Bioenergy Technologies supports targeted research, development, demonstration, and deployment (RDD&D) activities to progress sustainable, nationwide production of advanced biofuels that will displace a share of petroleum-derived fuels, mitigate climate change, create American jobs, and increase U.S. energy security.

What We Do

Bioenergy Technologies employs an integrated, cross-cutting RDD&D strategy to develop commercially viable biomass utilization technologies. The office makes strategic investments in the following areas:

- ✓ **Feedstock Infrastructure** advances a sustainable, secure, reliable, and affordable biomass feedstock supply for the U.S. bioenergy industry.
- ✓ **Conversion R&D** identifies and develops viable technologies for converting biomass feedstocks into fungible, liquid transportation fuels; bioproducts; and chemical intermediates.
- ✓ **Demonstration and Deployment** validates integrated technologies with the successful construction and operation of cost-shared pilot-, demonstration-, and commercial-scale biorefineries.
- ✓ **Sustainability** promotes positive economic, social, and environmental effects and reduces potential negative impacts of bioenergy.
- ✓ **Strategic Analysis** provides context and justification for program decision-making by establishing a basis of quantitative metrics, tracking progress toward goals, and enabling portfolio planning and management.

Program Goals/Metrics

Bioenergy Technologies' performance goals are designed to reduce the cost of biofuels to be competitive with petroleum-based fuels in the market. Key cost targets include the following:

- By 2017, achieve a modeled cost of $3/gallon of gasoline equivalent (gge) for the pyrolysis pathway to drop-in renewable gasoline, diesel, and jet fuel.
- Develop additional pathways to enable utilization of a larger variety of biomass resources and conversion technologies that also aim to achieve $3/gge.

FY 2014 Priorities

- Reduce the **feedstock logistics** cost target for delivery to plant from $55/dry-matter ton to $53/dry-matter ton for loblolly pine.
- Reduce the modeled mature plant cost of open pond algal oil by $2.35/gge to $14.31/gge by improving overall **algal biomass** productivity toward the $3/gge in 2022 goal.
- Define priority pathways for **hydrocarbon fuel development** and initiate two new programs beyond fuels: waste-to-energy and use of lignin and lignocellulosic sugars to produce carbon fibers.
- Reduce the **modeled conversion cost** from $3.18/gge to $2.70/gge for producing gasoline/diesel from biomass by way of pyrolysis or direct liquefaction technologies followed by catalytic upgrading.

(Dollars in Thousands)	FY 2012 Current	FY 2013 Request	FY 2013 Annualized CR*	FY 2014 Request
Feedstocks	35,038	47,000	--	40,500
Conversion Technologies	102,418	116,000	--	141,000
Integrated Biorefineries	42,897	94,000	--	78,000
Analysis and Sustainability	9,813	10,000	--	13,500
Biopower	4,829	3,000	--	4,000
NREL Site Wide Facility Support	-	-	--	5,000
Total, Bioenergy Technologies	**194,995**	**270,000**	**200,496**	**282,000**

*FY 2013 amounts shown to reflect the P.L. 112 175 continuing resolution level annualized to a full year. These amounts are shown only at the "congressional control" level and above; below that level, a dash (—) is shown.

- Enable the potential for transformational new energy technologies through the **Incubator Program** by identifying novel conversion technologies/approaches applied to existing or new pathways in the Bioenergy Technologies' portfolio.
- Continue efforts in commercial demonstration through DOD/Navy's **Defense Production Act** authority.
- Further develop and monitor Bioenergy Technologies' portfolio of innovative pilot-scale and demonstration-scale **biorefineries** for biofuel and bioproduct manufacturing.
- Conduct **cross-cutting and systems-level analyses** to inform program planning, decision-making, and R&D investments. Evaluate sustainability metrics and promote best practices regarding productivity, land use, water, emissions, and social sustainability.
- Emphasize **R&D and validation of cookstoves**. Improve combustion and heat transfer processes through a competitive process.

Recent Accomplishments

- **Bioenergy Demonstrations:** In FY 2012, the office demonstrated a biochemical and thermochemical conversion process in integrated systems at the pilot scale to convert biomass to ethanol and other industrial alcohols, which validated that these fuels can be produced cost-competitively with gasoline. The data from the office's efforts directed at alcohol fuels will be available to industry and others looking to commercialize any of these technology pathways. Specific technical accomplishments in FY 2012 include the following:
  - Achieved a modeled total cost of cellulosic ethanol for mature technology of $2.05–$2.15/gallon of ethanol (less than $3.21/gge).
    - Reduced modeled **conversion cost** through targeted R&D to $1.33/gallon of ethanol.
    - Reduced **feedstock logistics costs** for dry herbaceous biomass (i.e., field-dried corn stover) from harvest to biochemical conversion plant gate to $0.49/gallon of ethanol (equivalent to approximately $35/dry ton in 2007 dollars).
  - Achieved a conversion cost of $3.95/gge (combined fuel) from a bio-oil pathway, which is on track to support the $3/gge program goal for 2017.
- **Biorefinery Projects:** Three integrated biorefinery projects were completed, while 21 are currently active. One pre-commercial-scale (8 million gallons/year) biorefinery (INEOS) is expected to come online in March 2013. It will be the first operating cellulosic ethanol production facility cost-shared with DOE.

American Process, Inc. integrated biorefinery pilot plant in Alpena, Michigan