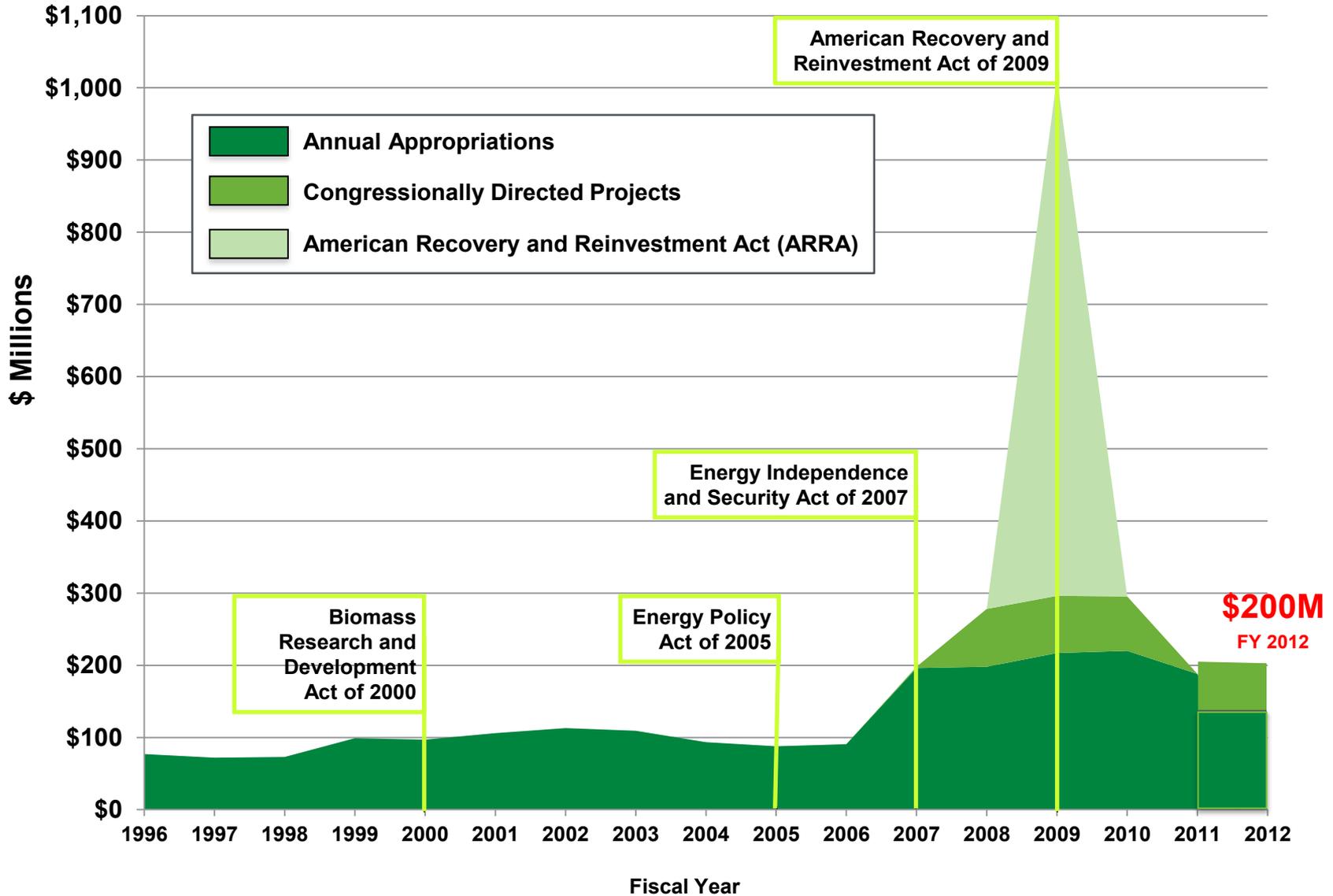


Biomass Program Overview

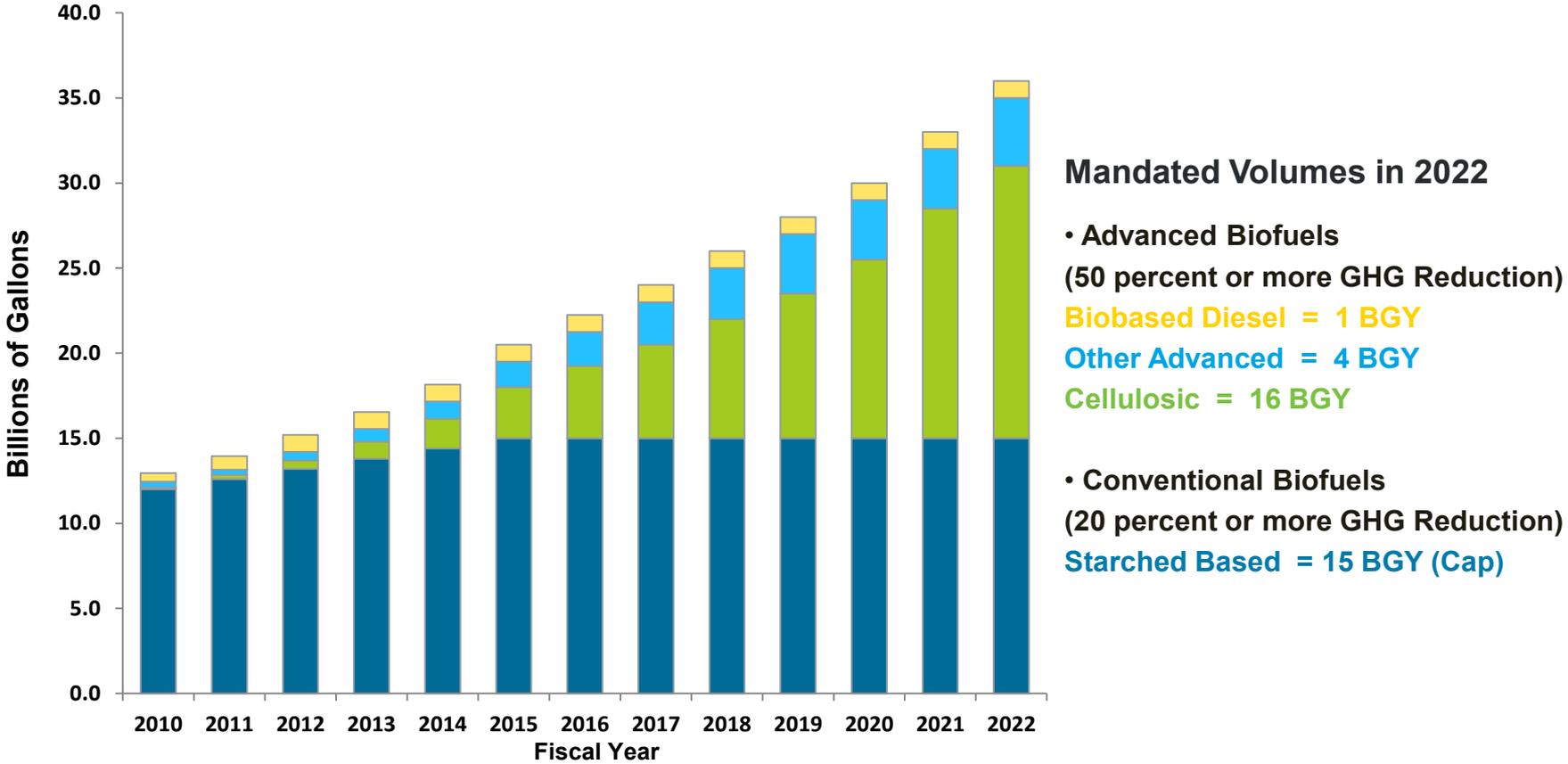
Dr. Valerie Reed,
Acting Program Manager
DOE Biomass Program

Program Drivers

Legislative Drivers



EISA Renewable Fuel Standard Biofuels Production Targets (Billions of Gallons)



EISA defines **Advanced Biofuel** as “renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions...that are *at least 50 percent less* than baseline lifecycle greenhouse gas emissions.” This includes biomass-based diesel, cellulosic biofuels, and other advanced fuels, including those derived from algae.

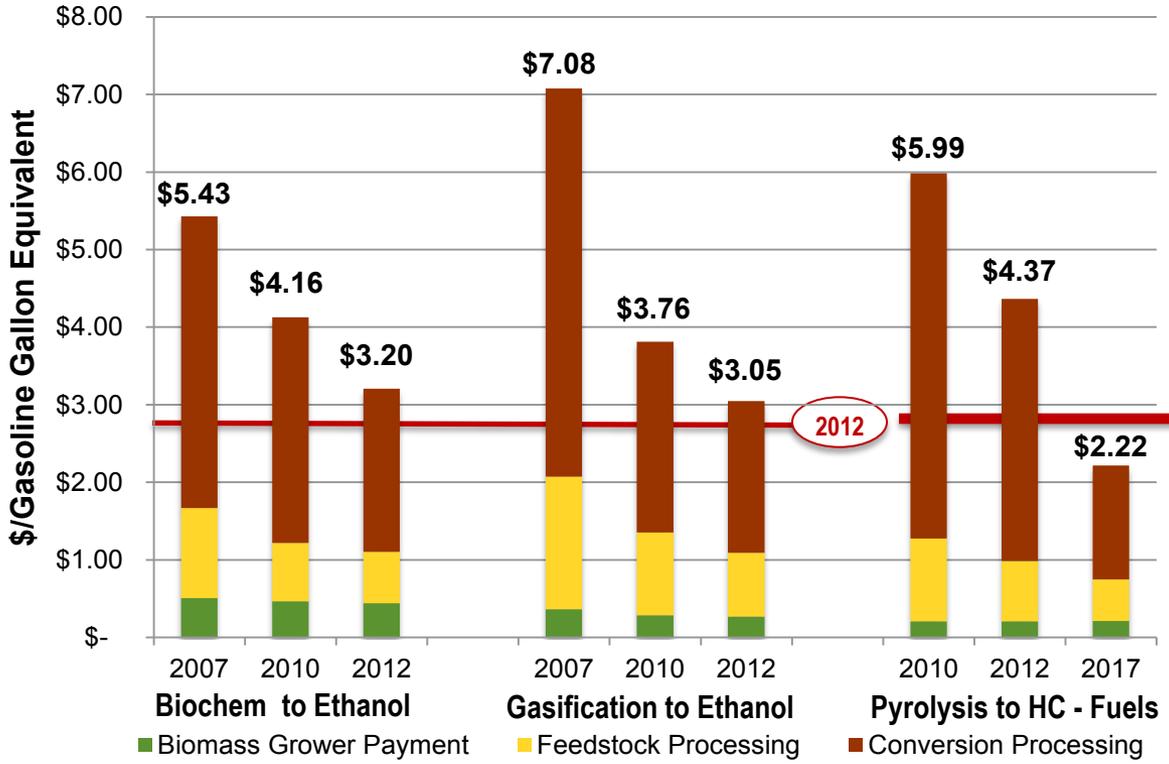
- Vision:** A viable, sustainable domestic biomass industry that produces renewable biofuels, bioproducts, and biopower:
- Creates economic and employment opportunities across the nation
 - Enhances U.S. energy security
 - Reduces our dependence on oil
 - Provides environmental benefits, including reduced GHG emissions
- Mission:** Develop and transform our renewable biomass resources into commercially viable, high-performance biofuels, bioproducts, and biopower through targeted research, development, demonstration, and deployment supported through public and private partnerships.
- Strategic Goal:** Develop commercially viable biomass technologies to enable the production of biofuels nationwide and reduce dependence on oil through the creation of a new domestic bioenergy industry, thus supporting the EISA goal of 36 billion gallons per year of renewable transportation fuels by 2022. And, increase biopower's contribution to national renewable energy goals by increasing biopower generating capacity.

Biomass Program

Goals, Strategies, and Approaches

<p>EERE Goals:</p>	<p>Reduce Dependence on Oil, Reduce Greenhouse Gas Emissions, and Create Jobs</p>				
<p>Strategies:</p>	<p>Develop sustainable, commercially viable, advanced cellulosic biofuel, bioproduct, and biopower technologies</p>		<p>Demonstrate, and deploy advanced cellulosic biofuel, bioproduct, and biopower production capability</p>	<p>Ensure environmentally sustainable biofuels, bioproducts, and biopower</p>	
<p>Program Approaches:</p>	<p>Reduce costs and develop commodity-scale feedstock logistics systems</p>	<p>Reduce costs by increasing conversion yields and reducing conversion costs</p>	<p>Demonstrate and deploy technology at first-of-a-kind facilities</p>	<p>Develop approaches to support sustainability and best practices</p>	

Biofuel Production Cost Projections and Targets



2012:
\$1.76/gallon of ethanol (\$2.62/GGE)

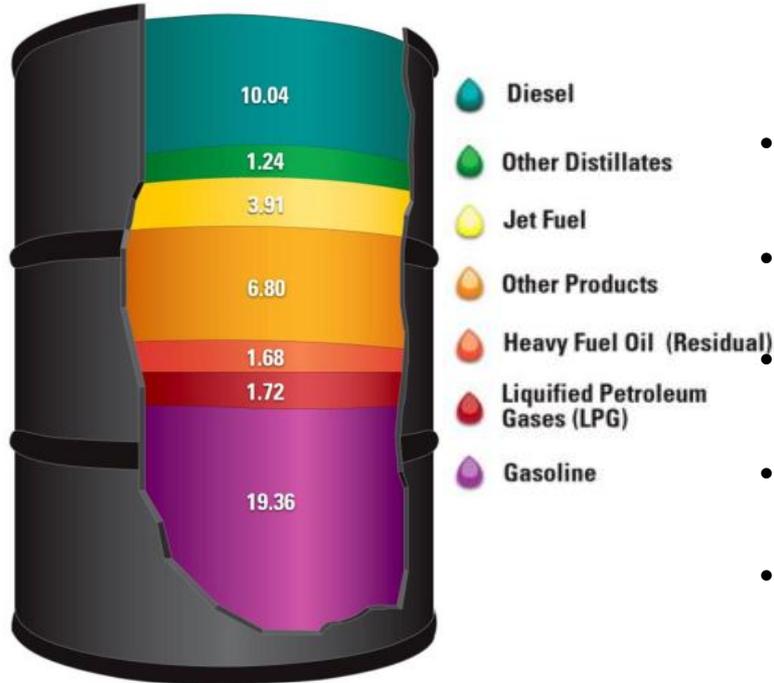
2017:
\$2.85/gallon of renewable gasoline
\$2.84/gallon of renewable diesel
\$2.76/gallon of renewable jet
(costs in 2007 dollars).

- Focus on RD&D of cellulosic biofuel technologies to help reduce the cost of production and spur private sector investment in biorefineries
- Cost of production of cellulosic biofuels – currently higher than conventional petroleum (and starch-based) fuels
- Production costs going down substantially as a result of Program support, declines projected to continue
- Biochemical drop in fuels – under study

Replacing the Whole Barrel

Products Made from a Barrel of Crude Oil (Gallons)

(2009)



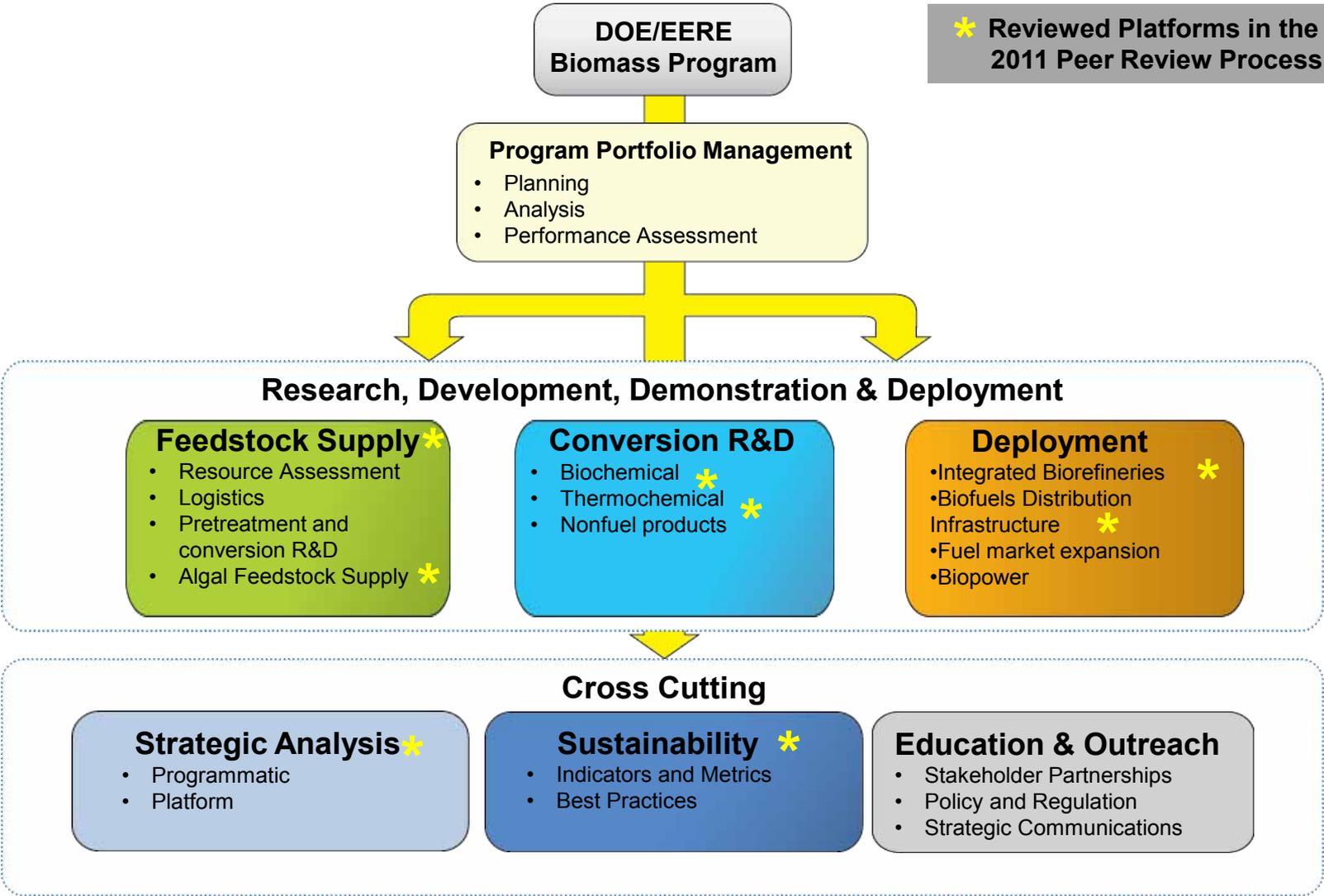
- Greater focus needed on RDD&D for a range of technologies to displace the entire barrel of petroleum crude
- Reducing dependence on oil will require developing technologies to replace other components of the barrel, such as diesel, jet, heavy distillates, and a range of chemicals and products
- Cellulosic ethanol displaces light duty **gasoline** fraction only
- U.S. spends more than \$1,197M each day on crude oil imports*
- Oil accounts for 94% of transportation fuel use (EIA), accounting for over 70% of total U.S. oil consumption.
- Nearly 22.3M barrels of oil are required every day to fuel ~247M light-duty vehicles on the road*
- Only about 40% of a barrel of crude oil is used to produce light duty petroleum gasoline

Source: Energy Information Administration, "Oil: Crude Oil and Petroleum Products Explained" and AEO2009, Updated February 2010, Reference Case.

*American Petroleum Institute.

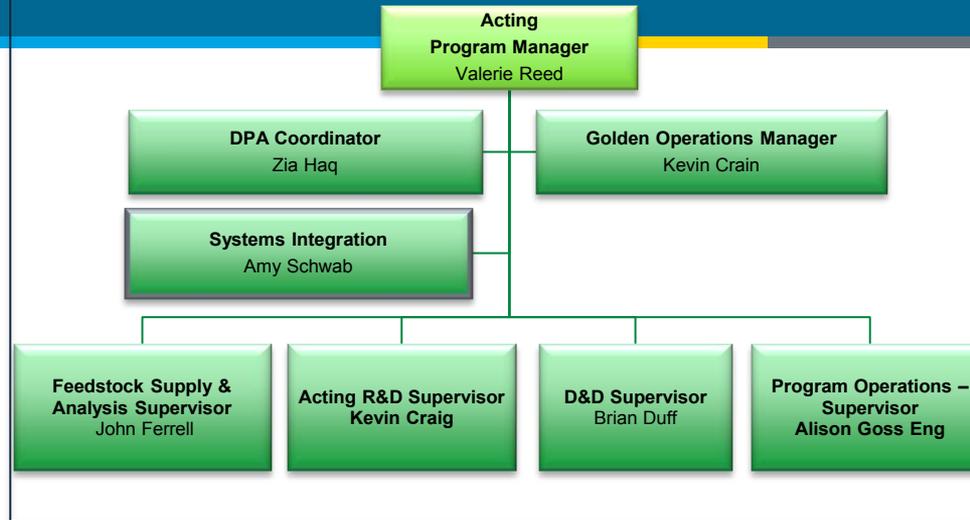
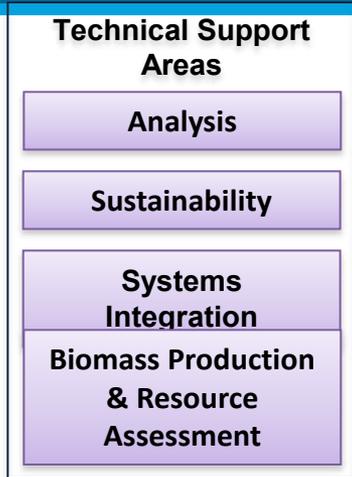
Program Structure (prior to FY 12)

* Reviewed Platforms in the 2011 Peer Review Process



OBP Program Organization

Program Management Team

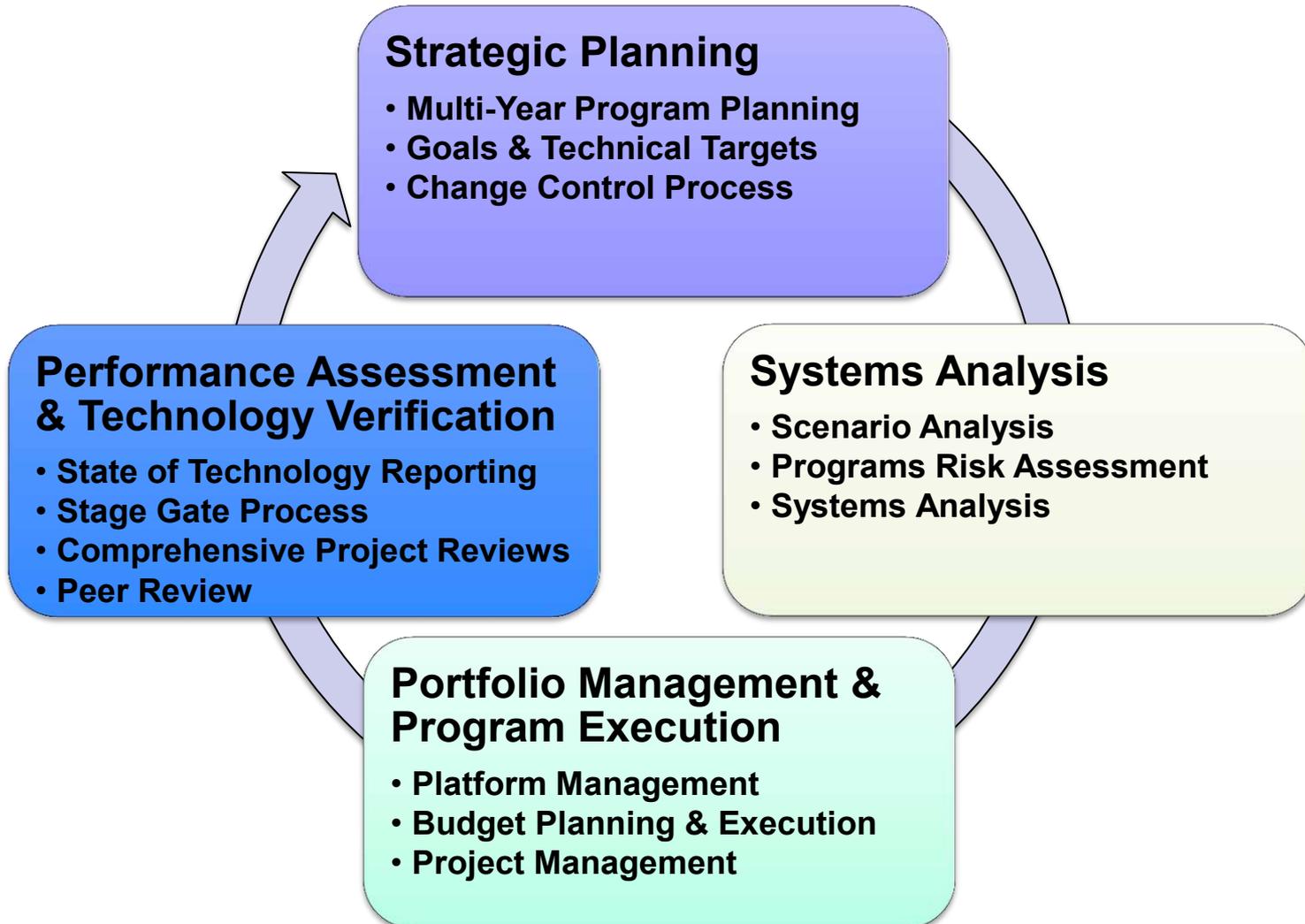


Critical Technical Goal Areas

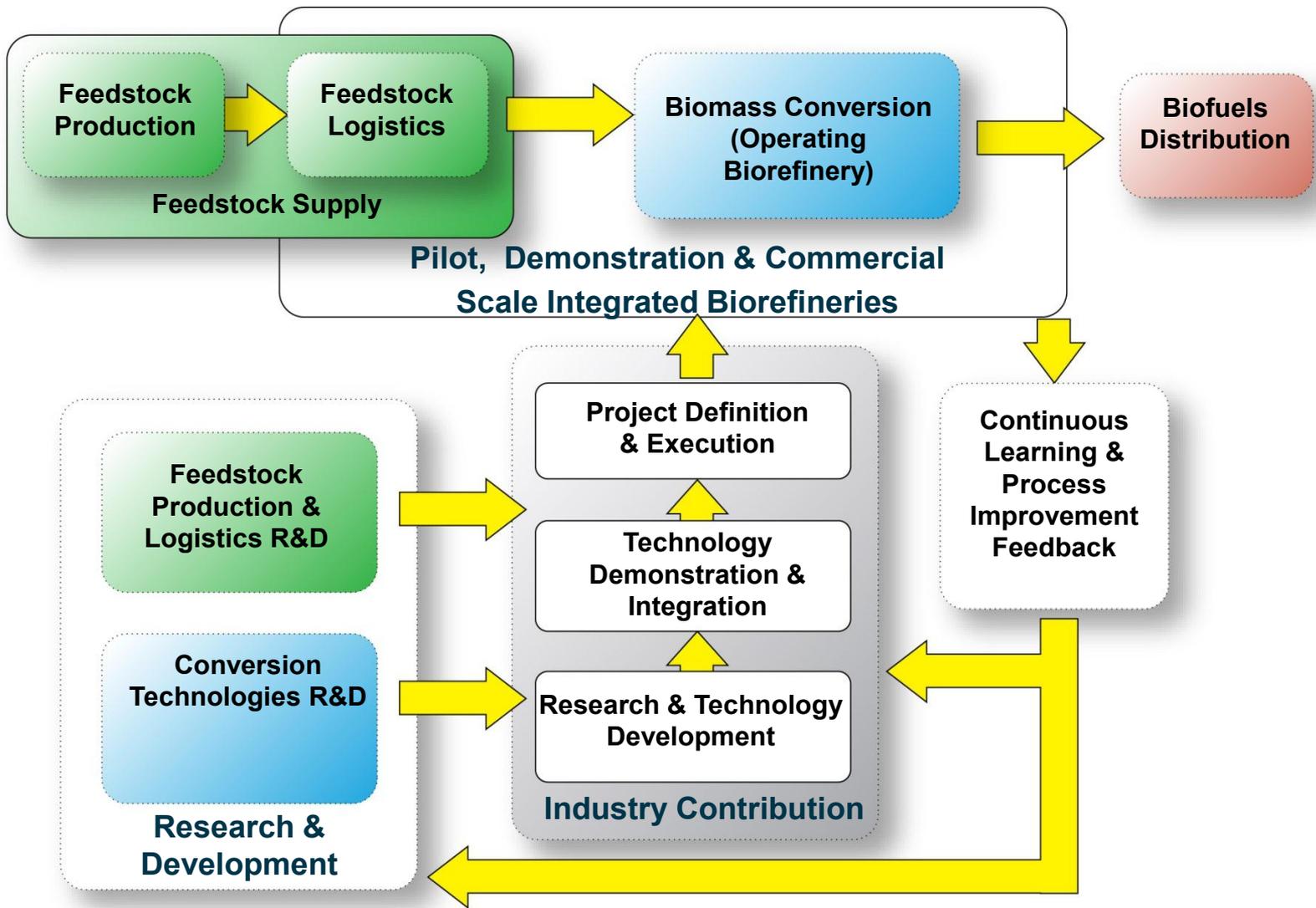


Other Technical Areas

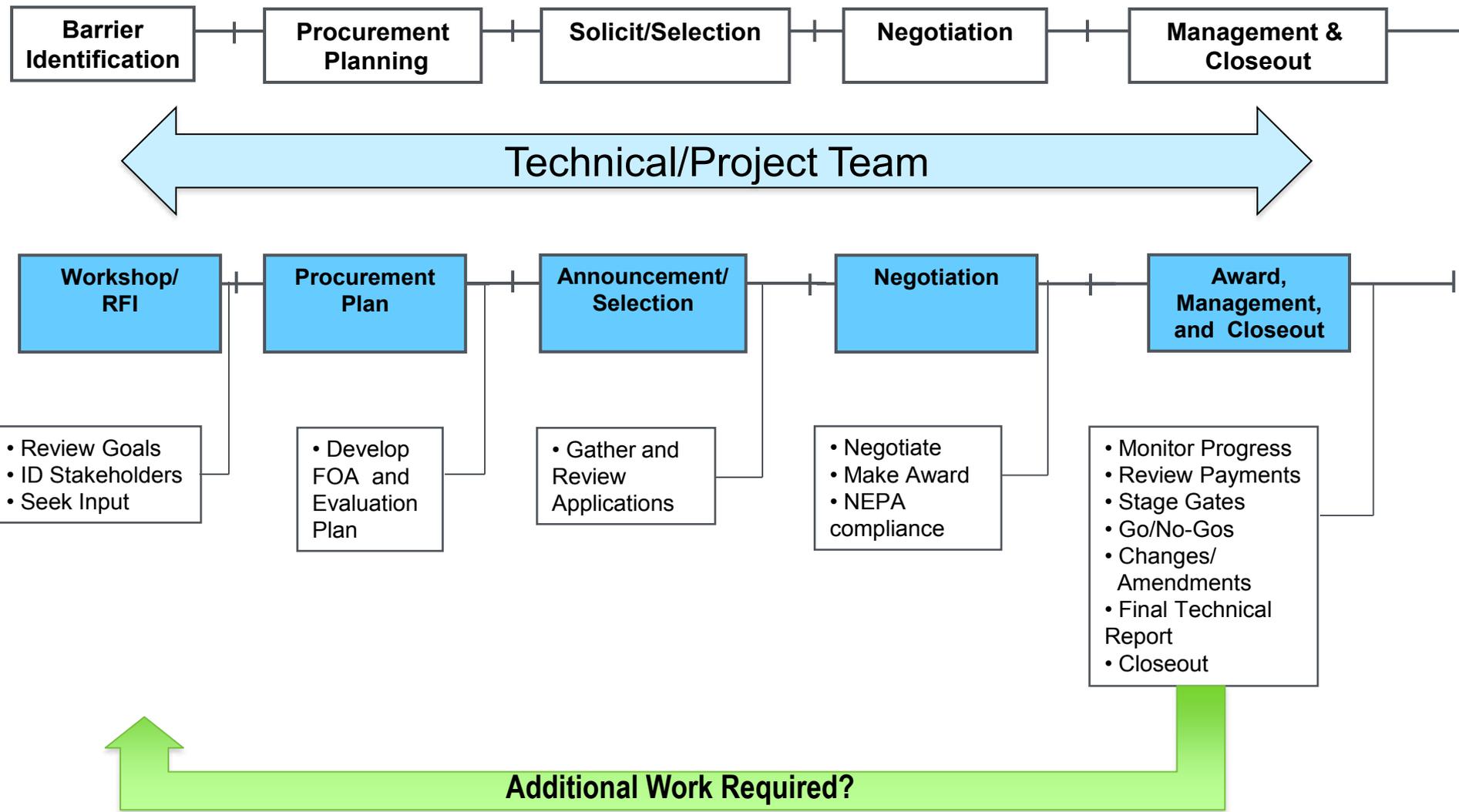




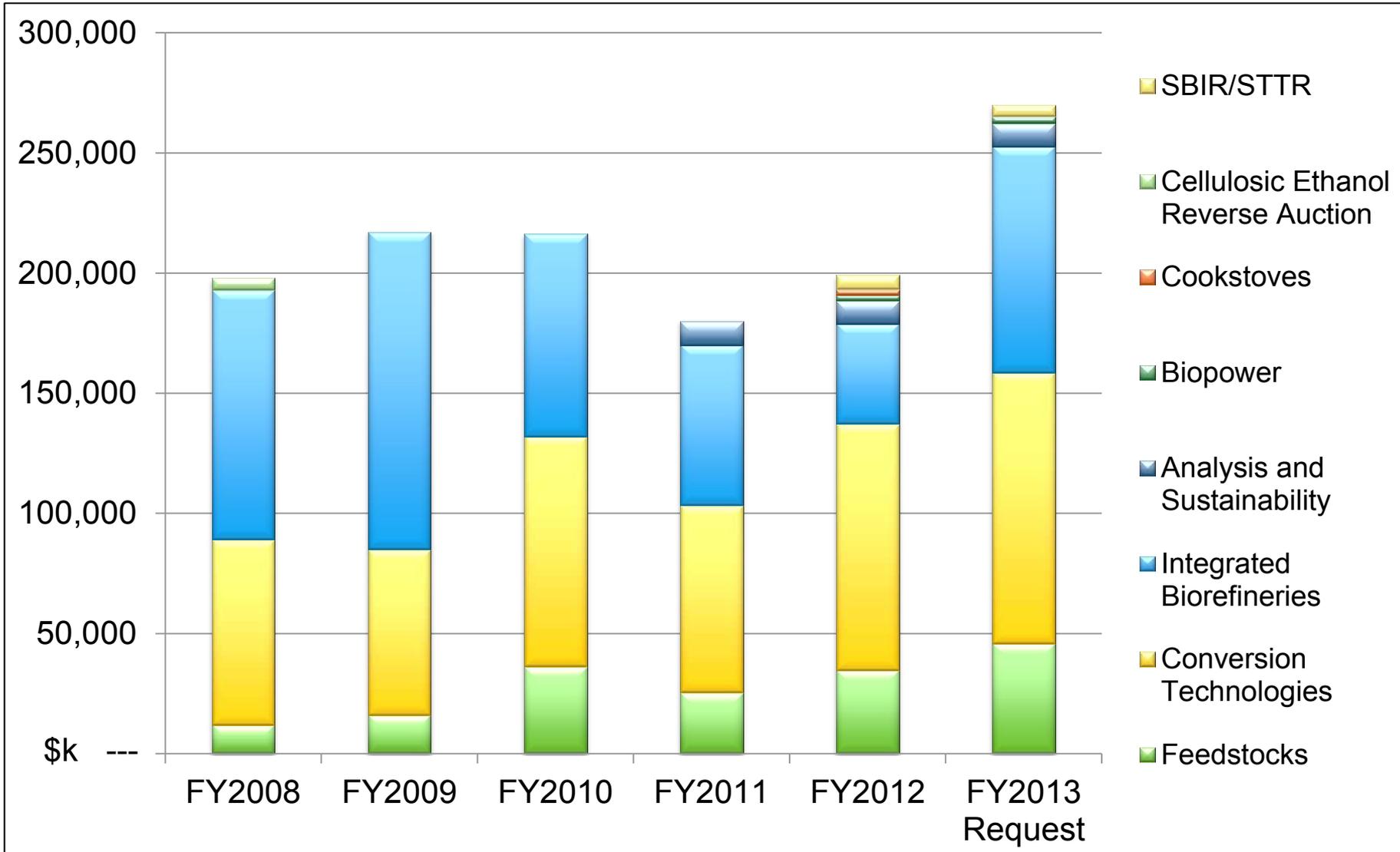
How the Pieces Fit Together



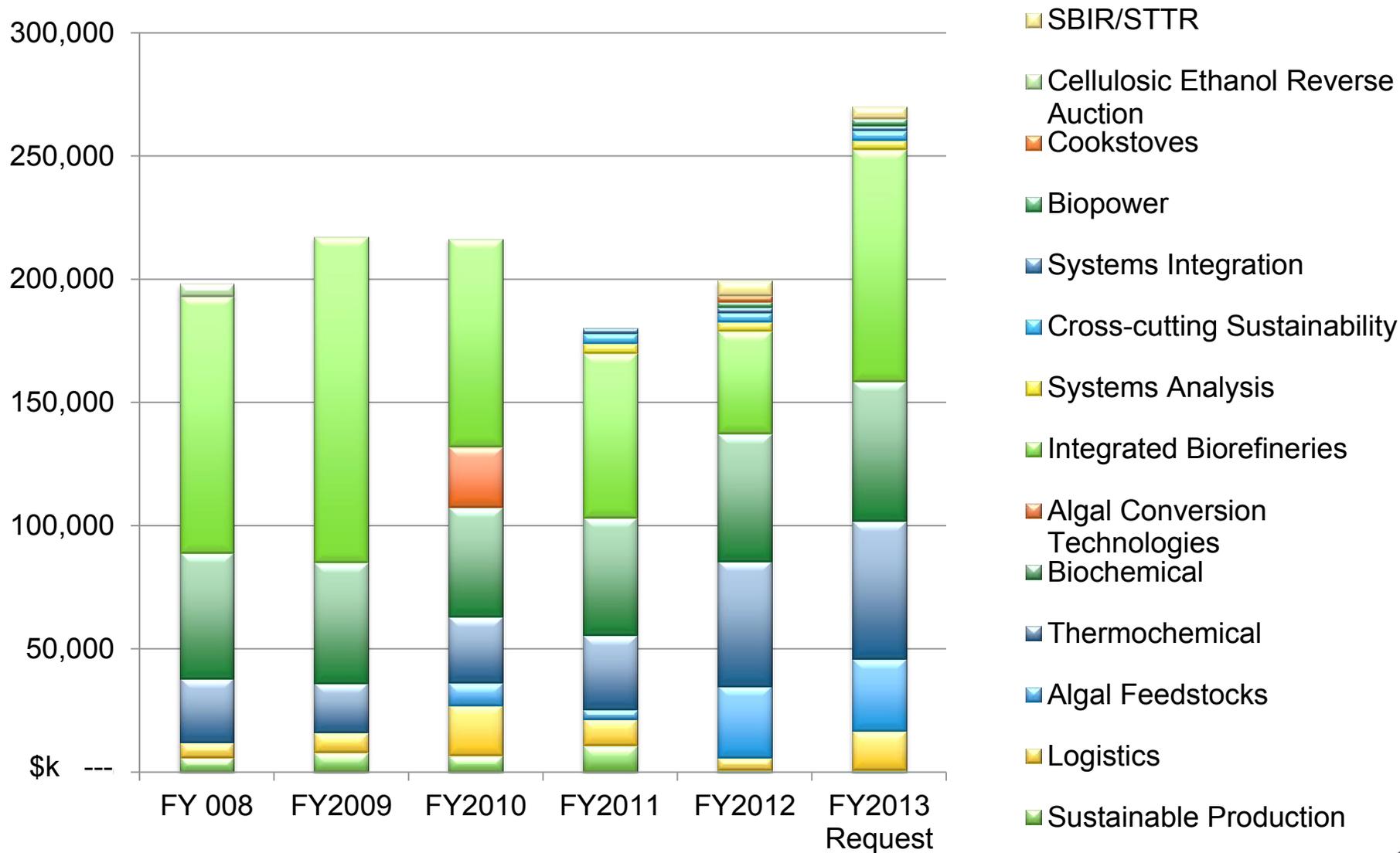
Project Lifecycle



Annual Appropriations



By Activity



Advancements in Sustainable Algae Production

OBJECTIVE:

- Support outdoor phototrophic algae research and development projects in two topic areas:
 1. Nutrient and water use in algal production systems
 2. Preparation of algae testbed facilities

Synthetic Biology Applications for Biofuels & Bioproducts

OBJECTIVE:

- Utilize synthetic biology techniques to an applied research topic that improve techno-economic analysis for unit operation(s) in biomass processing routes for the production of hydrocarbon biofuels and biofuel precursors, as well as bioproducts and chemicals.

Clean Cookstoves

OBJECTIVE:

- Accelerate the dissemination of transformative low-emission, high efficiency cookstove technologies that use solid biomass fuels through **three topic areas**:
 1. Product and auxiliary device development and piloting, including fans, sensors, and controls
 2. Combustion and heat transfer research applied to stove development
 3. Design tool for stove development

Bio-Oil Stabilization and Commoditization

OBJECTIVE:

- Target analysis and process development in thermochemical liquefaction to enable the commoditization of bio-oils for hydrocarbon biofuel production with industrial (refinery) off take partners. Two topic areas will be supported:
 1. Ideal for technology providers (TPs) that have not yet formed bio-oil off take agreements. Necessitates in-depth TEA/LCA and formation of a refinery partner for continuation onto phase II.
 2. Ideal for technology providers with a pre-existing refinery partner who are able to propose a complete pathway from feedstock through final hydrocarbon biofuel .

Innovative Pilot

OBJECTIVE:

- Production of hydrocarbon fuels at pilot or demonstration scale facilities that meet military blend specifications. A pilot or demonstration scale biorefinery should be integrated from biomass input to fuel output such that the finished product is a qualified fuel ready to be used with fossil fuels at downstream facilities. Two topic areas will be supported:
 1. Technologies that utilize algae (micro, macro, cyanobacteria, heterotrophic)
 2. Technologies that utilize other renewable and waste feedstocks