

The Billion Ton Bioeconomy Vision: Turning a Billion Tons of Biomass into more than a **\$200 Billion Bioeconomy**

February 2014



What is the “Bioeconomy”

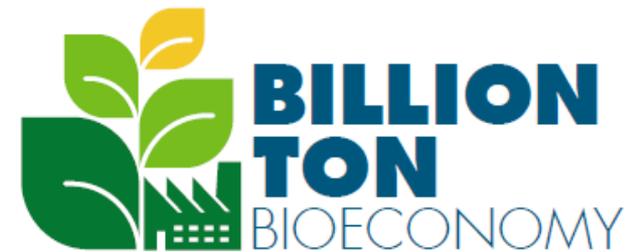
First and foremost, a vision for growing the economy through increased use of biomass.....

- **Technically it is:**

- Producing, harvesting, converting, and marketing the products from at least one billion tons of biomass annually
- Expanding the sector with more investment in infrastructure and production which provides jobs and adds to the economy
- Providing ancillary benefits to society as well

- **Programmatically it is:**

- An emphasis and goal to work collectively towards
- A criterion for policy and programmatic development
- An informational, marketing, and educational campaign
- A framework for addressing barriers and developing a roadmap for the future
- A communications tool
- A leadership role for the Federal Government



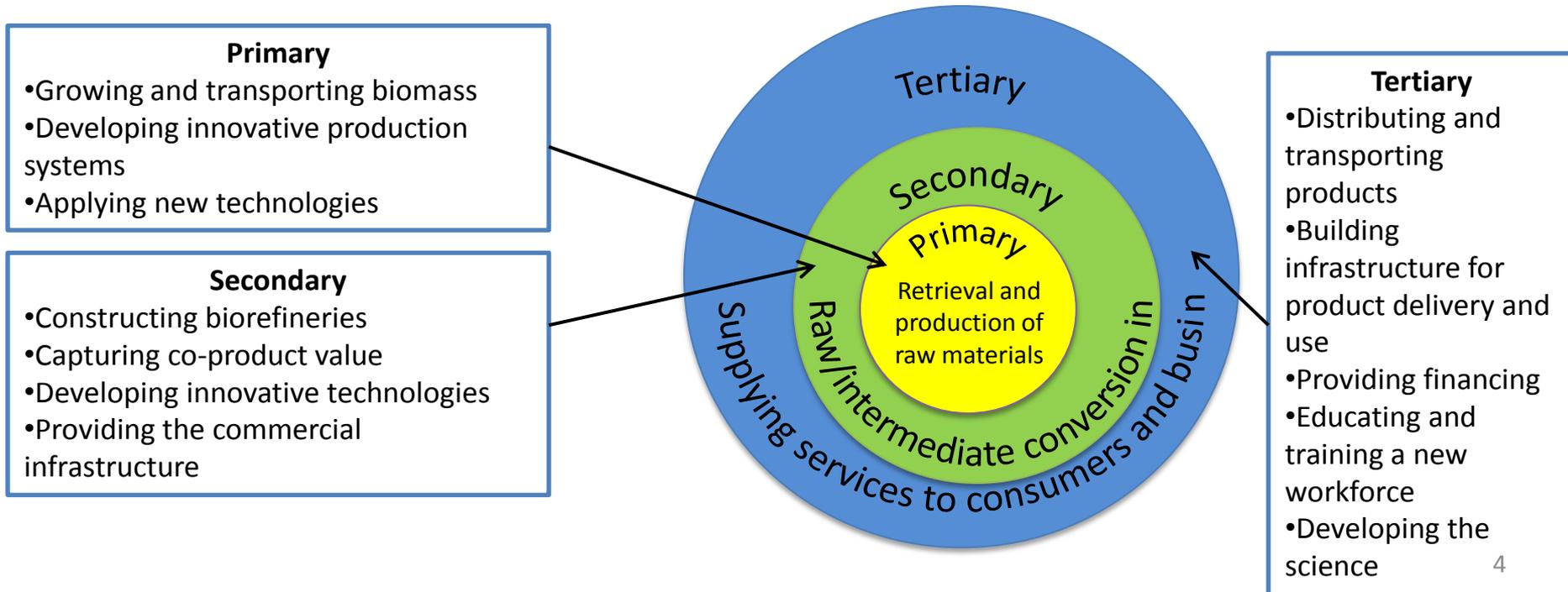
Our Current **Bioeconomy**

- Uses about 200 million dry tons of biomass for biofuels, bioproducts, and biopower
- Generates almost 16 GW of electricity from biomass, about 1.5% of total capacity
- Produces over 15 billion gallons of biofuels annually
- Provides about \$36 billion in revenue every year and adds another \$90 billion to the economy indirectly annually
- Employs about 450,000 people directly
- Reduces CO₂-e by almost 145 million tons per year

The Billion Ton Bioeconomy *VISION*

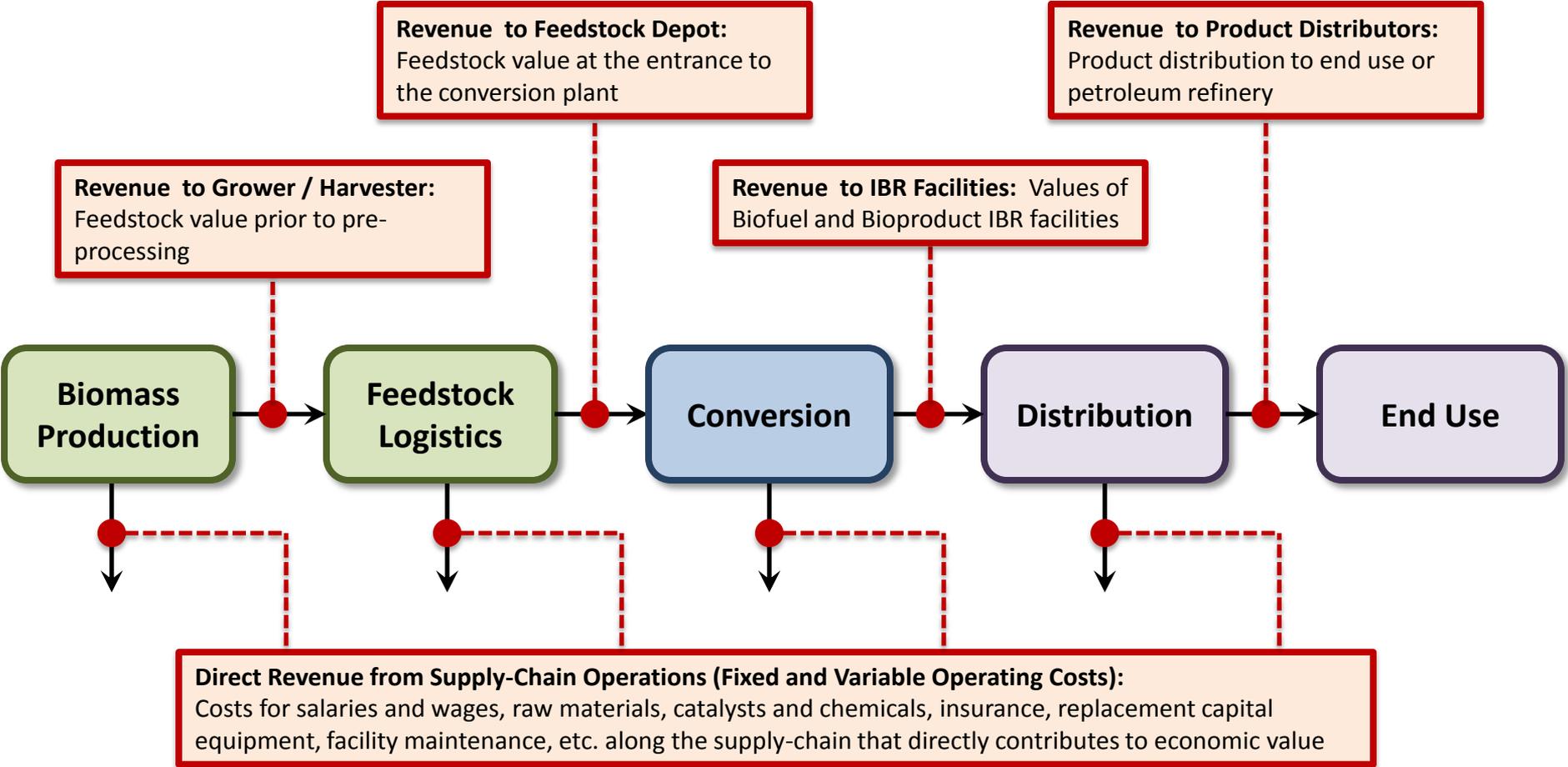
An expansion of the bioeconomy by 5 fold in the next 15 years to supply and convert a billion dry tons annually to biofuels, bioproducts, and biopower

The bioeconomy includes the production and conversion of biomass, manufacturing, and use of products, and all the associated services. *Bioeconomy will be brought online while still meeting the needs for food, feed, and fiber.*



Boundary Sketch for Annual Revenue

Basis: Income generated from the revenue streams identified below are taxable



A BILLION DRY TONS OF BIOMASS

CAN PRODUCE

1.7 MILLION JOBS
and keep about **\$200 BILLION** dollars in the U.S. every year.

92 BILLION kWh of electricity to power **8 MILLION** households.

50 BILLION gallons of biofuels displacing almost

36%

of annual gasoline consumption.

35 BILLION POUNDS

of biobased chemicals and bio-products, replacing a significant portion of the chemical market.

reductions of CO₂ emissions by

530 MILLION TONS

a year.



Creating up to a **\$500 Billion Bioeconomy** through a **5 fold** expansion of the industry in the next **15 years**.

STEPS TO BUILDING THE BIOECONOMY

- 1 Accelerate research & technology development
- 2 Develop production, conversion and distribution infrastructure
- 3 Deploy technology
- 4 Create markets and delivery methods

The Outcomes of a **Billion Ton Bioeconomy**

Promote energy security

- Reduce oil imports by 36% annually with the displacement of the 50 billion gallons
- Promote a more positive balance of trade by reducing oil import costs by about \$200 billion per year
- Secure domestic liquid fuel supplies
- Develop a renewable, reliable energy resource that is homegrown

Improve the environment

- Reduce CO₂-e by over 500 million tons per year
- Use advanced technologies with less emissions and inputs for growing and converting biomass
- Assure sustainability in all aspects of the supply chain

- Offer incentive for land and ecosystem restoration
- Provide diversity in new types of cropping and forest management systems (less water, landscape design, etc.)

Create economic opportunity and improve quality of life

- Have positive effects on farm and landowner tenure and rural life demographics
- Provide hometown jobs and career opportunities over a wide range of skills and interest areas
- Have impacts in R&D, manufacturing, engineering, and specialty occupations in development and use of new technologies and construction
- Require new science areas in biology, microbiology, chemistry, and engineering

Specific roles for the **Technical Advisory Committee**

- TAC Subcommittees should consider discussing potential technical barriers and recommendations to the Board to help refine the Bioeconomy initiative.
- Work with the Board to ensure industry participation and partnership with stakeholders during the development of the Bioeconomy initiative.
- TAC members are invited to participate *as individuals* in the Bioeconomy workshop(s), webinars, and other roadmapping meetings that would be open to the public.
 - First Bioeconomy workshop is being planned for July 31st, the day after *Biomass 2014* concludes.
- Individuals from the Committee may serve as reviewers and provide external feedback on initial scope of Bioeconomy vision.
 - If you are interested in becoming an external reviewer, please email Ashley at ashley.rose@ee.doe.gov

Specific roles for the **Biomass Board and OpsCo**

- Provides executive leadership in the development and implementation of the initial vision plans.
 - Currently developing a 10-page document due to the Board members on April 4th.
- Provides the focal point and mechanism for Agency involvement, collaboration, and action.
- Works with the TAC and other entities as needed to assure full participation in planning and plan execution across sectors and with partners and stakeholders.
- Monitors and manages deliverables, plans external events, coordinates all Bioeconomy action.

Synergies with the 2013 TAC Grand Challenge

- By 2030 with 45 billion gallons of fuel made with renewable carbon introduced into the biofuel industry. **Bioeconomy Initiative: 50 billion gallons by 2030.**
- Enhancing economic development to over 1 million direct and indirect jobs by 2022. **Bioeconomy Initiative: 1.7 million direct and indirect jobs by 2030.**
- Achieving 30% penetration of sustainable biomass carbon into the US transportation market by 2030. **Bioeconomy Initiative: 50 billion gallons of biofuels to displace almost 36% of annual gasoline consumption.**
- Develop biomass crop systems in sustainable manner, with no negative impacts for food, feed, or fiber production. **Bioeconomy Initiative: Same.**
- Insuring national energy security and decreasing the dependence of national defense on foreign energy supplies. **Bioeconomy Initiative: Same.**

Preliminary Bioeconomy Timeline

- ✓ February 19th – Board Meeting
 - ✓ Final Grand Challenge concepts presented from Board Co-chairs and Technical Advisory Committee
- February 27th – Present to the TAC
- March – Operations Committee refines vision and work plan
- May – Billion Ton Bioeconomy Vision submitted to Board for approval
- July – Workshop paired with Biomass 2014
- Fall/Winter – Develop document outlining plan to realizing Billion Ton Bioeconomy Vision

Appendix

The United States already has a flourishing biomass industry with the production of biofuels, bioproducts, electricity, heat, and steam. Today America currently uses about 200 million dry tons of biomass annually, provides about 450,000 jobs, and puts over \$35 million into our nation's economy. A sustainable bioeconomy also provides environmental and health benefits to the American people. With our abundant natural resources, new technologies, and the entrepreneurial spirit of the American people, we have the ability to potentially expand the bioeconomy by 5-fold in the next 15 years. What would it take to do that, how can we meet such a goal and still meet our needs for food, feed, and fiber, and more importantly, what would the result be for the future of America?