



U.S. Department of Energy
**Energy Efficiency
and Renewable Energy**

Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

Biomass Research and Development - Biorefinery Review and Selection Process

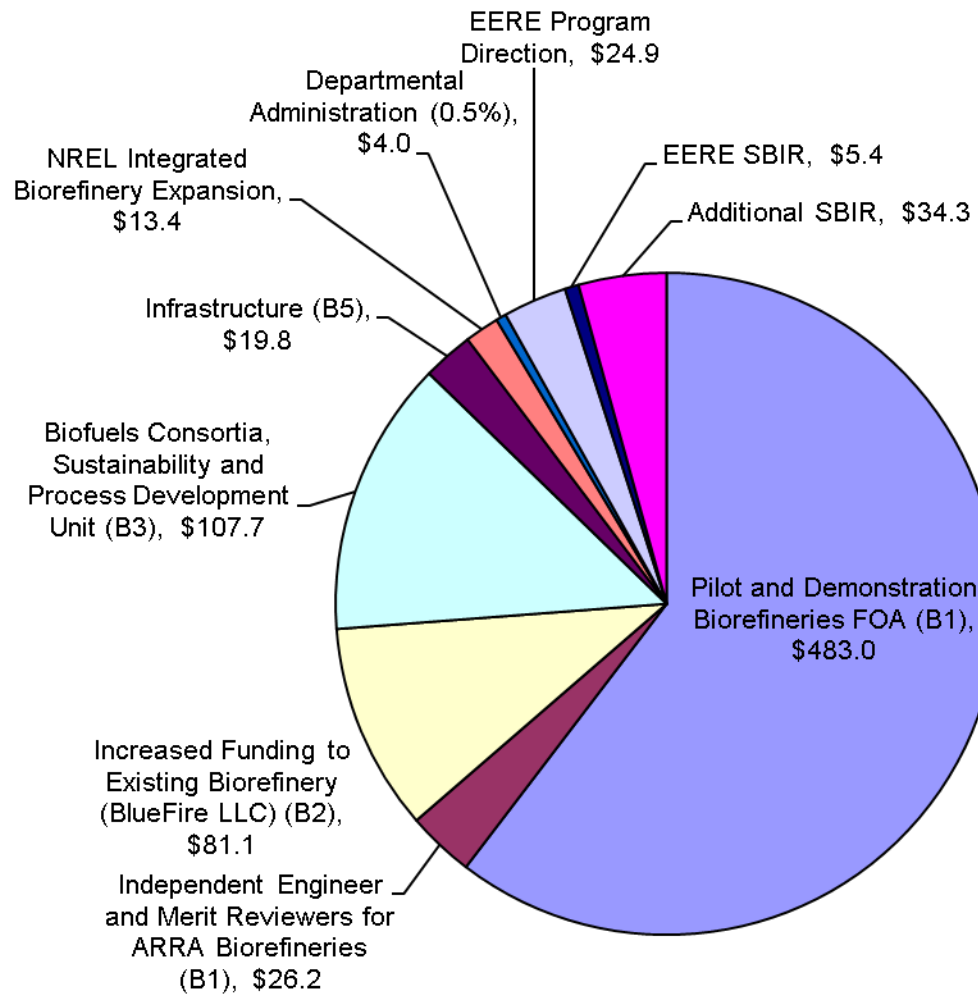
Technical Advisory Committee Public Meeting

September 29, 2010

Office of the Biomass Program
Golden Field Office



ARRA Funds in Millions of Dollars





Objective and Use of the ARRA IBR Funding

- B1 - Issued a Funding Opportunity Announcement (FOA) focused on the design, construction, and operation of integrated biorefineries at the pilot (minimum 1 dry tonne per day) or demonstration scale (minimum 50 dry tonnes per day).
 - Six Topic Areas to promote flexibility on allowable feedstock, scale, and primary output.
 - Secretarial cost share waiver could be requested.
 - Number of awards: 18 selected for \$483.0M
- B2 – Allocate federal funding to integrated biorefinery projects that were selected & awarded within the last two years.
 - BlueFire construction phase to be awarded with \$81.1M
 - Enables additional appropriated funds for other existing projects

Background

- Supports existing integrated biorefinery deployment efforts and authorizing legislation
 - FOAs for commercial and demonstration scale biorefineries, Energy Policy Act of 2005, Section 932
 - Energy Independence and Security Act of 2007, Section 207
 - American Reinvestment and Recovery Act of 2009, Title IV

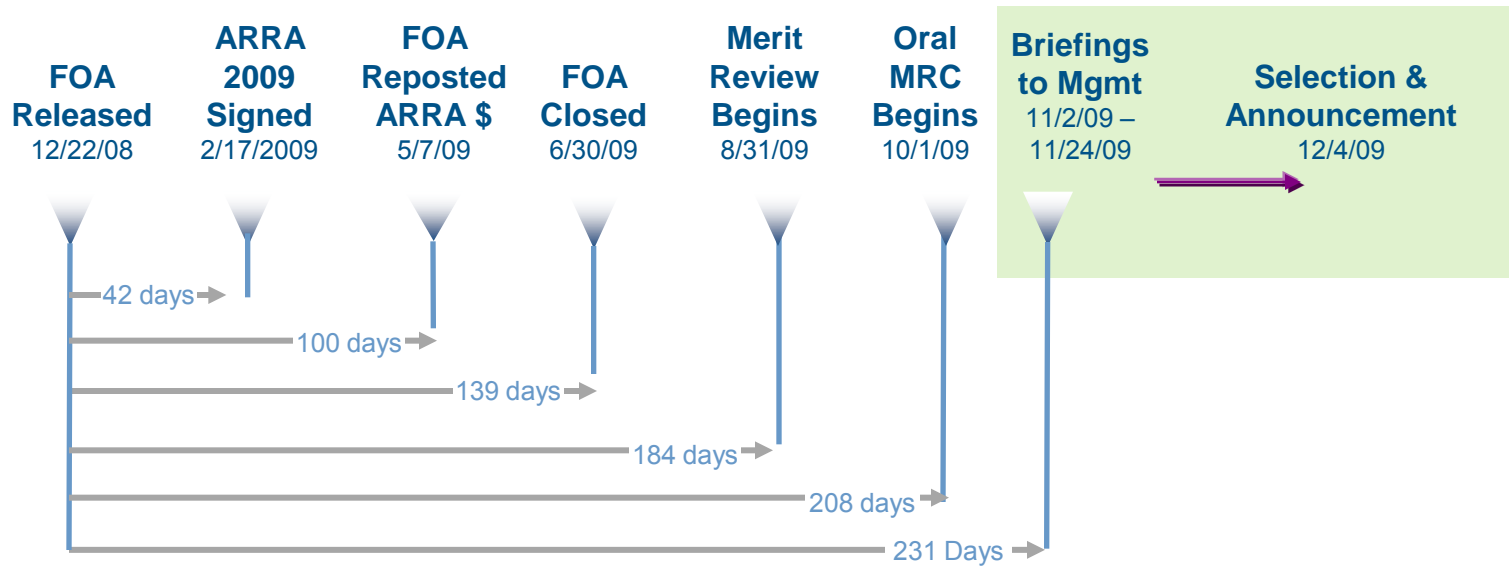


Topic Area	Minimum Scale (Feedstock Input)	Feedstock (Legislative Authority)	Primary Product	GHG reduction	Award Ceiling	Cost Share %*
1	1 ton per day integrated pilot	Algae, lignocellulosic (LC) biomass (EPA 2005, Section 932)	Biofuel	50% algae 60% LC	\$25M	20%
2	1 ton per day integrated pilot	Algae, lignocellulosic biomass (EPA 2005, Section 932)	Bioproduct	n/a	\$25M	20%
3	50 ton per day integrated demonstration	Algae, lignocellulosic (LC) biomass (EPA 2005, Section 932)	Biofuel	50% algae 60% LC	\$50M	50%
4	50 ton per day integrated demonstration	Algae, lignocellulosic biomass (EPA 2005, Section 932)	Bioproduct	n/a	\$50M	50%
5	1 ton per day integrated pilot	Any renewable biomass except corn starch (EISA 2007, Section 207)	Biofuel	80%	\$25M	20%
6	50 ton per day integrated demonstration	Any renewable biomass except corn starch (EISA 2007, Section 207)	Biofuel	80%	\$50M	50%

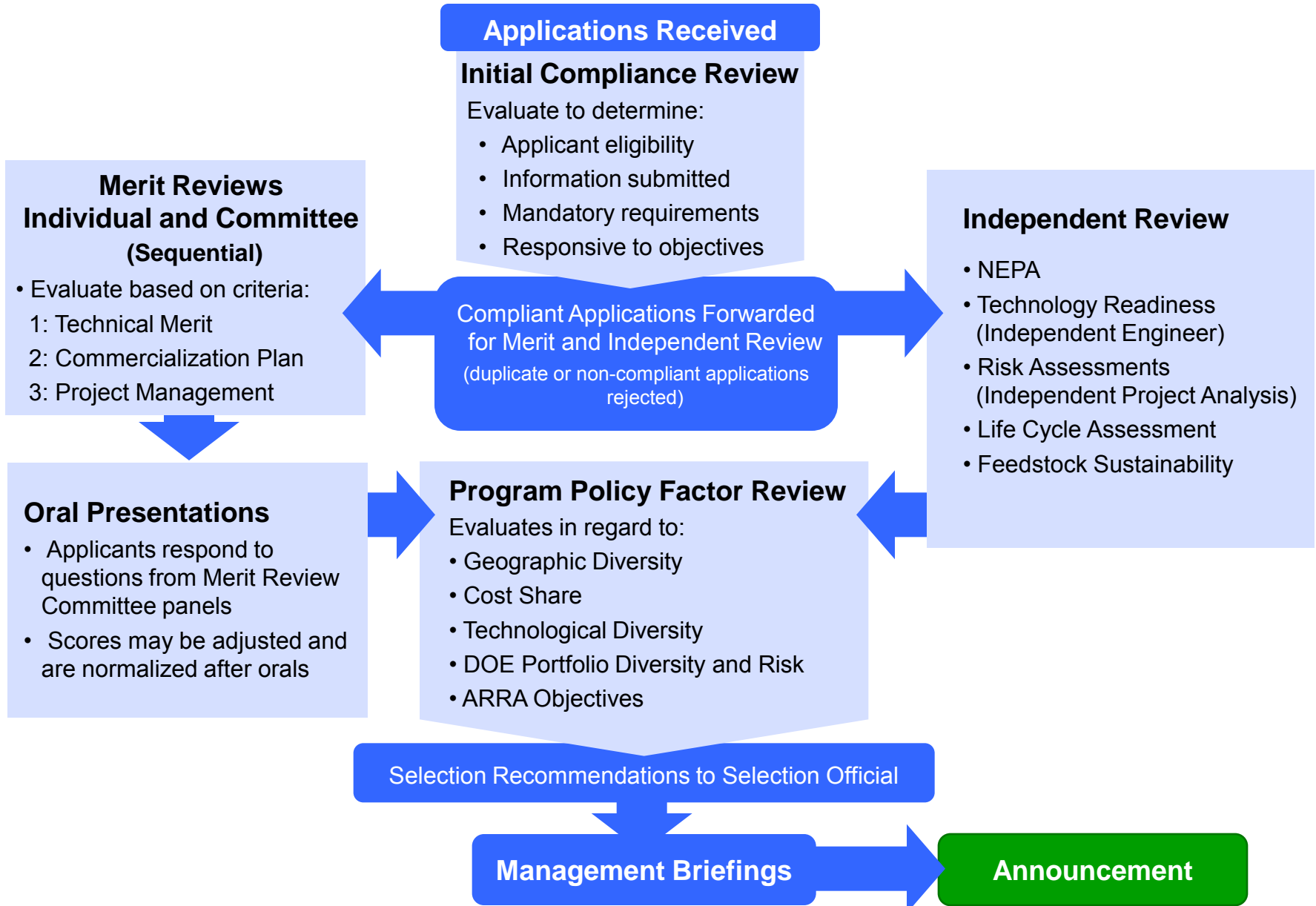
* Secretarial cost share waiver could be requested. A justification was required.



Demonstration of Integrated Biorefinery Operations



- Released December 2009 for up to \$200M from annual appropriations with 2 topic areas.
- Canceled and released May 2009 for up to \$480M from ARRA with 6 topic areas.
- Funds obligated in Dec 2009/Jan 2010
- Budget Period 1 funds released March/April 2010, Budget Period 2 negotiations ongoing





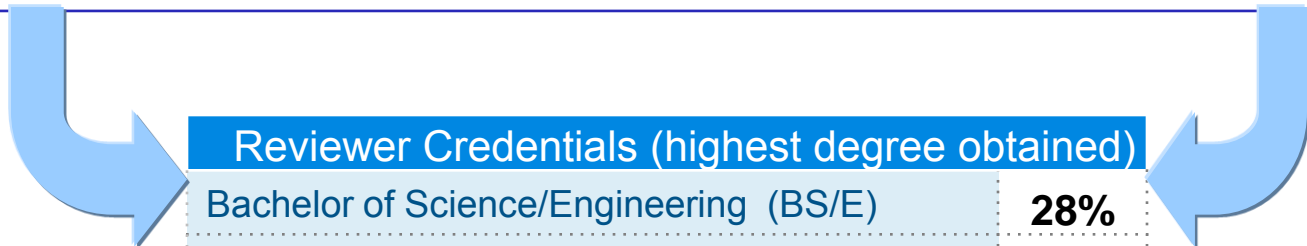
Merit Reviewer Qualification Summary

Qualification	Education	Desired Experience	Specific Knowledge
Merit Reviewers	BS Minimum, PhD preferred (85% MS or Higher)	>10 Years experience in Chemical Engineering, Biotechnology, Industrial Operations (average >25 Years)	<ul style="list-style-type: none"> •Feedstock Infrastructure •Thermochemical Conversion (pyrolysis, gasification, catalysts) •Biochemical Conversion (enzymes, bacteria, yeast organisms) •Algae Cultivation •Project Financing •Capital Project Management •Related Industry Experience (Pulp and Paper, Chemicals, Petroleum Refining, etc.) •New Technology Development and Commercialization

Reviewer Qualifications (highest degree obtained)	
Bachelor of Arts (BA)	2%
Bachelor of Science/Engineering (BS/E)	13%
Master of Business Administration (MBA) or Master of Science (MS/ME)	16%
Doctor of Philosophy (PhD/D.Sc)	69%



Qualification	Education	Desired Experience	Specific Knowledge
Crosscut Reviewers	BS Minimum, PhD preferred (70% MS or Higher)	>10 Years experience in Engineering, Industrial Operations, Project Management and Finance (average 15 Years)	<ul style="list-style-type: none">•Technology Readiness•Risk Assessments•Capital Project Management and Project Financing•Feedstock Sustainability and Availability•Life Cycle Assessments•NEPA/Environmental Permitting•Intellectual Property Rights



Reviewer Credentials (highest degree obtained)	
Bachelor of Science/Engineering (BS/E)	28%
Master of Science/Engineering (MS/ME) or Master of Business Administration (MBA)	23%
Doctor of Philosophy (PhD/D.Sci)	41%
Juris Doctor (JD)	8%

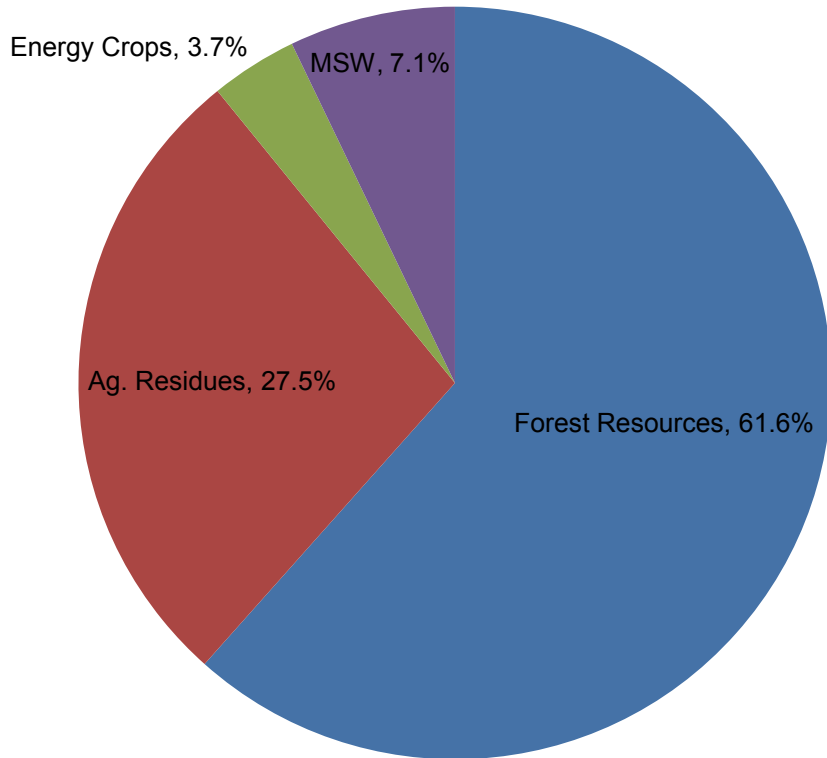


Summary Table of Projects Recommended for Selection

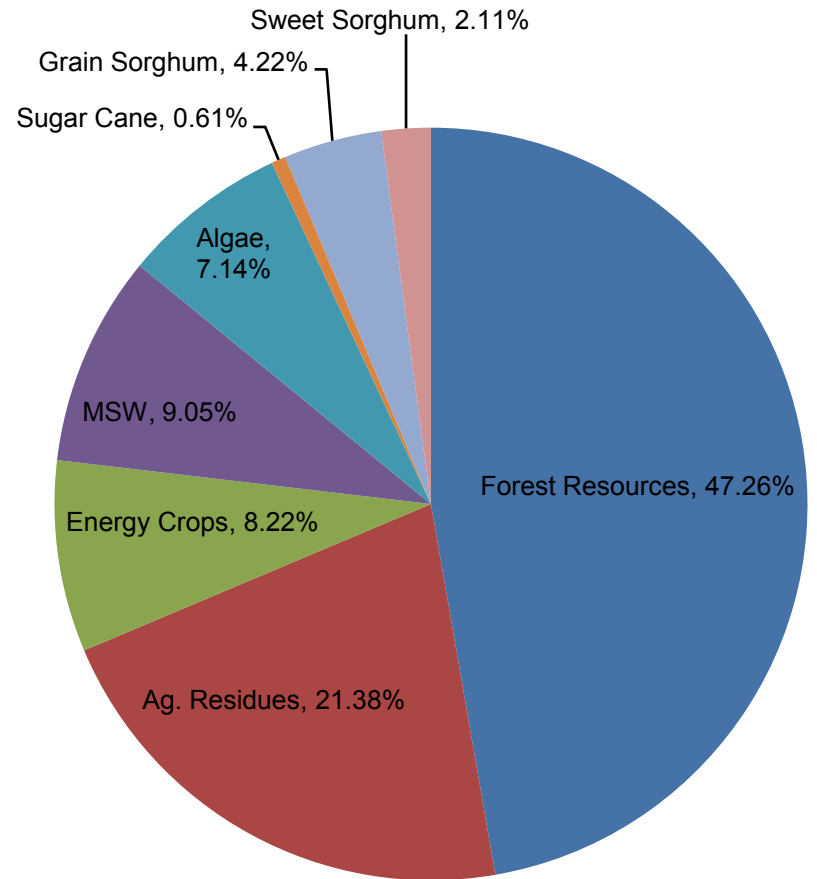
Topic Area	Recommended for Selection	DOE Funding (\$M)	Total Project (\$M)
1: Pilot-Algae/LC-Fuel	11*	\$234	\$384
2: Pilot-Algae/LC-Prod	1*	\$2	\$3
3: Demo-Algae/LC-Fuel	3	\$150	\$376
4: Demo-Algae/LC-Prod	1	\$50	\$140
5: Pilot-Sugar-Fuel	2	\$47	\$61
6: Demo-Sugar-Fuel	0	\$0	\$0
Total:	18	\$483	\$963



Feedstock Diversity Before Recovery Solicitation

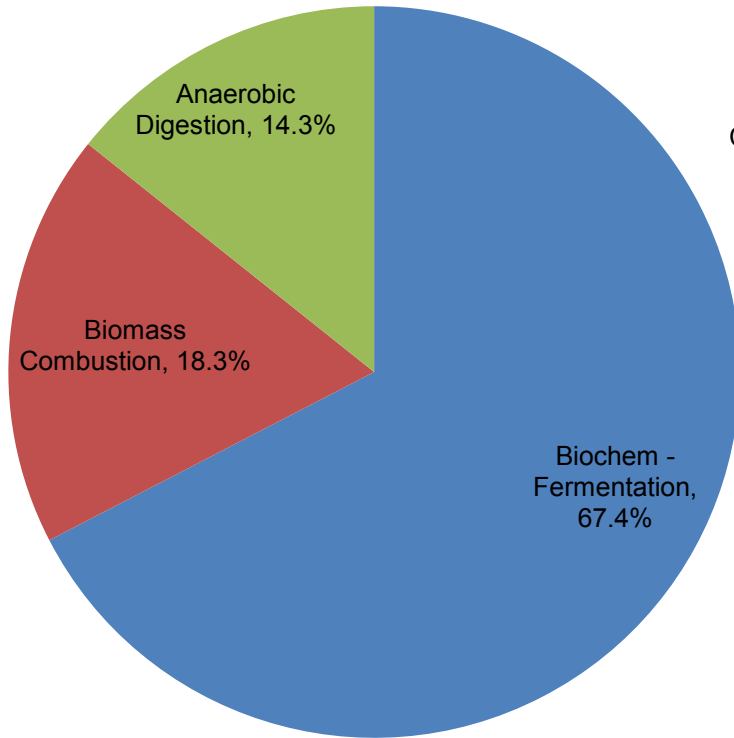


Feedstock Diversity After Recovery Solicitation

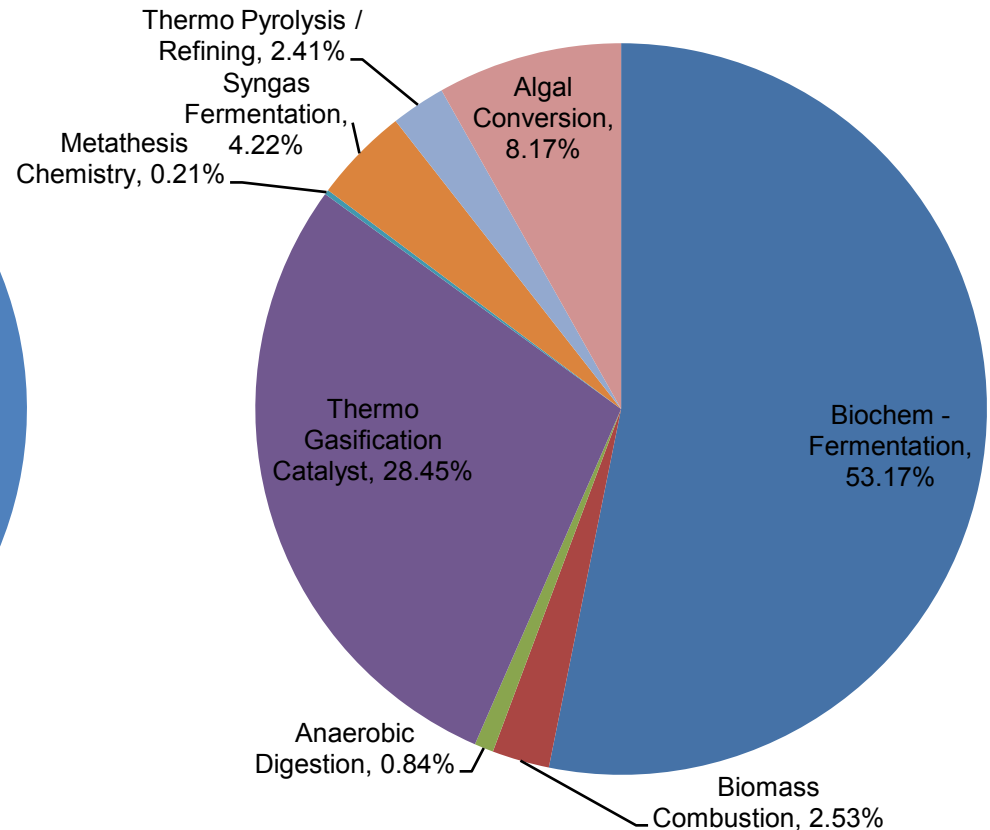




Conversion Technologies Before Recovery Solicitation

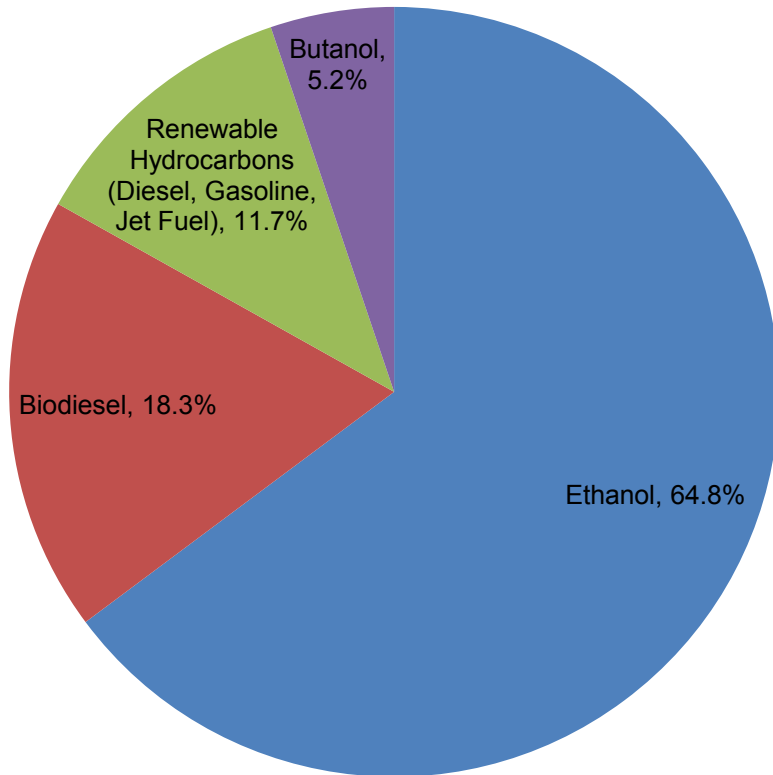


Conversion Technologies After Recovery Solicitation

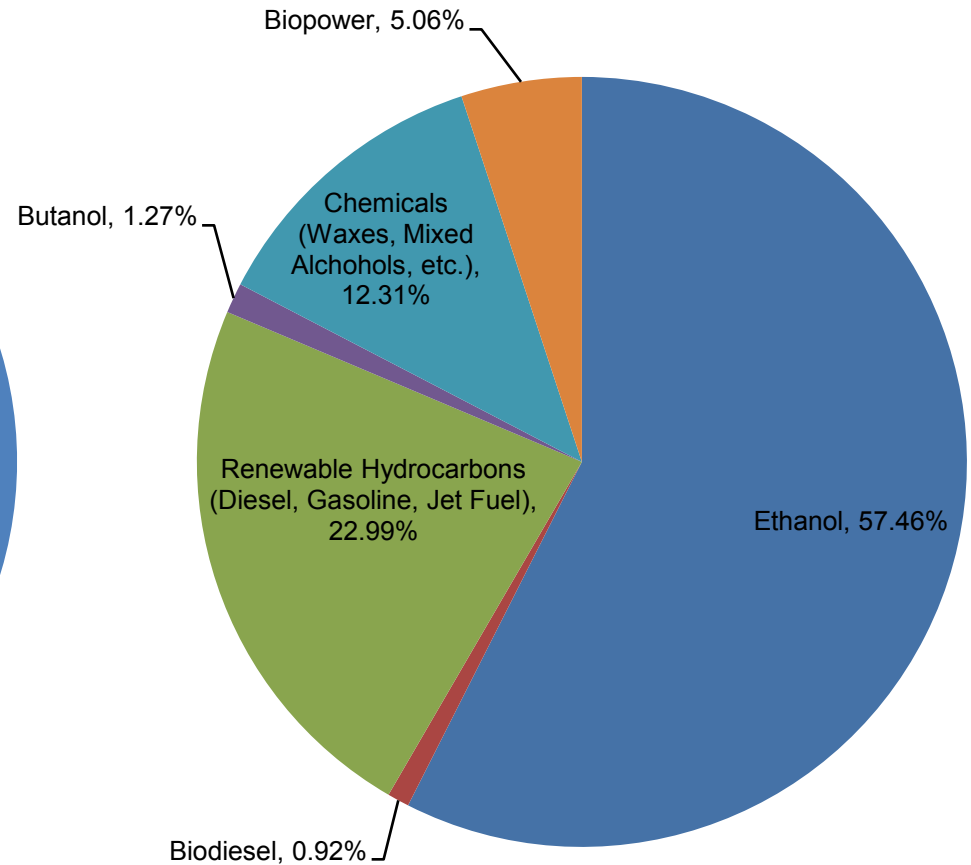




Products Before Recovery Solicitation



Products After Recovery Solicitation





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Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

IBR Portfolio

