
Na and K, combined	5.0 ppm, max	1.5 ppm
Ca and Mg, combined	5.0 ppm, max	1.5 ppm
Cold Soak Filtration	360 sec, max	200 sec
Oxidation Stability*	3.0 hr, min	6.0 hr *
Monoglycerides	Not required	0.40 %mass
Diglycerides	Not required	0.20 %mass
Triglycerides	Not required	0.15 %mass
Moisture (Karl-Fischer)	Not required	400 ppm
Visual Inspection (Haze rating)	Not required	1
Density @ 15 °C	Not required	0.87—0.89 g/mL

Notes:

Source:

Biodiesel Refining

- Old: Cold filtration
 - Biodiesel is cooled to near freezing and reheated to room temperature
 - During this process impurities that are the cause for clogging and flow issues at low temperatures separate out
 - The biodiesel is then run through a filter to remove the now separated impurities
- New: Distillation
 - Biodiesel is heated to above 210 °C which separates out impurities leaving only pure biodiesel
 - The remaining product is referred to as Heavy Esters

REG Heavy Esters

A new sustainable solution for generating heat and power

- REG Heavy Esters offer exceptional BTU performance when burned for heat or power generation
- As the nation's largest producer of biodiesel, REG offers a consistent supply of high-performing heavy esters for use as a clean-burning alternative to traditional fuel oils
 - REG Heavy Esters provides up to 128,000 BTUs per gallon
 - As a co-product of biodiesel production, REG Heavy Esters have minimal carbon intensity.
 - REG Heavy Esters are produced from recycled fats and oils such as used cooking oil, inedible corn oil, animal fat and other vegetable oils — renewable and plentiful resources.

REG Heavy Esters

REG Heavy Esters produced from Animal Fat at REG Newton



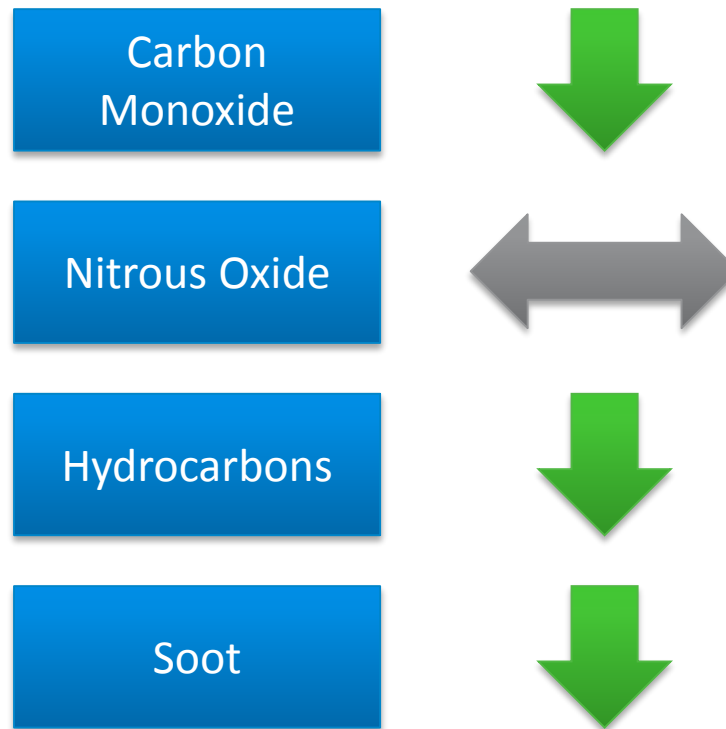
Technical Data Sheet

- Potential for two grades of Heavy Esters
- Depends on handling restrictions and/or sulfur limits
- Price depends on viscosity and/or sulfur limitations
- Moisture content less than 0.04%

<i>Property</i>	<i>Range or Limit</i>	
	<i>S-50</i>	<i>S-500</i>
Energy Content [BTU/lb]	16,500 – 17,500	16,000 – 17,700
Sulfur [ppm]	50, max	300, max
Acid Number [mg KOH/g]	2.0, max	3.0, max
Ash [wt %]	0.05, max	0.10, max
Flash Point [°C]	130, min	130, min
Density @ 60 °C [lb/gal]	7.1 – 7.7	7.6 – 7.9
Viscosity @ 60 °C [mm ² /s]	20, max	95, max
Viscosity @ 100 °C [mm ² /s]	9, max	25, max

Test Burn Data

REG Heavy Esters compared to No. 4 Fuel Oil



Value Add for Power Generation

- Biodiesel and Heavy Esters used in power generation produce Renewable Energy Credits (RECs)
- A Renewable Energy Certificate, or REC, is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation
- The value of RECs depend on the state in which they are generated

Notes:

1. \$0.05 under ULSD price
2. Represents average REC value of Northeast States

How to Generate a REC

- Governed at state level
 - Fuel burned must be a qualifying biomass or bioliquids
- Generated per MWh of qualifying electricity
 - Certain jurisdictions allow RECs on steam
- Greatly vary in price depending on jurisdiction

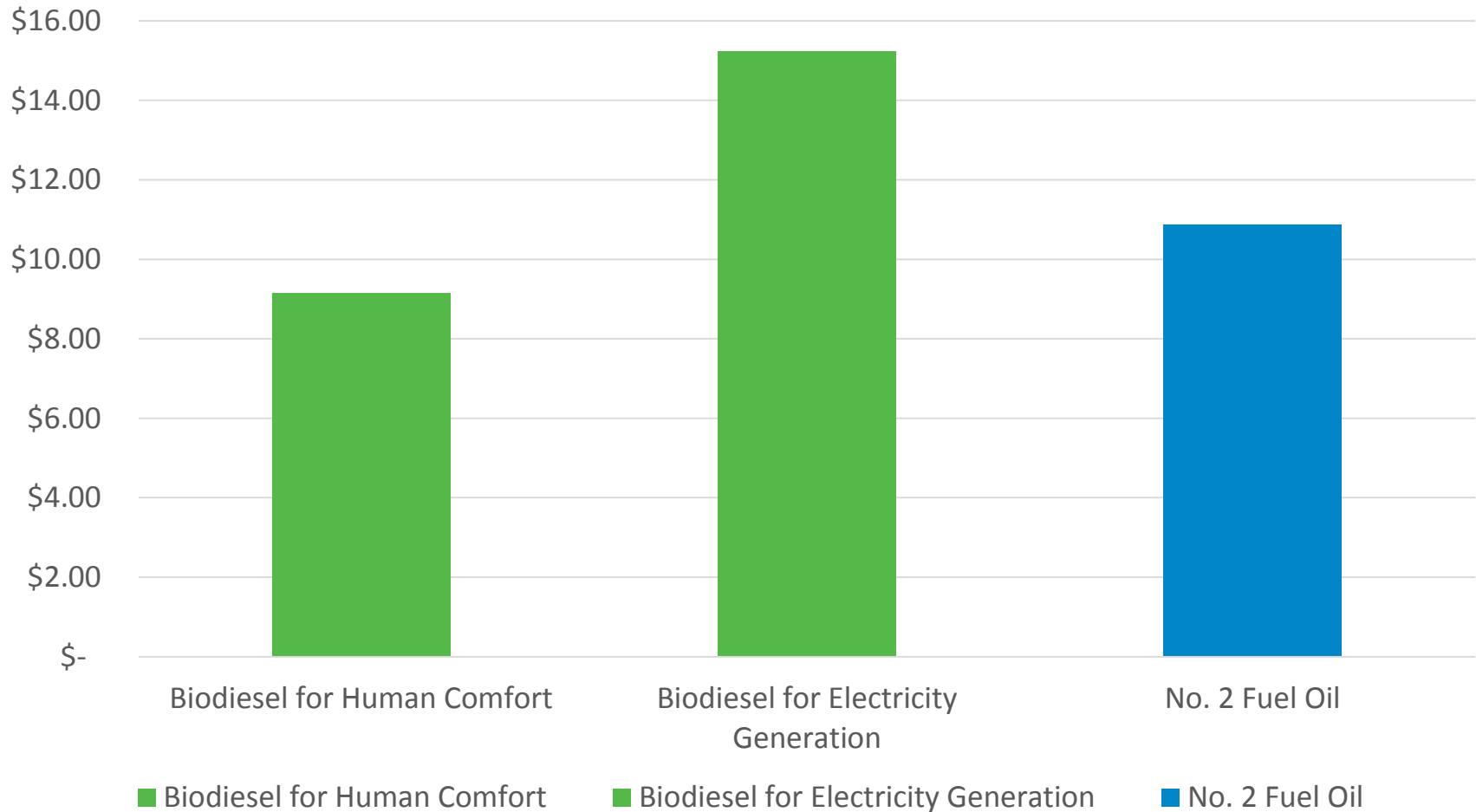
Value Add for Human Comfort

- When Biodiesel or Heavy Esters are used for human comfort (i.e. heating and cooling of buildings) Renewable Identification Number (RIN), credits may be generated under the Renewable Fuel Standard (RFS)
- RIN credits are used for compliance and have value in the market place
- Capitalizing on the value of RINs makes renewable fuels, such as biodiesel, cost competitive
- Biodiesel RINS currently trading for \$1.04/RIN
- 1.5 RINS/Gallon of Biodiesel = \$1.56/gallon

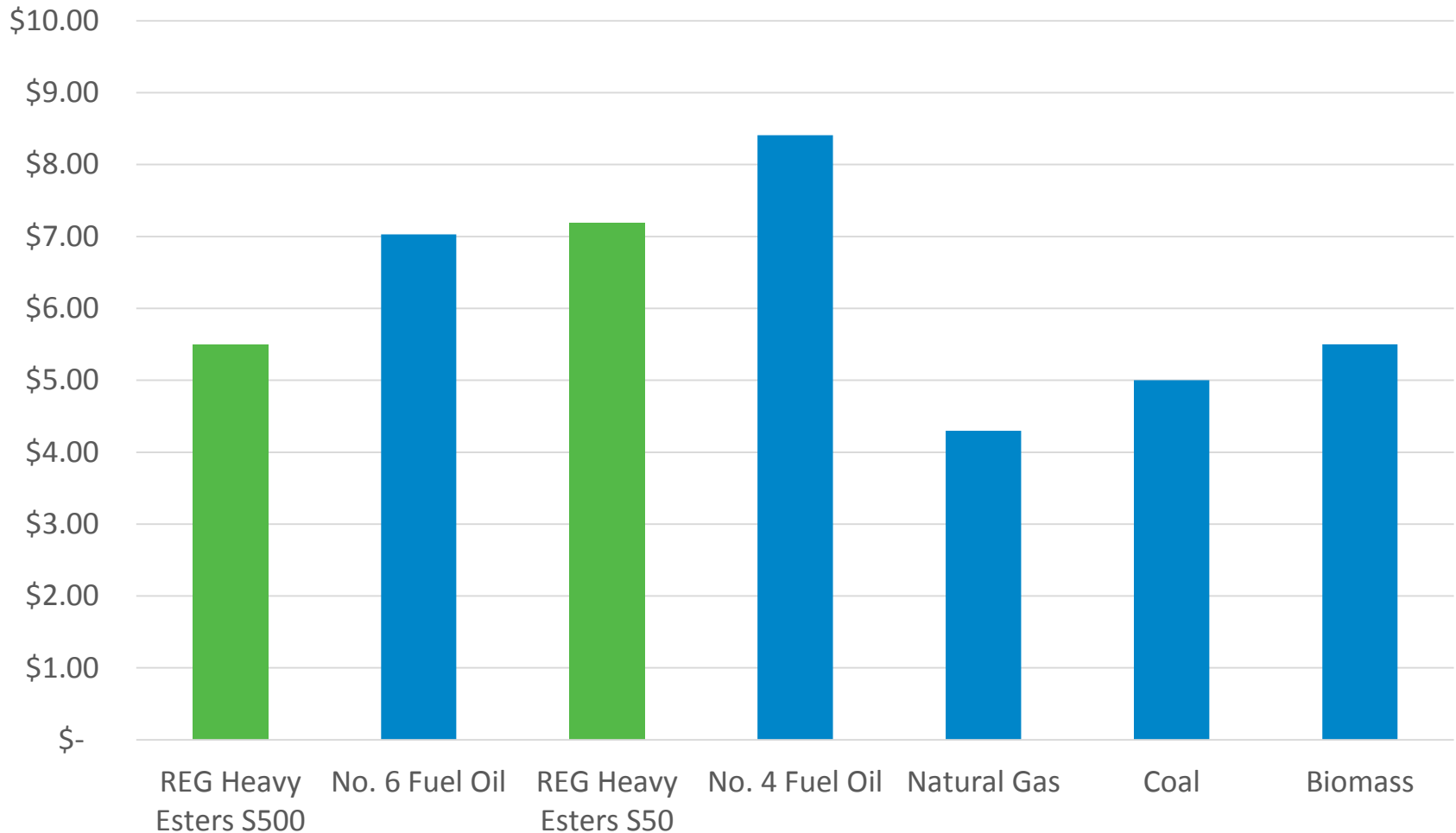
How to Generate a RIN

- Biodiesel generates when used in a qualifying manner
 - Transportation fuel and Heating oil
- Heating oil
 - Combusted for ‘human comfort’
 - Signed affidavit
- Producer of the biofuel generates the RIN

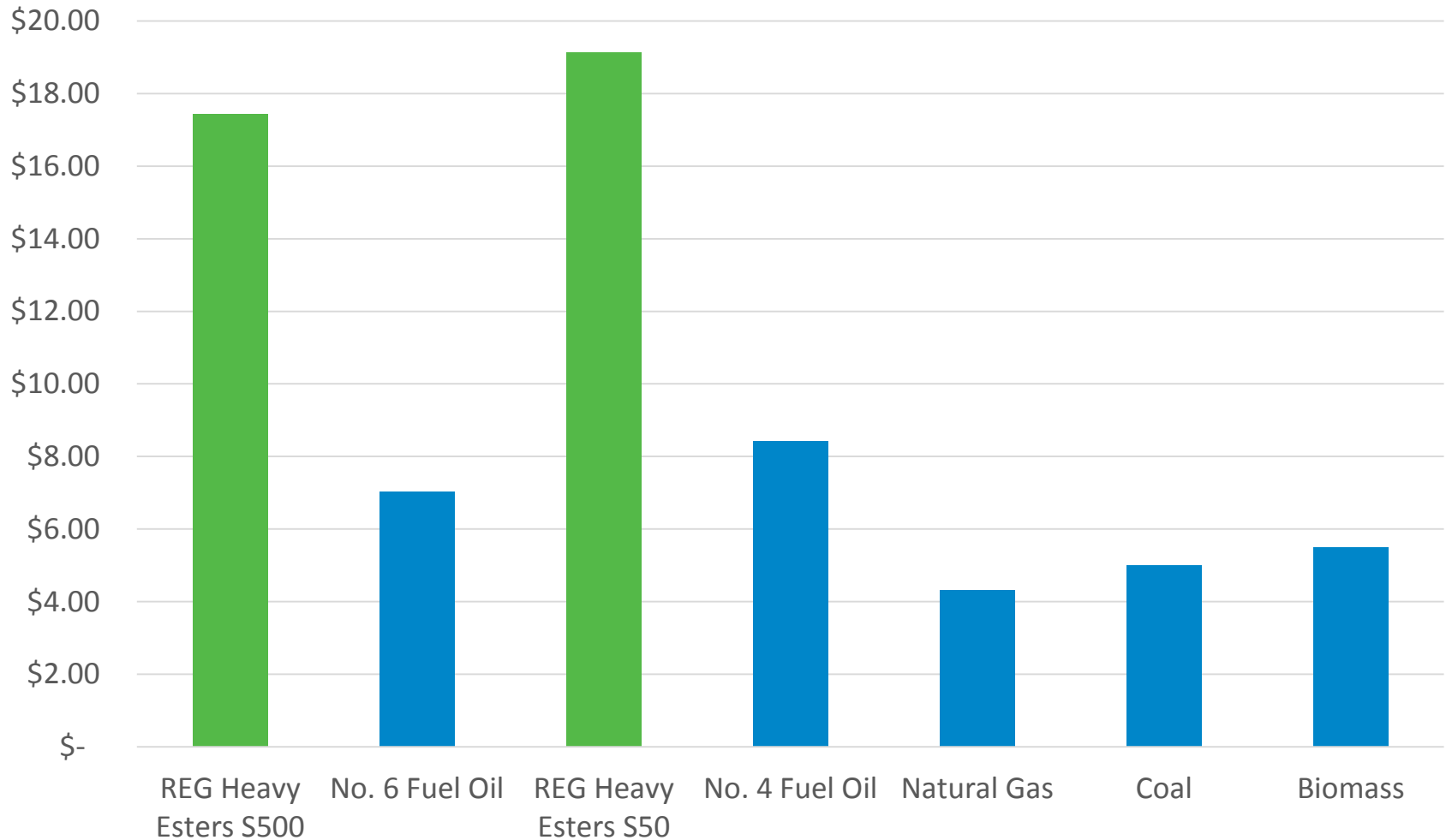
Cost per MMBTU - Biodiesel



Cost per MMBTU for Human Comfort



Cost per MMBTU for Electricity Generation



The Opportunity, Heavy Esters and Biodiesel

- Strong market interest from heavy fuel oil consumers to extend useful life of current equipment
- Avoid equipment disposal costs
 - Potentially change hazard classification of decommissioned equipment
- Competitively priced, domestically produced and 100% renewable liquid fuel
 - CHP co-generation facilities
 - District Energy facilities
 - Facilities burning liquid fuel for home comfort (RINS)
 - Facilities burning liquid fuel for electricity (RECS)
- B20/B50/B100 blends

Commercial Partners

REG is actively search for commercial partners in:

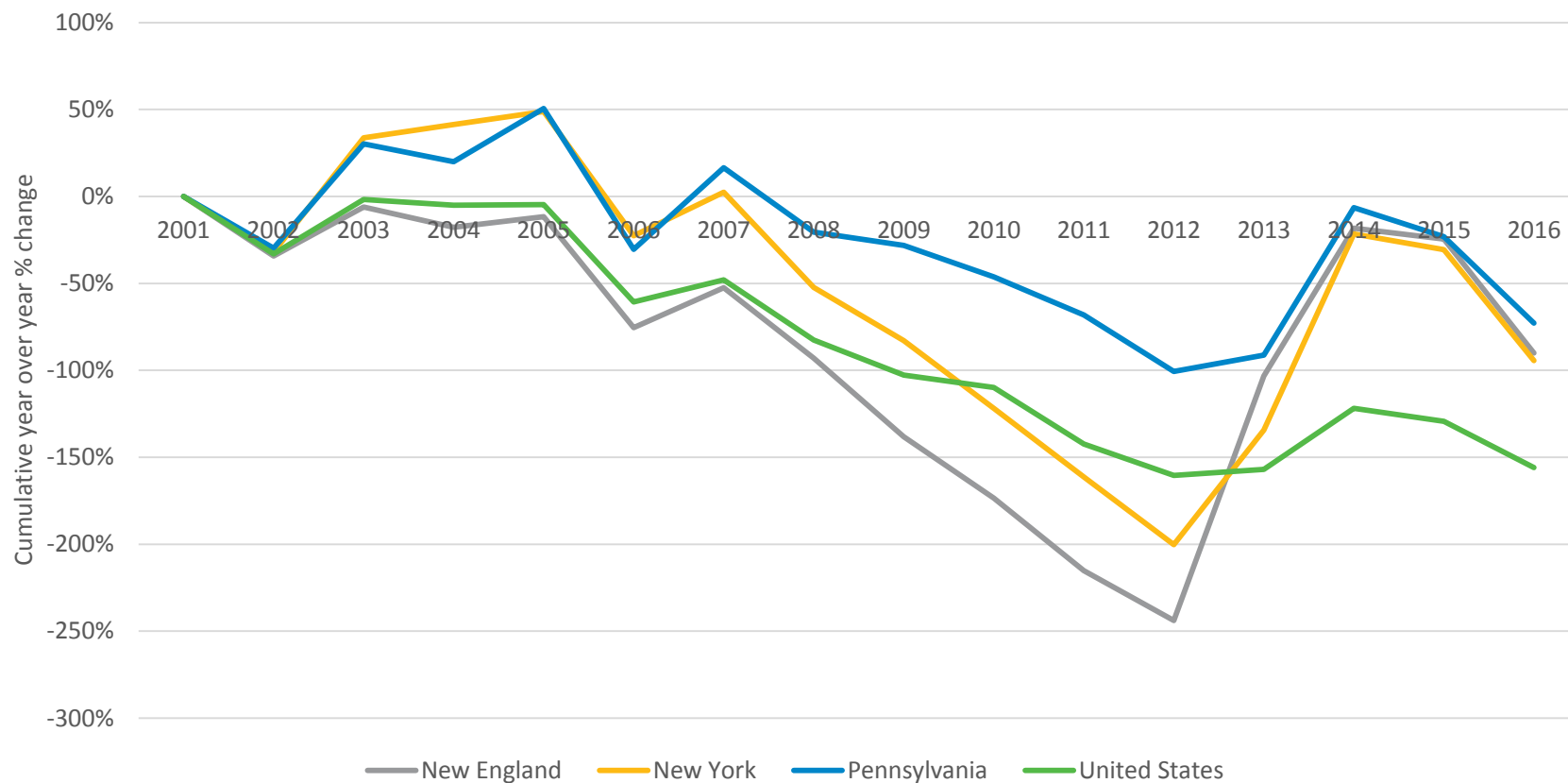
- Power generation
- Combined heat and power generation
- District heating



Appendix

Heavy Fuel Oil Market

Heavy Fuel Oil Used for Power Generation, Cumulative % Change



Coal Market

Coal Used for Power Generation, Cumulative % Change

